# The Impact of Exercise and Procrastination on Self-Esteem

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# Declaration

I declare that this submission is my own work. Where I have read, consulted, and used the work of others I have acknowledged this in the text.

**Signature:** David O'Hagan

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## List of Abbreviations

EXSEM – Exercise and Self-Esteem Model

ANOVA – Analysis of Variance

TMT – Temporal Motivational Theory

GLTES – Godin Leisure-Time Exercise Scale

## *Abstract*

This study aimed to investigate the impact of exercise and procrastination on self-esteem. The participants were aged between 18-65 and recruited using snowball sampling through social media sites (N=356). Participants completed questionnaires on exercise (Godin Leisure-Time Exercise Scale (GLTES)), procrastination (Pure Procrastination Scale), and self-esteem (Rosenberg Self-Esteem Scale). The results of the study indicated there was a significant difference in self-esteem scores between the low and high procrastination groups. However, there was no significant difference between the exercise groups (active, moderately active, sedentary) and no significant interaction between exercise and procrastination. Upon further analysis, an independent t-test reported a significant difference between the active and sedentary exercise groups on their self-esteem. The results of the study also indicated there was a significant relationship between exercise, procrastination, and self-esteem. The findings of this study are consistent with those of previous research. Previous studies also reported that less exercise is associated with lower self-esteem. Moreover, higher levels of procrastination have been linked with lower levels of self-esteem in previous literature. Although these findings seem to be consistent, there is still a need for further research into the area, especially for studies incorporating these three variables together, testing for both differences and relationships between them. Future research could incorporate longitudinal interventions to strengthen the credibility of the findings.



*Keywords*: Self-esteem, exercise, procrastination

# *Literature Review*

## *Self-esteem*

Self-esteem refers to an individual's attitude toward themselves and their evaluation of their worth. Having high self-esteem does not mean one thinks they are 'superior' to others; rather, they are merely 'good enough' (Rosenberg, 1965). Self-esteem develops over time as one gets older. During childhood, self-esteem usually increases, then plateaus in early adolescence before vastly increasing during early adulthood through to middle age and peaks around the age of 60 (Orth et al., 2018).

Self-esteem is an important contributor to mental health. Individuals with lower reported levels of self-esteem have significantly worse mental health than those who report high levels of self-esteem (Anto & Jayan, 2016). Moreover, low self-esteem has been seen to have an impact on individuals' depression and anxiety (Sowislo & Orth, 2013). Trzesniewski et al. (2006) reported that those with lower levels of self-esteem during adolescence had worse health and more involvement in criminal activity. They also reported that participants with low self-esteem have reduced economic prospects later in life due to factors such as unemployment and poor education. On the contrary, high self-esteem is linked with many positive outcomes such as well-being, happiness, and life and job satisfaction (Mann et al., 2004). According to Arshad et al. (2015), students with higher levels of self-esteem performed significantly better on academic tests than students with low self-esteem, thus indicating that self-esteem may be an important factor in relation to academic performance.

A meta-analysis carried out by Liu et al. (2015) reported that an exercise intervention significantly enhanced the self-worth and self-concept of both children and adolescents. Similar to these findings, a recent study investigated the impact of exercise on Greek prisoners' well-being and self-esteem. Following a 12-week exercise program, inmates reported higher levels of self-esteem than the control group who did not participate in the exercise programme (Psychou et al., 2019). In contrast to the previous findings, Wurz and Brunet (2020) reported no significant impact of exercise on the self-esteem of participants. With these contrasting findings, there is still scope to further explore the impact of exercise on self-esteem.

### *Exercise and self-esteem*

Sonstroem and Morgan (1989) designed the exercise and self-esteem model (EXSEM) to provide a theoretical framework explaining the relationship between exercise and self-esteem. The model has a hierarchy structure and states the following: higher self-efficacy in exercise leads to higher physical competency and acceptance, which results in higher self-esteem. Sonstroem and Harlow (1994) updated the EXSEM by dividing the physical competence level into a broader physical self-worth level with four subdomains: body attractiveness, physical condition, strength, and sport competence. Physical self-worth emerged as a substantial addition to the EXSEM as it played an important role between the levels and mediated the relationship between the subdomains and self-esteem.

There has been a vast increase in the number of studies conducted in the area of exercise and self-esteem. Although there has been evidence of links between exercise and self-esteem, there appears to be insufficient evidence of a causal association between them (Biddle et al., 2019).

Jankauskiene and Baceviciene (2021) reported that positive body image and perceived physical fitness mediate the relationship between exercise and self-esteem. Moreover, the results of the study indicate that higher levels of body image and perceived physical fitness may aid in fostering adolescent females' mental health. Although the results were significant, the study is difficult to generalize to the wider population as the sample consisted of adolescents only. The scales used in this study to measure self-esteem and exercise will also be used in the current study.

Similarly, Sani et al. (2016) investigated the relationship between physical activity and self-esteem while also examining body image and perceived physical fitness. They reported that increased exercise levels are positively associated with self-esteem. The study also reported a significant relationship between self-esteem and body image, while perceived physical fitness was linked to both body image and self-esteem. Thus, the findings are in line with those of the EXSEM, which strengthens the credibility of the results as they are theoretically supported. However, the study implemented cluster sampling, which negatively impacts the study's external validity.

Physical activity and self-esteem have been noted as factors which lead to better quality of life in young adults. Joseph et al. (2014) reported that physical self-esteem mediated the relationship between physical activity and quality of life. Additionally, physical activity directly impacted participants' self-esteem, which resulted in positive affect outcomes. Although, the participants only consisted of young adults, whereas the current study will recruit adult participants.

