

Examining the relationship between physical activity, BMI, gender, age and the ability to cope with stress.

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Abstract

This study aimed to investigate the relationship between physical activity, BMI, gender, age, stress and coping. The current study employed a within subjects design where data was collected through survey methods. Three groups were selected to partake in this study, undergraduate business students, gym members and members from a rural community. The sample consisted of 117 participants of which (n = 55) were male and (n = 61) were females. Previous literature suggests that increased physical activity is beneficial in reducing levels of stress and also an effective strategy for coping. It also suggests a relationship between BMI and stress, and that age and gender also play a significant role in levels of physical activity. Results showed no significant relationship between physical activities, stress and coping however, there was a positive correlation found between stress and BMI in line with previous literature and indicating that increased stress levels were indicative of an increase in BMI. Further research is required to observe the cause and effect nature of this relationship. A possible limitation of this study may be the sample size, a larger sample may provide greater insight into this area.

Introduction

1.0 Background

“All truly great thoughts are conceived while walking.” Nietzsche. As Nietzsche suggests the benefits of increased physical activity are long believed to have a positive effect on the mind. However, it is only in recent years that this relationship has been properly and scientifically explored.

The recent research carried out in the area of physical activity and mood suggests that increased physical activity elicits a “feel good effect” Biddle & Mutrie (2001) and increases feelings of wellbeing, (Brown & Siegel, 1988 as cited in Taylor, 2009 p. 83). It also has been found to reduce levels of negative affect such as Anxiety and Depression, Martinsen & Stephens, (1990). There has been little research however in the area of physical activity and its relationship to stress and coping. The research that exists in this area is mostly limited to clinical populations and undergraduate students abroad, a cross-sectional analysis of this nature could not be found and none of which could be found in Ireland. The research that could be found suggests that the negative effects of stressful life events were reduced as exercise increased (Brown & Siegel, 1988 as cited in Taylor 2009, p.84) who also found that physical fitness was associated with lowered cytokine responses in the immune system and in acute stress. Research by Hamer & Steptoe (2007) indicates that a lower fitness level was associated with a higher response to stress. Gupta, Ray & Saha (2009) conducted a study on university medical students in India suggesting that the volume of information to be absorbed, social isolation and peer expectation contributed to significant levels of psychological stress. With regard to the practice of physical activity research shows that university students are less physically active

than they would have been in high school and that exercise appears to cease somewhat during this period. Down's and Ashton (2010).

Rationale for research

This raises a potential issue that although students are under increased psychological stress, it appears that they are less likely to partake in physical exercise. This lead the researcher to question that if individuals could be encouraged to be more physically active could it have a positive impact on stress levels enabling them to cope better in times of stress. If this is the case, are BMI, age and gender considerations in this relationship as research suggests. It is not just students who are struggling to cope in these stressful times, many young families find themselves working harder with fewer resources. With recent media reports indicating that many families in Ireland often have just €100 disposable income remaining at the end of each month (Irish Examiner 9th July 2012) these are difficult times for them also. In rural Ireland towns have emptied as many young people go in search of work, this has an effect on older people who may feel even more isolated and there is a definite danger of mental health issues in this age group also. Research also suggests that in recessionary times people are less likely to participate in physical exercise (Taylor, 2009, p. 85). Therefore according to the literature this will have an impact on both psychological and physical health in the Irish population.

This research project will now take a more in depth look at these variables, the research surrounding and how they are related to this study. This section will conclude by outlining the research aims and hypothesis.

1.1 Defining stress

Conceptualising stress can be a difficult task. This is because it can be perceived differently according to sex, age, personality and even culture. Stress and the perception of stress can also change over time. However, it can be broadly defined as a “negative emotional experience accompanied by predictable biochemical, physiological, cognitive and behavioural changes that are directed either toward altering the stressful event or accommodating its effects” (Taylor, 1998, p.168).

Stress is the reaction to a stressor and whilst some stress can have a positive effect. Stress extended over long periods of time can have negative and even detrimental effects on a person’s psychological and physical health. How a potential stressor is perceived determines whether it will be experienced as stressful or not. (Taylor, 1998, p.168). Most stressful events themselves are not in themselves stressful, rather, it is an individual’s appraisal of the situation that makes it stressful. Some such negative events can be categorised as, uncontrollable events Ambiguous events and overload.

Negative events such as failing an exam, getting a traffic ticket or problems at home obviously will produce more stress than positive events. Sarasin, Johnson & Siegel (1978) have found that negative events show a stronger relationship to psychological distress and physical symptoms than do positive ones (Carlson, 2010, p.155) It is thought that this is because these negative events affect one’s self concept by reducing self-esteem and sense of identity. Uncontrollable or unpredictable events are also perceived to be more stressful than predictable or controllable ones. For example, students exposed to unpredictable loud bursts of noise when studying will be perceived as more stressful than noise they are expecting to hear. It is thought that that this is linked to a feeling of not being able to control their environment, believing

that one can control a stressor makes it less stressful (Taylor, 2009, p.169). Research has also found that uncontrollable stress has been linked to an immunosuppressive effect. (Brosschot et al., 1998; Peters et al., 1999; Hamer & Steptoe, 2007).

Similar to uncontrollable events, ambiguous events also are perceived as more stressful than more defined events, this is probably because the difficulty a person may have in responding to an ambiguous event makes it more stressful. This is particularly so in organisational psychology where role ambiguity can cause significant amount of work stress. (Billings & Moos 1984) have reported that taking a confrontative action is usually associated with less distress and better coping ability (Carlson, 2010.p.155).

Research does suggest that those who have more tasks to carry out report higher levels of stress (Cohen, 1978; Cohen & Williamson, 1988, as cited in Taylor, 2009). Overload is the individual's perception of having being responsible for too much in too little time and with too few resources. One study carried out by (Baum & Vallins 1977 as cited in Taylor, 2007, p.158) on a university campus separated resident students into two groups. One group lived in the dormitory corridors and were exposed to repeated and unavoidable exposure to a large number of other students. The second group lived in short corridors or in suites and were exposed to fewer encounters. It was found that the students who were repeatedly exposed to the larger volume of students initiated fewer conversations, maintained less eye contact and remained more of a distance to strangers, indicating that a perceived lack of control in ones environment can cause a significant amount of stress in an individual.

Physiology of stress

Seyle (1956 as cited in Taylor 2009) introduced the General Adaptation Syndrome or GAS to describe the cumulative effects of repeated stress on an individual. Seyle suggested that repeated or prolonged exposure can result in wear and tear, resulting in physiological damage and leading to physical illness. Another theorist Cannon (1932 as cited in Carlson 2010) was concerned with the physiological response to stress. Cannon introduced the Fight or Flight theory which stipulates that the body will react to stress by either fleeing or avoiding the stressful event or fighting it. It does this by activating both the sympathetic nervous system and the endocrine system which arouses the individual into action. Today there is a lot more known about the physiology of stress. There are two systems which are involved in the stress response, the sympathetic-adrenomedullary system (SAM) and the hypothalamic-pituitary adrenocortical axis or HPA axis.

