The Relationship Between Rate of Perceived Exertion, Perceived Stress, General Self-Efficacy and General Health

JJ Clarke

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Supervisor: Dr Rosie Reid

Head of Department: Dr Sinead Eccles

Student Number: 1596452

Course Code: A8RS010

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Department of Psychology

Dublin Business School
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Abstract

Aims

(i) Is there a significant relationship between Rate of Perceived Exertion, Perceived Stress, General Self-Efficacy and General Health?

(ii) Is there a significant relationship between Exercise Frequency, Perceived Stress, General Self-Efficacy and General Health?

(iii) Do significant differences exist between different types of Physical exercise across Perceived Stress, General Self-Efficacy and General Health?

These results will be analysed with regard to their findings and implications and applied in theory.

Results

Analyses found significant associations between Rate of Perceived Exertion, Stress, Self-Efficacy, General Health. Significant associations between Exercise Frequency and Stress, Self-Efficacy, General Health. Significant differences between different Types of Exercise of participant and level of Stress, Self-Efficacy, General Health.

Author Keywords: Physical Exercise, Stress, Self-Efficacy, General Health.
Chapter 1

Literature Review

Health is a pivotal to our daily lives but we are plagued now by more Stress, Self-Efficacy and General Health issues than ever? What can be done to improve Stress levels, Self-Efficacy and General Health? To affect the literature of this topic would be to improve knowledge on a significant component of Mental Health and Health Psychology. In this regard the aim of this study is to yield significant results from the three hypotheses stated. This will be an addition to the knowledge of the School of Psychology, focusing on Exercise psychology in particular and mental well-being.

As early as 138 AD, the Roman poet Juvenal’s emphasizes in Satire X the importance of physical and mental well-being. He writes in Latin “Mens sana in corpore sano” which is translated as a sound mind in a healthy body but more accurately means a healthy mind in a healthy body. Green (1991, p138). This link between mental and physical health has long been well documented but the ever increasing technologies and pleasures of contemporary society have caused balance to be more difficult to keep in concert. The current study looks to revive this view of all round well-being by informing the area with aims to inform policy on Rate of Perceived Exertion, Physical Exercise and Type of Exercise in relation to three psychological variables.

Mahatma Gandhi stated that “It is health that is the real wealth and not pieces of gold and silver.” Gandhi (1948, p.97). This sentiment speaks of the value of health and even in 1948 it was beginning to be overlooked as it certainly is in 2014.

In the Ireland of 2014 we have access to TV, escalators, internet, five-minute meals and a litany of other options which allow for a sedentary lifestyle. The 18-25 year olds are the masters of this new age of technology. This age group has been selected as they are most representative of this new age of ease where the answer to most problems is a click away. The age bracket selected must face the fact that with a low level of exercise they are at risk of
depression and obesity as well as a host of other ailments that accompany a life absent of physical exercise. “The prevalence of obesity in 18-64 year olds has increased significantly between 1990 and 2011, from 8% to 26% in men, and from 13% to 21% in women”. (Flynn et al, 2011, p.27).

“This those who think they have no time for bodily exercise will sooner or later have to find time for illness” a key point made by Edward Stanley (Stanley,1873) on the importance of exercise.

President John. F. Kennedy spoke on this importance of exercise when he said “I want to urge that this be a matter of great priority. ” a sound mind and a sound body”, all of you, as individuals and as groups, will participate in strengthening the physical well-being of young American boys’ and girls”. (Kennedy, 1961).

This study seeks to pull in all the relevant theories of Physical exercise. This will include psychological variables in order to gain more information on Rate of Perceived Exertion, Exercise Frequency, Type of Physical Exercise, Stress, Self-Efficacy and General Health.

“It is imperative for parents to know the advantages of regular physical activity and how exercise enhances quality of life in order to incorporate physical activity into everyday life and into their family's lives”. (Fletcher et al,1996).

**Rate of Perceived Exertion (RPE)**

Is the feeling an exercising person has of how hard he/she is working. Borg (1982).

It is based on physical sensations a person goes through during physical exercise these include increased heart rate, increased breathing rate, increased perspiring and muscle fatigue. Borg (1988).
A review on the Research of Perceived exertion in the 21st Century remarked that ratings of perceived exertion are an “Important construct to measure the psychophysical responses to exercise.” (Faulkner & Eston, 2008).

RPE is a range model for the reason that “individuals will experience similar degrees of perceived exertion at their respective minima and maxima, providing anchors or calibration for rating sensation across individuals.” (Borg, 1972, p.27).

**Perceived Stress Scale (PSS)**

Is a measure of the degree to which situations in one's life are appraised as stressful. Cohen, & Kamarck (1983). Stress is a common component in everyday life and is commonly viewed as completely negative. However, a little stress is quite normal and enables the individual to complete necessary tasks. Without any source of stress an individual would become stagnated and lack any purpose (sedentary lifestyle). In contrast, too much stress is not healthy for an individual. The sample of 18-25 year olds in this study are at risk of too much stress as they enter working life, third level education and move from home. All of this causes an increase in stress, as work demands are higher and individuals do not have the same support structure of family and friends that was present before.

A study observed that in times of increased stress in college, such as during examination period that perceived stress increased. This study found that students described an increase in negative health behaviors including smoking, a lack of physical activity and a rise in caffeine consumption. Oaten, & Cheng (2005).
**General Self-Efficacy (GSE)**

It is defined as people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performance. Bandura (1997). These self-efficacy beliefs are the basis for human motivation, well-being and personal accomplishment. Pajares (2002). Self-Efficacy is divided into four components which are Performance outcomes, Vicarious Experiences, Verbal Persuasion and Physiological Feedback. Bandura (1977).

Performance outcomes are when an individual has performed a task before and has done so successfully they are more likely to feel competent at that given task in the future and will devote more time to improve that skill. "Based on research of the four sources, performance outcomes are the most effective in influencing self-efficacy since they are derived from personal experience" (Redmond, 2010). Conversely if an individual has performed badly at a particular task in the past they are likely to have low levels of SE relating to that task and also are less likely to devote time to that specific task in the future. Bandura (1977).

Vicarious Experience is when people develop their SE through other individual's performance in a given task. A person can watch a peer or someone of similar ability perform a task successfully and this may inform their Self-Efficacy level in that task. Verbal persuasion is encouragement or discouragement such as someone telling an individual that they can complete a certain task. The result of verbal persuasion is largely due to the credibility of the person voicing the encouragement/discouragement.

Physiological Feedback is the arousal of sensations from the body and how the individual perceives them. Redmond (2010).

The features that inform Self-Efficacy all have implications for this study as SE levels are influenced by how hard exercise is perceived to be (RPE), how much one engages in that
exercise (Exercise Frequency) and which physical exercise type is chosen by the individual dependent on their perception of exercise type.

**Physiological Feedback and RPE**

Redmond’s (2010) above definition of physiological feedback is similar in character to Borg’s (1988) explanation of Rate of Perceived Exertion. Both cite sensations of the body and how the individual experiences/perceives them. A positive correlation found between SE (Physiological feedback) and Rate of Perceived Exertion would support and further the research done by Redmond (2010) and Borg (1988).

