Investigating the Relationship between Perceived Stress Levels and Lifestyle Behaviours amongst Third Level College Students

Shauna Mc Laughlin

18416296

Supervisor: Dr. April Hargreaves

B.A. (Hons) in Psychology

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Abstract

Aims: The current study aimed to investigate the relationship between a combination of lifestyle behaviours including sleep quality, exercise, smoking and alcohol consumption on the outcome of stress. A secondary aim of the research was to determine whether there were differences between groups on the outcome of stress. Research has shown that lifestyle behaviours often coexist, despite this, little research examines the interrelationship of lifestyle behaviours amongst college students. **Methods:** Each participant (n = 263) completed five questionnaires examining their stress levels and each lifestyle behaviours using the Perceived Stress Scale (PSS), Pittsburgh Sleep Quality Index (PSQI), Godin's leisure-time exercise questionnaire, a smoking questionnaire and the Alcohol Use Disorder Identification Test (AUDIT). **Results:** Findings from a Multiple Regression analysis revealed that exercise was the only significant predictor of stress. An independent samples t-test also found that smokers score significantly higher in the PSS than non-smokers. A one-way between-groups ANOVA revealed that stress levels were significantly higher amongst those who were insufficiently active compared to those who were active. No lifestyle behaviour alone predicted stress to a greater extent than a combination, although Sleep Quality alone predicted stress to the same extent as the overall model. **Conclusion:** Findings provide greater insight into the cumulative effects of lifestyle behaviours and their impact on stress. Implications are discussed.

Keywords: Lifestyle Behaviours, Perceived Stress, Inter-Relationship, Group Differences, Students Health

Introduction

Perceived stress levels are a major factor that can negatively contribute to an individual's mental and physical health (Chrousos, 2009), and the management of stress is crucial for academic attainment (Nagane, 2004). College students experience significant changes in their lifestyle whilst adjusting from adolescence to college life, these notable changes on top of higher standards of academic requirements can ultimately evoke negative health behaviours (Buresh, Hornbuckle, Garrett, Garber & Woodward, 2018). Poor social support, financial strains, and academic requirements are all factors that contribute to perceived stress levels amongst students (Hurst, Baranik & Daniel, 2013). Many students at this stage have not developed the appropriate skills to deal with stress (Arnett, 2014). If an individual can achieve high levels of mastery, social support, and/or self-esteem, the factors that can cause perceived stress on an individual can have less of a negative effect on a person's health and overall well-being. Without these coping skills, the attempt to manage stress can impact negatively on an individual's lifestyle behaviours (Thoits, 2010). Young adults respond to stressful situations through health behaviours including exercise, drinking, and smoking (Umberson, Liu & Reczek, 2008). The transition into young adulthood is a crucial period in the formation of health behaviour tendencies that can impact outcomes in later adulthood (Auerbach, Admon & Pizzagalli, 2014). Health behaviour changes amongst students are more notable than those of other groups experiencing similar stress due to students having fewer constraints (Steptoe, Wardle, Pollard, Canaan & Davies, 1996) and with limited knowledge and access to coping skills for chronic stress (Mohr et al., 2014) students are likely to experience problems surrounding health and lifestyle behaviours. This literature review aims to examine the relationship between perceived stress levels and the effect it has on the health behaviours of a sample of college students.

Research has repeatedly found that psychological stress is linked to poor health including cancer and heart disease (Tennant, 2000) and is a predictor of mental health disorders such as depression and anxiety (Augner, 2015). Research investigated psychological stress and its association with future health problems. They found that stress is a major predictor for future outcomes of poor health and disease (Turner et al., 2020). Researchers revealed that between 35-50% of third-level students drop out of college due to not having knowledge or access to the necessary coping skills to deal with chronic stress (Mohr et al., 2014). Stress shows to have a series of negative effects on the body physically and psychologically. In this literature review, I will discuss several factors that contribute to perceived stress levels amongst college students which include sleep quality, exercise, smoking and alcohol consumption.

Sleep quality has a large impact on stress levels. Sleep quality can be impacted by different types of stressors (Kim & Dimsdale, 2007). Researchers provide evidence that there is a significant relationship between sleep quality and stress amongst college students (Almojali et al., 2017). Researchers investigated the associations between stress, depression, and sleep quality using a multidimensional model on a sample of college students. Participants presented with perceived levels of stress and depression. On average participants got 8.4 hours of sleep each night. Results revealed that stress and depression were both predictors of sleep quality but not sleep quantity (Wallace, Boynton & Lytle, 2016). Poor sleep quality and high levels of exhaustion and psychosocial stress are associated with poor health (Waeldin, Vogt, Gerhards & Hellhammer, 2018). Stress is also impacted by everyday tasks, for example, stress relating to working the next morning also results in poor levels of slow-wave sleep (Kecklund & Åkerstedt, 2004). Poor coping strategies along with stress is also a predictor of poor sleep quality (Sawah et al., 2015). A study also found that students who are more likely to suffer from perceived stress also have poor sleep hygiene (Doğan & Doğan, 2019). Students who report being poor sleepers report more issues regarding mental

and physical health compared to students who report being good sleepers overall (Lund et al., 2010).