Exercise as an intervention has been reported to have a positive impact on self-esteem. Legrand (2014) examined the effect of exercise on women's levels of depression, self-esteem, and physical self-perceptions. During a 7-week exercise program, participants reported reduced levels of depression and increased levels of self-esteem. Similarly, Elavsky (2010) carried out a study to test the EXSEM on a sample of women. The women participated in an exercise intervention for two years. The results corroborated with the EXSEM, stating that enhanced levels of body attractiveness and perceived physical fitness result in higher self-esteem through exercise. As the study was longitudinal, the findings further strengthen the implications of the EXSEM and have contributed to the literature in the area, indicating that the theory is supported in longitudinal experiments.

However, some studies have argued the case that exercise does not have as much of a positive impact on self-esteem as it may seem. Spence et al. (2005) argued that the impact of physical activity on self-esteem has been overestimated in the literature. They carried out a meta-analysis which reported that physical activity has a small significant positive influence on self-esteem. Change in fitness and type of exercise programme were the only factors that significantly mediated the relationship between exercise and self-esteem. Although this study provides a strong argument, it only utilized studies focusing on exercise as an intervention.

### *Procrastination*

Steel (2007) defined procrastination as the act of voluntarily delaying tasks, despite the possible negative consequences. Procrastination tends to occur when there is time to avoid a task, and the reward of the task is being delayed rather than the punishment. Procrastinators tend to show low conscientiousness, which is associated with a lower level of performance. Procrastination is also negatively correlated with low self-esteem and self-efficacy. This can have a negative impact, as self-efficacy

and self-esteem tend to be low in procrastinators, it can potentially lead to higher fear of failure (Steel, 2007).

The Temporal Motivational Theory (TMT) has been noted as the theory that best explains how and why procrastination occurs (Steel, 2007). The theory states that motivation can be explained through the effect of its main factors, which are value and expectancy. This refers to how one values something, how attractive the prospect is and what one expects the outcome of a situation will be. Furthermore, the theory implies delay weakens motivation as it decreases the value and expectancy of a task (Steel & Konig, 2006). One way to reduce procrastination is to increase one's belief that they can achieve success in a task. Secondly, goal setting is another valuable way to decrease procrastination. The TMT also states that when a task's value is lessened, procrastination increases as one does not rank it as high importance. One way to combat this is to make the task more challenging, which can help keep the individual engaged. This aspect is also supported by the axioms of Flow Theory, balancing the challenge of a task with a person's ability to increase focus and engagement (Csikszentmihalyi, 1990). As procrastinators tend to be easily distracted and less organized, TMT suggests that to prevent procrastination, any signs of temptation should be removed. One should surround themselves with cues that remind them of the goals they have set out to complete (Steel & Konig, 2006; Steel, 2007). According to Ferrari (2018), 20 percent of adults are defined as chronic procrastinators. Steel and Ferrari (2013) reported, from a large global sample, that procrastinators were young single males who had lower levels of education and lived in a country with low discipline.

Van Eerde and Klingslieck (2018) reported that interventions can have a positive effect on lowering procrastination. The findings of their study suggest that cognitive behavioural therapy has the most positive effect on reducing procrastination. The study also indicated that participants did not retreat to their former level of procrastination as it remained stable over time, further demonstrating the impact of the intervention.

However, procrastination is not always a negative. Chu and Choi (2005) identified two different types of procrastinators and addressed how procrastination, in contrast to the literature, can be a positive influence. The two types of procrastinators are passive and active procrastinators. Firstly, passive procrastinators (also known as the traditional procrastinator) are individuals who struggle with decision making and

time management, leading to task delay. Active procrastinators however, are individuals who are capable of managing their time effectively and can efficiently make decisions. Although, active procrastinators tend to deliberately delay a task but only do so to attend to more important tasks. Moreover, active procrastinators enjoy the pressure of delaying a task and use it as a source of motivation, as opposed to passive procrastinators, who often become overwhelmed by the task and ultimately perform poorly or fail to complete the task.

### *Procrastination and Self-esteem*

Research has implied that individuals may use procrastination as a means of protecting their self-esteem. The origins of this concept are performance and ability, meaning people tend to believe that their performance on a particular task reflects their overall ability, which in turn impacts their self-worth. Therefore, if someone were to perform poorly on a task, they may negatively view their overall ability to perform which negatively impacts their self-worth. Thus, to prevent this from happening, they delay doing the task (procrastinate) and in doing so it protects their self-esteem (Burka & Yuen, 1983, as cited in Uzun et al., 2020).

Duru and Balkis (2017) reported that procrastination had a negative impact on self-esteem. Their findings suggest that people with higher levels of procrastination tend to have lower levels of self-esteem. Additionally, if the negative relationship between procrastination and self-esteem develops further, it can negatively affect overall well-being. However, this study had its limitations, such as the sample being derived from one faculty of education. Ferrari (1994) reported behavioural and decisional procrastination are associated with low levels of self-esteem. Similarly, Jayakumar et al. (2016) stated that students who procrastinate have lower levels of self-esteem and suggest that procrastination is a predictor of self-esteem. Although, the participants in this study were all from the same college, which can negatively impact the external validity and generalizability of the study.

Procrastinators usually lack organization and time management skills which in turn can lead to feelings of fear and anxiousness. Thus, causing one to hold negative thoughts of their capabilities, whether that be professional or personal, including self-esteem (Abbasi & Alghamdi, 2015).

Zhang et al. (2018) examined self-esteem and academic procrastination among undergraduates and investigated the mediating role of self-efficacy. The results

illustrate that self-esteem is negatively associated with academic procrastination, and self-efficacy played a significant mediating role between them. Zhang et al. (2018) also indicated that an intervention to improve students' self-efficacy and self-esteem positively impacted their procrastination. Similarly, Batool et al. (2017) investigated the impact of self-esteem on academic procrastination among students and the mediating role self-efficacy plays. The results, in line with those of Zhang et al. (2018), indicated there was a significant negative relationship between self-esteem and procrastination, while self-efficacy mediated the relationship. Although not a direct cause of procrastination, self-esteem is seen to influence one's belief of academic self-efficacy. The study implies that low self-esteem reduces self-efficacy, leading to procrastination.