**General Health (GH)**

Is a state of complete physical, mental and social well-being and not merely the absence of disease and infirmity. World Health Organization (1948). General Health is a well-documented area within the field of Psychology and can be divided into two categories Mental Health and Physical Health. The World Health Organization (WHO, 2012) describes mental Health as a “State of emotional and social well-being in which the individual realizes his or her own abilities, can manage the normal stresses of life, can work effectively, and is able to play a role in his or her community.”

Physical Health can be defined as “An essential part of overall health of an individual which includes everything from physical fitness to overall well-being.” (Cheshire East Council, 2008, para 1).

The combination of both the above definitions comprises all round general health and is the standard for every individual to strive for.
**Exercise Frequency (ExFreq)**

According to Caspersen, Powell & Christenson (1985) is how often an individual engages in physical exercise in a given week. The number of times an individual exercises in a week was measured using a likert – type scale.

In a study on the role of exercise frequency (Costa, Hausenblas, Oliva, Cuzzocrea, & Larcan, 2013) found that “Age, mood, exercise frequency, and gender predicted exercise dependence.” This illustrates the dangers of exercise frequency and how it can effect individuals, particularly because the participants within this study are at a vulnerable stage as emerging adults.

**Advantages of Physical Exercise**

Petruzzello, Landers, Hatfield, Kubitz and Salazar (1991, p.143) states

“There have been six meta analyses examining the relationship between exercise and anxiety reduction (Calfas and Taylor, 1994; Kugler, Seelback, & Kruskemper, 1994; Long & van Stavel, 1995; McDonald & Hodgdon, 1991; Petruzzello, Landers, Hatfield, Kubitz, & Salazar, 1991). These meta analyses ranged from 159 studies, (Landers & Petruzzello, 1994; Petruzzello et al., 1991) to five studies (Calfas & Taylor, 1994) reviewed. All six of these meta-analyses found across all studies examined, exercise was significantly related to a reduction in anxiety.”

Physical Exercise is not simply a cure that is best utilized when an individual is enduring hardship, it can play a part in improving health in general for the average individual as substantiated by Landers (1999) “Exercise is related not only to a relief in symptoms of depression and anxiety but it also seems to be beneficial in enhancing self-esteem, producing more restful sleep, and helping people recover more quickly from psychosocial stressors.”
A study on physical activity and the prevention of type 2 diabetes documented that “Replacing sedentary time with equal amounts of light, moderate and vigorous intensity physical activity is associated with better physical health and improved overall health benefits such as reducing risk of type 2 diabetes”. (Gill, & Cooper. (2008).

A study on the effects of aerobic exercise on depression findings suggest that "a moderate increase in maximum oxygen uptake (15-30%) was sufficient to obtain an anti-depressive effect from the training program". The study was conducted on 43 patients with depression both males and females. Martinsen, Medhus & Sandvik(1985, p.109). Furthering the backing of physical exercise and its relation to positive mental health.

**Relationship between Exercise and Mental Health**

The value that contemporary society places on mental health is illustrated by the amount of studies vindicating it. When individuals are mentally healthy they can enjoy their lives, environment and the people in it. "Depression is present in about 25% of people visiting family doctors" according to the World Health Organization (WHO). World Health Organization (2012).

"Exercise is a quantifiable activity that improves cognition in young and aged animals and humans" this is from the concluding remarks of a study on exercise and the brain. Van Praag (2009). The link has been established between cognitive function and exercise and should therefore be included as an integral part of everyday life.

It could not be more clearly put by Landers (1999) who states “The research literature suggests that for many variables there is now ample evidence that a definite relationship exists between exercise and improved mental health. This is particularly evident in the case of a reduction of anxiety and depression.” This is promising information for the effective treatment and improvement of mental health issues.
Emerging Adulthood

All of the 180 participants within this study are within the demographic of 18-25, as described by Arnett (2000). This period only exist within cultures that allow for an extended period of role exploration during the late teens and early twenties. This is a time of exploration, stress and self-discovery that asks a lot of the individual. Many begin college and go from a set routine to having no timetable or regiment altogether. Individuals have to learn to self-regulate in this time of novelty and strife.

Many problems are faced in this age bracket. Arnett (2007) argues that the some of the individuals within this group have a relaxed attitude to taking on a responsible adult role within society however they take a pride in moving towards self-sufficiency. Physical exercise or lack of it can play a part in the stress, Self-Efficacy and General Health of an individual. A study on emerging adulthood and patterns of Physical activity among young Australian women showed that interventions to encourage physical activity are essential and benificial among young women who cohabit with a partner or marry, and those who are unemployed and also that the individuals supporting young mothers to be physically active.( Bell & Lee, 2005).

Features of Rate of Perceived Exertion

Borg (1982) remarks of the RPE scale that “The old RPE scale is the best one for most simple applied studies of perceived exertion, for exercise testing, and for predictions and prescriptions of exercise intensities in sports and medical rehabilitation.” While this study is not directional, the information regarding the optimum perceived exertion for exercise intensities would be beneficial to this area of psychology.

In a study on the Physical activity level across Europe (Piatkowska, 2012, p.29) states “ Unfortunately, there are no adequate studies resolving the dispute on the optimal dose of physical activity”. The above statement means that there is an opening in the literature
where no study has properly addressed the issue of optimal Rate of Perceived Exertion and frequency of exercise which will be a sector which this study will touch upon but not in a directional sense as the Significance from the Spearman’s Rho test is two tailed.

The features of RPE and how it relates to any psychological variables are not in existence as of yet and thus this study has identified that there is little or no research and study on the rate of perceived exertion. Furthermore there is no research that isolates emerging adulthood and relates it to RPE. Correlational studies with RPE relating to Stress, Self-Efficacy and General Health have not been previously investigated. Rate of Perceived Exertion has been used in various studies as a measure of exertion. For example studies involving RPE include the effects of Caffeine on repetitions to failure and ratings of perceived exertion during resistance training, Green et al., (2007, p.250), in which no significant RPE differences were recorded during resistance training. Correlating Heart Rate and Perceived Exertion during Aerobic exercise in Alzheimer’s disease. Fang and Bill (2010), in which RPE was found to be an insufficient for measuring exercise responses which goes against the bulk of research such as (Faulkner and Eston, 2008) and also Borg’s findings (1982). However using RPE with Stress, Self-Efficacy and General Health in a study has not been investigated to date.

**Physical Exercise and Stress**

The interest in the relation between exercise and stress has grown in psychology in the last decade phenomenally as health professionals seek cheap and natural techniques for stress management and reduction. In a study on 814 American College students found “higher levels of physical activity were associated with significantly with lower levels of hassles.” Nguyen-Michel, Unger, Hamilton and Spruijt-Metz (2006, p.184). Another perspective on physical exercise and stress is this statement from Andreas Stroehle (2008, p.777) “The evidence for positive effects of exercise and exercise training on
depression and anxiety is growing”. This indicates the move to understand the effects of exercise on mental functioning.

