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Does physical activity have an impact on academic stress and perceived stress? And is there a difference between male and female students and their levels of perceived and academic stress?

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Abstract

The first hypothesis of this study is to investigate if different levels of physical activity (PA) will impact the levels of academic stress (AS) and perceived stress (PS) in college students. The second hypothesis is to investigate if there is difference between males and females and their perceived stress and academic stress levels. A total of 80 students, of an age ranged from 18 to 31 years (M=22.26 years) were recruited through social media platforms (e.g., Facebook). Three questionnaires were used to assess PS, AS, and PA levels. For the first hypothesis two separate between groups ANOVAs were conducted. For the second hypothesis two separate independent samples t-tests were run. There was no statistically significant difference in levels of PS for the three PA groups, F (2, 77) = 2.20, p = .117. However, there was a small statistical significant difference in AS levels for the three PA groups, F (2, 77) = 7.19, p = .001. There was no significant difference between genders and their levels of PS and AS. This study had limitations such as small sample size and a bias towards low and moderate PA groups. This study was conducted to get a clearer understanding of the student population, as little research is conducted on this population.

Introduction

According to the World Health Organization, 1 in 4 people do not meet recommended levels of physical activity (PA) (at least 30 minutes daily) (World Health Organization, 2020). An insufficient amount of PA can result in 30% of an increased risk of dying compared to those who are sufficiently active (World Health Organization, 2020). World Health Organization defines (2020) PA as ‘any bodily movement produced by skeletal muscles that requires energy expenditure’. PA is beneficial for overall health for any age and helps to prevent chronic diseases and other health risks such as coronary heart disease, stroke, diabetes type 2, obesity, and even certain cancers (Colcombe & Kramer, 2003; Paffenbarger, et al., 1986; Zubala, et al., 2017). According to Nuzum and colleagues, (2020) PA is

beneficial for healthy ageing as well as those who are at risk of being diagnosed with dementia or mild cognitive impairment. Research has found that PA is beneficial for mental health, especially good for individual's suffering with anxiety and mild depression (Fontaine, 2000). Exercise and its effects on depression and anxiety, is a very well researched area (Ranjbar, et al., 2015; Focht & Hausenblas, 2004). A study found that 60 female students who completed the Beck Depression Inventory found that after 4 weeks of engaging in exercise such as swimming and bodybuilding, scores of depression where significantly decreasing (mean depression scores decreased from 12 to 8.5, $p<.005$) (Ahmed, et al., 2002). Previous literature which investigated the student population and their stress or PA, contained mainly females (e.g., Tyson, et al., 2010; Wunsch, Kasten & Fuchs, 2017; Gustems-Carnicer, et al., 2019). This may be due to more females attending college than males (Marcus, 2017). According to the Atlantic, female students are outnumbering the male students by 1 to 6 (Marcus, 2017). This can pose a gender bias in research findings. This can cause the males to be underrepresented by literature. Most studies had a mean age of around 21.7 years, this indicates that many studies did not contain many mature students, and findings may differ for mature students (Largo-Wight, et al., 2005; Wunsch, Kasten & Fuchs, 2017; Gustems-Carnicer, et al., 2019).

In today's modern world, it is harder to regularly engage in PA, with most jobs promoting sedentary behaviour (e.g., in office jobs) (Deliens, et al, 2015). Sedentary behaviour (e.g., sitting, lying down) is common among depressed individuals', who engage in it more often than healthy individuals' (Garrison, et al., 1992). This suggests there is a relationship between depressive state and psychological well-being, because of this the individual may be at risk of diseases associated with physical inactivity (Garrison, et al., 1992). Only 22%% of U.S. adults aged between 18-64 years, meet the recommended guidelines for PA (Blackwell & Clarke, 2018). However, it is not surprising that many people

do not get enough PA on daily basis, as it requires time and effort to motivate one to engage in it (Biddle & Mutrie, 2000). More benefits of PA include improving one's cardiovascular muscles, helping reduce blood pressure, pumping more oxygenated blood around the body with less effort, this can be achieved with the minimum recommended PA on a day-to-day basis (Nystoriak & Bhatnagar, 2018). PA is good for our mental health, it helps to prevent depression by continually releasing positive hormones e.g., endorphins (Craft & Landers, 1998; De Moor, et al., 2006), and improves sleep, by releasing more melatonin (Myllymaki, et al., 2011; Singh Clements & Fiatarone, 1997) and improves academic performance in children (Booth & Lees, 2007). Participating in frequent PA is found to be beneficial in coping with stress (Jackson, 2013). During Covid-19, many people have limited space to engage in PA, during lockdowns as gyms and group training is forbidden for the time being (Amatriain-Fernández, et al., 2020). This may lead people to engage in PA less frequently, which can lead to an increase in sedentary behaviour during lockdowns, leading to physical body changes (e.g., weight gain) and mental health issues, especially from stress (Davies, et al., 2018).