However, many of the above studies focus on academic procrastination or contain a sample consisting of only students. To combat this issue, the current study will measure procrastination broadly, not only in terms of academia.

***The current study***

Codina et al. (2020) conducted a study to investigate how exercising for different durations can impact procrastination and well-being. The results suggest that the more time spent exercising (particularly 150 minutes or more), the better the individual's well-being (including self-esteem). The study also reported that participants who spent more time exercising displayed lower levels of procrastination. However, Codina et al. (2020) suggest deeper research into the domain of physical activity and its effect on procrastination and quality of life. Notably, a limitation of this study stated by the authors was the use of a correlational approach and suggestions were made for future studies to use other statistical tests. Moreover, Certel et al. (2013) conducted a study investigating the decision making and self-esteem of athletes. The results indicated athletes scored higher on self-esteem in decision making than other groups and scored lower on procrastination. When gender differences were examined, it was reported that males procrastinated more, and women had higher self-esteem in decision making. A suggestion for future researchers was to examine the self-esteem and decision making (including procrastination) of individuals who exercise and who do not exercise.

Based on the findings and limitations noted, the current study will aim to address the gaps in the research and contribute to the existing literature in this domain. The aim of the current study is to examine the impact of exercise and procrastination on self-esteem. Although these variables have been studied separately in previous research, there is a lack of research incorporating all three variables together.

***Research Questions and Hypotheses***

RQ1: Does exercise have an impact on self-esteem?

RQ2: Does procrastination have an impact on self-esteem?

RQ3: Is there a relationship between exercise, procrastination and self-esteem?

H1: There will be a difference for the participants on their self-esteem based on their exercise level.

H2: There will be a difference for the participants on their self-esteem based on their procrastination level.

H3: There will be a significant interaction between exercise and procrastination levels.

H4: There will be a significant relationship between exercise, procrastination and self-esteem.

## *Method*

### *Design*

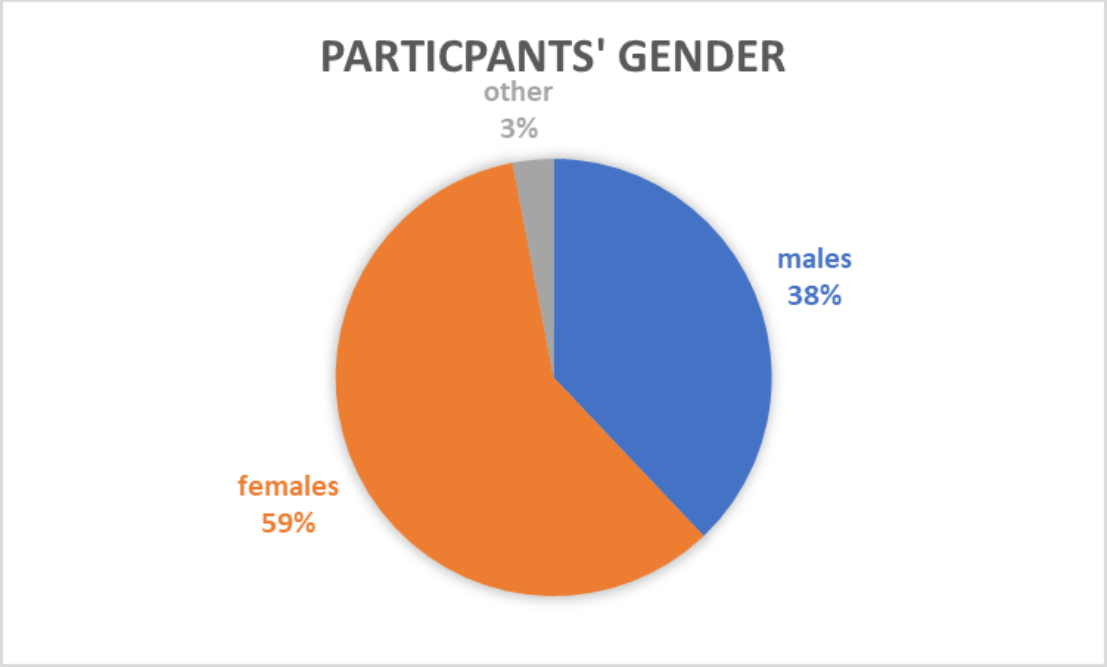
The present study employed a quantitative, 3x2 factorial, between-groups design. The independent variables for the study were exercise (sedentary, moderately active & active) and procrastination (high & low). The dependent variable for the current study was self-esteem.

### *Participants*

The sample for the current study was obtained using snowball sampling. 363 participants were recruited via social media sites. 5 participants were removed from the data set due to missing data, and a further 2 participants were outliers. After these participants were removed, a total of 356 participants' data was used for the study. Participants' age ranged from 18 to 65 years old, with a mean age of 32.44 (SD = 13.00). Figure 1 below displays the participants' gender.

**Figure 1**

*Pie chart illustrating the gender of participants*



### *Ethics*

The study was approved by The Department of Technology and Psychology Ethics Committee (DTPEC) of IADT (Appendix A & B), and participants were treated in accordance with the Ethics Code of the Psychological Society of Ireland (Psychological Society of Ireland, 2019).