In the activation of the sympathetic-adrenomedullary, the signal of a threat is transmitted to the hypothalamus, stimulating the medulla of the adrenal glands which in turn secretes catecholamines. Catecholamine's are hormones produced by the adrenal glands at the top of the kidneys in times of stress, the two major ones involved here are epinephrine and norepinephrine (Taylor 2009, p151). The release of these hormones leads to increased blood pressure, an increase in heart rate among other medical complications.

During a stressful event, the HPA is activated and the hypothalamus secretes corticotrophin-releasing factor or CRF. This allows the pituitary gland to then secrete adrenocorticotrophic hormone or ACTH which then stimulates the release of glucocorticoids or stress hormones from the adrenal cortex into the bloodstream. One

of the most significant of these stress hormones is cortisol as it helps reduce inflammation in case of an injury and also allows the body to return to its natural state of excitation after the event has passed. Corticosteroids in general have been shown to have immunosuppressive effects in an organism and prolonged secretion of cortisol has been linked to a destruction of neurons in the hippocampus (Taylor 2009, p.152) and also to increase fat cells around the abdominal area (Carlson, 2010, p.156). These responses have health implications. Frankenhaeuser (1991 as cited in Taylor, 2009) suggests that the sympathetic response may not actually be a pathway for disease, that it also requires the HPA axis to be activated. It has been argued that this may be an explanation for why physical exercise can be beneficial for health – because of its ability to stimulate the sympathetic response without necessarily activating the HPA axis. In summary the concept of stress can be an ambiguous one. As stated above, it has important implications not only for the physical health of the individual but also to psychological health. The ability to cope and build up a resiliency to stress is becoming increasingly important across all sectors of the population.

1.2 Theoretical link between stress and coping

The ability to cope with stress is so important and yet appears to be largely ignored within the promotion of health in Ireland today. In everyday terms cognitive functions such as memory and attention can be affected in extended periods of stress if an individual does not have adequate coping strategies in place. According to Lazarus and Folkman (1994), stress is the result of a person and its environment. They used the term “coping” to refer to the cognitive and behavioural efforts people use in order to deal with certain demands.

Individuals respond differently to stress, some take stressful situations in their stride whilst others may react to a similar situation with a great deal of distress. It depends

on how the individual appraises the situation and the use of behaviours and actions that enable them to deal with it. An individual may use either primary or secondary appraisal. Primary appraisal occurs when the person first encounters the situation and evaluates the threat involved. Secondary appraisal involves the use of a strategy to deal with that event. (Taylor, 2009 p.174) describe coping as the thoughts and behaviours used to manage both external and internal demands

There are three main strategies used in coping with stress. Problem focused coping which is used when the individual faces the situation and takes direct action in order to cope with the stressful event. It is an attempt to deal with the situation in a constructive way. The second strategy is emotional focused coping where the individual attempts to regulate emotions by accepting the situation, looking for the positive side of the situation or seeking support. The third strategy is seeking social support such as turning to friends in times of stress and seeking advice or assistance. Most people tend to use all three strategies when dealing with stress suggesting all are useful depending on the context of the stressor. However, it has been found that problem focused coping is more likely to be used if something constructive can be done whereas emotion focused coping is used more if the situation is perceived as something that must be endured (Folkman & Lazarus, 1984).

The COPE inventory (Carver, Scheier & Weintraub, 1989) provides a way of measuring coping in an individual. Because of the complexity of the nature of coping there is no overall measure for coping instead this scale aims to measure various aspects of both problem focused and emotional focused coping.

Personality also influences how a person copes with stress. Some personalities may be more predisposed to experience stress, this can be due to genetic factors but

also the environment they find themselves in. Negativity affect as (Friedman & Booth-Kewley, 1987; Cohen et.al.1995 as cited in Taylor 2009) suggests that some people may find it more difficult to cope with stress due to their personality type and those who are high in negative affectivity are more likely to experience distress, discomfort and dissatisfaction. High negativity affect is also associated with elevated cortisol secretion (Van Eck et. al. 1996 as cited in Taylor, 2009). They are also more likely to engage in the use of alcohol to deal with stress, to be more depressed and to show signs of suicidal behaviours. On the other hand Optimists appear to be better equipped to cope with stress (Taylor, 2009, p.175) and are associated with more use of problem focused coping, seeking social support and emphasizing the positive aspects of stressful situation.

To conclude coping with a stressful event depends on many things and many things depend on coping. It appears that individuals are adept at using different coping strategies in an effort to deal with whatever stressful situation faces them. At times of intense stress these strategies may crumble leaving a person feeling helpless. However, research shows that there may be certain behaviours such as increasing physical activity that may act as a buffer on the effects of stress and offer a more effective way of coping with stress.

1.3 Physical activity as a way of coping with stress

Physical inactivity is the fourth leading risk factor for global mortality (Rao et al, (2012). According to the Centre for the Advancement of Health it is recommended that the normal adult should maintain at least 30 minutes of moderate-intensity activity on most days and 20 minutes of vigorous activity for at least 3 days per week. Centre for the Advancement of Health, (2000, as cited in Taylor, 2009 p. 83).

The physical benefits of physical activity are well documented and include the prevention of chronic diseases such as cancer, diabetes hypertension as well as obesity suggests Warburton, Nicol & Bredin, (2006). However, there is also much research to suggest it is beneficial to psychological wellbeing. It has been found that those who are more physically active are more resilient to symptoms of anxiety and depression. Biddle and Mutrie, (2001) aerobically fit individuals show a reduced psycho-social stress response, Scully et al (1998) who also found that exercise acted more as a preventative measure against stress rather than a corrective one. Scully also suggests that in order for exercise to be beneficial it must consist of an elevated heart rate over a continuous period of time. Exercise was also found to be an effective coping strategy in school teachers in the UK and revealed an increased coping capacity in the elderly, (Austin, 2005; De Andrea 2010).

In one interesting study (Perna & McDowell, 1995, as cited in Taylor, 2009, p.153) separated athlete into groups according to the stress they experienced, they then measured cortisol levels post vigorous physical exercise. They found that it took longer for cortisol levels to return to normal for the group that had higher levels of everyday stress suggesting that consistent with previous research physical exercise influences the immune system and in doing so affects health.

Exercise as an addiction

It is possible to become addicted to exercise. There is emerging research indicating that the mood enhancing and sometime analgesic properties induced by the release of certain chemicals similar to opiates can become addictive (Scully et al, 1998). However, this is a relatively new concept and research appears to link it eating disorders. It is unclear whether exercise is in some way related to psychological

factors. The concept of a “runners high” from the release of endorphins is commonly reported however, there is little research to support these occurrences. Scully et al (1998) suggest this relationship needs to be investigated further.