Research suggests that infrequent exercise and smoking are also factors that can result in perceived stress levels amongst the working adult (Ng & Jeffery, 2003). Group differences are evident between smokers and non-smokers. Researchers found that students who smoke daily reported higher stress levels than students who don't smoke (Liu et al., 2007). Researchers revealed that smoking amongst students who were experiencing exam stress increased by 54.7% within women and remained consistent amongst men (Steptoe et al., 1996). Although there are significant gender differences here it is not certain as to why this is. An explanation could be that males and females may differ in terms of coping with stressful situations. It was found that students who have increased social support report reduced alcohol consumption during exam time and those with low social support increase alcohol consumption. Through the period of adolescence, there is seen to be an increase in smoking and alcohol use (Kwan, Cairney, Faulkner & Pullenayegum, 2012).

Perceived alcohol use is another factor that can impact the overall quality of life for students (Araas & Adams, 2008). One study examined how multiple health risk behaviours were associated with mental health. These risk behaviours included factors like smoking, binge drinking physical inactivity, and poor sleep hygiene. Results divided students into three categories: typical, high risk, and moderately healthy. Students in the high-risk category represented 20% of the sample and had the highest probability of smoking and binge drinking; 55-61%. Students in the high-risk category also reported the highest levels of stress (Kwan, Arbour-Nicitopoulos, Duku & Faulkner, 2016). Research by Park et al., (2004) also found that students consume more alcohol on days where they experience relatively more stress than on a normal day.

Another factor associated with perceived levels of stress amongst students is physical activity. Physical activity decreases during exam time. A literature review revealed that those who experience perceived stress levels show little or no attempts towards physical activity (Stults-Kolehmainen & Sinha, 2013). A similar study by Badger et al. (2019) examined a series of health behaviours and their association with perceived stress levels. A pedometer was used to measure physical activity, steps were recorded every day and an average was calculated for the seven days. Results indicated that perceived stress was most associated with physical inactivity and smoking, showing strong associations amongst women. Although, diet, binge-drinking, and BMI were not found to be significantly related to perceived stress levels. Participants in the study were students who enrolled in an introductory nutrition course which presents with obvious limitations, for example, students enrolled in this course may be more conscious of their health and lifestyle behaviours. The first study to examine a series of lifestyle behaviour including smoking, binge-drinking, fruit and vegetable intake and physical activity amongst college students found that high levels of psychological stress are related to low levels of physical activity (Dodd et al., 2010). Smoking, binge drinking, and physical inactivity increase in adolescence and can progress into adulthood (Kwan et al., 2012).

As seen from the literature above college student's lifestyle behaviours are negatively affected due to a series of stressors. Evidence shows that college students need interventions to promote healthy lifestyle behaviours. The ACHA NCHA III scale collects data every year from a large population of college students. The most recent study from spring 2020 presented students with a series of factors that may influence their academic performance including factors like alcohol use and intimate relationships. Stress was shown to negatively impact academic performance to a greater extent than any of the other factors (28%). The study also revealed that 30% of all college students reported receiving psychological or

mental health services. Only 56% of students get between five and seven hours of sleep on weekdays. Additionally, only 32% of college students eat three or more servings of vegetables a day. Independence is introduced when students move away from home, therefore the introduction of several new lifestyle behaviours seem to negatively impact student's stress levels.

The current study

Most research to date examines student lifestyle behaviours individually rather than a cluster of lifestyle behaviours. Prior literature concentrates on the effects of stress concerning individual lifestyle behaviours including physical activity, alcohol use, and sleep quality alone, rather than investigating a combination of those lifestyle behaviours, resulting in findings being more realistic and ecologically valid. Stress has repeatedly shown to negatively impact college student's health behaviours overall (Chrousos, 2009; Stults-Kolehmainen & Sinha, 2013; Thoits, 2010) and particularly impacts sleep quality, exercise, smoking, and alcohol use (Araas & Adams, 2008; Gerhards & Hellhammer, 2018; Ng & Jeffery, 2003; Waeldin, Vogt, 2018). The above research indicates the need for interventions for the college student population concerning perceived stress levels. Research into this topic can be beneficial for students if they are provided with the knowledge and methods to manage stress before reaching an unmanageable point where stress can negatively impact the student's lifestyle behaviours and their quality of life.

Therefore, the current study aims to look at the relationship between a combination of lifestyle behaviours and stress, determining whether the cumulative effects of lifestyle behaviours predict the outcome of stress. A secondary aim for the research is to determine whether there are differences between groups including smokers and non-smokers, and levels of exercise on the outcome of stress. Statistics reveal that the number of undergraduate students in Ireland between the ages of 18-24 was *n*= 135,860, this was the largest number of

students in any age group (Higher education authority, 2018). Similar studies have used the same age range (, Badger, Quatromoni, & Morrell, 2019, Dalton & Hammen, 2018). Research shows that compared to mature groups and baby boomers, millennials report a higher level of stress (APA, 2020). The knowledge gained from the current study could contribute towards the development of interventions. The research questions and hypothesis below were produced by the above aims:

Research Question 1: Does the relationship between a combination of lifestyle behaviours (smoking, exercise, alcohol consumption, and sleep quality) predict the outcome of stress? Based on previous literature we hypothesise that the relationship between a combination of lifestyle behaviours will predict the outcome of stress.

Research Question 2: Is there a difference in stress levels between smokers and non-smokers. Hypothesis 2: There is a difference in stress levels between smokers and non-smokers.

Research Question 3: Is there a difference in stress levels for college students who are active, moderately active, and insufficiently active. The third hypothesis states that there is a difference in stress levels for college students who are active, moderately active, and insufficiently active.