### *Procedure*

Data was collected through Microsoft forms. Firstly, participants were provided with a link to the online survey. Participants were shown an information sheet and consent form. After this, participants were asked demographic questions such as their age and gender, and then were prompted to create a unique identity code to ensure anonymity. Participants were shown three questionnaires and asked to fill out the GLTES (Godin & Shepard, 1985), Pure Procrastination Scale (Steel, 2010) and Rosenberg's self-esteem scale (Rosenberg, 1965). Following this, participants were debriefed on the study and provided with both the researcher and supervisor's contact details if they later decided to withdraw from the study. Finally, numerous psychological resources were provided if the participants had been negatively affected in any way by the study and then thanked for their participation.

### *Materials*

An information sheet (Appendix C) was provided to invite people to take part and outline the purpose of the study. A consent form (Appendix D) was provided to obtain informed consent from the participants before completing the questionnaires. Participants were asked to answer demographic questions (Appendix E). GLTES (Godin & Shepard, 1985) was used to measure participants' average weekly exercise levels (Appendix F). This is a 3-item scale which includes questions such as "During a typical 7-day period, how many times on average do you do the following kinds of exercise for more than 15 minutes during your free time". Godin and Shepard (1985) reported a reliability coefficient of .74 for this scale, while the current study reported a Cronbach's alpha value of .388 for this scale, indicating poor reliability.

The Pure Procrastination Scale (Steel, 2010) was used to measure participants' procrastination levels (Appendix G). The 12-item scale includes statements such as "I delay making decisions until it's too late" and is scored on a 5-point Likert scale (1=strongly disagree, 5= strongly agree), with higher scores indicating higher

procrastination. The Pure Procrastination Scale was reported to have a Cronbach's alpha value of 0.92 (Steel, 2010). The current study reported a Cronbach's alpha value of .926 for this scale, indicating excellent reliability.

Rosenberg's Self-Esteem Scale (Rosenberg, 1965) was used to measure participants' self-esteem (Appendix H). Rosenberg (1979) reported the Cronbach's alpha for the scale ranges from .85 to .88. This is a 10-item scale and uses a 4-point Likert scale (1=strongly agree, 4= strongly disagree), with higher scores indicating higher self-esteem. The scale includes statements such as "I feel that I'm a person of worth, at least on an equal plane with others". The current study reported a Cronbach's alpha value of .912 for this scale, indicating excellent reliability. Finally, a debrief sheet (Appendix I) was provided to give participants details on how they could withdraw from the study, thank those who took part and provide resources in case they were negatively affected in any way by the study.

***Pilot study***

A pilot study (N=4) was conducted to identify any potential problems while completing the survey and to calculate the average time participants took to complete it. On average, the study took 6 minutes to complete. Feedback from the participants of the pilot study related to grammar mistakes, these mistakes were corrected accordingly.

# *Results*

## *Overview of results*

A two-way between-groups analysis of variance (ANOVA) was conducted using IBM SPSS version 28 (Appendix J). The dependent variable for the current study was self-esteem. The independent variables for the study were exercise with three levels (active, moderately active, & sedentary) and procrastination with two levels (high & low). Preliminary analysis was conducted to check if assumptions had been violated.

There were four hypotheses for the current study:
Hypothesis 1: There will be a significant difference for participants in their self-esteem score based on their exercise level. Hypothesis 2: There will be a significant difference for participants on their self-esteem scores based on their procrastination level. Hypothesis 3: There will be a significant interaction between participants on their exercise level and procrastination level. Hypothesis 4: There will be a significant relationship between exercise, procrastination and self-esteem.

## *Descriptive statistics*

Table 1 below presents the mean self-esteem scores and standard deviations for high procrastination and low procrastination.

**Table 1**

*Descriptive statistics of self-esteem scores for the two procrastination groups*

| | Procrastination Group | N | Mean | Std. Deviation |
|---|---|---|---|---|
| **Total Self-Esteem** | High | 174 | 24.24 | 5.875 |
| | Low | 182 | 29.43 | 5.527 |

Table 2 below presents the mean self-esteem scores and standard deviations for active, moderately active and sedentary exercise levels.

**Table 2**

*Descriptive statistics of self-esteem scores for the three exercise groups*

| | Exercise Level | N | Mean | Std. Deviation |
|---|---|---|---|---|
| **Total Self-Esteem** | Active | 274 | 27.34 | 6.030 |
| | Moderately Active | 29 | 26.41 | 6.587 |
| | Sedentary | 53 | 24.87 | 6.912 |