Types of physical activity

It appears from the research that it is regular aerobic exercise that yields the most beneficial results when it comes to coping capacity (De Andrea et al, 2010). However, there is research also suggesting that a more relaxed form of exercise such as yoga can also be beneficial in reducing anxiety, stress and increasing psychological wellbeing as reported by Vancampfort et al, (2011). Increasing physical activity does not mean that individuals must spend long hours in the gym in order to benefit psychologically, for any individual even taking a short walk can be beneficial (Taylor, 2009, p. 83).

There is a paradox that exists in that modern life has become very convenient for most people in western society. Most individuals have cars, phones, internet facilities to hand that make lives more convenient, people do not have to move around as much, shopping can be done online, relationships can be maintained from the convenience of home yet most people would admit to higher levels of stress. Even children are less physically active with children reportedly watching up to 4 hours of television (ref) per day, adolescents reportedly spending long hours on social network sites (ref). There is a need to encourage physical activity in any form, whether it's aerobic, anaerobic, relaxation or simply taking a short walk every day. (Taylor, 2009, p. 83) points out the surprising fact that health practitioners do not uniformly recommend physical activity and argue that studies show that a recommendation from

a physician to increase physical activity is more likely to elicit compliance to exercise (Calfas et al., 1997 as cited in Taylor, 2009 p.83).

To summarise there are many benefits of increasing physical activity, it appears that the most beneficial is regular aerobic exercise however, increasing physical activity in any form can be reap benefits for both physical and psychological wellbeing. This study aims to use the International Physical Activity Questionnaire or IPAQ to gauge levels of activity across three categories, low, moderate and high levels of activity in adults in the hope that it will reveal more into the relationship between physical activity and the ability to cope with stress.

1.4 BMI and stress

The World Health Organisation estimates that 400 million people worldwide are obese and 1.6 billion are overweight (Taylor, 2009 p.100). Worryingly Ireland has become the fastest growing health problem when it comes to obesity, recent research indicating that one in eight Irish people are obese and every second person is overweight. There has been a 30% increase in the last 4 years alone. Research also indicates that obesity is greater in men than women. In Europe, incidences of obesity are doubling every 10 years, increasingly in younger people. WHO, (2000). Obesity is measured by use of population means, characterised into mild, moderate or severely obese. According to (Stankard, 1984 as cited in Taylor, 2009) mildly obese is considered to be 20-40% overweight, moderate is 41- 100% overweight and severely overweight is considered to be 100% overweight. The Body Mass Index or BMI is a universal way to measure obesity. BMI is calculated when the weight in kg is divided by the square of height in meters. A measurement of between 18.5 to 25 is considered healthy, a BMI over 25 is considered to be overweight and greater than 30 is

considered obese (Taylor, 2009, p 101). Soffer (2010) suggests that for women, a low BMI adheres to the ideal thinness which is perceived as attractive in western society. In western society the ideal female body is found to be below the normal BMI range whereas the ideal male is one that falls within the normal BMI range. Recent research indicates stress and ineffective coping are associated with an increase in BMI (Adams, 2007) and perceived chronic stress was significantly correlated with an increase in BMI (Walcott-McQuigg, 2009) who also reported that physical exercise was significantly correlated with chronic stress.

There was a surprising lack of research in this area particularly around predictors and interventions. This study aims to calculate BMI from each individual from the height and weight data collected in the demographic questionnaire to see if there is a relationship between BMI and stress and coping in this sample.

1.5 Gender

According to the literature available, men are more inclined to partake in physical exercise more often than women. Soffer (2010) who argued that this may be because men and women differ in their health promoting behaviours. Women ensuring they get adequate sleep, eat breakfast and avoiding snacking whereas men are more likely to get less sleep, skip breakfast, eat higher fat foods, drink heavily despite this however, they are also more likely to partake in physical exercise more often than women. In a qualitative study Robertson, (2007) found that exercise was rarely perceived as a health practice and that it was more a means to look good implying that perhaps men engage in health promoting behaviours according to social and cultural norms of what the ideal man should look like. Soffer (2010). Soffer, in line with existing research found that men exercised more than women not only this,

it was also found that women reported more job and stud related stress than men. In his study Soffer outlined the worrying number of women who reported more stress, engaged in less physical exercise yet had below normal BMI's.

When it comes to stress (Jacobs, 2007) suggest there is empirical evidence that woman experience higher levels of work related stress and as a result negative psychological health outcomes compared to men (Blix, Cruise, Mitchell, & Blix, 1994; Dey, 1994; Kinman, 1996; McInnis, 1999; Thompson & Dey, 1998; Thorson, 1996 as cited in Jacobs, 2007).

However, there is conflicting research in the pattern of psychosocial changes post exercise in males and females. For example, McDonald & Hodgdon (1991) found no difference in the reduction in depression or anxiety after exercise on the other hand Bennet et al and Folkins et all (cited in Huyla, 2009) who reported that men improve more quickly than women post exercise also of note the point to the significant difference to wellbeing. Contrary to their hypothesis Huyla (2009) found that males and females did not develop differently on trait anxiety, belief in external control or self-concept in the duration of their study. It was noted that male exercisers felt more sense of personal worth than females, but it was unclear why this was the case.

Motivations for exercise in gender

Research implies that there is difference in motivations for physical activity across gender. For instance Khodabakhshi & Khodae (2011) found that medical students in India reported using the college sports facilities regularly. Of this the majority were male students. These findings are in line with previous studies and the reasons for not exercising were reported as lack of time, laziness and exhaustion from academic

studies. Rao, et al, (2012) The differences in the motives for exercising for males and females may also explain why exerciser males improved more than exerciser females, for example, studies show that females are more likely to exercise to improve their appearance whereas males are more likely to exercise to get stronger or fitter (Huyla 2009).

This study however consisted of a small sample and also did not address the various age groups or populations. The researchers themselves acknowledged this limitation. This study aims to address this gap of age and also to include not only students but also other areas of the population such as gym members and also villagers in a small rural community in the west of Ireland of varying ages.

1.6 Age

Most children are very physically active, as can be seen in most schools and playgrounds across the country. However in adolescents this seems to decrease, particularly in young girls Crosnoe as cited in (2002 as cited in Taylor, 2009 p. 85). University students also tend to decrease physical activity, in one study in university students in the USA it was found that college appears to be a time when individuals cease vigorous physical activity (Downs & Ashton, 2010; Hazzaa & Al-Hazzaa 2007) found that in Saudi Arabia, physical activity decreased with advancing age. Despite the fact that being more physically active may help with issues such as social isolation, cognitive health and physical health in those who are getting older.