Stress effects everyone including young children and adolescents, there are various causes for stress such as environment and various life events (Grant, et al., 2004). Stress occurs when an individual encounters a situation that they perceive as overwhelming and struggle to cope with the immense pressure (Bataineh, 2013). These stressors may be relationships, finances, and jobs, which are just few of many factors of our lives that contribute to stress (Hammen, 2005). Stress can have direct (e.g., high levels of stress hormones) and indirect (e.g., smoking) negative impact on physiological effects, due to the engagement in harmful behaviours to cope with stress (Glanz & Schwartz, 2008). College students face unique stressors compared to the general population such as adjusting to independent lifestyle, academic work, and uncertainty of the future (Bland et al., 2014; Chao,

2012). There are different types of stress. Chronic stress is a type of stress that lasts over a period (longer than a couple of weeks) which may consist of a build-up of day-to-day stress (Hammen, 2005). Acute stress can occur through fight or flight situations but only lasts for a short period of time, example of this would be an individual losing their phone (McEwen, 1998). Acute stress can be beneficial to motivate and challenge a person to perform better and protect them from harm's way (e.g., meet assignment deadline) (Gustems-Carnicer, et al., 2019). However, pro-longed chronic stress can cause physical and psychological problems such as depression and memory impairment (Dias-Ferreira, 2010; Marin, et al.,2011).

Academic stress is common among college students, this possesses new stressors related to education such as accommodation, fear of failing and assignments (Fairbrother & Warn, 2003). It is revealed that roughly one-third of higher education students' dropout within their first year, worldwide (Respondek, et al., 2017). One of the main reasons for such a high dropout rate may be due to stress and student's inability to cope with such high pressures from their new environment (Respondek, et al., 2017). Both academic and perceived stress can have unfavourable effects on one's psychological and physical health if not dealt with properly (Falkner, et al., 1979). Like regular stress, academic stress can negatively impact the immune and neuroendocrine functions (Segerstrom & Miller, 2004). It is common for students to experience high academic stress during exam period (Wunsch, et al., 2017). It is important for students to remain active during these stressful periods to better deal with academic stress (Deliens, et al, 2015). However, it is reported that up to 50% of students participate in sedentary behaviour for up to 8 hours, daily (Deliens, et al, 2015). Pro-longed academic stress can cause harm to students by increasing their risk of experiencing anxiety, sleep disturbances and depression (Lund, et al., 2010; Edwards & Rothbard, 1999; Dyrbye, et al., 2006). Similarly, prolonged perceived stress can increase morbidity, mortality in coronary artery disease, diabetes, hypertension, depression, and sleep disturbances

(Ghiadoni, et al.,2000; Thorsteinsson & Brown, 2009; Stixrud, 2012; McEwen, 1998; Blumenthal et al., 1990; Stixrud, 2012). For students, stress can negatively impact their learning, judgement, and adaptive functioning which are vital for college life (Vaez & Laflamme, 2008; Stixrud, 2012). Stress among college students is common and is often left unaddressed which results in their academic performance declining, more importantly leading to mental and physical problems (Gubata, et al., 2013). It is not surprising that students experience higher stress levels than the general population and leaving them vulnerable to mental health issues (Bayram & Bilgel, 2008; Stallman, 2010; Zajacova, et al., 2005).

Coping is one of the main processes in managing stress (Gustems-Carnicer, et al., 2019). There are numerous ways to reduce stress, one of these is through exercise (Stults-Kolehmainen & Sinha, 2014). Stress reduction strategies, whether it is coping strategies or exercise, they all aim to decline levels of stress and improve psychological well-being of an individual (Gustems-Carnicer & Calderón, 2013). PA is used as a preventative measure, as well as treatment for stress related issues (Rueggeberg, et al., 2012; Nabkasorn, et al., 2006). Literature has supported that PA helps to relieve and to cope with stress (Meyer & Larson, 2018 & Wahl, et al., 2020). Physically active individuals are better at dealing and coping with physical and daily stressors, than those who do not engage in PA (Throne, et al., 2000; Rimmele, et al., 2007). Some of the benefits of PA are it helps to reduce stress levels and can improve behavioural and biological processes (e.g., decrease smoking, improved nutrition intake), where the stress may have negatively affected physical health (Boutelle, et al., 2000; Rimmele, et al., 2009). There have been many studies conducted which have looked at the effects of PA on different types of stress. These studies involved different types of PA, such as cycling, running and different population groups (Grant, et al., 2004; Ghiadoni, et al., 2000). A study investigating the psychological predictors of acute stress and recovery responses, found that PA intensity tolerance had a positive effect on perceived stress (Wahl,

et al., 2020). Woller and colleagues (2018), investigated if green exercise (participants exposed to nature sounds and views while exercising) can help boost recovery from acute stress. Results displayed decreased stress levels and improved mood scores after exercising (Woller, et al., 2018). The interest of this study is academic stress experienced by college students. Academic stress is caused by factors relating to the academic environment, this can include course work, needing to learn a large amount of information in a short period of time and exams, etc. (Wilks & Spivey, 2008). Majority of previous studies have found female students to be significantly more stressed than male students (Cavallo, Carpinelli & Savarese, 2016; Amponsah & Owalabi, 2011; Calvarese, 2015). These results may have been found due to small sample size, with more females present in studies than males and lack of diversity (e.g., sample population from one location) (Ebrahim, 2016; Amponsah & Owalabi, 2011; Calvarese, 2015). Even though stress can be beneficial at times, it is important to cope with it appropriately such as by engaging in frequent PA to prevent stress from causing any health issues (Wahl, et al., 2020).

The field of interest for this study will be college students and their engagement in PA. To investigate if students' fitness level has an impact on their academic and perceived stress. The student population is vulnerable to mental health issues due to the immense pressure from their demanding college life (Tyson, et al., 2010). Students experience unique stressors compared to the general population, which can impair their day-to-day life and academic performance, making academic stress an issue among students (Bataineh, 2013; Fairbrother & Warn, 2003). Literature does support that high levels of stress lead to poor academic performance (Sobhail, 2013). A survey revealed that up to 20% of the student population are suffering from psychological issues (e.g., stress) at any given time (Kumaraswamy, 2013). This is why it is important to study the student population and their stress levels in order to help students to cope with the immense pressures.