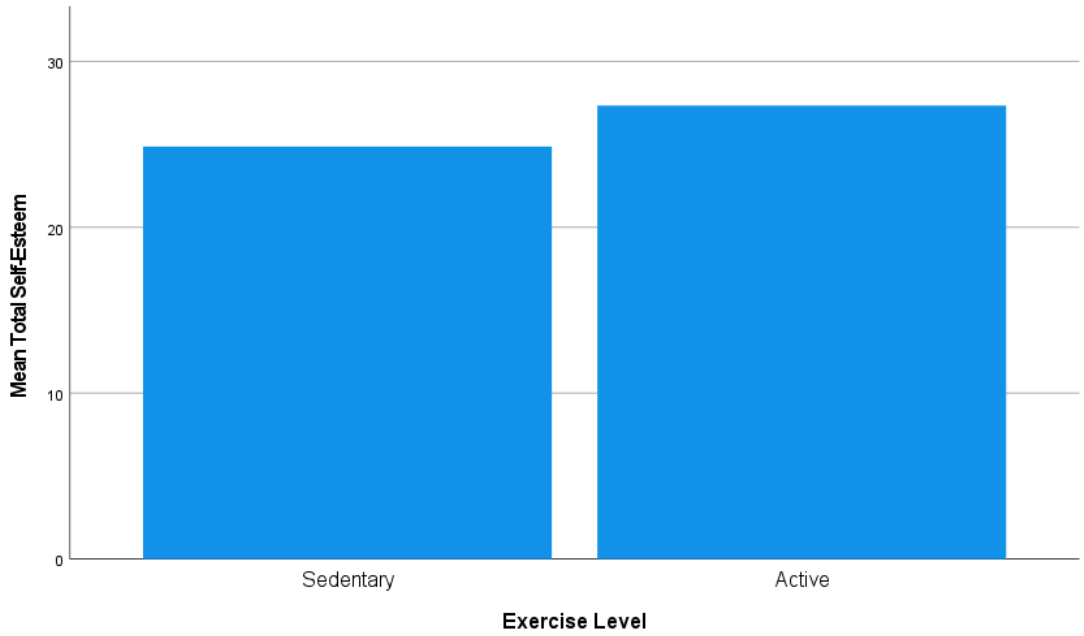
***Inferential statistics***

A two-way between-groups ANOVA was utilized to explore the impact of exercise and procrastination on self-esteem. Levine's test of homogeneity stated that the assumption of equal variance was not violated. Three separate Pearson's correlations were also carried out to test for relationships between exercise, procrastination, and self-esteem.

Hypothesis 1 stated that there would be a significant difference for participants on their self-esteem based on their exercise level. There was no significant effect between exercise level and self-esteem, $F(2, 350) = 2.485$, $p = .085$, observed power = .497. Therefore, the hypothesis was not supported. Upon further analysis, an independent t-test was carried out. The results of which reported a significant difference between the active and sedentary exercise groups on their self-esteem scores, $t(325) = -2.661$, $p = .008$. Figure 2 below illustrates the differences between the sedentary exercise group and the active exercise group on their self-esteem scores.

**Figure 2**

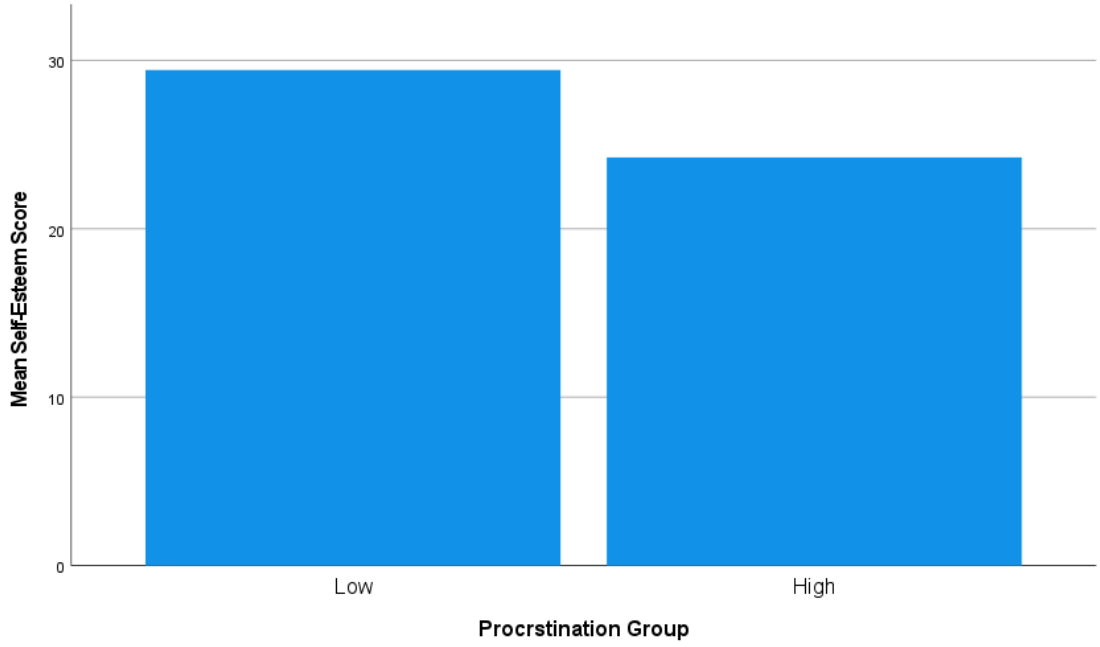
*Bar chart illustrating the difference in self-esteem based on sedentary and active exercise groups*




Hypothesis 2 stated that there would be a significant difference for participants on their self-esteem scores based on their procrastination level. This hypothesis was supported as there was a significant main effect for procrastination level, F (1, 350) = 42.162, p = <.001, the effect size was medium (partial eta squared = .108). Figure 3 below illustrates the difference for participants' self-esteem based on high and low procrastination.