Unfortunately there does not seem to be a specific physical exercise plan in circulation to treat psychiatric disease as mentioned by Meyers & Broocks (2000, p.269) “no general concept for the therapeutic administration of physical activity for patients with depression and anxiety disorders has been developed so far”. It is even argued by Stroehle (2000, p.777) that “Physical inactivity may also be associated with the development of mental disorders.”

**Relationship between Physical Activity and Self-Efficacy**

Physical Activity can affect both the physiology and the psychological constitution of an individual. In this paragraph the affect it has on perceived beliefs’ in one’s own abilities will be examined. As in a study on the relationship between self-efficacy and its prediction in performance in the ironman triathlon Hazlewood and Burke (2011, p.21) found that “The actual predictions of performance (self-estimation/Self-Efficacy) made by the triathletes, were more accurate predictors of triathlon performance” than that of sport specific SE which is to state that general Self-Efficacy in this case was more significant in predicting actual outcome than specific perceived SE.

To further demonstrate the above relationship a study on the effectiveness of imagery and coping strategies in sport performance (Omar-Fauzee, Binti Wan Daud, Abdullah, & Abd Rashid, 2009 ,p.106) found that “There are relationships between the imagery skill and coping strategies where two of these skills affect the sport performance. These two skills are mental practice as very useful practicing for all athletes to enhancing the performance.” Modeling is a big part of imagery skill as it allows the individual to aspire to the performance level they imagine and perceive. Coping strategies are enhanced by strong imagery skill as the individual is aware of the objective and the task.
**Relationship between Self-Efficacy, Perceived Exertion and Exercise**

In a study on Physical Activity, Self-Efficacy and Perceived Exertion Among Adolescents Robbins, Pender, Ronis, Kazanis & Pis (2004, p.441) found that when expectations of exertion are lower this promotes self-efficacy and increases confidence in Physical activity skills. They also found that "Among boys, higher perceived self-efficacy was associated with lower perceived exertion during exercise and lower perceived exertion was associated with higher self-efficacy after exercise". This means that when an individual believes the physical exercise to require low levels of exertion than they will have higher self-efficacy for completing the task. This is as a result of them looking at a problem as something that can be solved and not something unmanageable, also something easy to do.

**Type of Physical Exercise**

In Ireland 2014 there is serious significance and importance placed on Physical Exercise. Health shops, gyms and advertisements for the next 5k run are all indicative of this fact.

This study sought to discover whether there were difference in Stress, Self-Efficacy and General Health of participants who engaged in different types of physical exercise. Significant results in the case of this study could inform the topic on which physical exercise type is most beneficial for Stress levels, Self-Efficacy levels and General Health levels. Most studies on type of exercise remain general and do not go deeper than using umbrella terms of aerobic and anaerobic. A study by Norris, Carroll and Cochrane (1990) on the effects of aerobic and anaerobic training found support for exercise and more specifically aerobic exercise training which affected and benefited well-being. More specific studies have been completed which encourage the selection of a certain type of exercise as per how it can increase all round well-being.
One study found that mood boosting effects of aerobic exercise could be observed when an individual sustains it over a long period of time, whereas anaerobic exercise had greatest mood boosting effects when it was performed at high intensity. However this study goes on to state of aerobic exercise that “There is little evidence to suggest that one form of aerobic exercise has a greater positive effect than any other type of aerobic exercise, as long as the exercises are performed at similar intensities over the same period of time.” (Cohen, Shamus, 2009).

An example of comparing two different types of physical exercise is a study conducted on Yoga versus Walking outcomes found that “Walkers had significantly lower levels of depression and higher levels of quality of life compared with yoga participants.” (Kraemer & Marquez, 2009, p.400). This shows how the field of Physical Exercise study has narrowed and now is focusing on contrasting different types of exercise and how they score among psychological variables.

**Characteristics of this study**

This study is the first time that the variables Rate of Perceived Exertion, Perceived Stress, General Self-Efficacy, General Health, Exercise Frequency and Type of Physical Exercise have been tested on an Irish Population. It is the first study testing the three hypotheses and unique in that it is looking at 18-25 year olds. The study adds to the literature and informs the areas of Rate of Perceived Exertion and Exercise Frequency in particular as there is little to no research on these variables in relation to psychological study and testing.

The interesting features of this study are that it divides up physical exercise into five categories and generates information on Stress, Self-Efficacy and General Health which is completely unique and will be of much interest to individuals looking to choose a sport based on Physical and psychological benefits. The results can inform not just individuals but
corporate and government policy - which is the best rate of exertion to train at, what
frequency is optimum for PSS,GSE and GH levels and what type of Physical Exercise is most
beneficial for PSS,GSE and GH.

**Rationale for this Study**

This study aims to find accurate information that can be used to benefit Ireland’s
general health. Stress management courses could incorporate RPE, Exfreq and Exercise type
information from this study to relieve stress in a cost effective manner. Optimum levels of
RPE, Exfreq and Exercise Type would be advantageous to corporate and domestic
population within Ireland. In particular the emerging adults of Ireland will benefit from
significant relationships and differences discovered in this study. The current study seeks to
inform policy on well-being in general in Ireland. Improvement of Self-Efficacy in general
should be the aim of most nations thus business and schools will gain from this significant
relationships study as with higher levels of Self-Efficacy comes higher levels of performance.

Implementation and focus put on improving Ireland in terms of PSS, GSE and GH is
one of the predominant goals of this research and also any pitfalls encountered. This study
will be well documented so as to provide a road map of what to avoid and areas that need
further work and investigation.

**Hypotheses**

(1) There is a significant relationship between Rate of Perceived Exertion, Stress, Self-
Efficacy and General Health.

(2) There is a significant relationship between Exercise Frequency, Stress, Self-Efficacy
and General Health.

(3) Significant differences will exist between different types of Physical Exercise
participant’s level of Stress, Self-Efficacy and General Health.
Chapter 2

Method

The method of data collection used was convenience sampling or grab what you can get sampling. This form of sampling was useful as I had access to a diverse RPE group. I mainly sampled at St. Mary’s RFC. I gained 90 participants from St. Mary’s rugby club, of these rugby players 55 were males and 35 were females. (See Appendix E – Permission to Sample at St. Mary’s Rugby Club.

Participants were given a briefing for five minutes explaining the study and its implications. The withdrawal options were explained and every participant was informed that they were free to withdraw from the study at any moment. They were also informed that the questionnaire was anonymous and that by submitting and completing the questionnaire they were consenting to participation. The filling out of the questionnaires was supervised to ensure that it was completed in a serious manner and with thought. There was a cover sheet informing the participants of the study and any pertinent information should they have further questions after the study and a detachable sheet at the end of the questionnaire that contained information on various psychological helplines in the incidence that the material of the study was found to be upsetting. They were given the questionnaire to fill out and were permitted to take as much time as was needed. The questionnaires were collected when finished and a debriefing was given to answer any questions the participants had.

I had 180 participants all together; (N = 180). All were aged between the ages of 18-25. Of the sample 90 were Males (n = 90) and 90 were females (n = 90). The participants ranged from athletic individuals, to individuals who exercised only once or more a week, and a group that did not partake in any physical exercise at all in a week.