Age appears to be an important factor when it comes to the ability to cope with stress and also when it comes to levels of physical activity. (De Andrea, 2010) conducted a study in Brazil on eighteen elderly people in a hospital in Sao Paulo, Brazil, these people attended a supervised exercise programme that included aerobic,

resistance, stretching and stretching exercises. Andrea et al found that the practice of maintaining supervised and regular physical activity resulted in positive effects in coping capacity and also in the accomplishment of daily activities which would also, more than likely improve overall psychological health.

It is hoped that this study may reveal the relationship between age and physical activity levels in an Irish population. The age range in this study varies from 18 to 62 and age will be split by the age mean which will be 31 in order to see if there is a significant difference in these age groups.

1.7 Aim and hypothesis of study

This study aims to look at physical activity, stress and coping, whilst also take into consideration BMI, age and gender in an Irish population. The study also aims to look at the motivating or hindering factors of exercise in the hope that it may highlight ways of encouraging health promoting behaviours. This convenience sample will consist of student population business undergraduate students in Dublin Business School, gym members within a Dublin city centre gym and members of a rural community in the west of Ireland to with the hope that it will address some of the methodological issues outlined in previous research. With this in mind the following is hypothesised;

1. There will be a significant correlation between physical activity, stress and emotion focused coping.
2. There will be a significant positive correlation between stress and BMI.
3. There will be a significant difference in high levels of physical activity in males and females with males reporting to be more physically active.

4. In accordance with previous research there will be a significant difference in BMI in males and females. There will be a higher BMI in males.
5. There will be a significant difference in stress levels in gender with males reporting higher levels of stress than females.
6. There will be a significant difference in age group 1 (under 31) and age group 2 (over 31) across the three categories of physical activity, low moderate and high.

Methodology

2.0 Introduction

Outlined below is a summary of the methodology employed in this research study. It includes the participants included in the study, the research design that was used, materials and finally a detailed summary of the procedure and how the study was carried out.

2.1 Participants

A convenient, non-probability sample of members from a Dublin city centre gym, undergraduate business students in DBS, Dublin city centre and members of a community centre in a rural community in the west of Ireland were invited to participate in this study. The reason for this was to capture a variation of physical activity, gender and also age. A total of 117 participants took part in this study (N=117). Of this 55 were male (n=55) 61 were female 61 (n=61) and 1 person (n=1) did not state their gender. The mean age for male participants was 31.14 (M = 31.14, SD = 9.92) and for females participants revealed a mean age of 31.26 (M = 31.26, SD = 9.59), with an age range of 18 to 62.

2.2 Research Design

This study employed a within subjects, quantitative questionnaires research design. All respondents were requested to complete a booklet of measures along with demographic questions that consisted of age, gender, height and weight. The demographic questionnaire also asked for information on reasons a respondent exercised/did not exercise in order to gauge motivating and hindering factors of

physical activity. Along with this booklet a cover note which included information on the research and how to complete the questionnaire was attached.

A correlation design was used to examine the relationship between physical activity and stress and coping in order to capture a result on the stated hypothesis by the use of a correlational coefficient. An independent T test and Mann Whitney U test was used to look for differences in BMI and gender, age and Physical activity and differences in stress levels in gender. The independent variables were physical activity, BMI, age and gender. The dependent variables were stress and coping.

2.3 Materials

There were four measures used in this questionnaire. These questionnaires consisted of the IPAQ. Ekelund, Yngve & Sallis, (2003) suggest the IPAQ to measure physical activity, the GHQ to measure stress and the COPE to measure coping. A demographic questionnaire consisting of age, gender, height and weight in order to calculate the participants. BMI was also included, as well as questions on reasons if any of why or why not respondents exercised.

The International Physical Activity Questionnaire short was used to measure levels of physical activity. It is a self-administered questionnaire consisting of seven questions recommended for use in adults in an age range of 15 to 69 years of age. The IPAQ short asks about three different types of activity, low physical activity such as walking, moderate intensity activity and vigorous-intensity activity. Questions are asked about how long they spend on these three different categories and on how many days. Computation is then calculated by the summation of the duration in minutes by the frequency i.e. days per week. The authors of the IPAQ suggest the data be presented as median minutes per week rather than means; this is due to the non-

normal distribution of energy expenditure (ref). Three levels of physical activity were proposed; low, moderate and high.

The General Health Questionnaire (GHQ-12: Goldberg, 1978) was used to measure stress. The GHQ is a self-administered questionnaire that was designed to capture non-psychotic psychiatric disorders. This questionnaire asks participants if they have recently felt a certain way or carried out certain behaviour, for example, one question participants are asked is 'have you recently been able to concentrate on what you're doing'. In response to this, participants are given four options to respond from a four point liker scale from 'no more than usual', 'much more than usual', 'rather more than usual', 'and much more than usual'. The higher the score the greater the psychological distress in the participant.

The Brief COPE Inventory (Carver, 1997) was used to measure coping in participants. It consists of a total of 28 statements such as "I've been turning to work or other activities to take my mind of things". Participants were then asked to nominate one of four responses to each of these statements from "I haven't been doing this at all" to "I've been doing this a lot". This inventory assesses a wide range of coping responses and consists of four main sub-scales. These consist of approach coping, avoidance coping, altering consciousness and seeking support. This is a reliable measure which was validated with an undergraduate population in Florida (Carver, 1997).

In the demographic questionnaire, information on age and gender were requested. Along with this, information on height and weight were requested in order to gauge participants BMI which was later computed using the formula $\text{weight (kg)} / \text{height}^2 (\text{m}^2)$. Respondents were also asked to tick all that applied from seven options

of both motivating and hindering reasons as to why they did or did not partake in exercise. The options for motivating reasons included 'weight control', 'fitness', 'social reasons', 'athletics' 'feel good factor', 'I do not engage in exercise', and 'other'. These options were given as they were reported to be the most common in previous literature. The 'other' option was offered if none of these options applied. The options for hindering reasons included 'lack of time', 'lack of interest', 'lack of resources', 'financial reasons', 'too tired', 'I do regularly engage in exercise' and 'other'. Again these options were offered as they were reported to be the most common reasons individuals did not exercise in previous studies. Questionnaires were then collated and inputted onto SPSS (version 18) where descriptive and inferential statistics were then carried out.

2.4 Procedure

To carry out this study a quantitative convenience non probability sample of a total of 117 from part time business students in DBS, members of The Fitness Dock gym and members of a community centre in a rural village in the west of Ireland, the reason for this was to address the age, gender and physical activity variation.

The pack contained the demographic questionnaire, the IPAQ, the GHQ and the COPE. Along with this an introductory letter was provided at the forefront of the pack (see appendix 1) which offered information on the nature of the study, the approximate time it would take to complete it and also that it would be merged with other surveys thus guaranteeing anonymity. A contact number was provided for the student should the participant wish to contact the student with further questions regarding the study along with a number for organisations such as the Samaritans should the survey cause any kind of distress to the participant.