**Figure 3**

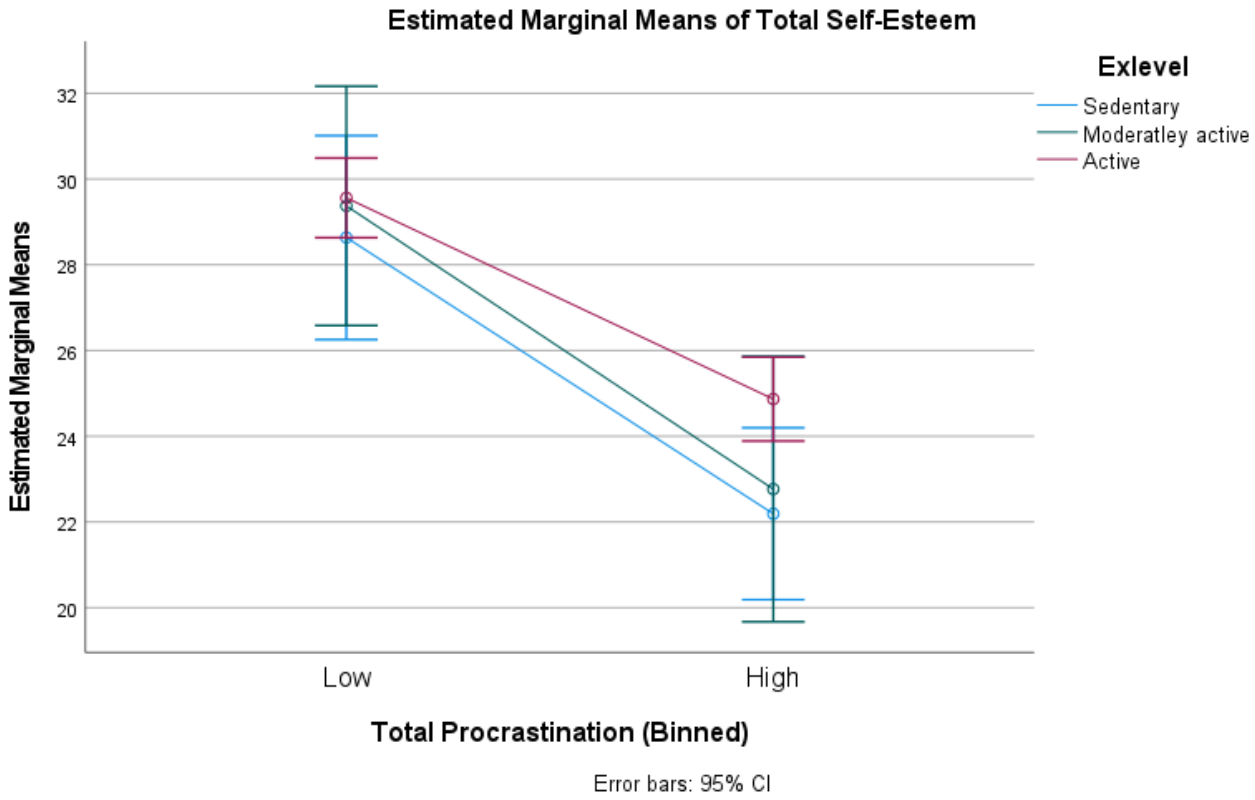
*Bar chart illustrating the difference in self-esteem scores between high and low procrastinators*




Hypothesis 3 stated that there would be a significant interaction between participants on their exercise level and procrastination level. The interaction effect between exercise level and procrastination level was not significant, F (2, 350) = .788, p = .456, observed power = .184. Therefore, the hypothesis was not supported. Figure 4 below displays the estimated marginal means for participants' self-esteem scores between procrastination and exercise groups.

**Figure 4**

*EM means of self-esteem scores between procrastination and exercise groups*

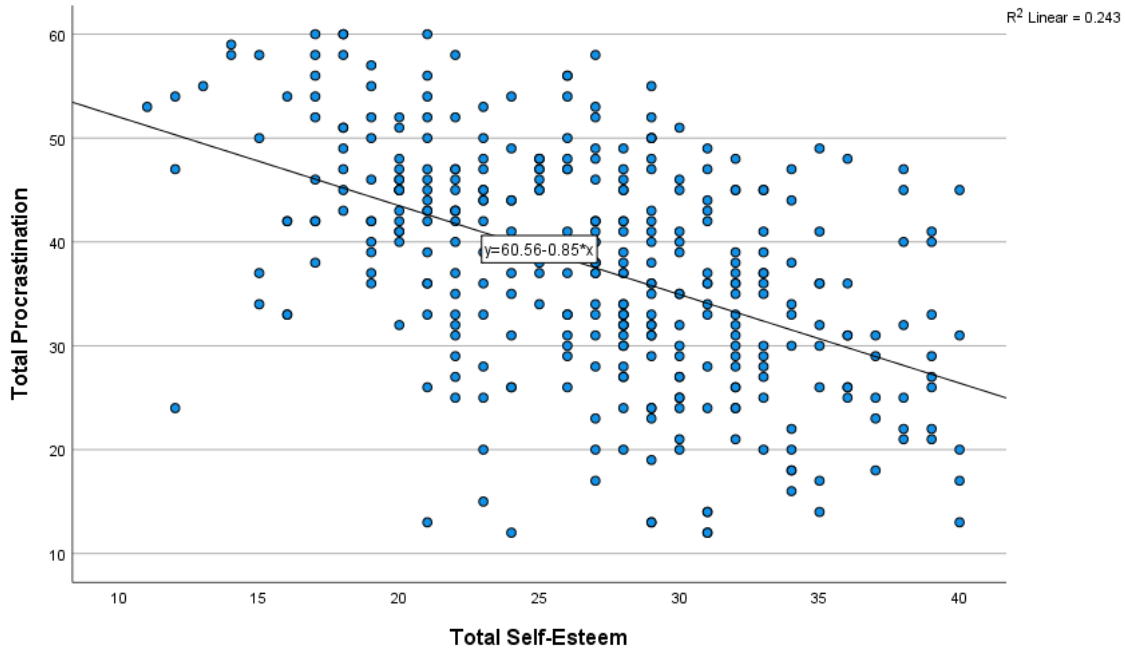



Hypothesis 4 stated that there would be a significant relationship between exercise, procrastination and self-esteem. Three Pearson's correlations were carried out to test for relationships.

There was a significant small negative linear relationship between exercise and procrastination, r (356) = -.123, p = .02. Secondly, there was a significant moderate linear relationship between procrastination and self-esteem, r (356) = -.492, p = <.001. Figure 5 below illustrates the relationship between participants' procrastination and self-esteem. Finally, there was a significant small positive relationship between exercise and self-esteem, r (356) = .146, p = .006. As all three correlations were significant, the hypothesis was supported.