Research Question 4: Does the relationship between a combination of lifestyle behaviours predict stress levels to a greater extent than any of the lifestyle behaviours alone. The final hypothesis states that the combination of lifestyle behaviours predict stress to a greater extent than any of the lifestyle behaviours alone.

Methodology

Participants

The initial sample consisted of 277 participants, although 14 individuals were removed for not fitting in the correct age range. The final sample consisted of 263 participants (Males: n = 106; Females: n = 154; Other: n = 2). The sample size was calculated using an online sample size calculator (Creative Research Systems, 2019) setting the population of college students in 2020 in Ireland age 18-24 at N = 237,328 (Lawlor & Burke, 2021). Previous research investigating perceived stress levels amongst undergraduate students reported sample sizes of 332, 114, and 285, however, this research was conducted in the U.S which has a larger population size than Ireland (Lee, 2012). For the current study, the sample size calculator indicated that the minimum sample size n = 177.

Each participant was a third-level student and between the ages of 18-24. Participants were recruited using non-probability convenience sampling using social media platforms including Facebook and Instagram and no incentive was given for participation in the research. To participate in the study each participant was required to give informed consent. Demographics including age and gender were collected from each participant.

Materials

Five scales were used in the current study to measure stress, sleep quality, exercise, alcohol consumption, and smoking. Each participant was provided with a link to an online Google form, a survey builder where all scales and questionnaires were completed. Demographics including gender and age were also included. The following questionnaires and scales were used:

The Perceived Stress Scale (PSS)

The PSS measures an individual's stress levels over the past month. It is a ten-item scale developed by Cohen, Kamarck, and Mermelstein (1983). Each question is a general question

regarding an individual's feelings and thoughts over the past month (e.g. in the last month how often have you felt nervous and stressed?). Each question is scored on a five-point Likert scale ranging from 0 (*never*) to 4 (*very often*). The PSS has been used in previous studies that focus on a college student population and has shown good reliability and validity; Cronbach's alpha of 0.89 (Roberti, Harrington & Storch, 2006). In the current study, the Cronbach's alpha coefficient for the PSS was .84 which indicates high internal consistency. Total scores on the scale range from 0-40. Scores ranging from 0-13 indicate low levels of stress; 14-26 indicate moderate stress and 27-40 indicate high-stress levels.

Godin and Shepard's Leisure Time Questionnaire (LTEQ)

This scale is used to measure exercise levels and was developed by Godin and Shepard (1985). Participants are asked how many times per week do they participate in three different types of exercise (1) strenuous exercise, this includes anything that gets the heart to beat rapidly for example running or football (2) Moderate exercise, this is not exhausting for example fast walking or swimming and (3) Mild/Light exercise, this involves minimal effort like yoga or fishing. Weekly frequencies of strenuous, moderate, and mild exercise are multiplied by nine (strenuous), five (moderate), and three (mild/light). These scores are then converted into a weekly metabolic equivalent. A score above 24 units is interpreted as active, between 14 and 23 units is moderately active and less than 14 is insufficiently active/sedentary. Research was conducted to determine reliability and validity and results revealed an overall good reliability and validity score, Cronbach's alpha .85 (Godin & Shepard, 1985). The Cronbach's alpha was also calculated for the current study and received a score of .43.

The Pittsburgh Sleep Quality Index (PSQI)

The PSQI was used to measure sleep quality and was developed by Buysse et al., (1989). The questionnaire assesses sleep quality and disturbances over the past month. It consists of

seven components; Subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Each item is scored on a 0 to 3 interval scale. The PSQI contains questions that relate to sleep habits (e.g. hours of actual sleep, usual time going to bed, usual waking up time). An overall score is administered; participants can score between 0 and 21 where lower scores indicate healthier sleep quality and high scores indicate poor sleep quality. The PSQI has good internal reliability and validity; Cronbach's alpha of 0.83 for the seven components of the questionnaire. (Buysse, 1989). the Cronbach's alpha for the current study was .68.

The Alcohol Use Disorder Identification Test (AUDIT)

The AUDIT was used to measure alcohol consumption amongst the sample. The AUDIT was developed by the WHO to assess alcohol consumption and drinking behaviours. There are two versions of the AUDIT: a clinically administered version and a self-report version. The current study used the self-report version. It is a ten-item questionnaire. Participant's scores can range from 0-40. A score from 0-7 indicates low risk and a score above eight indicates harmful alcohol usage (Saunders, Aasland, Amundsen & Grant, 1993). Research suggests good internal reliability and validity; Cronbach's alpha 0.80 (Moussas et al., 2009). The Cronbach's alpha for the current study was .80.

Smoking

To measure smoking each participant was asked one question: Do you smoke? Each individual was required to answer either Yes or No. Those who responded yes were categorised in a smoker's group and those who responded no were in the non-smoker's group.

Design

The research design in the current study is a cross-sectional design as data is going to be gathered from the sample at one specific point in time. A quantitative approach was used;

data was collected using surveys and questionnaires. The dependent variable (DV) in this study was Stress. The independent variables (IVs) in the study include sleep quality, exercise, alcohol consumption, and smoking. Standard Multiple regression was used to test the first hypotheses testing whether a combination of lifestyle behaviours would predict the outcome of stress. Stress was the Criterion Variable (CV) and sleep quality, exercise, alcohol consumption, and smoking were the Predictor variables (PV's). An independent-samples t-test was used to test the second hypothesis that investigated whether there are differences in stress levels between smokers and non-smokers. Stress was the DV and smoking was the IV. A one-way between-groups ANOVA was used to test the final hypothesis investigating differences in college students who are active, moderately active, and insufficiently active. For this hypothesis stress was the DV and exercise was the IV. Multiple regression was used to determine whether the relationship between a combination of lifestyle behaviours predict stress levels to a greater extent than any of the lifestyle behaviours alone. For the final hypothesis stress was the CV and sleep quality, exercise, alcohol consumption, and smoking were the PV's.