Lecturers within DBS were contacted by email to request permission to access students in order to conduct research. When access was granted it was emphasised that participation was entirely voluntary and there was no obligation to complete the surveys. With regard to Gym members, permission was granted from the Gym Manager who offered to advertise a poster requesting volunteers to participate in the study. A secure file box was provided in order to place completed surveys and there was a specific area provided to allow volunteers to complete questionnaires in private. In the community centre the same situation applied, there was a table provided in the corner of the centre with a secure file box where completed forms could be placed.

Results

3.0 Introduction

Statistical analysis involved the use of parametric and non-parametric testing and descriptive statistics. Non parametric testing was used due to the non-normal distribution of the physical activity variable. An initial test was run to check for errors in the dataset. Both Spearman's rho and Pearson's r correlations were used to determine correlational values and both independent samples t test and Mann Whitney U test was used to determine significant differences.

3.1 Descriptive Statistics

Descriptive statistics of the data revealed a total of 117 participants who took part in the study. There was an age range of between 18 and 62 with a mean age of ($m = 31.67$) and standard deviation of ($SD = 9.713$). Of this, 55 were male ($n = 55$) and 61 ($n = 61$) were female. BMI ranged from between 17 and 42 with a mean of ($m = 23.58$) and standard deviation of ($SD = 5.072$). Please see table 1 below for a breakdown of psychological variables and table 2 for physical activity variables.

Table 1. *Descriptive statistics of psychological measures.*

Variable	Mean	Standard Deviation
Stress	13.85	6.10
Active Coping	4.43	1.74
Seeking Emotional Support Coping	3.79	1.75
Acceptance Coping	3.88	1.78
Positive Reframing Coping	4.15	1.87

Table 2. Descriptive statistics of physical activity measures.

Variable	Mean	Standard Deviation
Low Physical Activity	172.89	27.13
Moderate Physical Activity	164.78	42.24
Vigorous Physical Activity	157.57	57.99

3.2 Inferential Statistics

Hypothesis One.

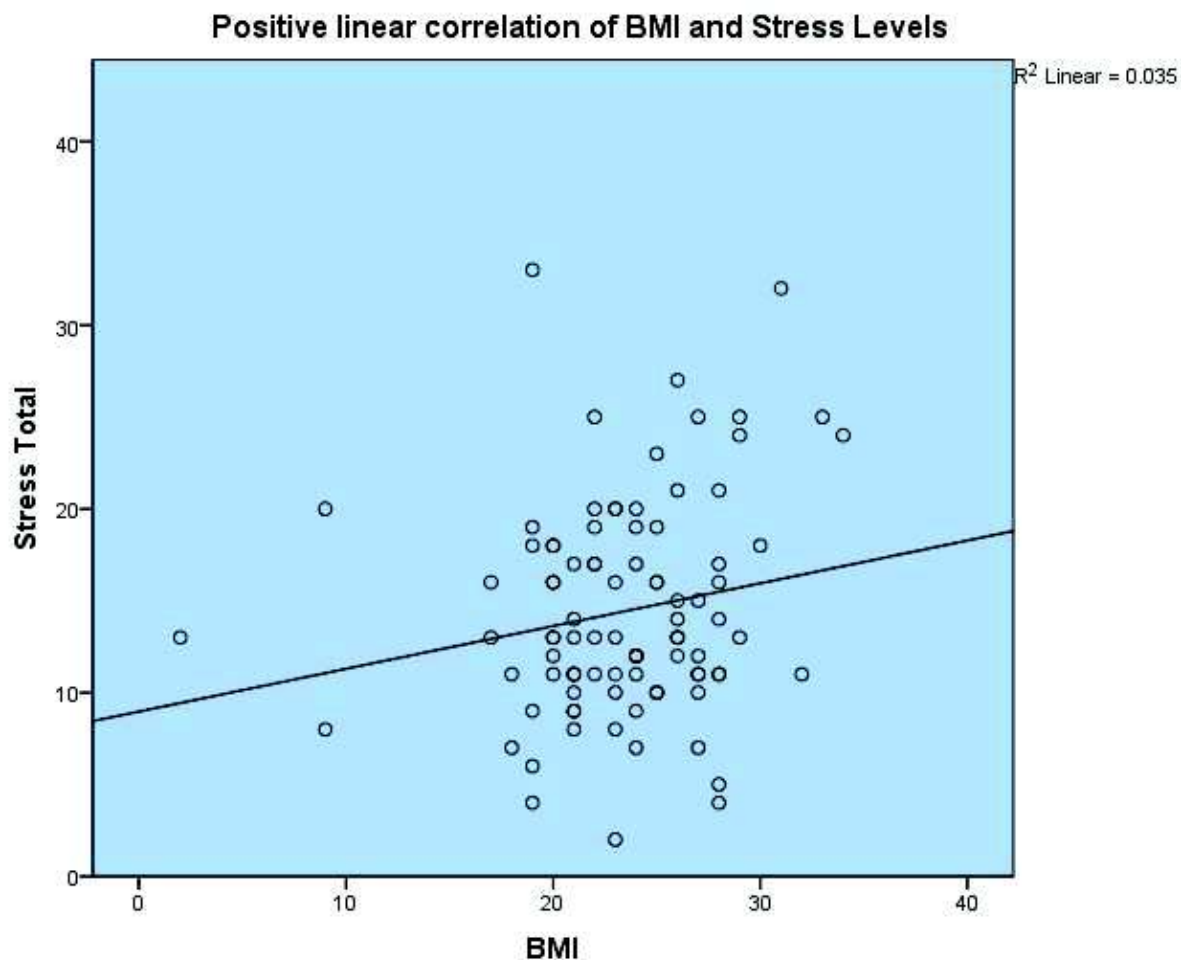
Due to the skewed nature of the variable of high levels of physical activity a Spearman's Rho was used to explore the relationship between high levels of physical activity, stress and emotion focused coping. However, analysis indicated that there was no significant correlation between high levels of physical activity and stress ($r = .065$, $N = 72$, $p < .005$, two tailed) and no significant correlation between high levels of physical activity and emotion focused coping ($r = .135$, $N = 74$, $p < .005$, two tailed) signalling that this hypothesis was not supported. Please see table below.

Table of correlational values.

Variable	Stress	Active	Physical Activity
Stress Total	-	-	-
Active Coping Total	0.58	-	-
High Physical Activity Total	0.65	.135	-

Hypothesis Two

A Pearson's r correlation was conducted to see if there was a significant relationship between stress and BMI. A Pearson's r correlation found that there was a weak but significant positive relationship between BMI and stress ($r = .188$, $N = 94$, $P = < .005$, one-tailed). Analysis revealed a mean of ($m = 23.58$, $SD = 5.072$) for BMI and ($m = 13.85$, $SD = 6.106$) for stress. Therefore the hypothesis that there will be a significant relationship between BMI and stress was supported. Please see below for visual representative of this correlation.



