The role of cognition in stress: Relationship between perceived life stress, self-efficacy, optimism, self-esteem, positive affect, negative affect, and work stress

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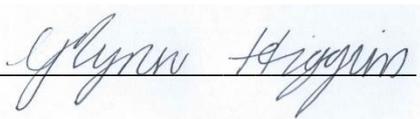
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# **Abstract**

This study examined the role of cognition in stress in a sample of 523 Irish college students. The development of our understanding of the construct of stress is vital as it can pose a substantial threat to both our physiological and psychological well-being. This is demonstrated by the large body of research associating stress with many common negative health conditions such as heart disease, cancer, anxiety, and depression. This study proposed a cognitive model of stress which assessed the relationship between the dependent variable perceived life stress and the cognitive predictor variables self-efficacy, optimism, self-esteem, positive affect, and negative affect. Negative affect was found to be by some way the most significantly strongly associated variable with perceived life stress in the model. This indicates that negative emotions encompassed under the negative affect cognitive process domain would appear to significantly influence stress levels. This study also evaluated the relationship between work stress and perceived life stress and found there to be a significantly strong relationship between the two variables. Future research should seek to greater comprehend the impact of specific negative emotional states and work stress on life stress as a whole. In turn this would further develop our understanding of the stress process and the role cognition plays within the process.

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# Introduction

The concept of stress is fundamentally subjective (Lazarus & Folkman, 1987). Numerous definitions of stress have been proposed with the process of defining the concept being approached from varying perspectives which has only lead to considerable confusion and struggle encapsulating the term (O'Driscoll & Cooper, 1996).

At the forefront of the work investigating stress was Hans Seyle colloquially identified as the "father of stress" (Fink, 2010). Seyle (1936) was one of the first to provide an understanding of stress specifying it as, the imprecise reaction of our body to any intent to change. Seyle was concerned with the human reaction to stress and the changes to our body or as he referred to them as "diseases of adaption" which result from experiencing stress. Cooper et al. (2001) note that Seyle's definition of the concept can be classified as a response based definition which are prolific in the medical sciences and are inclined to occupy a physiological perspective concentrating on results as opposed to causes.

Although unsurprisingly much of Seyle's hypotheses surrounding the concept of stress have since been generally rejected, his work has aided in specifying the importance of investigating stress as he found it could pose a significant threat to our immune system and adrenal glands (Fink, 2010). The potential damage stress can cause to our immune system can lead to enhanced vulnerability to certain diseases and to our adrenal glands can create a disruption in production and distribution of hormones. This potential damage is alarming which emphasises the need to develop a greater understanding of the construct.

As can be conferred from Seyle's work much of the early investigation of stress focused on the physiological components of the construct and it was not until around the 1950s that the psychological aspects of stress were recognised and investigated (Grinker & Speigel, 1945; Janis, 1958). Richard Lazarus was the leader of this change in exploring the psychological foundations of stress and he was also the first to evaluate different stress coping mechanisms (Lazarus, 1966).

Stress is generally regarded as a multidimensional concept as the investigation of the concept is still seen to be in its infancy as much of the research is scattered and there is a lack of universal direction in understanding stress. Although Lazarus and

Folkman's (1984) transactional theory of psychological stress is highly regarded in explaining stress.

This theory denotes stress to be, a specific bond between an individual and their environment to which the individual perceives to be overly demanding on their resources and thereby a risk to their well-being. The theory argues that each individual has differing levels of cognition and appraisal of stress and the unease they experience can be either physical, mental, social or a combination of each. This is contradictory to earlier beliefs that only recognised the physical impact of stress.

Dipboye et al. (1994) provide a complete and clear definition of stress which is in line with the transactional theory of psychological stress, they identify stress as any condition which assigns any psychological or physical strain on an individual which results in the occurrence of an out-of-the-ordinary response.

The American Psychological Association identified work to be the second greatest source of stress for Americans in their annual Stress in America report (American Psychological Association [APA], 2012). Work was rated marginally behind the number one stressor money and above other major sources of stress including personal health and well-being, relationships, and family commitments.

Folkman et al. (1987) define work stress as any harmful response that an individual experiences when their requirement to complete a task or work is not matched by their capability or perceived capability to complete said task.

Work stress is viewed as inevitable within most occupations, although it is not always classified as inherently negative as depending on the perception of the stress it can sometimes be desirable (Mitani et al., 2006). However, the frequent experience of high levels of work stress is seen to be a major issue and of considerable concern. A multitude of empirical research studies have identified that high levels of work stress can lead to many negative consequences (Cropanzano et al., 2003; Podsakoff et al., 2007).

**<u>The threat of stress</u>**

A considerable amount of research has identified stress as a significant risk factor in the growth and advancement of many physiological and psychological diseases (Muscatell & Eisenberger, 2012). Stress has been attributed to playing a role in 60% to 80% of outpatient visits to hospitals (Rosch, 1991; Avey et al., 2003). To put this in context, in the United States which has a population of over 300 million people, outpatient departments receive around 90 million visits each year (Hing et al., 2010).

Cohen et al. (2007) state that an association exists between stress and the main physical causes of death. Individuals that experience extensive perceived life stress, severe work demand, and marriage distress are seen to have a greater likelihood of experiencing a recurrent cardiovascular event and are exposed to greater risk of death if they already have a pre-existing cardiovascular disease (Rozanski et al., 1999). Research has identified postulated links between work stress and cardiovascular disease (Franke et al., 1997; Franke et al., 2002; Brunner et al., 2004; Byrne & Espnes, 2008). Kivimäki et al. (2005) in a meta-analysis estimated that the likelihood of developing cardiovascular disease can be increased by as much as 50% if an individual experiences a large degree of work stress. Substantial levels of traumatic stress as a consequence of undergoing a traumatic life event are also understood to propel the long-term risk of cardiovascular disease (Li et al., 2002; Dong et al., 2004).

In animal subjects stress was found to be a contributory factor in the instigation, growth, acceleration, and metastasis of specific cancerous tumours (Cohen et al., 2007). Research examining the associations between stress and cancer in humans also revealed that stress has a negative involvement within integral cancer pathogenic processes such as antiviral defences, DNA reparation, and cell maturation (Antoni et al., 2006). However, overall the evidence supporting a relationship between stress and cancer in human is sporadic at best (Turner-Cobb et al., 2001; Duijts et al., 2003; Heffner et al., 2003).

Although, the troubles being able to detect cancer at an early juncture may explain the difficulty that researchers are having in establishing a clear causal relationship between stress and cancer. As Cohen et al. (2007) notes that in the majority of cases cancer is only diagnosed after it has been growing for a number of years as most symptoms of the disease only present after considerable growth. Although, the research yields mixed results there is still an overall belief that stress

promotes progression of cancer and enhances the probability of the disease redeveloping during remission. In the United States, cancer is the second ranked cause of death behind heart disease and it is approximated that cancer kills 1,620 Americans daily and 25% of all deaths are as a result of cancer (American Cancer Society, 2015).

As well as having an involvement in main physiological problems, there is also a correlation between stress and some of the most common mental health disorders (Marin et al., 2011). Stress, anxiety, and depression are the most frequently diagnosed mental health problems (Ollendick & Yule, 1990; Davies et al., 1995; Brown et al., 1997; Farmer, 1998). A strong co-morbid relationship between stress, anxiety, and depression has been found to exist with each incorporating similar symptoms and possible outcomes (Dobson, 1985; Stavrakaki & Vargo, 1986; Feldman, 1993; Lovibond & Lovibond, 1995).

Gorman (1997) specifies that there is a quite high co-morbid rate between anxiety and depression with 90% of individuals with an anxiety disorder also experiencing depression and 85% with depression also having extensive anxiety. Hammen (2005) concluded that research identifies a strong connection between stress and depression. Heightened stress levels are seen to impact the clinical course of major depressive disorder by expanding duration, stimulating symptoms, and greatening the likelihood for redevelopment (Mazure, 1998; Hammen, 2005).

High work stress levels are also seen to greater the risk of anxiety and depression (Strazdins et al., 2004). Work stress is also associated with feelings of fatigue (Åkerstedt et al., 2002). Work stress related fatigue is seen to enhance the potential for burnout and evidence suggests it is co-morbid with anxiety, depression, and substance usage (Appels, 2000; Kant et al., 2003).

Being exposed to stressful life events is also connected with the experience of major depressive disorder and depressive symptoms (Monroe & Simons, 1991; Mazure, 1998; Hammen, 2005; Wang, 2005). It has been estimated that between 20% to 25% of individuals that experience a stressful life event will consequentially develop depression (Van Praag et al., 2004).