Physical Activity, Perceived Stress and Academic Stress

For such a large student population, very little research has been performed on benefits of PA on students (Tyson, et al., 2010). Meyer and Larson (2018) conducted a study which investigated if health promotions (e.g., leaflets), can help influence college students' behaviour to reduce stress. This study found a strong link between exercise and its ability in reducing stress, resulting in improved academic performance (Meyer & Larson, 2018). Similar results have been found in other studies (e.g., Yang & Chen, 2018). To measure academic and perceived stress, many studies opted for questionnaires (e.g., Bedewy & Gabriel, 2015; Largo-Wight, et al., 2005). Perceived Stress Scale (PSS) (Cohen, Kamarck, & Mermelstein, 1983) was found to be the most common questionnaire used in studies to assess perceived stress (Khan, Altaf, & Kausar, 2013; Nguyen-Michel, et al., 2006). Academic Self-Efficacy and Stress scale was common to assess academic stress (Cherry & Wilcox, 2020). To measure PA among participants many studies used a questionnaire such as the Physical Activity Questionnaire and total weekly leisure activity score developed and validated by Godin and Shephard (1985) (Nguyen-Michel, et al., 2006; Tyson, et al., 2010). This study will also use questionnaires to assess academic stress, Perceived Academic Stress, 18-item scale will be used (Bewedy & Gabriel, 2015). For perceived stress, the Perceived stress 5-point scale will be used (Wickrama, et al., 2013) and for PA performed on average on weekly basis Godin Leisure-Time Exercise will be used (Godin, 2011). These questionnaires are appropriate because they will assess the interests of this study by, finding out how often engage in PA, and the score will be revealed how physically active they are (the higher the score, more physically active the person is) (Godin, 2011). The other two questionnaires will assess levels of perceived and academic stress among students. The questionnaires will allow for more participants to be recruited for the study with the use of the internet as questionnaires are easy to understand and fill out.

Limitations for previous studies conducted include only recruiting participants who are physically active, and fail to specify PA levels (e.g., low, moderate, and high) (Wahl, et al., 2020; Macone, et al., 2006) meaning the results of these studies cannot be applied to every student, as everyone has different fitness levels. Small sample sizes are common, usually containing more females than males is an issue (Woller et al., 2018; Largo-Wight, et al., 2005; Calvarese, 2015). Throughout literature it has been detected that the two genders do differ in stress levels (e.g., Macone et al., 2006; Mishra, 2018). However, due to lack of male participation in student-based studies, results cannot be generalized to male students (Marcus, 2017). A study should attempt to recruit equal number of female students and male students, to see if there is a difference between genders and their academic and perceived stress levels. Recruiting participants from a single place is a limitation because findings for one region may not be applicable for different region (Bland, et al., 2014; Meyers & Larson, 2018; Calvarese, 2015; Mishra, 2018). To over-come these limitations, this study will be open to all people who are currently in education to receive a result that can be representative of all students. To ensure the study receives students from various colleges, the study will be sent out to social media groups where a variety of colleges are present to ensure variation in students.

The reason for this study is because young people are becoming more aware of their health, both physically and mentally (Pedersen & Thomsen, 2017). More young people are looking for ways to stay healthy and wanting to look after their overall well-being (Macone, et al., 2006). As teenagers' transition to college life, this transformation also carries new responsibilities, they struggle to cope with the daily stressors that college life may bring them (Gubata, et al., 2013). There is literature that investigates the relationship between stress and PA in college students (Wahl, et al., 2020; Meyer & Larson, 2018). However, as mentioned before they lack in-depth of PA levels (Wooler, et al., 2018). Fitness level may play role in coping with stress, for example, students who regularly engage in PA, may be able to cope

better with stress than those who rarely engage in PA. Collecting data from participants from various locations rather than just one would help the results of the study be more accurate (Bland et al., 2014). The aims of this study will be to investigate the impact of different levels of exercise on students' academic and perceived stress. The research question is do different levels of exercise have an impact on college students academic and perceived stress. The first hypothesis is that different levels of physical activity engagement will impact the levels of academic and perceived stress in college students. The second research question is will there be a difference between males and females and their levels of academic and perceived stress. The second hypothesis is that there will be a gender difference in perceived academic stress and perceived levels of stress.

Method

Participants

The study consisted of 80 student participants. The sample included 45 females (56.3%) and 35 males (43.8%), aged between 18 and 33 years (M: 22.2, SD: 2.6). Students at various colleges took part in the study. The study was distributed online through social media such as Facebook, Facebook groups which contained students and Instagram. Only individuals' who were in education (e.g., college, university and post leaving certificate) were invited to take part in the study. The participants had to be at least 18 years old to participate. The participants were asked to complete a questionnaire that assessed their academic and perceived stress, as well as their PA engagement. The questionnaire also obtained demographics such as age and gender.