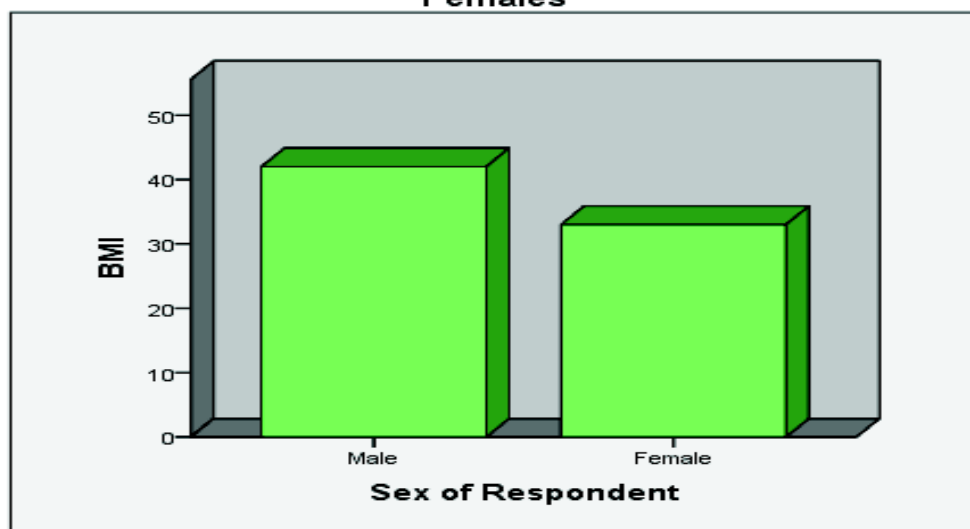
Hypothesis Three

An Independent Samples T test was carried out to look for differences in males and females in high levels of physical activity. An independent samples t-test found that there was no statistically significant difference in high levels of physical activity between males and females ($t(72) = .816, p > 0.05, 2$ tailed). However, physical activity results were found to be higher in males with a mean of ($m = 162.8, SD = 51.17$) compared to females ($m = 151.25, SD = 66.22$). Although there was a difference in means this hypothesis was not supported.

Hypothesis Four

An independent Samples T test was conducted to look for differences in males and females in BMI. A statistical significant difference was found in BMI in males and females ($t(95) = 3.105, p < 0.05, 2$ tailed). BMI was higher in males who had a mean of ($m = 25.13, SD = 4.971$) and a mean for females of ($m = 22.06, SD = 4.745$). Therefore it can be reported that BMI was higher in males than females supporting this hypothesis.

Simple Bar Chart of BMI difference in Males and Females



Hypothesis Five

An independent samples T test was carried out to observe for differences in stress levels for males and females. However, there was no statistical difference between levels of stress in males and females ($t(111) = -.241, p > 0.05, 2$ tailed). Analysis did show that females did have slightly higher levels of stress than males. Females had a mean ($m = 14.03, SD = 5.474$) and Males had a mean of ($m = 13.75, SD = 6.805$). Although there was a slightly higher level of stress in the mean for females, this hypothesis was not supported.

Hypothesis Six

A Man-Whitney U test was conducted to see if there was a significant difference in low, moderate and high levels of physical activity in those under the mean age of 31 (group 1) and those over the age of 31 (group 2). There was no statistical significant difference found between these age groups and high or vigorous levels of physical activity. ($U = 522.500, N_1 = 31, N_2 = 35, p = .692, two$ tailed). In fact contrary to previous research there was a slightly higher number of those over 31 who had higher levels of vigorous physical activity ($M = 34.07$) with a Median of 180 and ($SD = 63.906$) compared to those under 31 who had a ($M = 32.85$) with a Median of 180 and ($SD = 58.357$). No statistical significant difference was found in these age groups and moderate levels of physical activity ($U = 257.00, N_1 = 23, N_2 = 23, P = .803, two$ -tailed). Furthermore no significant statistical significant difference was found in low levels of physical activity ($U = 1119.500, N_1 = 49, N_2 = 47, P = .643$). However, analysis indicated a higher mean of low levels of physical activity in under 31's ($M = 49.15$) compared to over 31's ($M = 41.82$).

Other Results

An exploration was carried out on the motivating and hindering factors of exercise. It was found that the most common reason for exercising in males was for fitness reasons of which 65.5% of males reported this as their main reason exercise. 47.3 % chose the 'feel good factor' as the next most common reason and followed by 36.4% who said they exercised to control weight. Only 1.6 % of males reported athletics as a motivation for exercising which would suggest that sports or competition style exercise does not play a strong role in motivating physical activity.

For females the most common motivation for exercising was reported as weight control, 59.0% reported this as a main motivating factor for exercising. The second most common reason was fitness, 57.4% who reported this reason and 55.7% reported a motivating factor to be a 'feel good factor.' Athletics was also reported as the least motivating factor of exercising.

When it comes to the hindering factors of exercise males reported lack of time as one of the main reasons why they do not exercise, 54.5% chose this option. This was followed by reporting that they were too tired to exercise, 25.5% reported this. The least hindering factors of exercise in males were reported as lack of resources, only 5.5% reported this. In females the largest response was 60% who reported 'lack of time' followed by 47.5% who reported 'too tired' to be a major reason as to why they did not exercise. The least hindering factors to exercise for females were reported as 'lack of resources' which was similar to male responses.

When the exercise habits were explored the result yielded surprising results. 30.9% of males said that they regularly participated in physical exercise while almost half that 14.5% reported that they did not. In females, only 16.4% in this sample

reported that they regularly practiced physical activity. 13.1% of females said they did not regularly practice exercise.

Discussion

4.0 Introduction

The aim of this study was to explore the relationship between physical activity, stress coping whilst taking a look at the relationship of BMI, Age and Gender. This study also aimed to look at the motivating and hindering factors of exercise in an Irish population. Some of the analysis carried out was in line with previous research and was expected, however, other tests were not. This section will go into further detail on the analysis and results, while outlining the strengths and weaknesses of the study, the possible implications and finally the possibilities for further research.

4.1 Interpretation of Results

The first hypothesis stated that there would be a significant correlation between high levels of physical activity, stress and coping. However statistical analysis of this sample failed to support this, indicating no significant relationship. This result was unexpected and contradicts previous research. Previous literature outlines a significant relationship between coping and levels of distress (Austin-teacher, 2005). It has also been found that fitness has the ability to reduce stress levels (Scully et al, 1998). A positive correlation has also been previously reported between physical activity and mood, Martins & Stephens, (1994). The reasons for this result may well be due to the sample size. Although there were 117 participants in the study, only 74 of these participants took part in high levels of physical activity. It is recommended that approximately 100 partake in a correlational analysis in order for it to be considered representative so perhaps a larger sample may have yielded more significant results. .