Stress, anxiety, and depression are understood to pose an adverse impact on pertinent aspects of life including overall general satisfaction (Youngren & Lewinsohn, 1980; Kessler et al., 1994), poor quality of life (Norvell et al., 1993), and low standard of social interactions (Alden & Philips, 1990; Davies et al., 1995). Substantial

psychological strain is also associated with increased systolic blood pressure which can lead to cardiovascular disease (Capizzi et al., 2010).

There is also a link between stress and many bad health behaviours including smoking (Kassel et al., 2003), alcoholism and drug abuse (Herman, 2012), and sleeplessness (Ellis et al., 2012). Evidently such destructive behaviours have strong associations with the development of the aforementioned cardiovascular disease, cancer, anxiety, and depression.

The relationship between stress and numerous highly prevalent harmful ailments both physical and psychological is quite clear given the large body of research examining the impact of stress. This abundant research further strengthens the ideology that our understanding of the concept of stress and the threat it poses to our health needs to be continually developed to allow the formulation of methods to reduce such an impact.

**Stress and college students**

College is stressful for majority of young adults (Pierceall & Keim, 2007). Lust et al. (2010) notes that the time in which a student attends college can be characterised by considerable stress due to the many new experiences and challenges individuals are faced with during this time in their lives. The period of transition from adolescence to adulthood which coincides with the time majority of individuals attend college is understood to enhance college student's vulnerability to stress (Towbes & Cohen, 1996).

Research has identified that at any given moment 75% to 80% of college students are classified as moderately stressed with another 10% to 12% being severely stressed (Abouserie, 1994; Pierceall & Keim, 2007). Higgins (2016) compared stress levels between Irish college students and a universally recognised high stress group law enforcement officers. It was found that the Irish college students sample had significantly higher stress levels than the law enforcement officers sample. Porter (1990) notes that due to incapability to cope with stress levels up to 60% of university students leave university before finishing their degree.

Lazarus (1966) concluded that when students view their education as a challenge or test, resulting stress can offer them a sense of competence and triumph and thereby provide them with more incentive to learn and work harder. However, once students perceive their education to be a threat to them, stress can promote feelings ineptitude and hopelessness that failure is inevitable. The Yerkes-Dodson Law states that we achieve maximum learning potential when we experience moderate levels of stress (Yerkes & Dodson, 1908).

Although, research indicates that an ever increasing number of college students feel overcome by the pure amount of things they are faced with having to complete (Sax 1997, 2003; American College Health Association, 2012). College students specifically the age group of 18 to 24 year olds are overwhelmed by countless sources of stress such as academic workload and performance evaluation, part-time employment and financial difficulties, interpersonal relationships, and general daily hassles (Zirkel & Cantor, 1990; Zirkel, 1992; Dusselier et al., 2005; Meadows et al., 2006; Brougham et al., 2009). In order to successfully perform and achieve during time spent in college this tends to place significant strain on all aspects

of well-being which includes psychological, physical, emotional, spiritual, and interpersonal health and well-being (Crystal et al., 1994).

The experience of exasperatingly high levels of stress by college students is linked to mental health difficulties including anxiety and depression (Dyrbye et al., 2006). One such study identified that one in three undergraduate college students present with clinical levels of distress (Bewick et al., 2008). Another study uncovered that at any given time one in four college students experience symptoms of depression (Beck & Young, 1978). Considerable research has highlighted that college student's academic achievement and performance is impacted significantly by stress (Struthers et al., 2000; Lumley & Provenzano, 2003; Dusselier et al., 2005), depression (Fine & Carlson, 1994; Stark & Brookman, 1994), and anxiety (Anson et al., 1984).

Eisenberg et al. (2007) discovered that although college students are faced with many difficulties, most tend not to seek help for their problems mainly due to a lack of spare time and the stigma associated with using counselling services. However, for the small percentage of college students that do seek assistance, help is not always forthcoming as counselling services for college students are inadequately resourced and thereby have long waiting lists for their services (Kitzrow, 2003).

In an analysis survey of college and university counselling centres worldwide, 32% of centres were found to have a waiting list for their services at some point during the year (Mistler et al., 2012). The survey also looked at the students satisfaction with the counselling centres services and identified that 67% percent of students believed that use of the services helped their academic performance.

The survey also yielded notable findings with regards to demographics as 34% of all counselling centre clients were male. However, this finding is not unexpected as demographic research has highlighted variances in students' levels of depression and anxiety between genders (Hankin et al., 1998; Misra & Kean, 2000; Grant et al., 2002; Chapell et al., 2005; Howley & Dickerson, 2009).

Epidemiological research finds considerable gender variations in reported prevalence of numerous common mental health conditions and ailments (Grant & Weissman, 2007; Shear et al., 2007; Widiger, 2007). The National Comorbidity Survey 12 month and lifetime prevalence rates noted that females report substantially greater, approximately double the prevalence rates of their male counterparts in major depression, dysthymia, generalised anxiety disorder, panic disorder, social phobia, and specific phobia (Kessler et al., 1993; Kessler et al., 1994). Another study

conducted by the National Institute of Mental Health found females to be 2.6 times more prone to depression (Weissman et al., 1996).

## Stress and cognition

The transactional model of stress stipulates that stress is influenced by both personal and situational variables (Lazarus & Folkman, 1987). Higgins (2016) further evaluated this model of stress through use of a social-cognitive model of stress. Through investigation of this social-cognitive model of stress, it was found that cognitive variables were much greater at predicting stress levels.

The current study will propose a cognitive model of stress and will investigate the ability of the cognitive variables self-efficacy, optimism, self-esteem, positive affect, and negative affect to predict stress levels.

Self-efficacy refers to the perceived confidence an individual possesses to carry out a desired behaviour and levels of self-efficacy may be altered by persuasion, experience, knowledge, or physiological and psychological conditions including distress (Bandura, 1977). In a sample of college students, an association was found between high stress levels and low self-efficacy levels as well as heightened propensity to illness (Roddenberry & Renk, 2010). Moeini et al. (2008) also identified a link between poor self-efficacy and aggravated stress levels and reduced mental health status. Low self-efficacy is also associated with high job stress and is seen to precede burnout (Schwarzer & Hallum, 2008). Kreitler et al. (2007) found that cancer patients with greater levels of self-efficacy reported lower perceived stress levels and better quality of life.

Cassidy (1999) notes that optimism is focused on the attainment of desired future outcomes. Conversano et al. (2010) stipulates that optimism is embroiled by two closely allied concepts, the propensity of an individual to hope and the belief that we inhabit the best of all worlds. Optimists in comparison to pessimists appear to have greater psychological well-being and overall general health (Scheier & Carver, 1992; Carver et al., 2010). A large body of research supports that more optimistic individuals experience reduced stress levels (Robinson-Whelan et al., 1997; Chang et al., 2000; Baldwin et al., 2003; Crosno et al., 2009; Vollmann et al., 2011; Gustafsson & Skoog, 2012). Krypel and Henderson-King (2010) found that the more optimistic college students were the less likely they would be to perceive their education as a

stressor and thus had lower stress levels. Higgins (2016) identified that both optimism and self-efficacy were significantly strong predictors of perceived stress levels in a sample of Irish college students.

Rosenberg (1965) recognised self-esteem as being the positive and negative attitude held by an individual towards oneself and it develops via self-evaluation by the individual. The concluding judgement attained through this self-evaluation determines one's level of self-esteem. Evidence indicates that a negative correlation exists between self-esteem and stress levels, meaning that as self-esteem levels improve stress levels reduce and vice versa (Hayman et al., 2007; Pittman & Richmond, 2008; Hubbs et al., 2012). Hayman et al. (2007) found this negative correlation between the two variables to be evident within a sample of college students and also noted that the college students reported high perceived stress levels.

Positive affect is defined as the degree to which an individual feels pleasantly alert and individuals with high positive affectivity engage with life in an energetic, enthusiastic, confident, calm, and cheerful manner (Watson et al., 1988; Watson et al., 1994). Negative affect is a broad concept which incorporates feelings of anger, frustration, annoyance, worry, and disgust and is purposed as a term amalgamating depression, anxiety, and stress (Feldman-Barrett & Russell, 1998; Watson et al., 198). Watson et al. (1994) notes that individuals with an affinity to high negative affectivity report high stress levels and experience heightened symptoms of stress, have poor stress coping mechanisms, and are overly sensitive to the slight failures, inconveniences, and frustrations of general day-to-day life.