Participation in this study was voluntary and every participant had the option to withdraw from the study at any time.
Data on participants was gathered using three questionnaires. There were included five demographic questions age, gender, Type of Exercise, Exercise frequency and Rate of Perceived Exertion (Borg, 1998). Perceived Stress Scale Perceived Stress Cohen, S., Kamarck, T and Mermelstein, R. (1983). General Self-Efficacy Schwarzer and Jerusalem (1995,pp 35-37),General Health. (Goldberg & Williams, 1988) were the three questionnaires used and were the Independent variables.

**Design**

This study tested significance of relationships for the first two hypotheses and employed a correlational design measure. The dependent variable was Rate of Perceived Exertion (Borg,1998) in Hypothesis 1 and Exercise Frequency in Hypothesis 2.

This study also looked for differences between groups using type of Physical Exercise as the demographic. Participants were divided into 5 groups dependent on which type of physical exercise they engaged in.

It was expected that individuals with higher RPE would have lower PSS, higher GSE and High levels of General Health. Also this study expects to find that high ExFreq results in lower levels of PSS, higher GSE and a low score on general health.
**Materials**

The materials used in this study were pens and questionnaires. Questionnaires were self-administered in this research project, pen-and-paper questionnaires.

The first section of the questionnaire asks five demographic questions (Contained in Appendix A) which were:

(i) Age – the sample were all between the ages of 18 and 25.

(ii) Gender.

(iii) Which type of Physical Exercise the participant engaged in – the options were None (where no sport was selected), Cardio Endurance, Weight Lifting, Team Sport, Individual Sport, Swimming, Cycling, Running, Other.

Individual Sport, Swimming, Cycling, Running and Other were collapsed under the banner of None, Cardio Endurance, Weight Lifting, Team Sport and Mixed Physical Exercise Combination (when participants selected more than one option for Type of Physical Exercise they were put into mixed-exercise) dependent on their characteristics.

(iv) How often does the participant engage in Physical Exercise each week – options were Never, Once a week, Twice a week, Three times a week and More than three times a week.

(v) Borg’s Perceived Exertion Scale (Borg, 1998).

The second part of the questionnaire is the Perceived Stress Scale by Cohen, Kamarck (1983) (Contained in Appendix B) It is a self-report measure. The Scale uses a mode of measurement similar to the Likert Scale 0=Never, 1=Almost never, 2=Sometimes, 3=Fairly often, 4=Very often. The items are scored 0 to 4, with items 4, 5, 6, 7, 9, 10 and 13 scored in reverse direction (0=4, 1=3, 2=2, 3=1, 4=0) and summed with the other negatively worded items. Scores range from 0-56. The scale measures how stressful events are perceived in the
participant’s life. The higher the score the more stressed the participant is. (Cohen et al, 1983).

The third part of the questionnaire is the General Self Efficacy Scale by Schwarzer and Jerusalem (1995)(Contained in Appendix C). This questionnaire examines the perceptions of the participant’s on how their skills match up to a given task. The participants are asked to read the statements and answer on a scale of 1-4 how much it relates to them. It was designed to assess the perceived self-efficacy in the adult and adolescent population. (Schwarzer & Jerusalem, 1995). It is measured on a four point likert scale ranging from not at all true (1) to exactly true (4). Reliability - It has a cronbach’s alpha range from .76 to .90 with the majority in the high .80s. It samples from 23 nations. (Schwarzer and Jerusalem, 1995).

The fourth part of my questionnaire was the general health questionnaire (GHQ12), (Goldberg, 1992) ( Contained in Appendix D) a four point likert- scale was used for the measurement. The GHQ12 was scored from 0 to 3 for each question with a distribution of scores ranging from 0 to 36. Scores that are greater than 15 indicate evidence of distress. Scores in excess of 20 suggest severe problems and psychological distress. The greater the score on the GHQ12, the higher the probability is of a clinical disorder. “Analysis used during the development of GHQ12 ensured that it has good content validity”. (Goldberg & Huxley, 1980). In a range of studies internal consistency has been reported using Cronbach’s alpha, with correlations ranging from 0.77 to -0.93. (Goldberg & Williams, 1988). Scores are relative to other scores within that particular sample/population and may seem high or low when compared with scores from a different sample/population.
**Procedure**

Participation in this study was done on a voluntary basis. They were informed that the questionnaire was anonymous. The participants were informed that the study was on the relationship between Rate of Perceived Exercise, Perceived Stress, Self-Efficacy and General Health. I was granted approval to go into St. Mary’s College Rugby club and to collect as much data as was required for the study. This yielded 90 questionnaires which was half of my sample. The other half came from immediate family, friends and acquaintances.

Types of Physical Exercise was summarized in a Pie Chart in graphical format which will allow the reader better understand the distribution of participants in the different types of Physical Exercise.

Test 1: Spearman’s Rho

The dependent variable is Rate of Perceived Exertion (Borg, 1988) and the independent variables are PSS, GSE and GH.

Test 2: Spearman’s Rho

The dependent variable is Exercise Frequency and the independent variables are PSS, GSE and GH.

Test 3: One-way ANOVA

The dependent variable is Type of Physical Exercise and the independent variables are PSS, GSE and GH.

There were 180 participants involved in this study (N=180). All of the participants were between the ages of 18 and 25. 90 were males (n=90). 90 were females (n=90). 90 participants of the sample were rugby players (male and female) from St. Mary’s College Rugby Club – these participants engaged in physical exercise twice or more a week. 30 participants stated that they did not engage in any Physical Exercise in a week.
Chapter 3

Results

Inferential Statistics

**Hypothesis 1**

A Spearman’s Rho correlation found that there was a significant association between Rate of Perceived Exertion and Perceived Stress (rs(180) = -0.22, p = .003).

A Spearman’s Rho correlation found that there was a significant association between Rate of Perceived Exertion and General Self-Efficacy (rs(180) = 0.47, p < .001).

A Spearman’s Rho correlation found that there was a significant association between Rate of Perceived Exertion and General Health (rs(180) = -0.31, p < .001).

Null Hypothesis- There is no significant relationship between Rate of Perceived Exertion, Stress, Self-Efficacy and General Health.

**Hypothesis 2**

A Spearman’s Rho correlation found that there was a significant association between Exercise Frequency and Perceived Stress (rs(180) = -0.36, p < .001).

A Spearman’s Rho correlation found that there was a significant association between Exercise Frequency and General Self-Efficacy (rs(180) = 0.50, p < .001).

A Spearman’s Rho correlation found that there was a significant association between Exercise Frequency and General Health (rs(180) = -0.36, p < .001).

Null Hypothesis- There is no significant relationship between Exercise Frequency, Stress, Self-Efficacy and General Health.
**Hypothesis 3**

**PSS**

When we examine the mean number for Perceived Stress in each exercise group, it can be seen that the No Physical Exercise group (None group) had the highest score on Perceived Stress and that the Team sport group had the lowest score on Perceived Stress. A one-way analysis of variance showed that there was a significant difference between the five groups in terms of Perceived Stress score ($F(4,175) = 2.91, p=.023$).