Materials

The study consisted of three questionnaires which were The Perception of Academic Stress Scale (PAS), (Bewedy & Gabriel, 2015), The Perceived Stress Scale (PSS) (Wickrama, et al., 2013) and Godin Leisure-time Exercise Questionnaire (Godin, 2011). PAS

is an 18-item scale and a 5-point Likert-type (from 1= strongly disagree to 5= strongly agree) (Bewedy & Gabriel, 2015). Higher scores indicate higher levels of academic stress (Bewedy & Gabriel, 2015). PAS was used to measure perceptions of academic stress and its causes, (Bewedy & Gabriel, 2015). 90 is the highest score that can be received, higher results indicate more academic stress (Bewedy & Gabriel, 2015). The scale investigates four factors which may be responsible for causing academic related stress, these four factors are responsible for 46% variance (Bewedy & Gabriel, 2015). These factors are: Factor 1: pressure to perform (typically stems from excess pressure from competition between students, parents' expectations, etc.), five items, 18% variance, Cronbach's Alpha, 0.6 (Bewedy & Gabriel, 2015). Factor 2: perceptions of workload and examinations (refers to stress associated with excessive workload and fear of failing in examinations), four items, 10% variance, Cronbach's Alpha, 0.6 (Bewedy & Gabriel, 2015). Factor 3: self-perceptions (refers to academic self-confidence), an individual's confidence (making right choices and choosing their future career), five items, 9% variance, Cronbach's Alpha, 0.5 (Bewedy & Gabriel, 2015). Lastly, factor 4: time restraints (associated with stresses due to the limited time allocated for classes and having difficulty maintaining balance between part time employment and course work), six items, 8% variance, Cronbach's Alpha, 0.6 (Bewedy & Gabriel, 2015). The scale consists of questions such as 'I can make academic decisions easily' and 'examination times are very stressful to me' (Bewedy & Gabriel, 2015). The four factors are responsible for 43% variance (Bewede & Gabriel, 2015). The scale has an internal consistency reliability of 0.7 (Cronbach's Alpha) (Bewedy & Gabriel, 2015). In this study the overall consistency reliability was 0.8, with Cronbach's Alpha, for each factor was, factor 1 0.8, factor 2 0.6, factor 3, 0.6 and factor 4 0.5.

The PSS is 12-items, rated on a 5-point scale (from 0=never to 4=very often) higher scores indicate a greater degree of the measure construct (Wickrama, et al., 2013). It

measures perceived stress by measuring two factors, the first part of the scale examines psychological competency, and second part, psychological vulnerability (Wickrama, et al., 2013). Psychological competency involves questions such as 'how often have you felt things were going your way?' and 'how often have you been able to control the way you spend your time?' (Wickrama, et al., 2013). Psychological vulnerability consists of questions such as 'how often have you felt stressed or nervous?' and 'how often have you found yourself thinking about things that you have accomplish?' (Wickrama, et al, 2013). Depending on the total score, which can range between 0-40, participants were then be placed in perceived levels of stress: scores ranging of low stress (scores between 0-13), moderate stress (scores between 14-26) and high stress (scores between 27-40) (Wickrama, et al., 2013). The scale has an internal consistency reliability of 0.8 (Cronbach's alpha) (Wickrama, et al. 2013). When analysing data, the scales Cronbach's Alpha was 0.8.

To measure participants PA level the Godin Leisure-time Exercise questionnaire was used (Godin, 2011). It consists of three sections, A, B, & C. Section A, is for strenuous exercise (e.g., jogging, running, and basketball), B consists of moderate exercise (e.g., tennis, and fast walking) and C consists of mild/light exercise (e.g., yoga, fishing, and bowling) (Godin, 2011). The questionnaire measures how often a person typically engages in the specified exercises on weekly basis for more than 15-minutes during their free time (Godin, 2011). The person then places a number beside each option (A, B, C), depending on how often they engage in it through the week (e.g., twice a week a person runs long distance, they would put a 2 beside option A.) (Godin, 2011). Each response for each option then must be multiplied, option A multiplied by nine, B multiplied by 5 and C multiplied by 3 (Godin, 2011). Participants then add up their scores, based on their total they then are placed in a group: active (Score of 24 or up), moderately active (14-23 scores) or low activity (scores less than 14) (Godin, 2011).

Design

This is a quantitative, cross-sectional study. Convenience sampling and snowball sampling were used to recruit participants. The key variables in this study are academic stress (dependent variable), perceived stress (dependent variable), exercise level (independent variable) and gender (independent variable). The questionnaire was formed on Google Forms, which was then composed of all the questionnaires (PAS, PSS and Godin Leisure-time Exercise questionnaire, (Wickrama, et al., 2013; Bewedy & Gabriel, 2015; Godin, 2011)).

Procedures

The study was performed by posting the questionnaire on social media platforms (e.g., Facebook, etc.) and asking students to participate. The post contained information about the study, such as what are its aims, hypothesis, who is the target population, also informed potential participants that they must be at least 18 years old to participate and estimated time to complete the study was included. A link was included in the post, which brought the participant to the study. Once the participant clicked on the link, they were greeted with participants information sheet. This sheet contained information such as what is the study about, what will be taking part in the study and do participants have to take part in the study. Information about what will happen to their data and how long it will be retained and if there were any queries regarding the study contact details were included. The statement asked to confirm that the participants were over the age of 18 and they were fully aware of the study and its risks to tick the box to give consent to partake in the study. Once the box was ticked, they were welcomed to start the questionnaire. Instructions on how to complete the following scales was displayed at the top of the page before engaging in each scale. At the end of the questionnaire, they reached the debriefing form, which thanked for their participation and if experienced any negative effects due to part taking in the study, they were provided with

helplines they could reach out to. Before they clicked ‘submit’ button, they were once again reminded they can withdraw, but once the data was submitted the data was not retrievable. All questions were made mandatory to fill in.