**<u>Current study</u>**

As the literature suggests our comprehension of the construct of stress is not clear and overall limited as much of the research is quite sporadic and has lacked a universally clear direction. Given the significant impact and threat that stress poses to both our physical and mental health as indicated by the relationship between stress and a number of popular ailments and the personal and financial costs these bear on society, it is fundamental that a better understanding of stress and how the construct operates is developed.

The current study will aim to better understand the construct of stress by further investigating Lazarus and Folkman's (1984) widely accepted transactional model of stress and expand on Higgins (2016) investigation of the same model. The model suggests that cognition plays a significant role in stress levels as stress manifests through the key cognitive process of perception. The model specifies that if an individual evaluates their environment to be over demanding on their resources and then stress will develop as a result. The individual must create a perception of their environment as well as their own resources in order for stress to manifest.

This study will thereby seek to better understand the role cognition plays in the stress development process by evaluating the ability of key cognitive variables to predict stress levels. Through a review of the literature it was identified that the cognitive variables self-efficacy, optimism, self-esteem, positive affect, and negative affect had been found to continually have a strong relationship with stress. However no comparative studies of the variables and their predictive relationship with stress have been conducted which meant no formal hypotheses to indicate which variable best predicts stress could be produced. The current study will propose a cognitive model of stress which includes the variables self-efficacy, optimism, self-esteem, positive affect, and negative affect and will determine which of these cognitive variables is the strongest predictor of stress. Investigation using this model will enable a better understanding of the cognitive process involved in stress and thereby an overall greater understanding of the construct as a whole.

Higgins (2016) identified Irish college students to be a high stress group. It was thereby evaluated that Irish college students would be a suitable sample to utilise in this current study as they would be a convenient sample to obtain and the presumed high levels of stress that they would report would lend to a greater understanding of

the construct of stress. Through use of this sample it also presents the opportunity to study the concept of work stress as college students would also be seen to display heightened levels of work stress as well as an overall general perceived life stress.

Given the Folkman et al. (1987) definition of work stress referring to it as the stress which results from the requirement to complete a task, college students would be highly subjective to this type of stress given the specific work stress related demands of college. Research also indicates that work is a high priority source of stress for individuals and this current study will seek to evaluate these findings by investigating the relationship between work stress and overall perceived life stress in Irish college students.

It was also recognised that college students are a unique group and can be potentially exposed to another substantial source of work stress not related to college. College students can hold employment if they desire and although not all college students opt to do so a reasonable proportion do. It was thereby decided to control for this element and investigate whether college students that hold employment report varying overall perceived life stress levels to college students that are unemployed. However, in assessing the relationship between work stress and perceived life stress it was concluded that the best approach would be to focus on work stress solely related to college work as all college students would be subjected to this potential source of stress regardless of their employment status.

Focusing on the demographic variations between the study variables, this current study will also seek to expand on Higgins (2016) findings that female Irish college students report significantly higher levels of perceived stress and significantly lower levels of self-efficacy and optimism than males. The study will also compare levels of self-esteem, positive affect, negative affect, and work stress as well as the aforementioned perceived life stress, self-efficacy, and optimism between genders. Given the lack of significant variability in ages within a college student sample it was not considered worthwhile to examine age variations in stress levels within this current study.

Forthcoming outlined are the research questions of this current study and the hypotheses that could be formulated by the review of previous research relating to the specific aims and research questions of this study.

## Research questions

1. Will the proposed cognitive model of stress be a significantly strong model in explaining perceived life stress?

2. To what extent do each of the cognitive variables self-efficacy, optimism, self-esteem, positive affect, and negative affect predict perceived life stress?

3. What is the relationship between work stress and perceived life stress?

4. Does employment status impact perceived life stress?

5. Does perceived life stress, self-efficacy, optimism, self-esteem, positive affect, negative affect, and work stress vary between genders?

## Hypotheses

1. The proposed cognitive model of stress will be a significantly strong model in explaining perceived life stress.

2. Each variable within the proposed cognitive model of stress will be a significantly strong predictor of perceived life stress.

3. There will be a strong positive relationship between work stress and perceived life stress.

4. Those that are employed will have greater perceived life stress.

5. Females will have greater perceived life stress, negative affect, and work stress than males and will have less self-efficacy, optimism, self-esteem, and positive affect than males.

## Methods

### Participants

The sample for the current study was made up of 523 participants. As this study was examining college students, it was a requisite that all participants must have attended a tertiary level educational institution during the most recent academic year which precluded the data collection period. As data collection took place from $6^{th}$ June 2017 to $11^{th}$ July 2017, the most recent academic year was therefore from September 2016 to May 2017. Participants were informed that they must have attended a tertiary level educational institution from September 2016 to May 2017. No information was sought for participant's level of study or area of study within tertiary level education and thereby there was no exclusion criteria implemented on basis of participant's level or area of college study. This sample was selected as through the literature review it was determined that Irish college students were a high stress group and a greater understanding of the construct of stress could be gathered utilising such a group. This sample was also convenient for the researcher to obtain.

With regards to the gender split within the sample it was heavily skewed towards females (Males: n = 129; Females: n = 394). The mean age of the sample (M = 20.62) was quite young as was anticipated given the study was utilising a sample of college students. All participants were residents of Ireland at the time of participating in the study.

This study also sought information on participant's employment status during the academic year. The sample was divided into five groups on the basis of employment status during the most recent 9 month academic year, unemployed for the full nine months (n = 175), employed for less than one of months (n = 44), employed between one and three of the months (n = 51), employed between four and six of the months (n = 56), and employed between seven and nine of the months (n = 197).

## **Design**

This study operated a quantitative cross-sectional correlational design. Participants were divided into groups based on; their gender either male or female, and their employment status. All participants were assessed in their levels of perceived life stress, self-efficacy, optimism, self-esteem, positive affect, negative affect, and work stress.

The differences in levels between genders in each of the aforementioned variables was compared using independent samples t-tests. The differences in levels between the five employment status groups in perceived life stress was assessed using a one-way between groups analysis of variance. A hierarchical multiple regression analysis was used to evaluate the proposed cognitive model of stress by assessing the ability of the cognitive predictor variables self-efficacy, optimism, self-esteem, positive affect, and negative affect to predict scores in the criterion or dependent variable perceived life stress. The relationship between the criterion variable perceived life stress and the predictor variable work stress was also determined using the same hierarchical multiple regression analysis.

**<u>Materials</u>**

A questionnaire was created which included an information sheet, consent form, demographic questions, and scales to assess perceived life stress, self-efficacy, optimism, self-esteem, positive affect, negative affect, and work stress (see appendix). The questionnaire was inputted into Google Forms, which is an internet-based application which enabled the convenient distribution and collection of the questionnaire and responses. Responses were then analysed using the data analysis program IBM SPSS Statistics 21.0.

   The information sheet, consent form, and demographic questions were formulated by the researcher for the purposes of this study. The information specified each participant's rights of participation in the study, the voluntary and confidential aspects of the study, and what would be required of each participant in the study. The consent form requested that participants provide informed consent in agreeing to participate in the study. The demographic questions included questions relating to gender, age, country of residence, and employment status. For the gender and country of residence questions multiple choice answer formats were used. Participants were given the option of selecting either male or female for the gender question and either Ireland or other for the country of residence question. For the age question participants were allowed specify their own specific age at the time of taking part in the study. For the employment status question, firstly participants were asked if they were employed at any stage during the most recent academic year which was from September 2016 to May 2017. If they were employed at any stage during this period, they were then prompted to answer a follow up question which asked how long during this period they were employed for. Participants were given the options which specified that they were either employed for less than one of months, employed between one and three of the months, employed between four and six of the months, and employed between seven and nine of the months within the nine month academic year.

   The perceived life stress levels of participants were measured using the Perceived Stress Scale (PSS-10; Cohen et al., 1983). The PSS-10 is a ten item scale designed to measure perceived stress of an individual during the most recent month. Each item is measured using a five point scale ranging from 0 ("never") to 4 ("very

often"). The maximum score that can be obtained is 40 and the minimum is 0, the higher the score on the scale means a greater level of perceived stress. The scale has been found to be a valid and reliable instrument for the assessment of perceived stress (Roberti et al., 2006) and has high internal reliability (Cronbach's alpha) of .91 (Cohen & Janicki-Deverts, 2012). Through use of the scale in the current study it was also found to have high reliability (Cronbach's alpha) of .89.