Post hoc analysis confirmed that the differences in Perceived Stress were significant in nature between the No Physical Exercise group ($M=19.47, SD=4.22$) with the Team Sport group ($M=14.97, SD=6.49, p=.018$) and with the Mixed Exercise Combination group ($M=15.75, SD=6.78, p=.035$).

**GSE**

When we examine the mean number for General Self-Efficacy in each exercise group, it can be seen that the Mixed Exercise Combination group had the highest score on General Self-Efficacy and that the No Physical Exercise group (No group) had the lowest score on General Self-Efficacy. A one-way analysis of variance showed that there was a significant difference between the five groups in terms of General Self-Efficacy score ($F(4,175) = 43.75, p<.001$).

Post hoc analysis confirmed that the differences in General Self-Efficacy were significant in nature between the No Physical Exercise group ($M=18.06, SD=8.26$) with the Cardio Endurance group ($M=29.95, SD=2.93, p<.001$) and with the Team Sport group ($M=29.82, SD=4.00, p<.001$) and with the Mixed Exercise Combination group ($M=30.82, SD=3.88, p<.001$).
When we examine the mean number for General Health in each exercise group, it can be seen that the No Physical Exercise group (None group) had the highest score on General Health and that Cardio Endurance group had the lowest score on General Health. A one-way analysis of variance showed that there was a significant difference between the five groups in terms of General Health score ($F(4,175)= 43.62, p<.001$).

Post hoc analysis confirmed that the differences were significant in General Health in nature between the No Physical Exercise group ($M=27.15, SD=7.79$) with the Cardio Endurance group ($M=13.78, SD=2.95, p<.001$) and with the Weightlifting group ($M=14.25, SD=7.14, p<.001$) and with the Team Sport group ($M=14.26, SD=3.61, p<.001$) and with the Mixed Exercise Combination group ($M=16.25, SD=4.40, p<.001$).

Null Hypothesis- There is no significant differences between different types of Physical Exercise Participant’s level of Stress, Self-Efficacy and General Health.
Descriptive Statistics

Figure 1. Pie-Chart. Distribution of Exercise Types of Participants.

In the above Graph it is important to observe the split of Physical Exercise types – namely the large groups of Mixed-Exercise Combination, Team Sport and Cardio Endurance which is a split that was anticipated as sampling was done over a diverse group of participants.
**Hypothesis 1**

**Rate of Perceived Exertion**

**Spearman’s Rho**

Table 1. Correlations between RPE, PSS, GSE, GHQ.

<table>
<thead>
<tr>
<th></th>
<th>TotalPSS</th>
<th>TotalGS</th>
<th>TotalG</th>
<th>RPE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>E</td>
<td>HQ12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spearman’s Rho</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TotalP</td>
<td>-549**</td>
<td>.168*</td>
<td>-.221**</td>
<td></td>
</tr>
<tr>
<td>Sig. (2-Tailed)</td>
<td>.</td>
<td>.025</td>
<td>.003</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>180</td>
<td>180</td>
<td>180</td>
<td>180</td>
</tr>
</tbody>
</table>

TotalG Correlation Co-

<p>| SE   | Efficient | -.549** | 1.000 | -.324** | .466** |
|      | Sig. (2-Tailed) | .000 | .    | .000 | .003 |
| N    | 180 | 180 | 180 | 180 |</p>
<table>
<thead>
<tr>
<th></th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>TotalG</td>
<td>Co-Efficient</td>
</tr>
<tr>
<td>HQ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>.168*</td>
</tr>
<tr>
<td></td>
<td>-.324**</td>
</tr>
<tr>
<td></td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>-.307**</td>
</tr>
</tbody>
</table>

Sig.

(2-Tailed) | .025  | .000  | .  | .000  |
N           | 180   | 180   | 180| 180   |

<table>
<thead>
<tr>
<th></th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPE</td>
<td>Co-Efficient</td>
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<td></td>
<td>-.221**</td>
</tr>
<tr>
<td></td>
<td>.466**</td>
</tr>
<tr>
<td></td>
<td>-.307**</td>
</tr>
<tr>
<td></td>
<td>1.000</td>
</tr>
</tbody>
</table>

Sig.

(2-Tailed) | .003  | .000  | .000| .  |
N           | 180   | 180   | 180| 180 |

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).
In Table 1 above particular focus should be directed to significance level in Perceived Stress, General Self-Efficacy and General Health. All correlations were significant at the level 0.01. With the exception of Total Perceived Stress and Total General Health which were significantly correlated at the level 0.05. (p= .025).

**Hypothesis 2**

**Spearman’s Rho**

Table 2. Correlations between ExFreq, PSS, GSE, GHQ.

<table>
<thead>
<tr>
<th>TotalPSS</th>
<th>TotalGS</th>
<th>TotalG</th>
<th>ExFreq</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HQ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spearman’s Rho</td>
<td>TotalPS</td>
<td>Correlation</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co-Efficient</td>
<td>1.000</td>
<td>-.549**</td>
<td>.168*</td>
</tr>
</tbody>
</table>

Sig.

(2-Tailed) | . | .000 | .025 | .000 |

N | 180 | 180 | 180 | 180 |
<table>
<thead>
<tr>
<th>TotalG</th>
<th>Correlation</th>
<th>SE</th>
<th>Co-Efficient</th>
<th>Sig. (2-Tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>-.549**</td>
<td>.000</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-.324**</td>
<td>.000</td>
<td>180</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>.502**</td>
<td>.000</td>
<td>180</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TotalG</th>
<th>Correlation</th>
<th>HQ</th>
<th>Co-Efficient</th>
<th>Sig. (2-Tailed)</th>
<th>N</th>
</tr>
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<tbody>
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<td></td>
<td></td>
<td></td>
<td>.168*</td>
<td>.025</td>
<td>180</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>-.324**</td>
<td>.000</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.000</td>
<td>.000</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-.361**</td>
<td>.000</td>
<td>180</td>
</tr>
<tr>
<td>ExFreq</td>
<td>Correlation Co-Efficient</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>--------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-.356**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.502**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-.361**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** Sig. **

(2-Tailed) .000 .000 .000 .

N 180 180 180 180

**. Correlation is significant at the 0.01 level. (2-tailed).

*. Correlation is significant at the 0.05 level. (2-tailed).
**Hypothesis 3**

**One-Way ANOVA**

Table 3. Descriptives of One-Way ANOVA between Exercise Type, PSS, GSE, GHQ.