A pilot study was not necessary. This is because the study was using standardised questionnaires with non-vulnerable sample. The risk of participants’ experiencing minor stress due to the study asks about exercise and stress. This stress may develop due to the sensitivity of the topic to certain individuals leading to them feeling too uncomfortable to continue participation. To solve this, participants are informed before starting the study and before the survey is submitted, that if they wish to withdraw before final submission they can without consequences. As well as, participants were informed that their data is completely anonymous, once they submit it (study avoided asking any personal details that may be traceable to the participant). Another solution was to include helplines’ contact details at the end of the study and encouraged participants to seek help if they experienced any discomfort when taking part in the study. The study was approved by the National College of Ireland, Psychology Ethics Review Committee.

Analytic processes have determined quantitative research, using both descriptive and inferential statistics to analyse the data. Results from the three scales were collected, with no missing data. Two separate ANOVAs were used one ANOVA to examine the differences between the 3 PA category groups (one-way between groups ANOVA), on the outcome of academic stress using the PAS, and another (one-way between groups) ANOVA to examine the differences between the 3 exercise category groups on the outcome of perceived stress. To examine gender differences across the outcomes of academic stress and perceived stress, two Independent T-tests, were completed to form an analysis with this data.

Results

Descriptive Statistics

The current data has been collected from a sample of 80 participants (n = 80). The sample contained 45 females and 35 males, the age groups were placed into three groups for descriptive, mean age is 22.26 years old, see Table 1 for descriptive statistics for gender, age, and activity level.

Table 1

Descriptive statistics for Gender, Age and Activity Level.

Variable	Frequency	Valid Percentage
Gender		
Female	45	56.3
Male	35	43.8
Age		
18-22	78	65.2
23-28	25	31.4
29+	3	3.9
Activity Level		
Low Activity	16	20.0
Moderate Activity	18	22.5
Active	46	57.5

There are three continuous variables which are age, perceived stress and academic stress. Mean (*M*), 95% confidence intervals (95% CI), median, standard deviation (*SD)* and range of these continuous variables are displayed in Table 2.

Table 2

Descriptive statistics for Age, Perception of Stress, and Academic Stress, N=80

Variable	*M [95% CI]*	Median	*SD*	Range
Age	22.26[21.68, 22.84]	22	2.60	18-33
Perceived Stress	27.55 [26.63, 28.46]	27	4.11	14-37
Academic Stress	55.03 [52.84, 57.22]	56	9.83	27-76

Inferential Statistics

For the first hypothesis, a one-way between groups ANOVA was conducted to determine if there was a fitness level difference in perceived academic stress. Participants were divided into three activity groups, based on their Godin Leisure-time exercise questionnaire results, participants scoring under 14 were placed in low activity group, 14-23 placed in the moderate activity group and participants who scored 24 and above were in the active group. There was a statistically significant difference in academic stress level scores for the three exercise groups, F (2, 77) = 7.19, p = .001. The effect size indicated a small difference in academic stress level scores (eta squared = .01). Post-hoc comparison using the Tukey HSD test indicated that the mean score for low activity (M = 48.25, SD = 8.16) was not significantly higher (p = .237) than the moderate activity (M = 53.38, SD = 10.84). The active group had a significant difference in mean scores (p = .001, M = 58.04, SD = 8.73).

There was a statistically significant difference in mean scores between low activity (*M* = 48.25) and active groups (*M* = 58.04, *p* = 001). There was no statistically significant difference in mean scores between active and moderate activity (*p* = .66).

Another one-way between groups ANOVA was conducted for the first hypothesis, to determine if there was a fitness level difference in perceived stress. The same three activity groups were used (low activity, moderate activity, and active groups). There was no statistically significant difference in levels of perceived stress for the three PA groups, *F* (2, 77) = 2.20, p = .117. The effect size indicated a small difference in perception of stress scores (eta squared = .05).

For the second hypothesis, two independent samples t-tests were conducted. The first, independent t-test was conducted to compare levels of perceived stress between males and females. There was no significant difference in scores, with males (*M* = 26.80, SD = 4.58) scoring similarly to females (M = 28.13, SD 3.64), *t* (78) = 1.44, *p* = .15, two-tailed. The magnitude of the difference in the means (mean difference = -2.6, 95% CI: -6.97 to -1.83) was small (Cohen's d = .32).

The second independent t-test was conducted to compare academic stress levels between males and females. There was no significant difference in scores with males (*M* = 56.48, SD = 10.28) scoring similarly to females (*M* = 53.91, SD = 9.42), *t* (78) = -1.16, *p* = .*24*, two-tailed. The magnitude of the differences in the means (mean difference = -2.57,95% CI: -6.97 to 1.82) was small (Cohen's *d* = .26).

Two separate between groups ANOVA were conducted. There was no statistically significant difference in levels of perceived stress for the three PA groups, *F* (2, 77) = 2.20, p = .117. However, there was a statistically significant difference in academic stress level scores for the three exercise groups, *F* (2, 77) = 7.19, *p* = .001. There was a statistically significant difference in mean scores between low activity and active groups (*p* = 001). The

two independent samples t-tests concluded that there was no significant difference between males and females and their perceived stress and academic stress levels.