The self-efficacy levels of participants were measured using the General Self-Efficacy Scale (GSE; Schwarzer and Jerusalem, 1995). The GSE is a ten item scale designed to measure levels of self-efficacy. Each item is measured using a four point scale ranging from 1 ("not at all true") to 4 ("exactly true"). The maximum score that can be obtained is 40 and the minimum is 10, the higher the score on the scale means a greater level of self-efficacious. The scale has been found to have high internal validity (Cronbach's alpha) of .89 (Hulbert and Morrison, 2006). Through use of the scale in the current study it was also found to have high reliability (Cronbach's alpha) of .88.

The optimism levels of participants were measured using the Revised Life Orientation Test (LOT-R; Scheier et al., 1994). The LOT-R is a ten item scale designed to measure levels of optimism. Each item is measured using a five point scale ranging from 0 ("strongly disagree") to 4 ("strongly agree"). The maximum score that can be obtained is 40 and the minimum is 0, the higher the score on the scale means a greater level of optimism. The scale has been found to have adequate internal consistency and re-test reliability (Cronbach's alpha) of .72 (Hirsch et al., 2010). Through use of the scale in the current study it was also found to have high reliability (Cronbach's alpha) of .8.

The self-esteem levels of participants were measured using the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965). The RSES is a ten item scale designed to measure levels of self-esteem. Each item is measured using a four point scale ranging from 1 ("strongly disagree") to 4 ("strongly agree"). The maximum score that can be obtained is 40 and the minimum is 10, the higher the score on the scale means a greater level of self-esteem. The scale has been shown to be continually reliable with values consistently in excess (Cronbach's alpha) of .85 (Bagley et al., 1997). Through use of the scale in the current study it was also found to have high reliability (Cronbach's alpha) of .9.

The positive and negative affect levels of participants were measured using the International Positive and Negative Affect Schedule Short Form (I-PANAS-SF; Thompson, 2007). The I-PANAS-SF is a ten item scale designed to measure levels of positive affect and negative affect. Each item is measured using a five point scale ranging from 1 ("never") to 5 ("always"). Five items measure levels of positive affect and five items measure levels of negative affect. The scale has been found to have adequate reliability (Cronbach's Alpha) of .74 for the positive affect items and (Cronbach's Alpha) of .69 for the negative affect items (Thompson, 2007). Through use of the scale in the current study it was also found to have adequate reliability (Cronbach's alpha) of .68 for the positive affect items and .74 for the negative affect items.

The work stress levels of participants were measured using an amended version of the Work-Related Stress Scale (McCutcheon and Morrison, 2016). The scale was amended in order to suit college students and measure specifically the work stress that results from being a college student. The Work-Related Stress Scale is a four item scale designed to measure work stress. Each item is measured using a seven point scale ranging from 0 ("never") to 6 ("always"). The maximum score that can be obtained is 24 and the minimum is 0, the higher the score on the scale means a greater level of work stress. The scale has been shown to have good reliability (Cronbach's alpha) of .88 (McCutcheon and Morrison, 2016). Through use of the scale in the current study it was also found to have high reliability (Cronbach's alpha) of .81.

**Procedure**

Before data collection began a questionnaire was created which incorporated an information sheet, consent form, demographic questions, and scales to assess perceived life stress, self-efficacy, optimism, self-esteem, positive affect, negative affect, and work stress. Once finalised this questionnaire was then inputted into Google Forms. An internet webpage link for the questionnaire was then created using Google Forms. This link was then shared on the social media platform Facebook and advertised towards college students asking them to participate in the study by clicking on the link and filling out the questionnaire. Facebook was the only platform used by the researcher to distribute the questionnaire but any individual that had access to the link to the questionnaire had the ability to further distribute the questionnaire and engage in snowball sampling if they so wished.

After clicking on the link to the questionnaire, individuals were immediately presented with the information sheet and the consent form which required the individual to confirm that they had read the information sheet thoroughly. The information sheet explained participant's rights and also stated explicable that in order to participate in the study participants must have attended a tertiary level educational institution during the most recent academic year which was from September 2016 to May 2017. The information sheet also explained the potential unlikely risks which participation in the study could endeavour and indicated that if the participants required assistance that they may contact the researcher to which details for contact were presented. After participants gave their informed consent they were then presented with the demographic questions followed by each scale one by one to assess perceived life stress, self-efficacy, optimism, self-esteem, positive affect, negative affect, and work stress. Instructions on how to fill out each scale were given before each scale. When participants finished filling out the questionnaire Google Forms automatically sent their response to the researcher.

The data collection period took place over approximately a one month period from 6th June 2017 to 11th July 2017. The collection period began when the link to the questionnaire was made live and then ended when the link was altered to stop allowing individuals to fill out the questionnaire. Once the data collection period had ended all responses were inputted into IBM SPSS Statistics 21.0 and analysed using the same program.

# Results

## Descriptive statistics

The descriptive statistics for perceived life stress, self-efficacy, optimism, self-esteem, positive affect, negative affect, and work stress are presented in Table 1. Histograms and normal Q-Q plots were examined for each aforementioned variable in order to assess normality.

The mean score for perceived life stress (M = 24.89, SD = 7.54) indicated that participants reported moderately high levels of perceived life stress. The mean score for self-efficacy (M = 26.79, SD = 5.32) indicated that participants reported moderately high levels of self-efficacy. The mean score for optimism (M = 10.58, SD = 4.7) indicated that participants reported moderate levels of optimism. The mean score for self-esteem (M = 24.58, SD = 6.8) indicated that participants reported moderate levels of self-esteem. The mean score for positive affect (M = 17.17, SD = 3.27) indicated that participants reported moderate levels of positive affect. The mean score for negative affect (M = 15.43, SD = 3.67) indicated that participants reported moderate levels of negative affect. The mean score for work stress (M = 16.8, SD = 4.57) indicated that participants reported moderately high levels of work stress.

For perceived life stress, self-efficacy, optimism, self-esteem, positive affect, negative affect, and work stress all histograms were normally distributed and achieved a bell curve shape and the normal Q-Q plot for each had a reasonable straight line. Given this and that the mean scores for each variable were within a moderate or moderate to high range this suggests that a normal distribution was present for each variable.

## Correlation analysis

Prior to carrying out the regression analysis it was first necessary to conduct bivariate correlation analysis to ascertain the relationship between the independent variables and the dependent variable; as well as the relationship between the independent variables.

The relationship between all continuous variables was investigated using Pearson product-moment correlation coefficient. Results of this Pearson product-moment correlation coefficient are presented in Table 1. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity.

There was a moderate, negative correlation between perceived life stress and self-efficacy, $r = -.45$, $n = 523$, $p < .001$, with high levels of perceived life stress associated with lower levels of self-efficacy.

There was a moderate, negative correlation between perceived life stress and optimism, $r = -.45$, $n = 523$, $p < .001$, with high levels of perceived life stress associated with lower levels of optimism.

There was a strong, negative correlation between perceived life stress and self-esteem, $r = -.56$, $n = 523$, $p < .001$, with high levels of perceived life stress associated with lower levels of self-esteem.

There was a moderate, negative correlation between perceived life stress and positive affect, $r = -.3$, $n = 523$, $p < .001$, with high levels of perceived life stress associated with lower levels of positive affect.

There was a strong, positive correlation between perceived life stress and negative affect, $r = .63$, $n = 523$, $p < .001$, with high levels of perceived life stress associated with higher levels of negative affect.

There was a moderate, positive correlation between perceived life stress and work stress, $r = .44$, $n = 523$, $p < .001$, with high levels of perceived life stress associated with higher levels of work stress.

## Table 1

Descriptive statistics, reliability, and correlations for all continuous variables (n = 523)

| Variables | PLS | SEF | O | SES | PA | NA | WS |
|---|---|---|---|---|---|---|---|
| Perceived Life Stress (PLS) | 1 | | | | | | |
| Self-efficacy (SEF) | -.45*** | 1 | | | | | |
| Optimism (O) | -.45*** | .45*** | 1 | | | | |
| Self-esteem (SES) | -.56*** | .52*** | .61*** | 1 | | | |
| Positive Affect (PA) | -.3*** | .47*** | .36*** | .47*** | 1 | | |
| Negative Affect (NA) | .63*** | -.48*** | -.52*** | -.68*** | -.34*** | 1 | |
| Work Stress (WS) | .44*** | -.21*** | -.26*** | -.23*** | -.08 | .29*** | 1 |
| Means | 24.89 | 26.79 | 10.58 | 24.58 | 17.17 | 15.43 | 16.8 |
| Standard Deviations | 7.54 | 5.32 | 4.7 | 6.8 | 3.27 | 3.67 | 4.57 |
| Range | 2 – 40 | 11 – 40 | 0 – 22 | 10 – 40 | 7 – 25 | 5 – 24 | 0 – 24 |
| Possible Range | 0 – 40 | 10 – 40 | 0 – 24 | 10 – 40 | 5 – 25 | 5 – 25 | 0 – 24 |
| Cronbach's Alpha | .89 | .88 | .8 | .9 | .68 | .74 | .81 |

Note. Statistical significance: *$p < .05$, **$p < .01$, ***$p < .001$

**Regression analysis**

Hierarchical multiple regression was performed to investigate the ability of self-efficacy, optimism, self-esteem, positive affect, negative affect, and work stress to predict levels of perceived life stress. The results for this hierarchical multiple regression are presented in Table 2. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. Additionally, the correlations amongst the predictor variables (self-efficacy, optimism, self-esteem, positive affect, negative affect, and work stress) included in the study were examined and these are presented in Table 1. The correlations were weak, moderate, and strong, ranging between $r = -.21$, $p < .001$ and $r = -.68$, $p < .001$. This indicates that multicollinearity was unlikely to be a problem. All predictor variables were statistically correlated with perceived life stress which indicates the data was suitable correlated with the dependent variable for examination through multiple linear regression to be reliable undertaken. The correlations between the predictor variables and the dependent variable (perceived life stress) were all moderate to strong, ranging from $r = .3$, $p < .001$ to $r = .63$, $p < .001$.