### PSS

<table>
<thead>
<tr>
<th>Exercise Type</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>19.47</td>
<td>4.22</td>
</tr>
<tr>
<td>Cardio-Endurance</td>
<td>16.95</td>
<td>6.12</td>
</tr>
<tr>
<td>Weight-Lifting</td>
<td>15.50</td>
<td>3.87</td>
</tr>
<tr>
<td>Team Sport</td>
<td>14.97</td>
<td>6.49</td>
</tr>
<tr>
<td>Mixed-Exercise Combination</td>
<td>15.75</td>
<td>6.78</td>
</tr>
</tbody>
</table>

### GSE

<table>
<thead>
<tr>
<th>Exercise Type</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>18.06</td>
<td>8.26</td>
</tr>
<tr>
<td>Cardio-Endurance</td>
<td>29.95</td>
<td>2.93</td>
</tr>
<tr>
<td>Weight-Lifting</td>
<td>29.82</td>
<td>8.91</td>
</tr>
<tr>
<td>Team Sport</td>
<td>29.82</td>
<td>3.40</td>
</tr>
<tr>
<td>Exercise Type</td>
<td>Mean</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------</td>
<td>--------------------</td>
</tr>
<tr>
<td>None</td>
<td>27.15</td>
<td>7.79</td>
</tr>
<tr>
<td>Cardio-Endurance</td>
<td>13.78</td>
<td>2.95</td>
</tr>
<tr>
<td>Weight-Lifting</td>
<td>14.25</td>
<td>7.14</td>
</tr>
<tr>
<td>Team Sport</td>
<td>14.26</td>
<td>3.61</td>
</tr>
</tbody>
</table>
| Mixed-Exercise Combination    | 16.25 | 4.40               

In table 3 it is important to highlight that within Perceived Stress scores that Team Sport group reported the lowest scores at 14.97 and that None group reported the highest perceived stress levels at 19.47.

In table 3 Mixed-Exercise Combination group had the highest Self-Efficacy with 30.82 and the None group had the lowest with 18.06.

In table 3 Cardio-Endurance group had the lowest General Health level and the None group had the highest General Health score at 27.15. It was noted that Mixed-Exercise Combination scored in the category for “evidence of distress” and that None group scored in the category “severe problems and psychological distress” (GHQ12) (Goldberg, 2012).
## Types of Physical Exercise

### ANOVA

Table 4. *One Way Analysis of Variance on Type of Exercise, PSS, GSE, GHQ.*

<table>
<thead>
<tr>
<th>Total PSS</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>437.838</td>
<td>4</td>
<td>109.46</td>
<td>2.913</td>
<td>.023</td>
</tr>
<tr>
<td>Within Groups</td>
<td>6575.023</td>
<td>175</td>
<td>37.57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>7012.861</td>
<td>179</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total GSE</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>4219.464</td>
<td>4</td>
<td>1054.866</td>
<td>43.751</td>
<td>.000</td>
</tr>
<tr>
<td>Within Groups</td>
<td>4219.336</td>
<td>175</td>
<td>24.110</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>8438.800</td>
<td>179</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Total GHQ12</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>4214.988</td>
<td>4</td>
<td>1053.747</td>
<td>43.622</td>
<td>.000</td>
</tr>
<tr>
<td>Within Groups</td>
<td>4227.340</td>
<td>175</td>
<td>24.156</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Types of Physical Exercise

**Table 5.** Multiple Comparison - Significant Differences.

#### PSS

<table>
<thead>
<tr>
<th>(I)Exercise Type</th>
<th>(J)Exercise Type</th>
<th>Mean Difference (I-J)</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Team Sport</td>
<td>4.50</td>
<td>.018</td>
</tr>
</tbody>
</table>

#### GSE

<table>
<thead>
<tr>
<th>(I)Exercise Type</th>
<th>(J)Exercise Type</th>
<th>Mean Difference (I-J)</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Cardio-Endurance</td>
<td>-11.89</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Team Sport</td>
<td>-11.76</td>
<td>.000</td>
</tr>
<tr>
<td>Mixed-Exercise</td>
<td>Combination</td>
<td>-12.76</td>
<td>.000</td>
</tr>
<tr>
<td>(I)Exercise Type</td>
<td>(J)Exercise Type</td>
<td>Mean Difference (I-J)</td>
<td>Sig.</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------</td>
<td>-----------------------</td>
<td>-------</td>
</tr>
<tr>
<td>None</td>
<td>Cardio-Endurance</td>
<td>13.36</td>
<td>.000</td>
</tr>
<tr>
<td>Weight-Lifting</td>
<td>12.90</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Team Sport</td>
<td>12.88</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Mixed-Exercise</td>
<td>Combination</td>
<td>10.89</td>
<td>.000</td>
</tr>
</tbody>
</table>
**Means Plots**

*Total Perceived Stress*

![Graph](image)

Figure 2. *Means plot for differences in PSS across different Exercise Types.*

In Graph 8 the means plot depicts Perceived Stress in participants. The group which had the highest level of Perceived Stress was the None (no exercise) group. This finding was not a surprise and was a finding that was anticipated from the beginning of the study. The Team Sport group had the lowest level of Perceived Stress. This was a surprise as at the beginning of the study it was thought that Cardio-Endurance was going to be the Exercise Type with the lowest level of Perceived Stress. Cardio-Endurance group levels of Perceived Stress were quite high when compared to the other exercise types, this information was also unforeseen.
Figure 3. *Means plot for differences in GSE across different Exercise Types.*

In Graph 9 the means plot illustrates that General Self-Efficacy was lowest among participants who engage in no physical exercise which is already well documented. The Mixed-Exercise Combination group had the highest general Self-Efficacy which displays that the participants within this group who exercise using a combination of exercise types have higher perceived levels of belief in themselves and their skills. Also Weight-Lifting seemed to have low levels of General Self-Efficacy which wasn’t expected in the beginning of this study.
Total General Health

It can be seen in the above graph 10 that participants who engaged in Cardio-Endurance had the lowest level of General Health which suggests that Cardio-Endurance is the optimum type of Exercise within the spectrum of this study for General Health Levels. Conversely, participants who engaged in no exercise had the highest level of General Health which is well documented but is also significantly different from the other Exercise Types in terms of General Health.
Chapter 4

Discussion

The Overall and primary aim of this research was to establish a significant relationship between Stress, Self-Efficacy and General Health levels among 18-25 year olds with both Rate of Perceived Exertion and Exercise Frequency individually. In addition the study looked to establish significant differences in Stress, Self-Efficacy and General Health among participants with different Exercise Types. It is essential for this discussion to separate each hypothesis because the research that went into each Hypothesis was unique and different from the other hypotheses.

The aim of this study is to find (i) A significant relationship between Rate of Perceived Exertion, Stress, Self-Efficacy and General Health. The first hypothesis sought to improve on the general knowledge and usage of Rate of Perceived Exertion as there is little information on the variable. The Borg scale was found to be an effective tool for measuring participants exercise intensity within the sample (Faulkner & Eston, 2008). This hypothesis sought to improve on Borg’s (1982) scale and link it to the three psychological variable measures. The test was successfully correlated to Stress, Self-Efficacy and General Health. This is new to the area of Rate of Perceived Exertion as there were only broad studies done on Rate of Perceived Exertion previously. This will focus Rate of Perceived Exertion literature and give direction to further research. (ii) A significant relationship between Exercise Frequency, Stress, Self-Efficacy and General Health. (iii) Significant differences will exist between different types of Physical Exercise participant’s level of Stress, Self-Efficacy and General Health.