Hypothesis two stated there would be a significant relationship between levels of stress and BMI. Statistical analysis found that this hypothesis was supported revealing a weak but positive significant correlation. A linear correlation would suggest that those who reported higher levels of stress also had a higher BMI. This result is consistent with previous research which argues that stress and ineffective coping were associated with an increase in BMI (Adams, 2007) It was also found that perceived chronic stress was significantly correlated to an increased BMI (Huyla, 2009). Although there is a surprising lack of research in the cause and effect nature of this relationship it is unclear for instance whether the rise in stress hormones such as cortisol may be responsible for an increase in weight or if those with a higher BMI may for some reason find it more difficult to cope with stress. There are implications for future research in this area.

Hypothesis three argued that in line with previous research males would be more physically active than females. Although an Independent T test revealed no statistical significant difference, nevertheless, analysis of means revealed men were more physically active than females. For example mean for men was found to be ($m = 162.8$) compared to a mean for females ($m = 151.25$) therefore it could be argued that this hypothesis was partially supported. However, the fact that no statistical significant difference in the sexes in levels of activity is at odds with previous research which shows that men appear to be more physical activity, (Soffer, 2010; Rao et al, 2011). This may be due to the sample size, again similar to the first hypothesis there was a relatively small number of participants (74) who partook in high levels of physical activity.

Hypothesis four states that there will be a significance difference in BMI between males and females. This hypothesis was supported by an independent t test

which revealed a statistical significance difference in BMI in males and females. Analysis supported the hypothesis that males had a higher BMI ($m = 25.13$) than females ($m = 22.06$). This is in line with previous research findings that BMI is generally higher in males than females (Must and Tybor, 2005).

Hypothesis five stated that there would be a significant difference in stress levels in males and females with females reporting higher levels of stress. This study failed to find a statistical significant difference in stress levels in males and females and so was not supported. Analysis of means showed that women did report slightly higher levels of stress ($m = 14.03$, $SD = 5.477$) than males ($m = 13.75$, $SD 6.805$). These results contradict previous studies which reveal empirical evidence that females experience higher levels of stress than males and also report higher levels of work related stress (Jacobs, 2007; Soffer, 2010).

Hypothesis six posits that there will be a significant difference between age groups and moderate levels of physical activity. Age was split into two groups according to mean which was 31. Group 1 consisted of those under 31 and group number 2 was made up of those over 31. A Mann Whitney U test was conducted to carry out this test revealing no significant difference. This contradicts previous research that suggests that physical activity decreases with the advance of age, Hazzaa, Al-Hazzaa (2007). However, there is other research to suggest that physical activity ceases during college years, Downs and Ashton, (2010). In fact on further inspection of analysis the mean was higher in the second age group, over 31's compared to the first age group of under 31's. This would imply that the older age group were slightly more physically active. There was no significant statistical difference in age groups and moderate levels of physical activity and no significant statistical difference in age groups in low levels of physical activity. There was a

slight difference in means signifying younger individuals reported higher levels in the low category of physical activity.

Finally, the results from the exploration of motivating and hindering factors of exercise suggest that men and women have different motives for exercising. It was found that the most motivating factor for men was fitness while women reported weight control as their most motivating factor. This result corroborates previous literature. Rao et al (2009) also reported similar results. The fact that males reported being more physically active in this analysis 30.9% compared to only 16.4% in females is also supported by Rao et al (2009). However it is contrasted by the result which indicated no significant difference in physical activity in hypothesis four in this study which raises a question of the method used in this study to measure physical activity.

4.2 Research limitations

A methodological strength of this study was the size of the sample which consisted of 117 respondents of which there was a good variation gender and age. There was also a good variation of those exercised and those who didn't. However, the sample size may also be considered a limitation, particularly when it came to the measurement of physical activity. Because not everyone took part in vigorous physical activity it lessened the number that could be measured in this sample, this became a potential problem when it came to the correlational analysis. This may also be a reason why no relationship was found in hypothesis 1 and no significant difference was found in 3 and hypothesis 6 which provided unexpected results not supported by previous literature. Equally a limitation of the study may be the use of the IPAQ to measure physical activity. Feedback was received post collection of the

raw data from two respondents who informed the researcher that they found this section of the questionnaire pack difficult to understand and they were not sure that they had completed it correctly. This may be why there were a significant number of respondents who did not complete this part of the questionnaire.

A further limitation of the study may be that allocation of questionnaires in college students was done prior to class in an auditorium type lecture hall where seats were quiet close and there appeared to be groups clustered together, this may have affected how students completed the questionnaires and they may not have completed them as honestly as they may otherwise have. This may have been a weakness as the measurements for stress, coping and physical activity were self-reported and so it required the respondent to be completely honest when completing the questionnaire. An answer to this possible pitfall may be to take oral swabs to measure for cortisol levels instead of the GHQ to measure stress. The same could be considered to measure BMI, which relied on of the participant knowing details of height and weight. An alternative may be if the researcher could take physical measurements at the same time, this may avoid problems such as response bias.

4.3 Practical Implications

Although there was no statistical significant relationship found in physical activity, stress and coping, there is sufficient evidence available to suggest that that physical activity can have a beneficial effect mental health. With the growing awareness around mental health issues in Ireland today, the benefits of increasing physical activity need to be promoted. Research does indicate that health professionals are reluctant to recommend physical activity (Taylor, 2009, p.83) despite the fact that physicians who do recommend can lead individuals to increase

their exercise (Calfas et al., as cited in Taylor, 2009, p.83). This would suggest that individuals will comply if advised to exercise by their doctors. Other research implies that exercise is an effective way of coping, however, few people use exercise as a means of coping with stress, Austin, (2005). This would suggest again that partaking in regular physical activity is an effective way of coping with stress however, there is a need for this to be publicised more. The result found in this study that BMI and Stress were positively correlated in this sample is of significance also and has implications for further research regarding this relationship and the particularly in the cause and effects of BMI and Stress. In summary, as discussed above, there are positive implications when it comes to the benefits of increasing physical activity and promoting better mental health, there are also implications for further research.

4.5 Future research

In light of the research limitations outlined above, there is room for further research in the relationship between stress coping and physical activity in Ireland perhaps with a larger sample that may be more representative of an Irish population. Further research should be carried out in this relationship. Also, there appears to be very little research on the relationship between BMI and Stress and Coping and particularly in cause and effect of this relationship needs to be determined. Further research is also needed to determine how physical activity can reduce stress levels particularly in physiological effects.

4.6 Conclusion

To conclude this study has potential implications for the area of stress management and also in health promotion. These findings reveal possible motivating and hindering factors of physical activity and this may be useful in looking at

behaviours around exercise and changing behaviours to encourage others to take some control of their health and encourage self-care. This could apply to various fields of psychology, in health psychology, organisational psychology and sports psychology.