In the first step of hierarchical multiple regression, five predictors were entered; self-efficacy, optimism, self-esteem, positive affect, and negative affect. This model was statistically significant $F (5, 517) = 82.18$; $p < .001$ and explained 44% of variance in perceived life stress. After the entry of work stress at step 2 the total variance explained by the model as a whole was 50% ($F (6, 516) = 86.74$; $p < .001$). The introduction of work stress explained an additional 6% variance in perceived life stress, after self-efficacy, optimism, self-esteem, positive affect, and negative affect ($R^2$ Change $= .06$; $F (1, 516) = 61.46$; $p < .001$).

In the final model three of the predictor variables were statistically significant, with negative affect recording a higher Beta value ($\beta = .37$, $p < .001$) than college work related stress ($\beta = .26$, $p < .001$) and self-esteem ($\beta = -.16$, $p < .01$). These results indicate that higher levels of negative affect and work stress and lower levels of self-esteem predict increased scores in perceived life stress.

Table 2

Hierarchical regression model of perceived life stress

| | R | $R^2$ | $R^2$ Change | B | SE | $\beta$ | t |
|---|---|---|---|---|---|---|---|
| **Step 1** | .67 | .44*** | | | | | |
| Self-efficacy | | | | -.18 | .06 | -.13** | -3.02 |
| Optimism | | | | -.12 | .07 | -.08 | -1.78 |
| Self-esteem | | | | -.18 | .06 | -.17** | -3.21 |
| Positive affect | | | | .01 | .09 | .01 | .14 |
| Negative affect | | | | .86 | .09 | .42*** | 9.1 |
| **Step 2** | .71 | .5*** | .06*** | | | | |
| Self-efficacy | | | | -.15 | .06 | -.11 | -2.67 |
| Optimism | | | | -.06 | .07 | -.04 | -.98 |
| Self-esteem | | | | -.18 | .05 | -.16** | -3.37 |
| Positive affect | | | | -.04 | .09 | -.02 | -.42 |
| Negative affect | | | | .75 | .09 | .37*** | 8.3 |
| Work stress | | | | .43 | .05 | .26*** | 7.84 |

Note. Statistical significance: *$p < .05$, **$p < .01$, ***$p < .001$

## Employment comparison analysis

A one-way between groups analysis of variance was conducted to explore the impact of employment on perceived life stress. Participants were divided into five groups according to their employment status during the most recent 9 month academic year preceding the data collection period (unemployed for the entire 9 months, employed less than 1 month, employed between 1 to 3 months, employed between 4 to 6 months, and employed between 7 and 9 months). Results for this one-way between groups analysis of variance are presented in Table 3.

There was no statistically significant difference in perceived life stress between the five employment status groups $F(4, 518) = 1.08$, $p > .05$. The difference in mean scores between the groups was quite small. The effect size, calculated using eta squared was, 0.001.

Post-hoc comparisons using the Tukey HSD test indicated that there was no statistically significant differences in mean perceived life stress scores between any of the employment groups.

Table 3

Analysis of variance for perceived life stress scores

| Group | M | SD | n | 1. | 2. | 3. | 4. | 5. |
|---|---|---|---|---|---|---|---|---|
| 1. Unemployed | 24.94 | 7.58 | 175 | 0 | | | | |
| 2. Employed less than 1 month | 24.82 | 7.64 | 44 | -.12 | 0 | | | |
| 3. Employed 1 to 3 months | 24.22 | 8.84 | 51 | -.72 | -.6 | 0 | | |
| 4. Employed 4 to 6 months | 25.46 | 7.83 | 56 | .52 | .64 | 1.24 | 0 | |
| 5. Employed 7 to 9 months | 24.88 | 7.08 | 197 | -.06 | .06 | .66 | -.58 | 0 |

The columns 1.–5. are grouped under the header "Mean Differences".

Note. Statistical significance: *p < .05, **p < .01, ***p < .001

**<u>Gender comparison analysis</u>**

A number of independent samples t-tests were conducted to compare scores in perceived life stress, self-efficacy, optimism, self-esteem, positive affect, negative affect, and work stress between all male and female participants in the study. Results for these t-tests are presented in Table 4.

There was a significant difference in perceived life stress scores between the two genders, $t(523) = -3.34$, $p < .01$, two tailed males ($M = 22.84$, $SD = 8.33$) scoring lower than females ($M = 25.57$, $SD = 7.15$). The magnitude of difference in the means (mean difference = -2.73, 95% CI: -4.34 to -1.12) was small (eta squared = .02).

There was a significant difference in self-efficacy scores between the two genders, $t(523) = 3.18$, $p < .01$, two tailed males ($M = 28.07$, $SD = 5.67$) scoring higher than females ($M = 26.37$, $SD = 5.14$). The magnitude of difference in the means (mean difference = -1.7, 95% CI: .65 to 2.75) was small (eta squared = .02).

There was a significant difference in optimism scores between the two genders, $t(523) = 2.67$, $p < .01$, two tailed males ($M = 11.53$, $SD = 4.71$) scoring higher than females ($M = 10.27$, $SD = 4.67$). The magnitude of difference in the means (mean difference = 1.27, 95% CI: .33 to 2.2) was small (eta squared = .01).

There was a significant difference in self-esteem scores between the two genders, $t(523) = 3.52$, $p < .01$, two tailed males ($M = 26.5$, $SD = 7.34$) scoring higher than females ($M = 23.95$, $SD = 6.51$). The magnitude of difference in the means (mean difference = 2.55, 95% CI: 1.12 to 3.98) was small (eta squared = .02).

There was a non-significant difference in positive affect scores between the two genders, $t(523) = 1.17$, $p > .05$, two tailed males ($M = 17.46$, $SD = 3.49$) scoring higher than females ($M = 17.07$, $SD = 3.19$). The magnitude of difference in the means (mean difference = .39, 95% CI: -.27 to 1.04) was small (eta squared = .002).

There was a significant difference in negative affect scores between the two genders, $t(523) = -2.62$, $p < .01$, two tailed males ($M = 14.66$, $SD = 3.95$) scoring lower than females ($M = 15.68$, $SD = 3.54$). The magnitude of difference in the means (mean difference = -1.02, 95% CI: -1.79 to -.25) was small (eta squared = .01).

There was a significant difference in work stress scores between the two genders, $t(523) = -3.64$, $p < .001$, two tailed males ($M = 15.38$, $SD = 5.36$) scoring lower than females ($M = 17.26$, $SD = 4.19$). The magnitude of difference in the means (mean difference = -1.88, 95% CI: -2.9 to -.86) was small (eta squared = .03).