The following variables were investigated Rate of Perceived Exertion, Exercise frequency, Exercise Type, Perceived Stress, General Self-Efficacy and General Health.
**Findings**

**Hypothesis 1**

A Spearman’s Rho Correlation found that there was a significant association between Rate of Perceived Exercise and Perceived Stress. A Spearman’s Rho found that there was a significant association between Rate of Perceived Exercise and General Self-Efficacy. A Spearman’s Rho Correlation found that there was a significant association between Rate of Perceived Exercise and General Health.

The Biology of Sport study (Piatkowska, 2012) which was mentioned in the Introduction will be informed by this result as it shows a significant relationship between Rate of Perceived Exertion and General Health which is a step closer to discerning the “Optimal dose” for Physical activity.

The Borg Scale of Rate of Perceived Exertion was found to be reliable and the participants were satisfied with the self-report measures within the scale in relation to their perceived exertion substantiating the research of (Faulkner & Eston, 2008).

The study by Robbins et al. (2004, p.441) supports the findings of this study that Rate of Perceived Exertion and General Self-Efficacy are positively correlated with a correlation coefficient value of .466 and a significance value of .003. However both Perceived Exertion and General Health were negatively correlated to Rate of Perceived Exertion.

Redmond (2010) and Borg’s (1988) research was supported and substantiated by a positive correlation of General Self-Efficacy (in particular physiological Feedback) and Rate of Perceived Exertion in the first correlational study. (See table 1). The positive significant correlation connects General Self-Efficacy and Rate of Perceived Exertion which will inform one-way directional studies on Rate of Perceived Exertion in the future.
Hypothesis 2

A Spearman’s Rho Correlation found that there was a significant association between Exercise Frequency and Perceived Stress. A Spearman’s Rho Correlation found that there was a significant association between Exercise Frequency and General Self-Efficacy. A Spearman’s Rho found that there was a significant association between Exercise Frequency and General Health. Similar to the Hypothesis one result Exercise Frequency was positively correlated with General Self-Efficacy with the correlation coefficient value being .502 and p value being p<.001 significance. This adds to the research of Costa (Costa et al, 2013) on Exercise Frequency and its effects. This also supports the assumption of Costa (Costa et al, 2013) that Exercise Frequency is a significant influence on cognitive function be it behaviours (Exercise dependence) or beliefs (Self-Efficacy). Exercise Frequency was negatively correlated to Stress and General Health levels.

Nguy-Michel et al’s (2006, p.184) findings “that higher levels of physical activity (similar to ExFreq) was significantly associated with significantly lower levels of hassles(similar to Perceived Stress)” was supported by a negative significant correlation between Exercise frequency and Perceived Stress. (See table 2).
**Hypothesis 3**

A one-way analysis of variance showed that there was a significant difference between the five groups of Physical Exercise in terms of Perceived Stress score.

Firstly Petruzzello et al’s (1991) research completely supports the findings in that this test displays the significant difference between the exercise types and the group of participants who selected none for type of exercise. Petruzzello’s finding in the meta-analyses that exercise across the board reduces anxiety was vindicated in this study findings by the fact that the no exercise (None group) type had significantly and substantially higher levels of Perceived Stress and General Health than when compared with the other exercise types. (See table 4 – Means Scores).

A one-way analysis of variance showed that there was a significant difference between the five groups of Physical Exercise in terms of General Self-Efficacy.

The None group displayed higher levels of Perceived Stress than any other group of Physical activity, this can be connected to Oaten & Cheng’s research that found stressful times lead to a lack of physical activity. However, the study was not causal and further investigation is necessary to determine if it Stress that causes inactivity or the reverse. (Oaten, & Cheng, 2005).

**PSS**

Significant Difference in terms of Perceived Stress was recorded when Team Sport was compared to None group at the significance level $p= .018$.

Significant Difference in terms of Perceived Stress was recorded when Mixed-Exercise Combination was compared to None group at the significance level $p= .035$. 
From the One-Way ANOVA we see that the None group (No Exercise) had the highest stress levels which corroborates the findings of the study done by Landers(1999) which establishes the relationship between exercise and improved mental health. The other four groups of Physical Exercise had much healthier levels of PSS than that of the None group (No Exercise).

**GSE**

Significant Difference in terms of General Self-Efficacy was recorded when Cardio-Endurance, Team Sport and Mixed-Exercise Combination were compared to None group at the significance level p<.001.

**GHQ**

Significant Difference in terms of General Health was recorded between Mixed Exercise group and None group at the significance level p<.001.

Significant Difference in terms of General Health was recorded between Team Sport and None group at the significance level p<.001.

Significant Difference in terms of General Health was recorded between Weights group and None group at the significance level p<.001.

Significant Difference in terms of General Health was recorded between Cardio-Endurance group and None group at the significance level p<.001.

A one-way analysis of variance showed that there was a significant difference between the five groups of Physical Exercise in terms of General Health score.

The results of this study are conclusive in that every test that was done on the data from the questionnaires of the three hypotheses being tested was significant. Each hypothesis was substantiated by a significant relationship in the first two hypotheses. The
third hypothesis was found to be correct in the results with a significant difference being found.

There was 30 participants (n=30) who stated that they did not partake in any exercise in a given week. These participants were not sought after by this study but nonetheless account for a large part of the sample. In another study a sample drawn of only individuals who do not take any exercise in a week could further information on Stress, Self-Efficacy and General Health in this demographic. Furthermore the study of a no exercise group would be an addition to the Exercise vs No Exercise research.

**Future Research**

There are many applications for this study and avenues for future research. The demographic questions could be looked at in more detail. Individual exercise type could be looked at and correlated with Rate of Perceived Exertion and Exercise Frequency in terms of score in a Psychological variable. The implications for exercise are vast as types could be looked at in greater detail and it could be investigated which contains the best attributes for increasing mental well-being.

A causal relationship between Rate of Perceived Exertion and Stress could be investigated as it was correlated in Hypothesis one with a Spearman’s Rho that the two were significantly related PSS (rs(180)= -0.22, p= .003). This would be of value to third level education and to Corporate Ireland as individuals in this study were either entering the workforce/ college or already in work/college.
Limitations

The three questionnaires used by this study are all self-report questionnaires. This study is not a longitudinal study and this means that the effect of Rate of Perceived Exertion, Exercise Frequency and Type of Physical Exercise on Perceived Stress, General Self-Efficacy and General Health is gathered from participants at one particular time. Therefore the long-term effects of this study's findings are not significant.

The sample size was quite small numbering 180 in total (N=180) which could be done on a larger group which would give a more accurate picture of emerging adults in contemporary Ireland.

The study was limited to participants between the ages of 18-25 which is the emerging adults category, Arnett (2000) which could be expanded to all age groups or could focus on a particular age group other than that of emerging adults. In this regard the study is not representative of data on all ages and is therefore weakened as a study. A wider spectrum could be used in future and would be a superior and more accurate perspective of Rate of Perceived Exertion, Exercise frequency, Exercise Type, Perceived Stress, General Self-Efficacy and General Health of the Irish population.

Most of the study and research was conducted on a computer and was limited by access to library. There was a definite lack of information on Rate of Perceived Exertion and Exercise type which frustrated the process of investigating these topics. There were restrictions on time and sample size which featured but this is the case with all research.