Procedure

All the data for the current study was collected through an online questionnaire via google forms. Information regarding the study was posted on social media platforms like Facebook and Instagram. A link was then provided to Google forms and those who were interested in participating followed the link and completed the questionnaires. Participants were greeted with an information leaflet outlining what was entailed in participating in the study (Appendix G). The questionnaire was completely anonymous. Each participant was required to give informed consent to participate in the study (Appendix H). If informed consent was not given participation was not allowed.

Each individual completed the google forms questionnaires which consisted of five sections including the smoking questionnaire, The Perceived Stress Scale, the Pittsburgh Sleep Quality Index, The AUDIT, and Godin Leisure Time Questionnaire (see appendices II, III, IV, V, and VI). Each of these scales is outlined in detail in the materials sections above. Participation in the project will take no more than 20 minutes to complete all relevant questionnaires including filling out information on demographic variables. Demographics will include age and gender (Appendix A). Participants could complete the above questionnaires in their own time and be able to take a break whenever necessary.

Ethical Considerations

Data collected for the current study followed all the ethical guidelines and was approved by the NCI ethical committee. All participants provided informed consent before participation. Any risks involved in the study were outlined in the information leaflet section that each participant read before participating in the research study (see appendix G). Although little risk was anticipated in participating in the study a debriefing leaflet included helplines and contact emails of the researchers if any individual felt distressed after participation (see appendix I).

Results

Descriptive Statistics

Data from the current study was taken from a sample of 263 third level students. From the sample 106 were male (*n* =106), 154 were female (*n* =154) and 2 participants selected the third option, other (*n* = 2). Descriptive statistics were performed for each variable including gender, smoking, age perceived stress, sleep quality, alcohol use, and exercise. Means (*M*), Standard Deviations (*SD*), and Range were performed on each variable. Preliminary analysis was preformed on the data set to ensure all data was normal distribution of all data. Alcohol Consumption and Exercise were positively skewed. The analyses used to measure both variables were robust, therefore a non-parametric alternative was not necessary.

Descriptive statistics for the categorical variables are presented in Table 1. The majority of participants were female (58.6%). Descriptive statistics for the continuous variables are presented in Table 2. Descriptive statistics for stress scores for each exercise group is presented in Table 3.

Table 1

Descriptive statistics for Categorical Variables

Variable	Frequency	Valid %
Gender		
Male	106	40.5
Female	154	58.8
Smoking		
Yes	67	25.5
No	196	74.5

Table 2

Descriptive statistics for continuous variables

Variable	*n*	*M* [95% CI]	*SD*	Range
Age	263	20.40 [20.22, 20.58]	1.52	18-24
Perceived Stress	254	23.25 [22.40, 24.10]	6.86	6-39
Sleep Quality	246	6.58 [6.20, 6.95]	2.98	1-15
Alcohol use	248	7.56 [6.87, 8.25]	5.52	0-29
Exercise	204	33.96 [30.84, 37.08]	22.61	0-101

Table 3

Descriptive statistics for stress scores by exercise group

Exercise Group	*n*	*M*	*SD*
Active	121	21.89	7.02
Moderately Active	32	24.38	5.79
Insufficiently Active	43	26.58	6.56
Total	196	23.33	6.98

Inferential Statistics

Hypothesis 1 - The relationship between a combination of lifestyle behaviours (sleep quality, alcohol consumption, exercise, and smoking) will predict the outcome of stress.

Multiple regression analysis was performed to determine how well stress levels could be explained by four variables including sleep quality, exercise, smoking, and alcohol consumption. Preliminary analysis was conducted to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. The correlations between predictor variables and the criterion variable included in the study were examined (see table 4 for full details).

Two of the predictor variables, Exercise (r = .27, p =.008) and Sleep Quality (r =35, p <.001). was significantly correlated with the criterion variable. The correlations between the predictor variables were also assessed with r values ranging from .06 to .35. Tests for multicollinearity also indicated that all Tolerance and VIF values were in an acceptable range. These results indicate that there was no violation of the assumption of multicollinearity, and that data were suitable for examination through multiple regression analysis.

Table 4

Inter-correlations (Pearson's r) between model variables

Variable	**1.**	**2.**	**3.**	**4.**	**5.**
1.Stress	-				
2.Sleep Quality	.35***	-			
3.Alcohol use	-.06	.18*	-		
4.Exercise	-.27***	-.14*	.23**	-	
5.Smoking	-.16*	.14*	.13*	.13*	-

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

Since no *a priori* hypotheses had been made to determine the order of entry of the predictor variables, a direct method was used for the analysis. The four predictor variables explained 18.6% of the variance in stress scores (F (4-185) = 10.53, p <.001). Two of the variables, Exercise (β = -.19, p = 008) and Sleep quality (β = .32, p <.001) was found to uniquely predict Stress levels to a statistically significant degree (see table 5 for full details).