Table 4

Results of t-tests and descriptive statistics for all continuous variables by gender for all participants

| | Gender | | | | | | | |
| | Male | | | Female | | | | |
| | M | SD | n | M | SD | n | 95% CI for Mean Difference | t |
|---|---|---|---|---|---|---|---|---|
| Perceived life stress | 22.84 | 8.33 | 129 | 25.57 | 7.15 | 394 | -4.34, -1.12 | -3.34** |
| Self-efficacy | 28.07 | 5.67 | 129 | 26.37 | 5.14 | 394 | .65, 2.75 | 3.18** |
| Optimism | 11.53 | 4.71 | 129 | 10.27 | 4.67 | 394 | .33, 2.2 | 2.67** |
| Self-esteem | 26.5 | 7.34 | 129 | 23.95 | 6.51 | 394 | 1.12, 3.98 | 3.52** |
| Positive affect | 17.46 | 3.49 | 129 | 17.07 | 3.19 | 394 | -.27, 1.04 | 1.17 |
| Negative affect | 14.66 | 3.95 | 129 | 15.68 | 3.54 | 394 | -1.79, -.25 | -2.62** |
| Work stress | 15.38 | 5.36 | 129 | 17.26 | 4.19 | 394 | -2.9, -.86 | -3.64*** |

Note. Statistical significance: *p < .05, **p < .01, ***p < .001

**<u>Discussion</u>**

This study had three main objectives to which five corresponding research questions were formulated to surmise. They were as follows; Will the proposed cognitive model of stress be a significantly strong model in explaining perceived life stress? To what extent do each of the cognitive variables self-efficacy, optimism, self-esteem, positive affect, and negative affect predict perceived life stress? What is the relationship between work stress and perceived life stress? Does employment status impact perceived life stress? Does perceived life stress, self-efficacy, optimism, self-esteem, positive affect, negative affect, and work stress vary between genders? Within this discussion section each research question will be examined, any limitations of the study will be noted, and areas for improvement and future research will be provided.

**<u>Cognitive model of stress</u>**

The main aim of this study was to develop a greater understanding of the construct of stress and thus a cognitive model of stress was proposed to accomplish this. Research to date examining stress has lacked an omnipresent direction and as a result there is deficient understanding of the construct and how it operates. However, the impact of stress is unequivocal as mountainous evidence indicates the significant threat it poses to our physiological and psychological well-being as it has a strong association with many common health issues including cardiovascular disease, cancer, anxiety disorders, and depressive disorders.

This study sought to examine cognitive processes involvement within the stress modus operandi by evaluating which of the relevant cognitive variables including self-efficacy, optimism, self-esteem, positive affect, and negative affect best predict stress levels. Through determining which variable is the strongest predictor of stress this would allow for a greater understanding of which cognitive aspects are most involved in the stress process. By discovering this it may enable future research to focus on the most pertinent cognitive aspect of stress and thereby enhance the likelihood of unlocking methods to reduce the substantial impact stress poses.

A multiple regression analysis was conducted to ascertain the ability of the proposed cognitive model as a whole and each individual variable within the model to predict perceived life stress. The model in its entirety was quite strong in predicting

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perceived life stress levels as overall it explained 44% of the variance in perceived life stress scores and was significant at the $p < .001$ level. This indicates that cognition appears to play a substantial role within the stress process and is in line with Higgins (2016) findings and Lazarus and Folkman's (1984) transactional model of stress. This also confirmed the first hypothesis that the cognitive model of stress which this study proposed would be a significantly strong predictor of perceived life stress.

As this result was anticipated through evaluation of previous literature this was not the main objective of this study and the goal of proposing this cognitive model of stress was to create a comparison between each cognitive variable within the model. Previous research has indicated that all of the cognitive variables of self-efficacy, optimism, self-esteem, positive affect, and negative affect within the model have a strong association with stress. However, no research has been carried out to provide a comparative analysis between each variable to determine which cognitive variable is most strongly associated with stress. As this comparative analysis is the first of its kind with these specific variables no prior hypothesis could be made as to which variable would be most strongly associated with stress.

Utilising the same aforementioned multiple regression analysis it was concluded that negative affect was far and away the most strongly associated cognitive variable with perceived life stress within the model. Negative affect recorded a beta value of more than double the next closest variable and was significant at the $p < .001$ level. The next most strongly connected variables were self-esteem followed by self-efficacy which both reported similar beta scores and were significant at the $p < .01$ level. The final two variables within the model, optimism and positive affect expressed low beta scores and were non-significant.

These findings contradicted the hypothesis as it was predicted that each variable would be strongly connected to the dependent variable perceived life stress as the literature suggested so. Although, as the results note there was substantial variation between the variables strength of bond to perceived life stress with negative affect being far and above the strongest associated and optimism and positive affect indicating little if any association with perceived life stress.

Overall this proposal of a cognitive model of stress within this study further demonstrated the previously substantiated the significant role cognition plays within the stress process. Through use of this model this study also sought to enhance our understanding of the role of specific cognitive processes within stress and done so

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through determining that negative affect has a strong link with stress when compared with other key cognitive aspects.

Given how significantly stronger negative affect was associated with perceived life stress in comparison within any of the other cognitive variables within the proposed study model, it would be advisable that future research focus on the relationship between negative affect and stress. The scale utilised in this study to assess levels of negative affectivity asked participants to what extent do they generally feel upset, hostile, ashamed, nervous, and afraid. This was in line with our definition of negative affect provided which referenced negative affect as encompassing similar emotive conditions (Feldman-Barrett & Russell, 1998; Watson et al., 1998).

It may also be advisable to examine how specific emotions related to negative affect influence stress and specifically the aforementioned emotions assessed in the International Positive and Negative Affect Schedule Short Form (I-PANAS-SF; Thompson, 2007) scale which this study used to evaluate negative affectivity. It may prove fruitful to consider each emotion's relationship with stress in isolation as although they are all inherently negative emotions they are not the same and do often present themselves in significantly varied circumstances. Through further assessment of negative affect and its relationship with stress this should lend to a further enhanced understanding of the construct of stress.

In relation to the other cognitive variables within the model, the variables connected to one's opinion of oneself, self-esteem and self-efficacy also appear to have a reasonably strong association with stress just not to the same degree as negative affect. However, these findings are still notable and should be further explored as considering that both self variables had such a similar strength of association to stress. This clearly indicates that the evaluative cognitive processes of oneself do play a role in stress albeit potentially miniscule but future research should still explore such cognitive processes relation to stress.

With regards to the remaining variables within the model, optimism and positive affect's association with stress was substantially weaker in comparison to the other variables and this result was unforeseen as can be conferred from the prior rejected hypothesis. This was a notable finding as it suggests that our perception of the future does not seem to heavily influence stress and may advocate that stress manifests within the present moment and isn't overly concerned with the future and

potential consequences. It was also interesting that positive affect had such a weak link to stress especially given how strongly associated its reverse partner variable negative affect was with stress. This indicates that negative emotions are impactful within the stress process but there is no counter moderation relief effect seen through positive emotions. This contrast is quite unusual as it would be expected that if negative emotions have a strong relationship with stress then positive emotions would have a similar strong relationship just in an opposite direction but this was not the case.

Evaluation of the prospective limitations within this current study may yield an explanation for such unprecedented results. The first potential limitation is the sample. As the dependent variable within this study was stress, it was considered best practice to evaluate this variable in heightened conditions and thereby a theoretically high stress sample was selected, college students. Through use of a high stress sample, this enhanced the propensity to understand stress and the impact stress poses as this impact is only present when levels of stress are exuberant.

However, this also has the potential to limit our understanding of stress and the relationship of the cognitive variables with stress as individuals with low or moderate stress were not evaluated within this study. High stress levels are linked to high negative affect levels and low levels of self-esteem, self-efficacy, optimism, and positive affect. This means by selecting a high stress sample for study, as a consequence the sample would also likely have high negative affect and low self-esteem, self-efficacy, optimism, and positive affect. Thus this study only assessed each variable under extreme conditions either high or low. It would be of interest to see if the results of this study hold true to a more generic sample where stress levels are more levelled off and this is an area where future research could look to focus. Also, the sample within this study did not possess great variation in age as the mean age indicated the sample was quite young and lacked cultural diversity as all participants were residents of Ireland. It would also be noteworthy to see if the findings of this study would be replicable over more age ranges and cultural dimensions.

The proposed cognitive model of stress itself and the scales used to assess each variable in the model may also be open to criticism. Four of the five variables within the model displayed a negative relationship with stress. The only variable to have a positive relationship with stress was negative affect which evidently had the

strongest relationship with stress by some distance. This finding cannot be overlooked as it may be viewed that the design of the model may be skewed in favour towards negative affect. The scales used may have also contributed to this even though they all displayed reasonable reliability. Future research should consider designing and testing a model whereby there is greater equality and distribution within the direction of the relationships between the predictor variables and the dependent variable stress. This can be done through selection of different variables and the adjustment of scales used to assess variables, for example measuring pessimism as opposed to optimism.

However, it cannot be ignored that negative affect has a strong relationship with stress and it may be garnered that negative affect is a key cognitive process involved in stress. Of course, further research is required to develop a greater understanding of the relationship between the two variables but there are still implications of these findings of the current study. This study has enhanced our understanding of the construct of stress and the role cognition and specifically negative emotions play in the process.