**Figure 5**

*Scatterplot illustrating relationship between procrastination and self-esteem*



# *Discussion*

### *Overview*

Hypothesis 1 stated that there would be a significant difference for participants on their self-esteem scores based on their exercise level (active, moderately active & sedentary). The results reported no significant difference therefore, the hypothesis was not supported. Previous research by Wurtz and Brunet (2020) supports this result. In their study, they reported no significant impact of exercise on participants' self-esteem scores. Upon further analysis, an independent t-test was carried out. A significant difference was found for participants' self-esteem scores between the sedentary and active exercise groups. These findings align with the EXSEM proposed by Sonstroem and Morgan (1989), which states that higher levels of exercise lead to higher self-esteem, thus supporting this hypothesis.

Hypothesis 2 stated that there would be a significant difference for participants on their self-esteem scores based on their procrastination level (high & low). The results reported a significant difference therefore, the hypothesis was supported. This coincides with previous research by Duru and Balkis (2017), who reported that participants with higher procrastination had lower self-esteem. Jayakumar et al. (2016) also reported that students who had higher levels of procrastination had lower levels of self-esteem.

Hypothesis 3 stated that there would be a significant interaction between participants on their exercise level and procrastination level. This hypothesis was not supported, failing to report an interaction between the independent variables. This contrasts with the findings of previous research by Codina et al. (2020), who reported that participants who engaged more in exercise scored lower on procrastination. Moreover, Certel et al. (2013) reported that athletes, who exercise frequently, scored lower levels of procrastination.

Hypothesis 4 stated that there would be a significant relationship between exercise, procrastination and self-esteem. The results of the study reported a significant relationship between each of the variables, therefore the hypothesis was supported. There was a small positive linear relationship between exercise and self-esteem, meaning higher exercise levels are related to higher self-esteem. This result is

similar to the findings of Sani et al. (2016), who reported that increased exercise levels are associated with increased levels of self-esteem. There was a moderate negative linear relationship between procrastination and self-esteem, suggesting higher levels of procrastination are associated with lower self-esteem scores. This is in line with the findings of Zhang et al. (2018), who reported academic procrastination has a negative relationship with self-esteem. Finally, there was a small negative linear correlation between exercise and procrastination, suggesting increased exercise is associated with lower procrastination. These findings are similar to those of Codina et al. (2020), which suggested that the more participants engaged in exercise, the lower they scored on procrastination.

### *Strengths and limitations of the study*

#### *Strengths*

A number of strengths have been identified for the current study. One strength is that the findings of the study have added to a growing body of research in the area of exercise and self-esteem (Biddle et al., 2019). Furthermore, the findings of the study contribute to a gap in the literature investigating exercise, procrastination and self-esteem. While previous literature has focused on exercise (Jankauskiene & Baceviciene, 2021; Psychou et al., 2019) and procrastination (Duru & Balkis, 2017) separately in relation to self-esteem, research involving the three variables together seems to be lacking. The current study attempted to address this lack of research. Lastly, this study had a large sample size (Pallant, 2010). Having a larger sample improves the generalizability of the study as it better represents the population and can also yield more accurate findings (Halsey et al., 2015).

Additionally, this study used two reliable and valid scales, with the Pure Procrastination Scale (Steel, 2010) having a Cronbach's alpha value of .926 and Rosenberg’s Self-Esteem Scale (Rosenberg, 1965) having a Cronbach's alpha value of .912.

Although there were several strengths of the study as stated, there were also numerous limitations that should be considered when interpreting the results.

### *Limitations*

Firstly, there was unequal numbers in each of the groups for exercise (active, moderately active & sedentary) and procrastination (high & low). For example, the majority of participants fell under the "active" group for exercise, meaning the other two groups were not equally represented. Unbalanced numbers in groups for a two-way ANOVA means it has less power than equal numbers in the groups (Van Ginkel & Kroonenberg, 2021).

Secondly, the scales used to measure exercise, procrastination and self-esteem were all self-reporting measures. This could potentially lead to participants giving socially desirable answers and not their true answers. The use of such measures may decrease the validity of the questionnaire and impact the study's external validity (Van de Mortel, 2008).

Finally, as opposed to the other two scales, the GLTES (Godin & Shepard, 1985) had a weak Cronbach's alpha value of .388, meaning it was not reliable. Although, Jankauskiene and Baceviciene (2021) found significant results using this scale, therefore due to the contrasting findings it may be of interest to use it in future studies. However, future research should strictly employ equal cases in each of the three groups for the scale.

The implications of the study based on the findings are examined below.

### *Implications*

The current study contributed to the existing literature in the area of exercise, procrastination, and self-esteem. Although no significant results were reported from the two-way ANOVA, the results of the independent t-test give some support to the EXSEM (Sonstroem & Morgan, 1989), stating that increased levels of exercise can lead to increased self-esteem. This study reported that active participants had significantly higher self-esteem than participants in the sedentary group.

Furthermore, the results of the current study support the findings of previous literature, which state that lower levels of procrastination can positively impact individuals' self-esteem (Duru & Balkis, 2017). As procrastination has been seen to be an issue, particularly in the academic domain (Zhang et al., 2018), devolving an

intervention/method for preventing procrastination may be considered in future research to aid in boosting self-esteem.

### *Future research*

The current study may provide direction for future research aiming to examine the difference or relationship between exercise, procrastination and self-esteem. Future research may incorporate a longitudinal design, as this study was cross-sectional it may be beneficial for future studies to examine the impact of exercise and procrastination on self-esteem over a longer period.