Table 5

Multiple regression model predicting Stress scores

Variable	R^2	B	SE	β	t	p
Model	**.19*** **					

Sleep Quality	0.74	0.16	.32	4.65	<.001
Alcohol use	-0.11	0.09	-.09	-1.26	.210
Exercise	-0.06	0.02	-.19	-2.70	.008
Smoking	-1.65	1.07	-.12	-1.54	.126

Note: R^2 = R-squared*;* β = standardized beta value; B = unstandardized beta value; *SE* = Standard errors of B; *N*= 263; *t* = degrees of freedom Statistical significance*:* ***p <.001

Hypothesis 2 - There is a difference in stress levels between smokers and non-smokers.

An independent samples t-test was conducted to compare stress levels between smokers and non-smokers. There was a significant difference in scores with smokers (*M* = 25.17, *SD* = 7.47) scoring significantly higher on perceived stress levels than non-smokers (*M* = 22.59, *SD* = 6.53), *t* (252) = 2.64, *p* = .009, two-tailed. The magnitude of the differences in the means (mean difference= 2.58, 95% CI: .66 to 4.50) was small (Cohen's *d* = .37).

Hypothesis 3 - There is a difference in stress levels for college students who are active, moderately active, and insufficiently active.

A one-way between-groups ANOVA was conducted to determine if there were differences in the level of exercise and stress level scores. Participants were divided into three groups according to their level of exercise (24 units or above = Active, 14-23 units = Moderately active, and less than 14 units = Insufficiently active). There was a statistically significant difference in levels of stress between the three exercise groups, *F* (2, 193) = 8.14, *p* <.001. The effect size indicated a medium difference in stress levels (eta squared = .07).

Post-hoc analysis using the Tukey HSD test indicated that the mean stress score for participants in the insufficiently active group (*M* = 26.58, *SD* = 6.56) was significantly higher (*p* < .001) than those in the active group (*M* = 21.89, *SD* = 7.02). There was no statistically significant difference (*p* = .155) between stress levels for participants who were active or moderately active (*M*= 24.37, *SD* = 5.78); or between those who were moderately active or insufficiently active (*p* = .342).

Hypothesis 4- The combination of lifestyle behaviours predict stress to a greater extent than any of the lifestyle behaviours alone.

Multiple regression was used to determine whether the relationship between a combination of lifestyle behaviours predict stress levels to a greater extent than any of the lifestyle behaviours alone. The overall model reported a significant value of $p < .001$. Smoking ($p = .13$), Alcohol ($p = .21$) or Exercise ($p = .008$) alone did not predict stress levels to a greater extent than a combination of the lifestyle behaviours. Although, sleep quality ($p < .001$) predicts stress to the same extent as a combination of lifestyle behaviours.

To summarize, exercise and sleep quality are significant predictors of stress. The predictor variables (exercise, sleep quality, smoking and alcohol consumption) explained 19% of the variance in stress scores. Smokers scored significantly higher in the Perceived Stress Scale than non-smokers. individuals who are insufficiently active also score significantly higher in the PSS than individuals who are active. Sleep Quality was the only predictor variable that predicted stress to the same extent than all the predictor variables combined. Exercise, smoking and alcohol consumption alone did not predict stress levels to a greater extent than all the predictor variables combined.

Discussion

The present study aimed to examine the relationship between a combination of lifestyle behaviours including sleep quality, exercise, smoking and alcohol consumption on the outcome of stress. The study also examined if there were any differences in stress levels between smokers and non-smokers and differences in stress levels between those who were active, moderately active, and sufficiently active. Prior research reveals that sleep quality, exercise smoking and alcohol consumptions are all predictors of perceived stress levels amongst college students (Kim & Dimsdale, 2007, Ng & Jeffery, 2003, Stults-Kolehmainen & Sinha, 2013 Kwan, Arbour-Nicitopoulos, Duku & Faulkner, 2016). Research also reveals the importance of researching a cluster of lifestyle behaviours as they coexist (Al-Nakeeb et al., 2015). Based on this literature four hypotheses were formed.

The first hypothesis stated that the relationship between a combination of lifestyle behaviours including sleep quality, exercise, smoking, and alcohol consumption will predict the outcome of stress. Using multiple regression analyses, we found that two of the predictor variables, Exercise and Sleep Quality significantly predicted perceived stress levels. The overall model was statistically significant. Research from Badger et al., (2019) found that smoking and physical activity was associated with perceived stress levels amongst college students. In line with our research particularly concerning exercise they found that students who reported having low levels of physical activity also reported high levels of stress, and those who reported being highly active had low levels of stress. Consistent with research by Doğan & Doğan (2019) the current study found sleep quality to be a significant predictor of stress. Although the current research did not find smoking to be an overall predictor of stress, groups differences were evident. In contrast to previous literature (Araas & Adams, 2008) the current study did not find alcohol to be a significant predictor of perceived stress. Although, Badger at al. (2019) did not find alcohol to be a significant predictor of perceived stress

levels. However, Park (2004) did find that students encounter positive consequences more frequently than negative consequences regarding alcohol.

The second hypothesis states that there is a difference in stress levels between smokers and non-smokers. Using an independent samples t-test results revealed that there was a significant difference in stress levels between smokers and non-smokers. Smokers scored significantly higher in the PSS than non-smokers. Results indicate that those who are stressed are more likely to smoke. These results are in accordance with findings reported by Badger et al., (2019) who found that smokers reported higher stress levels than non-smokers. This is also consistent with findings from Liu et al., (2007) who found that students who smoke daily report perceived stress levels compared to individuals who don't smoke.