Stress can place a great strain on physical and mental well-being and has been linked with many common ailments including heart disease, cancer, anxiety, and depressive disorders. In turn this creates a considerable cost burden both personal and financial for society. Hospitals and health services see an increase in expenditure due to stress related diseases. Individuals may suffer increases in taxation and insurance premiums and the personal and emotional impact cannot be quantified. Even organisations may bear additional costs in recruitment and replacement of workers that leave or are absent due to stress related diseases.

A greater understanding of the construct of stress and how it operates will allow for the development of methods to reduce its considerable impact. This study highlighted the substantial role cognition and specifically the cognitive process negative affect plays in stress. Through manipulation of the emotions encompassed by negative affect this could see a reduction in stress levels and thus the impact of stress. Methods to alleviate such undesirable emotions under the realms of negative affect can be developed and employed. This is where future research should focus in understanding such emotions and finding methods to control them in order to alleviate stress and its substantial impact.

**<u>Work stress and perceived life stress</u>**

This study also sought to ascertain the relationship between work stress and perceived life stress. Through evaluation of the literature it was established that work stress refers to any stress which results from being required to complete a task (Folkman et al., 1987). With this in mind and given the chosen study sample, it was decided the best practice would be to measure the college students work stress which relates to their college work and experience solely as it would be anticipated that all college students would be exposed to this type of work stress. Therefore, the Work-Related Stress Scale (McCutcheon and Morrison, 2016) was used and amended to measure specifically the work stress which relates to college. Using this amended scale was not considered to be a limitation as the amendments were not substantial and the amended version reported strong reliability (Cronbach's alpha) of .88 through use in this study.

Given the unusual predisposition of college students in that they can attend tertiary level education but can also hold employment at the same time if they opt to do so and many college students do. It was deemed necessary to control for this aspect as when measuring perceived life stress, this study desired an assurance that additional work stress that may result from employment would not create variations in levels of perceived life stress between employed and unemployed college students.

To control for this facet, participants were asked about their recent employment history over the nine months prior to data collection which coincided with the most recent college academic year. Participants were asked for how many of these nine months were they employed and given the options of either being unemployed for the full nine months, employed less than one month, between one and three, between four and six, and between seven and nine of the months. There was a reasonable distribution of responses for each option with not surprisingly majority indicating that they were either unemployed for the full nine months or employed between seven and the full nine months.

A one-way between groups analysis of variance was carried out to determine if college students that were employed for any of the time would differ in perceived life stress levels to those that were unemployed. This analysis indicated that there were no significant differences in mean perceived life stress scores between any of the unemployment or employment duration categories. This was a surprising finding and against the hypothesis and conventional wisdom as it would have been expected than

an additional stressor such as employment would see an additional rise in perceived life stress levels but this was not the case.

An argument could be made however that possessing employment could offset other potential stressors that may be more pertinent to unemployed individuals such as financial difficulties. As the American Psychological Association (2012) noted in their Stress in America report that money was the largest source of stress for Americans. The scale used determine participant's employment status may also have contributed to this unexpected result as the scale was formulated by the researcher specifically for this study. Thereby, the scale had no prior use in previous research which can be seen as a potential limitation as it is advisable where possible to use scales that have been shown to have reliability and validity through repeated use. Although, this finding was unexpected this analysis was not a key priority of this study as it was only used as a control but nevertheless this was a notable finding and it may prove of value to further explore within future research.

However unexpected, this finding was welcome for the main objective of evaluating the relationship between work stress and perceived life stress as it indicated that the sample's perceived life stress scores were likely not being influenced heavily by another work stress related variable. A multiple regression analysis was utilised to assess the relationship between work stress and perceived life stress. Through this analysis, it was identified there was a strong significant positive relationship between work stress and perceived life stress at the $p < .001$ level. This verdict was anticipated as can be gathered from the prior proposed hypothesis.

This result means that work stress is likely to contribute significantly to overall perceived life stress. Thereby, it may be concluded that through reducing work stress this would likely considerable reduce perceived life stress and the substantial impact extreme perceived life stress poses to our well-being. This result was in line with previous research and the hypothesis. Future research should focus on understanding the construct of work stress and developing potential methods to reduce work stress which should consequentially alleviate overall stress levels. Again, it would also be notable to see if these findings can be replicated using a more universal sample with regards to age and culture as the sample within this study was quite specific and thereby limited.

## Gender comparison

The final aim of this study was to compare levels of perceived life stress, self-efficacy, optimism, self-esteem, positive affect, negative affect, and work stress between males and females. Literature suggests that females are more prone to mental health difficulties including stress, anxiety, and depression (Kessler et al., 1993; Kessler et al., 1994; Weissman et al., 1996; Hankin et al., 1998; Misra & Kean, 2000; Grant et al., 2002; Chapell et al., 2005; Grant & Weissman, 2007; Shear et al., 2007; Widiger, 2007; Howley & Dickerson, 2009). Higgins (2016) also concluded that females express significantly lower self-efficacy and optimism levels. Thus, it was assumed that females would report significantly higher perceived life stress and work stress and lower self-efficacy and optimism levels than males. Through evaluation of the literature pertaining to the relationships between self-esteem, positive affect, and negative affect and the other study variables, it was also hypothesised that females would report significantly lower self-esteem and positive affect scores and higher negative affect scores.

The comparison between genders within this current study was complete using a series of independent sample t-tests. Results from this analysis concluded that females scored significantly higher in perceived life stress, work stress, and negative affect and significantly lower in self-efficacy, optimism, and self-esteem. These findings were supported by the hypotheses and previous evidence.

However, unexpectedly and against the hypothesis the only variable where there was no significant difference in scores between the genders was positive affect. Alarmingly positive affect's significance as a variable was questionable throughout most analyses within this current study. A potential explanation for this was the scale used to measure positive affect. This scale reported the lowest reliability of any of the scales used within this study (Cronbach's alpha) .68. Although, this is a reasonable reliability score in isolation in the context of this study it was not and thereby could be an explanation for positive affect's by in large poor performance within this study.

All other aspects of the hypothesis prospered. Notably work stress saw the most significant difference in scores between the genders at the $p < .001$ level whereas all other variables besides positive affect were significant only at the $P < .01$ level. These findings further support the literature identifying the significant differences which exist between males and females with regards to mental well-being

and cognitive processes and also adds a different perspective through the use of the sample within this current study. This greater highlights the reasoning that resources should be more focused on females in mental health services as they appear significantly more vulnerable and at risk than their male counterparts.

The findings are also interesting as there is clear variation in cognitive processes between each gender. This further underlines the impact cognition plays in the stress process and that differences in cognition between individuals can influence risk of mental health difficulties. Again, further research should explore the role of cognition in stress and also focus on how cognitive processes differ between genders. The findings of this comparison within this study should be viewed with caution however given the sample. The specific nature of the sample used can impact on sample size as this study had 523 participants. Although, of these participants there was not an even gender split as only 129 participants were male. This means that only around one quarter of the sample was male. Thus, this could be a potential limitation of the results within this comparative analysis and they should be viewed with caution. Future research conducting similar comparisons should seek to have as equal a gender split as possible to ensure greater reliability of results.

## Conclusion and recommendations

The main focus of this study was to develop our understanding of the role of cognition in stress. This was done through the proposal and evaluation of a cognitive model of stress supported by past theoretical frameworks and research evidence. It was concluded that cognition possesses a significant role within the stress process. Particularly the cognitive proponent of negative affect was identified as having the strongest connection to stress. Future research should evaluate this relationship between negative affect and stress further as it is clear that negative emotions are strongly evident within the stress process.

Stress places a major cost financial burden on society at a national, international, individual, and even organisational level. Workers can be subjected to substantial stress as a result of their work as this study identified a strong relationship between work stress and life stress as a whole. Organisations should pay considerable attention to the potential for duties of work to result in workers experiencing exuberant stress. This can be quite damaging to worker's well-being and as a consequence harmful to the organisation as if it is not monitored and controlled it could see extensive absenteeism and turnover rates for the organisation. By virtue, the organisation would have to bear additional cost burdens such as reductions in productivity due to absenteeism and extra financial strain for the human resource management department through an increase in recruitment and selection processes. If organisations implement and develop practices which aim to monitor and understand worker's stress with the aim of reducing worker's stress this could see a substantial reduction in costs for the organisation. This should be of immediate priority to organisations as workers are integral for the continued success of the organisation and a threat to their well-being and capacity to carry out their work effectively should not be ignored.

The continual development of our understanding of stress will allow for the formulation of more effective stress reduction and coping methods which will in turn alleviate the severe burden stress places on society.