There were 90 (n-90) of the Participants used from St. Mary's Rugby Club Rugby Club which means that 90 of the participant exercised twice or more in a given week. This may cause the results to be skewed in favour of people who exercise to this frequency or higher as it makes up half of the sample. A more diverse sample in terms of physical exercise frequency may be needed in future to allow for consideration of individuals who do not take any exercise. 30 participants within this sample stated that they did not exercise in a given
week which makes up 16.6% of the sample but does not make up half of the sample and so is in the minority. In this way this study is not balanced and does not give a full account of the no physical exercise group. A study in the future could do a half exercise half no exercise split to improve on this study and inform this topic.

The types of Physical Exercise that candidates could choose were limited to None, Cardio-Endurance, Weight-Lifting, Team Sport, Mixed-Exercise Combination which is limiting as there are other types of Physical Exercise that exist and don’t belong in any of these categories.

Follow up research could be done on this study and by repeat testing individuals rather than testing participants once or twice.
Conclusions

Participants Rate of Perceived Exertion was significantly associated with Stress, Self-Efficacy and General Health using a Spearman’s Rho correlation.

Frequency of participant exercise in a given week was significantly related to Stress, Self-Efficacy and General Health using a Spearman’s Rho correlation.

There was a significant differences found between the chosen Exercise Type of the participant and their level of Stress, Self-Efficacy and General Health using a One-Way Analysis of Variance.

A key point that Gill and Cooper (2008) made about the replacement of Sedentary time with physical activity can benefit physical health and prevent and reduce risk of disease is the direction that this study has taken. That is to look at what effect no exercise has on the body and the mind. The next study could be the exploration of lack of exercise and the relationship between motivation for a no-exercise lifestyle and Perceived Stress, General Self-Efficacy and General Health levels.

The results did highlight areas that could be given more attention in the future such as the Self-Efficacy of individuals that do not take any physical exercise in a week and also the individual traits and effects of Physical exercise type on Psychological variables within an individual.

The direction that the significant relationships and significant differences of this study point is in Sports Psychology and also informing Health Psychology.

The big difference in this study was that it was on emerging adults and displayed a severe contrast of Perceived Stress, General Self-Efficacy and General Health scores for individuals who exercised and those who didn’t. This difference in score warrants a serious need for a study and research on Physical exercise negligence and Total effects of Lack of Activity.
References


Hazlewood, I., Burke, S., (2011). Self-Efficacy and it's Relationship to selected sport psychological constructs in the prediction of performance in Ironman Triathlon. *Journal of Human Sport & Exercise, (6), 1-23.*


Pajares (2002). *Overview of social cognitive theory and of self-efficacy.* Retrieved month day, year, from [http://www.emory.edu/EDUCATION/mfp/eff.html](http://www.emory.edu/EDUCATION/mfp/eff.html)


*Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948.*


Stanley, E. (1873, December). Address to Liverpool College. From Conduct of Life.


Appendix A

A study examining the relationship Rate of Perceived Exertion, Perceived Stress, General Self-Efficacy, General Health.

My name is JJ Clarke and I am conducting research in the Department of Psychology that explores the Relationship in Self-Efficacy, Stress and General Health of participants with different levels of Rate of Perceived Exertion. This research is being conducted as part of my studies and will be submitted for examination.

You are invited to take part in this study and participation involves completing and returning the attached anonymous survey. While the survey asks some questions that might cause some minor negative feelings, it has been used widely in research. If any of the questions do raise difficult feelings for you, contact information for support services are included on the final page.

Participation is completely voluntary and so you are not obliged to take part.

Participation is anonymous and confidential. Thus responses cannot be attributed to any one participant. For this reason, it will not be possible to withdraw from participation after the questionnaire has been collected.

The questionnaires will be securely stored and data from the questionnaires will be transferred from the paper record to electronic format and stored on a password protected computer.

It is important that you understand that by completing and submitting the questionnaire that you are consenting to participate in the study.

Should you require any further information about the research, please contact .

My supervisor can be contacted at

Thank you for taking the time to complete this survey.

Demographic Details:

1. Age ________

2. Gender ________
3. Please circle which exercise you engage in:

Cardio Endurance  Weight Lifting  Team Sport  Individual Sport  Swimming  Cycling  Running

Other (specify) ________________.

4. Please circle how often you exercise a week?

Never  Once a week  Twice a week  Three times a week

More than three times a week.

5. Based on the following rating system circle the average intensity of your exercise?

Never  Very, very light  Very light  Fairly Light

Somewhat hard  Hard  Very hard  Very, very hard
**Appendix B**

**Instructions**
Please Circle that which most describes how you have felt in the past month:

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

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>In the last month, how often have you been upset because of something that happened unexpectedly?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>In the last month, how often have you felt that you were unable to control the important things in your life?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>In the last month, how often have you felt nervous and stressed?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>In the last month, how often have you felt confident about your ability to handle your personal problems?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>In the last month, how often have you felt that things were going your way?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>In the last month, how often have you found that you could not cope with all the things you had to do?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>In the last month, how often have you been able to control irritations in your life?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>In the last month, how often have you felt that you were on top of things?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>In the last month, how often have you been angered because of things that happened that were outside of your control?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Appendix C

Instructions:

Please Circle that which most describes how you have felt:

1 = Not at all true   2 = Hardly true   3 = Moderately true   4 = Exactly true

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

Instructions:

Please circle that which most describes how you have felt:

1 = Better than usual  2 = Same as usual  3 = Less than usual  4 = Much less than usual

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Have you recently been able to concentrate on whatever you’re doing?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2</td>
<td>Have you recently lost much sleep over worry?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td>Have you recently felt that you are playing a useful part in things?</td>
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<td>4</td>
<td>Have you recently felt capable about making decisions about things?</td>
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<tr>
<td>5</td>
<td>Have you recently felt constantly under strain?</td>
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</tr>
<tr>
<td>6</td>
<td>Have you recently felt you couldn’t overcome your difficulties?</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Question</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<td>----------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>7</td>
<td>Have you recently been able to enjoy your normal day-to-day activities?</td>
<td></td>
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</tr>
<tr>
<td>8</td>
<td>Have you recently been able to face up to your problems?</td>
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<td></td>
<td></td>
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<tr>
<td>9</td>
<td>Have you recently been feeling unhappy and depressed?</td>
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<tr>
<td>10</td>
<td>Have you recently been losing confidence in yourself?</td>
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<tr>
<td>11</td>
<td>Have you recently been thinking of yourself as a worthless person?</td>
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<tr>
<td>12</td>
<td>Have you recently been feeling reasonably happy, all things considered?</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
Appendix E

Consent from Stephen Hennessy (Club President) St. Mary’s College Rugby Football Club to hand out questionnaire at St. Mary’s RFC to the players.

You have received a message from mobile number

Subject:<no subject>

I give JJ consent to work within St Mary's college rugby football club as part of his degree.
Appendix E

Consent from Stephen Hennessy (Club President) St. Mary’s College Rugby Football Club to hand out questionnaire at St. Mary’s RFC to the players.

You have received a message from mobile number

Subject:<no subject>

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