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Appendices

Dear Participant,

I am a psychology student conducting research on attitudes regarding physical activity and its relation to psychological health in partial fulfilment of the requirements of my studies, which will be submitted for examination.

I would be very grateful if you would take the time to answer this short questionnaire, it should take no more than 10 minutes to complete. There is no right or wrong answer and complete anonymity is guaranteed. Your answers will be merged with those from other people and will not be traced back to you. No identification details will be asked for.

Participation is completely voluntary and you are not obliged to participate however by completing the questionnaire you are consenting to partake in the study. If there is a question you are uncomfortable answering you may leave it blank however, I would be very grateful if you could answer as many questions as is possible.

These questionnaires are often used in research however, if you find that the questions asked have affected you in any way I have included a contact number at the end of the questionnaire that may be of assistance.

If you would like more information on the study or if you are interested in the outcome of the study please contact me on the number below.

With many thanks for your time and interest.

Laura Egan
[REDACTED]

Age: _____

Gender: *(Please tick one)*

Male: _____

Female: _____

Height: (M) _____

Weight: (Kg) _____

Which of the following best describes the motivating factors as to why you exercise?

(Please tick all that apply)

Weight control _____

Fitness _____

Social reasons: _____

Athletics _____

Feel good factor _____

I do not engage in exercise _____

Other: *(Please state)* _____

Which of the following best describes the reasons as to why you do not exercise?

(Please tick all that apply)

Lack of time _____

Lack of Interest _____

Lack of resources _____

Financial reasons _____

Too tired _____

I do regularly engage in exercise _____

Other: *(Please state)* _____

1. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?

_____ **days per week**

No vigorous physical activities → *Skip to question 3*

2. How much time did you usually spend doing **vigorous** physical activities on those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

3. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

_____ **days per week**

No moderate physical activities → *Skip to question 5*

4. How much time did you usually spend doing **moderate** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?

_____ **days per week**

No walking **➔** *Skip to question 7*

6. How much time did you usually spend **walking** on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

7. During the **last 7 days**, how much time did you spend **sitting** on a **week day**?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

Please circle the response that best applies to you.

Have you recently:

1. Been able to concentrate on what you're doing?

Better than usual (0)	Same as usual (1)	Less than usual (2)	Much less than usual (3)
--------------------------	----------------------	------------------------	-----------------------------

2. Lost much sleep over worry?

Not at all (0)	No more than usual (1)	Rather more than usual (2)	Much more than usual (3)
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3. Felt that you are playing a useful part in things?

More so than usual (0)	Same as usual (1)	Less so than usual (2)	Much less than usual (3)
---------------------------	----------------------	---------------------------	-----------------------------

4. Felt capable of making decisions about things?

More so than usual (0)	Same as usual (1)	Less so than usual (2)	Much less than usual (3)
---------------------------	----------------------	---------------------------	-----------------------------

5. Felt constantly under strain?

Not at all (0)	No more than usual (1)	Rather more than usual (2)	Much more than usual (3)
-------------------	---------------------------	-------------------------------	-----------------------------

6. Felt you couldn't overcome your difficulties?

Not at all (0)	No more than usual (2)	Rather more than usual (3)	Much more than usual (4)
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7. Been able to enjoy your normal day to day activities?

More so than usual (0)	Same as usual (1)	Less so than usual (2)	Much less than usual (3)
---------------------------	----------------------	---------------------------	-----------------------------

8. Been able to face up to your problems?

More so than usual (0)	Same as usual (1)	Less than usual (2)	Much less than usual (3)
---------------------------	----------------------	------------------------	-----------------------------

9. Been feeling unhappy or depressed?

Not at all (0)	No more than usual (1)	Rather more than usual (2)	Much more than usual (3)
-------------------	---------------------------	-------------------------------	-----------------------------

10. Been losing confidence in yourself?

Not at all (0)	No more than usual (1)	Rather more than usual (2)	Much more than usual (3)
-------------------	---------------------------	-------------------------------	-----------------------------

11. Been thinking of yourself as a worthless person?

Not at all (0)	No more than usual (1)	Rather more than usual (2)	Much more than usual (3)
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12. Been feeling reasonably happy, all things considered?

More so than usual (0)	Same as usual (1)	Less so than usual (2)	Much less than usual (3)
---------------------------	----------------------	---------------------------	-----------------------------

- 1 = I haven't been doing this at all
 2 = I've been doing this a little bit
 3 = I've been doing this a medium amount
 4 = I've been doing this a lot

Please circle the response that best applies to you.

- | | | | | |
|--|---|---|---|---|
| 1. I've been turning to work or other activities to take my mind off things. | 1 | 2 | 3 | 4 |
| 2. I've been concentrating my efforts on doing something about the situation I'm in. | 1 | 2 | 3 | 4 |
| 3. I've been saying to myself "this isn't real." | 1 | 2 | 3 | 4 |
| 4. I've been using alcohol or other drugs to make myself feel better. | 1 | 2 | 3 | 4 |
| 5. I've been getting emotional support from others. | 1 | 2 | 3 | 4 |
| 6. I've been giving up trying to deal with it. | 1 | 2 | 3 | 4 |
| 7. I've been taking action to try to make the situation better. | 1 | 2 | 3 | 4 |
| 8. I've been refusing to believe that it has happened. | 1 | 2 | 3 | 4 |
| 9. I've been saying things to let my unpleasant feelings escape. | 1 | 2 | 3 | 4 |
| 10. I've been getting help and advice from other people. | 1 | 2 | 3 | 4 |
| 11. I've been using alcohol or other drugs to help me get through it. | 1 | 2 | 3 | 4 |
| 12. I've been trying to see it in a different light, to make it seem more positive. | 1 | 2 | 3 | 4 |
| 13. I've been criticizing myself. | 1 | 2 | 3 | 4 |
| 14. I've been trying to come up with a strategy about what to do. | 1 | 2 | 3 | 4 |
| 15. I've been getting comfort and understanding from someone. | 1 | 2 | 3 | 4 |
| 16. I've been giving up the attempt to cope. | 1 | 2 | 3 | 4 |
| 17. I've been looking for something good in what is happening. | 1 | 2 | 3 | 4 |
| 18. I've been making jokes about it. | 1 | 2 | 3 | 4 |
| 19. I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping. | 1 | 2 | 3 | 4 |
| 20. I've been accepting the reality of the fact that it has happened. | 1 | 2 | 3 | 4 |

- | | | | | |
|---|---|---|---|---|
| 21. I've been expressing my negative feelings. | 1 | 2 | 3 | 4 |
| 22. I've been trying to find comfort in my religion or spiritual beliefs. | 1 | 2 | 3 | 4 |

Thank you for your time completing this questionnaire. If, as a result of completing this questionnaire you felt affected in any way please contact the number below.

Samaritans
1850 60 90 90