## **Personal learning statement**

Although, this project was quite challenging, it will be considered a worthwhile experience on both a personal and academic level. It has allowed the honing of numerous applicable life skills such as time management, analytics, research, and creative thinking that will enable prosperity through all aspects of life. Of course, additional resources and time would have permitted an overall greater quality to the work but overall evaluation concludes this to be an adequate and valuable effort. The hope prior to commencement of this project was to enhance knowledge and this has been done to a acceptable degree for the individual and for the wider academic community.

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**Questionnaire**

Information sheet and consent form:

It is of vital importance that you read through this section thoroughly and in its entirety. This section will outline any relevant information about the study and will inform you of your rights in participating in this study.

The researcher:
My name is Glynn Higgins and I am a final year masters human resource management student in the National College of Ireland.

Purpose of this study:
As part of my degree I am required to carry out a research study. My research study is investigating the relationship between work stress and overall general life stress.

What will participation in this study involve?
Participation in this study involves the completion of a short questionnaire that should take approximately five minutes to complete. Participants must only complete this questionnaire once.

Who can participate in this study?
In order to participate in this study you must be a college student (i.e. have attended a tertiary level educational institution during the most recent academic year, September 2016 to May 2017). Also, participants must be 18 years old or older at the time of taking part in this study.

Do you have to participate in this study?
Participation in this study is voluntary meaning that you do not have to take part in this study if you do not want to. If you do choose to continue and participate in this study by answering the questions, please be aware that you have the right to stop

participating at any time and have any information you have given up to that point removed from the study and destroyed.

Confidentiality of the study:
Participants in this study will not be required to disclose their identity as this study is completely anonymous.

Results from the study:
By agreeing to participate in this study, participants must recognise that any answers they give in the questionnaire may be used for analysis and the formulation of a research report which will be examined and potentially published.

What is Google Forms?
Google Forms is an online survey application that makes it easier to distribute questionnaires to a wider audience.

Is there any potential risk in participating in this study?
Participation in this study will require you to answer questions about your gender, age, country of residence, employment, levels of stress, self-efficacy, optimism, self-esteem, positive affect, and negative affect. By answering these questions, it is unlikely that you will be harmed in anyway but you must be made aware that these questions are personal and in unlikely cases could cause distress to a participant. If this highly unlikely occurrence occurs, contact the researcher for assistance.

Debriefing process:
A debriefing process is available to all participants in this study. This process will offer participants an opportunity to learn more about the study and if necessary give any participants who have developed any problems from participating an opportunity to express these to the researcher. For more information regarding this process, contact the researcher.

Problems or queries:
If you have any problems with or queries about this study, do not hesitate to contact the researcher.

Researcher contact details:

Glynn Higgins

National College of Ireland

E-mail; glynn.higgins@student.ncirl.ie

By selecting the "Agree to participate" option below and continuing onto the next section of this questionnaire and answering the questions that follow you agree to participate in this study and give informed consent recognising that you have read the information sheet thoroughly and understand your rights with regard to participating in this research study.

Agree to participate

Demographic questions:

Instructions: Select the category that applies to you and fill in any blanks where required.


Gender:

Male           Female          Other: _____


Age: _____


Country of residence:          Ireland          Other:_____


Employment status: If at any stage during the most recent academic year, September 2016 to May 2017, you were employed, select the "Employed" option below, if not, select the "Unemployed" option.

Employed            Unemployed


If employed, for how many full months during the most recent academic year, September 2016 to May 2017, were you employed?

Less than 1 month     1 to 3 months          4 to 6 months          7 to 9 months

<u>Work-Related Stress scale:</u>

The questions in this scale ask you about your college work. In each case, select the most appropriate number response.

0 = Never
1 = Rarely
2 = Occasionally
3 = Sometimes
4 = Often
5 = Nearly always
6 = Always

1. The demands of college make it difficult to be relaxed at home.
     0     1     2     3     4     5     6
2. I feel overwhelmed by my college workload.
     0     1     2     3     4     5     6
3. I feel guilty when I'm not doing college work.
       0     1     2     3     4     5     6
4. I have unrealistic time pressures for my college work.
     0     1     2     3     4     5     6

Perceived Stress Scale (PSS-10):

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by selecting *how often* you felt or thought a certain way.

0 = Never
1 = Almost Never
2 = Sometimes
3 = Fairly Often
4 = Very Often

1. In the last month, how often have you been upset because of something that happened unexpectedly?
      0    1    2    3    4

2. In the last month, how often have you felt that you were unable to control the important things in your life?
      0    1    2    3    4

3. In the last month, how often have you felt nervous and "stressed"?
      0    1    2    3    4

4. In the last month, how often have you felt confident about your ability to handle your personal problems?
      0    1    2    3    4

5. In the last month, how often have you felt that things were going your way?
      0    1    2    3    4

6. In the last month, how often have you found that you could not cope with all the things that you had to do?
      0    1    2    3    4

7. In the last month, how often have you been able to control irritations in your life?
      0    1    2    3    4

8. In the last month, how often have you felt that you were on top of things?
      0    1    2    3    4

9. In the last month, how often have you been angered because of things that were outside of your control?
      0    1    2    3    4

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?
      0    1    2    3    4

General Self-Efficacy Scale (GSE):

Instructions: Select the most appropriate number response for each question.
1 = Not at all true
2 = Hardly true
3 = Moderately true
4 = Exactly true

1. I can always manage to solve difficult problems if I try hard enough.
        1       2       3       4
2. If someone opposes me, I can find the means and ways to get what I want.
        1       2       3       4
3. It is easy for me to stick to my aims and accomplish my goals.
        1       2       3       4
4. I am confident that I could deal efficiently with unexpected events.
        1       2       3       4
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.
        1       2       3       4
6. I can solve most problems if I invest the necessary effort.
        1       2       3       4
7. I can remain calm when facing difficulties because I can rely on my coping abilities.
        1       2       3       4
8. When I am confronted with a problem, I can usually find several solutions.
        1       2       3       4
9. If I am in trouble, I can usually think of a solution.
        1       2       3       4
10. I can usually handle whatever comes my way.
        1       2       3       4

Revised Life Orientation Test (LOT-R):

Instructions: Please answer the following questions about yourself by indicating the extent of your agreement using the following scale:
0 = strongly disagree
1 = disagree
2 = neutral
3 = agree
4 = strongly agree
Be as honest as you can throughout, and try not to let your responses to one question influence your response to other questions. There are no right or wrong answers.

1. In uncertain times, I usually expect the best.
      0     1     2     3     4
2. It's easy for me to relax.
      0     1     2     3     4
3. If something can go wrong for me, it will.
      0     1     2     3     4
4. I'm always optimistic about my future.
      0     1     2     3     4
5. I enjoy my friends a lot.
      0     1     2     3     4
6. It's important for me to keep busy.
      0     1     2     3     4
7. I hardly ever expect things to go my way.
      0     1     2     3     4
8. I don't get upset too easily.
      0     1     2     3     4
9. I rarely count on good things happening to me.
      0     1     2     3     4
10. Overall, I expect more good things to happen to me than bad.
      0     1     2     3     4

Rosenberg Self-Esteem Scale (RSES):

Instructions: Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.
1 = Strongly disagree
2 = Disagree
3 = Agree
4 = Strongly agree

1. On the whole, I am satisfied with myself.
      1     2     3     4
2. At times I think I am no good at all.
      1     2     3     4
3. I feel that I have a number of good qualities.
      1     2     3     4
4. I am able to do things as well as most other people.
      1     2     3     4
5. I feel I do not have much to be proud of.
      1     2     3     4
6. I certainly feel useless at times.
      1     2     3     4
7. I feel that I'm a person of worth, at least on an equal plane with others.
      1     2     3     4
8. I wish I could have more respect for myself.
      1     2     3     4
9. All in all, I am inclined to feel that I am a failure.
      1     2     3     4
10. I take a positive attitude toward myself.
      1     2     3     4

International Positive and Negative Affect Schedule - Short Form (I-PANAS-SF):

Instructions for each word: Thinking about yourself and how you normally feel, to what extent do you generally feel:
1 = Never
2 = Almost never
3 = Sometimes
4 = Almost always
5 = Always

Upset:
  1  2  3  4  5
Hostile:
  1  2  3  4  5
Alert:
  1  2  3  4  5
Ashamed:
  1  2  3  4  5
Inspired:
  1  2  3  4  5
Nervous:
  1  2  3  4  5
Determined:
  1  2  3  4  5
Attentive:
  1  2  3  4  5
Afraid:
  1  2  3  4  5
Active:
  1  2  3  4  5