The third hypothesis states that there is a difference in stress levels for college students who are active, moderately active, and insufficiently active. A one-way between-groups ANOVA revealed that there was a significant difference in stress levels between the groups, specifically those in the insufficiently active group and the active group. Those in the insufficiently active group scored higher in the PSS than those in the active group. Results indicate that insufficiently active individuals are more likely to report higher stress levels than active individuals. Results were in line with previous literature implying that students who exercise infrequently experience higher stress levels than individuals who exercise regularly (Badger, 2019; Dodd et al., 2010; Kwan et al., 2012; Stults-Kolehmainen & Sinha, 2013).

The final hypothesis investigated whether the relationship between a combination of lifestyle behaviours predicts stress to a greater extent than any of the individual lifestyle behaviours alone. Using a multiple regression analysis results indicated that the relationship between a combination of lifestyle behaviours predicted stress to a greater extent than any individual lifestyle behaviour alone. Although Sleep Quality did predict stress to the same

extent as a combination of lifestyle behaviours. These findings also support previous research indicating that lifestyle behaviours do not occur individually (Adams & Colner 2008; Badger et al., 2019; Dodd et al., 2010).

The current study is one of few studies that examine the relationship between a combination of lifestyle factors and their effect on stress, despite previous research indicating that lifestyle behaviours often coexist. For example, Adams & Colner (2008) investigated the association between high-risk behaviours and fruit and vegetable intake amongst a sample of college students. The high-risk behaviours included tobacco use, alcohol intake, sexual and physical activity, and other drug use. The results from the study revealed that fruit and vegetable intake is associated with multiple other health-related behaviours. Previous research on a sample of adolescences investigated a series of health behaviours surrounding physical activity and nutritional behaviours. The study researched the relationship between a combination of health behaviours rather than any individual behaviour alone to create more ecologically valid results (Sanchez et al., 2007).

Understanding the factors that contribute towards perceived stress levels amongst students in extremely important as psychological stress can lead to poor mental health (Augner, 2015), cancer and heart disease (Tennent, 2000). While we understand these consequences students still fail to participate in regimes that can help reduce their stress levels. Instead students respond through a series of negative health behaviours including smoking, binge drinking and low levels of physical activity (Umberson, Liu & Reczek, 2008). Research reveals that students have fewer constraints and changes in lifestyle behaviours are deemed an issue (Steptoe, Wardle, Pollard, Cannan &Davies, 1996).

Practical Implications

The practical implications of the current study are that lifestyle behaviours especially sleep quality and exercise need to be assessed and tackled when attempting to reduce stress

amongst third-level students. The findings from this study highlight the importance of adopting healthy lifestyle behaviours to maintain low levels of stress. Results from this study will be useful for policymakers and researchers who are devoted to improving the health and well-being of college students. Few studies focus on the interrelationship between stress and a series of lifestyle behaviours, therefore future research should adopt this approach as additional research is needed here to develop a better understanding of this issue.

The time between the end of secondary school and the end of college is a crucial period of opportunity to educate young adults on the necessity of adopting healthy lifestyle behaviours (Cullen, 1999). Therefore, this research is beneficial for individuals who work within colleges to promote healthy lifestyle behaviours on campus to improve students stress levels. The Union of Students Ireland (USI) could use this information to promote physical activity and the importance of sleep quality amongst students especially during exam periods than are deemed a more stressful time in students lives.

Although students are aware of the lifestyle behaviours that impact stress it is noticeable that they are not put into practice. Policymakers could implement a new educational policy. A suggestion could be an inbuilt policy within the curriculum in each college that is mandatory for each student to complete. For example, each semester the college could introduce one class on the topic of the importance of sleep hygiene and the importance of physical activity in maintaining low stress levels throughout the college semester.

Strengths, Limitations and Future Research

Several limitations should be considered whilst interpreting the findings from the current study. Firstly, the scale used to measure exercise levels revealed a Cronbach's alpha of .43 indicating poor reliability and validity. Previous studies had found the scale to be an internally reliable measure of exercise (Ng & Jeffery, 2003, Reed & Phillips, 2005), although the scale had very low internal consistency with the current sample. The scale consisted of

only three items. The scale was also misinterpreted by a large number of participants, several individuals answered the question with the type of exercise they participated in rather than how many times they exercised a week which resulted in 59 individuals being excluded from the analysis. Future research should consider a more clear and in-depth scale when measuring levels of exercise. It is also important to note that although a large sample of participants interpreted the scale LTEQ incorrectly, we still found that exercise was a significant predictor of stress which suggests that exercise is an extremely strong predictor of stress levels and the importance of exercise in managing stress levels amongst college students. A further 14 individuals also had to be removed from the study for not fitting in the age range, indicating that some individuals may not have read the information leaflet properly. Participants from this study were also mainly from County Donegal and County Dublin reducing the generalisability of the results.

Secondly, each questionnaire was based on self-report measures which may have resulted in a limitation to the current research. Although all data in the research study was completely anonymous participants may have felt ashamed or embarrassed completing the AUDIT scale and therefore not answering questions relating to alcohol consumption as truthful as possible. Future research could adopt a more experimental approach in completing surveys, although it would be more time consuming it could result in more accurate and honest answers.