Discussion

Stress is inevitable, it is part of life. While short-term stress can be a source of motivation to work, it can also have consequences if it becomes pro-longed (Gustems-Carnicer, et al., 2019). The demanding college life may feel like it is constantly asking for more demands than the student can cope with, leading to high academic stress levels (Tyson, et al., 2016). Academic stress can impair academic performance, leading to poorer grades, which can lead to mental health issues if stress is not dealt with properly (Fairbrother & Warn, 2003). The aim of this current study was to investigate the impact of different levels of PA on students' academic and perceived stress. As well as, to investigate if there is a difference between males and females and their levels of academic stress and perceived stress levels. For academic stress and perceived stress, the mean scores indicated that majority of participants were experiencing high stress levels. Whereas previous literature found students to commonly experience moderate stress (Sorout, et al., 2020; Yikealo, Yemane & Karvinen, 2018). However, a study that was conducted during Covid-19, also observed high levels among students, with the highest stressor being uncertainty (Moawad, 2020). It is common to experience high stress during the exam season (Sorout, et al., 2020). The reason for high stress levels may be due to exams approaching as this study was released around November time, before and duration of the Christmas exams. Another variable that may be responsible for high scores for both academic and perceived stress but was not included in the study may be Covid-19. As countries attempt to control this virus, many people such as students, must adapt to new ways of living, which include attending online classes and limiting physical contact. Covid-19 may have caused an increase in stress levels (Gupta, 2020). In this study, up to 57% of participants were highly physically active (active group). The reason why the

study contained many highly active participants could be due to the self-report questionnaire to assess PA levels. This could have cause participants to over-estimate their weekly average in their engagement in PA, this is common among self-reports. However, a study found that students who were moderately or highly active also reported to have a gym near their campus (Chaudhary, et al., 2020). Having a gym near the campus may help encourage students to engage in PA. For the first hypothesis, the results found showed that participants who engaged in low PA also scored low on the academic stress scale compared to group highly active, which scored high in the academic stress scale. These results may be due to students who are experiencing high academic stress, may attempt to cope with academic stress by engaging in more PA than students experiencing low academic stress, which resulted in lower PA levels. The literature provides many various outcomes, such as negative relationship between PA and academic stress or PA does not influence academic stress (Cruz, et al., 2013; Lines, et al., 2020). Majority of the studies have found PA having little effect on academic stress levels (Ebrahim, 2016). Chacón-Cuberos and colleagues (2019), conducted a cross-sectional study, (N=515) found no significance between PA and academic stress. Jones and colleagues (2017) found low PA and sedentary behaviour was positively correlated and revealed low PA predicted higher stress levels. However, it did not support that sufficient PA levels reduce to stress (Jones, et al., 2017). For future studies, a longitudinal study, which considers different PA groups, would be appropriate as it would be able to get consistent data regarding their academic and perceived stress levels and PA. The literature requires more studies which consider different PA levels as this would help to conclude on how to help students to deal with high stress levels more effectively.

However, for the second part of the first hypothesis, there was no significant difference between different levels of exercise on students' perceived stress. These findings were consistent with literature who did not find a difference in PA and perceived stress.

Sorout and colleagues (2020), also detected no significance between PA level and perceived stress in medical students. These participants were found to be highly active, despite experiencing moderate stress levels (Sorout, et al., 2020). This may not necessarily mean that PA decreases stress levels. A longitudinal study revealed to have found a significant between-person variability, while observing exercise effects on stress (Burg, et al., 2017). Out of its 69 participants, only 15 participants associated exercise with significantly lower stress, while 2 participants had significantly higher stress and the remainder experienced no difference in stress levels after exercise (Burg, et al., 2017). This may be an important variable that was not considered when the study was taken that stress and PA may impact individuals differently, which may be the reason why there was no significant difference found between perceived stress and PA groups and why there was only a small significance found between academic stress and PA groups. Another cross-sectional, study of 814 students found not correlation between PA groups and perceived stress (Nguyen-Michel, et al., 2006). This could indicate that PA has less of an influence on stress than originally thought. Results of another study found students who are highly physically active were more likely to have a higher stress tolerance than those who did not (Bland, et al., 2014). However, there is evidence of highly active students of reporting lower perceived stress, than those who engaged in less PA (VanKim & Nelson, 2013; Meyer & Larson, 2018). Nonetheless, VanKim and Nelson (2013), is one of the few studies to investigate the effects of high PA levels on perceived stress. Due to limited literature on students and the impact of their PA levels on academic and perceived stress levels, it is hard to conclude if PA is enough to reduce stress.

For the second hypothesis, the results showed no difference between males and females and their levels of academic stress and perceived stress levels. These findings were not consistent with previous findings, as a large volume of studies, found females to be more stressed than males (Cavallo, Carpinelli & Savarese, 2016; Amponsah & Owolabi, 2011; Lee

& Kim, 2019). A study found females students to be highly stressed which led them to develop physical and mental issues such as depressive symptoms and sleep disturbances (Lee, et al., 2013). Similarly, a cohort study, found that academic performance as a stressor had a gender gap, with females stressing more about performance in education than males (West & Sweeting, 2003). Another reason as why to females may be more stressed than males, could be due to females have higher expectations regarding their physical image (e.g., body shape, etc.), which can cause further stress (West & Sweeting, 2003). In contrast, there are studies which have found males to be more stressed than females (Mishra, 2018; Aihie & Ohanaka, 2019). These studies speculate that in an educational context, the pressure of expectations of males to perform better than females, may be too much or due to procrastination which leads to workload piling up and placing immense pressure to get the workload complete in time (Mishra, 2018; Aihie & Ohanaka, 2019). However, these studies had limitations which may had impacted their findings such as both studies had uneven numbers of both genders, with males dominating the sample size and both studies recruited students from one area (Mishra, 2018; Aihie & Ohanaka, 2019). Nonetheless, it is important to remember that there are more females in education than males, which can underrepresent the male student population (Marcus, 2017). Like the current study, there are studies which have found no significant difference between genders and their stress levels (Farhan & Khan, 2015; Khan, Altaf & Kausar, 2013; Yikealo, Yemano, & Karvinen, 2018). All these studies used PSS to assess academic/perceived stress (Gnomie & Devendiran, 2017; Yikealo, Yemane & Karvinen, 2018). Study conducted by Farhan and Khan (2015), had the most, 300 participants, which were recruited from three different private universities of Pakistan, most of the participants were males. However, even with such a good sample size there was no significant difference found between genders (Farhan & Khan, 2015). Studies which did contain more males than females, still found no difference between the genders (Khan, Altaf