Thirdly, gender and age were the only demographic information collected for participants in the current research. Previous research indicates that there are gender differences between males and females regarding smoking and stress (Steptoe et al., 1996). Dodd et al., (2010) also found that females reported higher levels of psychological stress and low levels of physical activity. Information surrounding demographic variables and their association with stress amongst college students is not included in the current research. Future research should run analyses on gender differences within each variable.

Lastly, the current study adopted a cross-sectional design therefore causation cannot be established. When addressing the research questions in the current study, future research may use a longitudinal approach to investigate the series of lifestyle behaviours over longer periods. Although a cross-sectional design was used the results revealed significant results.

The study also presented several strengths. The sample size was necessary for the research was 177 and the study gained 263 participants overall. The current study reports a representable sample. Statistics for the HSE reveal that 18% of all adults ages 18-24 are smokers. In the current study, 25.5% of research participants were smokers and the remaining were non-smokers, which is quite representative of the target population (HSE, 2020). The current sample regarding gender was also extremely representative of the target population. The current research study reported 58.6% of participants were female and 40.5% male. Statistics from the Central Statistics Office (CSO) reported that in 2016 49.6% of college students between the ages of 18-24 were male and 55.1% were female (CSO, 2016).

Results from the current research were significant, therefore this was a novel finding. This combination of lifestyle factors predicted stress to a greater extent than smoking, exercise, and alcohol consumption alone. Sleep quality predicted stress to the same extent as the overall model therefore it is important to focus on students sleep hygiene. The findings could have benefits for students if policies are implemented within third level institutions.

Conclusion

Findings from the current research illustrate a major concern regarding student's stress levels. Evidence reveals that the relationship between a combination of lifestyle behaviours has a significant impact on perceives stress levels amongst a sample of third-level college students. Although the current research did not find Smoking and Alcohol consumption as significant predictors of Perceived Stress levels, they each show a prevalent association with perceived stress levels. Consistent with prior research students who smoke also score high on

the stress scale and those who don't smoke score low on the stress scale. Supporting previous research regarding exercise levels we found that students who exercise less score higher in the PSS than active participants. Findings highlight the importance of targeting factors that are associated with perceives stress levels in students. It is important to research these factors alongside each other for more realistic results. Future research should identify more predictors of stress amongst college students.

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Appendices

Appendix A

Demographic Questions

1) Please select your gender below

Male □ Female □ Other □

2) What is your age?

_____

Appendix B

Smoking Scale

Do you smoke?

Yes ___

No ___

Appendix C

Perceived Stress Scale

Cohen, Kamarck, & Mermelstein (1983)

From each question choose the following alternatives

0= never 1=almost never 2= sometimes 3=fairly often 4= very often

_____ 1. In the past month, how often have you been upset because of something that happened unexpectedly

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

_____3. In the last month, how often have you felt nervous or stressed?

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

_____ 5. In the last month, how often have you felt things were going your way?

_____ 6. In the last month, how often have you found that you cannot cope with all the things that you had to do?

_____ 7. In the last month, how often have you been able to control irritations in your life?

_____ 8. In the last month, how often have you felt that you were on top of things?

_____ 9. In the last month, how often have you been angered because of things that happened that were outside of your control?

_____ 10. In the last month, how often have you felt difficulties were piling up so high you could not overcome them?

Appendix D

Pittsburgh Sleep Quality Index

Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989).

1. During the past month, what time have you usually gone to bed at night?
2. During the past month, how long (in minutes) has it usually takes you to fall asleep each night?
3. During the past month, what time have you usually get up in the morning?
4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spend in bed)
5. During the past month, how often have you had trouble sleeping because you:

   Answer the following statements: Not during the past month, less than once a week, three or more times a week or three or more times a week.

   a) cannot get to sleep within 30 minutes

   b) wake up in the middle of the night or early morning

   c) have to get up to use the bathroom

   d) cannot breathe comfortably

   e) cough or snore loudly

   f) feel too cold

   g) feel too hot feel too cold

   h) had bad dreams

   i) have pain

   j) other reasons please describe below

   If you answered question (j) above, how often during the past month have you had trouble sleeping because of this

6. During the past month, how would you rate your sleep quality overall?
7. 7) During the past month, how often have you taken medicine (prescribed or over the counter) to help you sleep?
8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?
9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

Appendix E

The Alcohol Use Disorders Identification Test

Questions	0	1	2	3	4	Score
How often do you have a drink containing alcohol?	Never	Monthly or less	2-4 times per month	2-3 times per week	4 times or more per week	
How many drinks containing alcohol do you have on a typical day when you are drinking?	0-2	3-4	5-6	7-9	10 or more	
How often do you have six or more drinks on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
How often during the last year have you found that you were not able to stop drinking once you had started?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
How often during the last year have you failed to do what was normally expected of you because of drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
How often during the last	Never	Less than	Monthly	Weekly	Daily or	

year have you needed a first drink in the morning to get yourself going after a heavy drinking session?		monthly			almost daily	
How often over the last year have you felt guilt or remorse after drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
How often during the last year have you been unable to remember what happened the night before because of your drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
Have you or someone else been injured because of your drinking?	No		Yes, but not in the last year		Yes, during the last year	
Has a relative, friend, doctor or other health care worker been concerned about your drinking or suggested you cut down?	No		Yes, but not in the last year		Yes, during the last year	

Appendix F

Leisure -Time Exercise Questionnaire

Godin and Shepard (1985).