& Kausar, 2013, Yikealo, Yemane & Karvinen, 2018; Farhan & Khan, 2015). Similar limitations apply to these studies as it does to the current study, sample sizes were too small and they lacked diversity of participants (Khan, Altaf & Kausar, 2013; Gnomie & Devendiran, 2017). There are various results present in literature regarding gender difference and their stress levels. Majority of the literature conclude that female students have higher stress levels than males' students. There has been a 32% increase of students attending third level between 2007 to 2017 (Department of Education and Skills). For a population that is increasingly growing each year and the lack of literature on student population. It may be the case that males are underrepresented in studies, as more females take part in studies than males (e.g., Gnomie & Devendiran, 2017). Whatever the case, student population needs to be further studied to get a clearer result.

Limitations

There are several limitations in this study. First, this was a cross-sectional study which has its own limitations such as response bias. Due to the study being posted on Instagram, Twitter, and Facebook, excludes anyone outside of these social medias. During Covid-19, many charities, have come up with new ways of raising money by encouraging people to participate in PA (e.g., 5 kilometer runs). This may have caused people to increase their PA levels to what they would usually be, to take part for in charity events. Due to such a high volume of highly active participants, there was a bias towards the low activity and moderate activity groups. This could have been caused by the self-report questionnaire, causing participants to over-estimate their participation in PA. Covid-19 may have caused students to be more stressed than usual due to the uncertain circumstances. Another limitation, the study does not specify if participants education level and where they are attending. This data would have been beneficial, as it would have helped to find out which education level are the highly stressed students are from (e.g., third level, etc.). Also, would have been beneficial for

diversity, to know from which location (e.g., Trinity, NCI, etc.) participants are coming from. Another limitation is the sample size. The sample size was very small, and this makes it harder for the results to be generalizable to the student population. For future studies, participants should be recruited from multiple sources (e.g., social media and handing out leaflets on campus), this would help to get a more diverse sample of students and may increase sample size. Diversity of location is a common problem as many studies lack samples (including current) from multiple areas. Regardless of the results, the study adds the to the knowledge of the student population. Despite the sample size, did collect similar amount of both genders. Which helped to get an insight if there was a difference between them and their stress levels. The study investigated if there was an association between the three PA groups and academic and perceived stress, this area still requires more research. Nonetheless, because of this study a longitudinal method may be appropriate to gain a better insight into this area. It is evident that PA may not be enough to influence stress and more may be required to cope with it.

Conclusion

Overall, this study found no significant difference between males and females and their perceived stress and academic stress levels. The study also did not find any statistically significant difference in levels of perceived stress for the three PA groups. However, the study did find that those who were in the low activity group, also had low scores for academic stress than those who were in the active group, which displayed higher levels of academic stress. Like the current study, many student population studies are more appropriately studied with a longitudinal method, this would ensure data is more reliable. Especially for student population which can experience high stress levels near exams, etc. One of the major limitations were sample size. This may have given the study a different finding if sample size was greater. Nonetheless, this study gives an insight to students

academic and perceived stress levels. PA may not be sufficient to reduce stress. This is beneficial to know when developing coping strategies for stress for students. More ways of how to reduce stress should be studied other than PA.

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Appendices

Appendix 1

Evidence of SPPS

Descriptives

PASTotal

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
LowAct	16	48.2500	8.16088	2.04022	43.9014	52.5986	36.00	67.00
ModAct	18	53.3889	10.84728	2.55673	47.9947	58.7831	27.00	69.00
Active	46	58.0435	8.73551	1.28798	55.4494	60.6376	40.00	76.00
Total	80	55.0375	9.83078	1.09911	52.8498	57.2252	27.00	76.00

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
PASTotal	Based on Mean	1.178	2	77	.313
	Based on Median	1.205	2	77	.305
	Based on Median and with adjusted df	1.205	2	76.314	.305
	Based on trimmed mean	1.215	2	77	.302

ANOVA

PASTotal

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1201.697	2	600.848	7.192	.001
Within Groups	6433.191	77	83.548		
Total	7634.888	79			

```
T-TEST GROUPS=GenderF(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=PSSTotal
  /CRITERIA=CI(.95).
```

T-Test

Group Statistics

	GenderF	N	Mean	Std. Deviation	Std. Error Mean
PSSTotal	1	45	28.1333	3.64692	.54365
	2	35	26.8000	4.58771	.77546

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
PSSTotal	Equal variances assumed	1.038	.312	1.449	78	.151	1.33333	.92037	-.49898	3.16565
	Equal variances not assumed			1.408	63.737	.164	1.33333	.94705	-.55876	3.22543

Appendices 2

Information sheet

Participant Information Sheet

Does our fitness level have an impact on academic and perceived stress?

You are being invited to take part in a research study. Before deciding whether to take part, take your time to go through this document, which will inform you about this study, it explains why the research is being performed and what it would involve for you. If you have any questions about the information provided, please do not hesitate to contact me using the details at the end of this sheet.

What is this study about?

I am a final year student in the BA in Psychology programme at National College of Ireland. As part of my course, I need to carry out an independent project of my interest. A lot of people today enjoy looking after their wellbeing. We are all looking for ways to stay healthier. Exercise is one way to keep our body and mind healthy. Apart from our body's getting stronger and our mind healthier, I am interested in investigating if different levels of exercise engagement have a differential impact on levels of academic and perceived stress in college students?

What will be taking part in the study?

If you wish to take part in the study, you will be receiving a link which will lead you to the study. The study will greet you with an introduction and information about the study. The estimated time of the questionnaire will be included, and my contact details will be available to reach out if there is any questions or concerns. The study consists of three questionnaires. You will be asked questions such as: Examination time is short to complete answers? how

often have you felt things were going your way? and you will also be asked to put a number of how many times per week to do you engage in moderate exercise (fast-walking, cycling, etc.). The data will be retained until March 2021.

Who can take part?

You must be at least 18 years old to take part. Other than that, anyone is welcome to take part!

Do I have to take part?

You do not have to take part in the study. It is 100% voluntary. It is up to yourself if you wish to take part. You can with draw at any stage if you wish to do so. However, the data cannot be withdrawn once the study has been submitted as the data is anonymised.

What are the possible risks and benefits of taking part?

Benefits of the study, if you are physically active or just have an interest on the topic of the study and wish to know the results of the study and see if there is an affect, I would be happy to report the final result. There is very minimal risk as the participants will not be asked any sensitive topics. But there is a risk of experiencing stress. Participants may be asked about their daily routine. However, if participants feel uncomfortable and they wish to discontinue with the study, that will be respected.

Will taking part be confidential and what will happen to my data?

All data will be treated in the strictest confidence. The questionnaire will be submitted anonymously so the participants cannot be identified (no names or any data that may be traceable to you will be asked). After the questionnaire is submitted it will be analysed further and will be represented using statistics. Any data from the participants will be destroyed immediately after the study has been completed (March, 2021).

What will happen to the results of the study?

The results of this study will be presented in my final dissertation, which will be submitted to National College of Ireland.

Who should you contact for further information?

Participants will be able to contact myself for further information, the contact details will be available to those who wish to take part.

Appendices 3

Consent form

Consent Statement

To proceed to the study, you must be at least 18-years old. This study is completely voluntary, and you do not have to take part if you do not wish to. You can withdraw at any time during the study, without penalty. However, once the data is submitted you will not be able to withdraw the data given, as the data collected is anonymised.

Please tick the box below if you wish to proceed.

☐

Appendices 4

Debriefing form

Thank you for taking your time to complete the study. Your data is submitted meaning you will not be able to withdraw at this time. If you have experienced any distress when completing the study, please reach out to one of the following helplines:

- Free text to SPUNOUT to 50808 (Open 24hours a day, 7 days a week)

Email: Supportmail@aware.ie (Responds within 24 hours, include name and e-mail).

Appendices 5

Questionnaires

Perceived Stress Scale (Wickrama, et al., 2013)

Psychological competency

How often have you felt that you were effectively coping with important changes that were occurring in your life?

How often have you felt confident about your ability to handle your personal problems?

How often have you felt things were going your way?

How often have you been able to control the irritations in your life?

How often have you been able to control the way you spend your time?

Note. Item responses range from *never* (0) to *very often* (4), and higher scores indicate greater psychological competency.

Psychological vulnerability

How often have you been upset because of something that happened unexpectedly?

How often have you felt that you were unable to control the important things in your life?

How often have you felt nervous and stressed?

How often have you found that you could not cope with all the things that you had to do?

How often have you been angered because of things that happened outside of your control?

How often have you found yourself thinking about things that you have to accomplish?

How often have you felt difficulties were piling up so high that you could not overcome them?

Note. Responses range from *never* (0) to *very often* (4), and higher scores indicate greater psychological vulnerability.

Perception of Academic Stress (Bewedy & Gabriel, 2015)

Appendix I. The final version of the Perceptions of Academic Stress (PAS) scale.

Please rate your perception about the following statements in contributing to academic stresses *1 = Strongly disagree to 5 = Strongly agree*	*1*	*2*	*3*	*4*	*5*
Am confident that I will be a successful student					
Am confident that I will be a successful in my future career					
I can make academic decisions easily					
The time allocated to classes and academic work is enough					
I have enough time to relax after work					
Please rate your perception about the following statements contributing to Academic Stresses *1 = Strongly agree to 5 = Strongly disagree*	*1*	*2*	*3*	*4*	*5*
My teachers are critical of my academic performance					
I fear failing courses this year					
I think that my worry about examinations is weakness of character					
Teachers have unrealistic expectations of me					
The size of the curriculum (workload) is excessive					
I believe that the amount of work assignment is too much					
Am unable to catch up if getting behind the work					
The unrealistic expectations of my parents stresses me out					
competition with my peers for grades is quite intense					
The examination questions are usually difficult					
Examination time is short to complete the answers					
Examination times are very stressful to me out					
Even if I pass my exams, am worried about getting a job					

Godin Leisure-Time Exercise (2011)

	Times per week		Totals
a) **STRENUOUS EXERCISE (HEART BEATS RAPIDLY)** (e.g., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)		**X9**	
b) **MODERATE EXERCISE (NOT EXHAUSTING)** (e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)		**X5**	
c) **MILD/LIGHT EXERCISE (MINIMAL EFFORT)** (e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snow-mobiling, easy walking)		**X3**	
WEEKLY LEISURE-TIME ACTIVITY SCORE			

Godin Scale Score	Interpretation
24 units or more	Active
14 – 23 units	Moderately Active
Less than 14 units	Insufficiently Active/Sedentary