During a typical 7-day week how many times on average would you do the following kinds of exercise for more than 15 minutes during your free time?

1. Strenuous exercise (e.g. running, football, basketball, vigorous swimming)
2. Moderate exercise (e.g. fast walking, tennis, easy swimming)
3. Mild/Light exercise (e.g. yoga, bowling, easy walking)

Appendix G

Information Leaflet

You are being invited to take part in a research study. Before deciding to participate please read the following information leaflet this outlines the reason for the research and your involvement in the process. If you have any enquiries about the information provided, please do not hesitate to contact me, I have provided my personal contact details at the end of this sheet.

What is this study about?

I am a final year student studying in the BA in psychology programme at the National College of Ireland. As part of our degree, we must carry out an independent research project. For my project, I aim to investigate the relationship between perceived stress levels and lifestyle behaviours amongst college students. The lifestyle behaviours include exercise, sleep quality, alcohol consumption and smoking. The project will be supervised by Dr. April Hargreaves National College of Ireland.

What will taking part in the study involve?

If you do decide to participate in the research, you will be asked to:

- Complete five surveys; The perceived stress scale, Godin leisure-time exercise questionnaire, the Pittsburgh sleep quality index, the AUDIT, to measure alcohol consumption and a simple smoking question.
- The Perceived Stress Scale measures an individual's stress levels over the past month. It is a ten-item scale on which each question is a general question regarding an individual's feelings and thoughts over the past month (e.g. in the last month how often have you felt nervous and stressed?)

- The Pittsburgh Sleep Quality Index- this scale consists of seven components. It aims to determine an individual's sleep quality. A total number is scored at the end of the scale and a higher score indicates poor sleep and a lower score indicates good sleep quality.
- Godin Leisure Time Questionnaire. This will be used to measure exercise levels. The outcome will be active, moderately active, or insufficiently active.
- Smoking- a simple yes/no question will be asked on whether you smoke or not.
- The AUDIT- will be used to measure alcohol consumption. This scale is a ten-item questionnaire and a score above eight indicates harmful alcohol usage.

Who can participate?

If you take part in this study, you are over the age of 18 and under the age of 24 attending third-level education.

Do I have to take part?

Participation in this research is completely voluntary. You do not have to take part, and a decision not to take part will have no consequences for you. If you do decide to take part, you can withdraw from participation at any time before submitting the data. Once you have submitted the questionnaires involved in this research, it will not be possible to withdraw your data from the study, because the questionnaire is anonymous and individual responses cannot be identified.

What are the possible risks and benefits of taking part?

This study does not include any directs risks as it consists solely of online questionnaires and there is very limited risk involved with each questionnaire. Participants may experience minor distress surrounding topics of alcohol consumption.

Benefits include knowing that you have participated in research investigating the association between student's lifestyle behaviours and stress. Finding ways to reduce stress is an important area of study that can provide real, beneficial outcomes for students. Whilst results

will not be available to participants on an individual basis, group-level results will be written up and stored in the National College of Ireland Library should participants wish to view the study outcome.

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

The questionnaire involved is anonymous. It is not possible to identify a participant based on their responses to the questionnaire. All data collected for the study will be treated in the strictest confidence, with responses to the questionnaires being stored securely in a password protected/encrypted file on the researcher's computer. Only the researcher and their supervisor will have access to the data. Data will be retained for 5 years in accordance with the NCI data retention policy.

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 the National College of Ireland.

Who should you contact for further information?

Below are the contact details for the researcher and supervisor of the current study.

Shauna Mc Laughlin
Email- 18416296@student.ncirl.ie
Researcher

April Hargreaves
Email – April.Hargreaves@ncirl.ie
Supervisor

Appendix H

Consent Form for participation

An investigation into the relationship between perceived stress levels and lifestyle behaviours among college students

- I agree to participate in the current research study
- I fully understand after signing this consent form I have the right to withdraw from the study during or before any submission of data (surveys and/or questionnaires)
- I understand the nature of the study.
- I have read the participation information sheet before providing my consent.
- I understand participation includes completing the Perceived stress scale, Godin leisure-time exercise questionnaire, the Pittsburgh sleep quality index, the AUDIT and smoking question.
- I understand I am able to contact any researcher involved in the study at any time.
- No signature is required for participation instead by clicking yes below indicates consent, this is to anonymise data

Appendix I

Debriefing Leaflet

Thank you for your participation in this research regarding an investigation into the relationship between perceived stress levels and lifestyle behaviours. Your participation has been greatly appreciated.

If at any time you feel psychologically distressed by participation in this study, I encourage you to contact either me or the supervisor.

If you have any further questions regarding the study, please do not hesitate to contact me.

Shauna Mc Laughlin
Email- 18416296@student.ncirl.ie
Researcher

April Hargreaves
Email – April.Hargreaves@ncirl.ie
Supervisor

Below are some contact details for organisations if you do feel emotionally distressed due to the current research:

Samaritans Dublin
+44 330 094 5717
jo@samaritans.org

Mental Health Ireland
01 284 1166
communications@mentalhealthireland.ie

HSE alcohol information website

https://www2.hse.ie/wellbeing/alcohol/improve-your-health/?gclid=EAIaIQobChMI37P8noiq7AIVC-ztCh0YdwAwEAAYASAAEgKqafD_BwE&gclsrc=aw.ds

Nite Line student support

1800793793 info@niteline.org

Appendix J

Evidence of data (all data available upon request)