Additionally, future studies should aim to have equal group sizes as it increases the power rating and is equally representative (Van Ginkel & Kroonenberg, 2021). Future research could implement an experimental approach, similarly to Legrand (2014), who used exercise as an intervention rather than a self-report measure. Using experimental design may also improve the reliability of the findings. Additionally, the use of another scale to measure exercise may be utilized as the current study's measure was unreliable, such as using an objective digital exercise metric to decrease participant bias or socially desirable responses (Van de Mortel, 2008). Although, as previously mentioned there has been a contrast in significant findings between the current study and previous literature using the scale, suggesting it needs to be examined further.

Another suggestion for future research could be to investigate further into the relationship between exercise and procrastination, as in the current study no interaction was found from the two-way ANOVA, but there was a significant relationship from the results of the correlation. Future studies may also use a different statistical test such as a MANVOA when exploring these variables, such as investigating the impact of exercise on procrastination and self-esteem.

### *Conclusion*

To conclude, the present study investigated the impact of exercise and procrastination on self-esteem. This study’s findings suggest that increased levels of exercise and lower procrastination may result in increased levels of self-esteem. The results of this study reported both a significant relationship and a significant difference between exercise, procrastination and self-esteem. Although the results for

exercise and self-esteem should be interpreted with caution, they do provide some support for the theoretical framework of the EXSEM (Sonstroem & Morgan, 1989). The findings of the current study are a welcomed addition to the under-researched area of literature examining exercise, procrastination and self-esteem. As the group sizes were unbalanced in this study, especially for the exercise levels, future studies should aim to have equal numbers in groups to strengthen the validity of their results. Additionally, a different scale should be used to measure exercise as the leisure-time exercise scale (Godin & Shepard, 1985) used in the current study was found to be unreliable. Employing an experimental design may combat this issue and can also be used to control for group size.

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# *Appendices*

## *Appendix A: Ethics form*

**Section 6: Confirmation of Adherence to Basic Ethical Principles for Amber and Red Route Projects**

Complete the Table below with guidance from your supervisor. If you need to tick any of the 'red' boxes, then your project must be submitted under the 'Red Route'.

| | | Yes | No | N/A |
|---|---|---|---|---|
| 6.1 | **I will describe the main research procedures to participants in advance so that they know what to expect. I will use the sample Information Sheet provided by DTPEC to do this.** | X | | |
| 6.2 | **I will tell participants that their participation is voluntary.** | X | | |
| 6.3 | **I will obtain written consent from participants using a 'tick' consent form which follows the current template provided by DTPEC prior to starting data collection.** | X | | |
| 6.4 | **I will verify that participants still wish to include their data in online studies by including a final indicator of consent at the end of the questions.** | X | | |
| 6.5 | **If my research involves content analysis or observation in any private or partially private setting then I will ensure to obtain informed consent prior to collecting data.** | | | X |
| 6.6 | **I will explain to participants that they can withdraw from the study at any time and for any reason.** | X | | |
| 6.7 | **I will ensure that participants know that they can refrain from answering any question that they don't want to, even if this is part of a psychometric scale.** | X | | |
| 6.8 | **If using an online data collection method I will ensure that the only questions which require answers in order to proceed are the questions relating to providing informed consent, and I will ensure that participants are provided with an option which indicates that they do not give their consent.** | X | | |

| | | | | |
|---|---|---|---|---|
| 6.9 | I will inform participants that their data will be treated with full confidentiality, and that, if published, it will not be identifiable as theirs. | X | | |
| 6.10 | I will debrief participants at the end of their participation (i.e. give them a brief explanation of the study, whether or not deception was involved) following the current template provided by DTPEC | X | | |
| 6.11 | I will obtain passive consent from parents/guardians for studies involving people aged between 16 and 18 years, as well as active consent from the participant and their school/organisation | | | X |
| 6.12 | I will obtain active consent from parents/guardians for studies involving people aged under 16 years. Where feasible I will also obtain active consent from the participant themselves. I will ensure that the parent/guardian or their nominee (e.g. a teacher) will be present throughout the data collection period. | | | X |
| 6.13 | I will ensure that my project supervisor has full access to the data that I collect and will only use data collection software which permits this. | X | | |
| 6.14 | I will ensure that my project supervisor retains full rights to the data collected, including the ability to delete all data at any time, and that third-parties (e.g., software companies) will not 'own' the data collected. | X | | |
| 6.15 | I will ensure that participants in studies involving Virtual Reality (VR) are not susceptible to extreme motion sickness or other physical conditions which may result in harm to the participants. I will ensure that a chaperone is present during VR sessions, and that the participant has the option of also having a nominee of their choosing present as well. | | | X |
| 6.16 | I will ensure that any equipment used in this study is cleaned and disinfected after each participant, and that appropriate hygienic barriers (e.g. masks) are used by all participants | | | X |
| 6.17 | Is there any realistic risk of any participant experiencing either physical or psychological distress or discomfort? | | | |
| 6.18 | I plan to use animals as part of my research study | | | |
| 6.19 | I plan to tell participants their results on a task or scale which I am using in my research. | | | |

| | | | | |
|---|---|---|---|---|
| **6.20** | **I am researching a sensitive topic which may cause some participants distress (such as, but not limited to, religion, sexuality, alcohol, crime, drugs, mental health, physical health, parenting, family relationships)** | | | |
| **6.21** | **One or more aspects of my study is designed to change the mental state of participants in a negative way (such as inducing aggression, frustration, sadness, etc.)** | | | |
| **6.22** | **My study involves deception or deliberately misleading participants in some way.** | | | |
| **6.23** | **My target population includes people who have learning or communication difficulties** | | | |
| **6.24** | **My target population includes patients (either inpatient or outpatient)** | | | |
| **6.25** | **My target population includes people in custody** | | | |
| **6.26** | **My target population includes people who may feel under personal or professional pressure to take part in my research (for example, close friends; family; employees or staff of managers or school principals who may support the research).** | | | |

**Section 7: Declaration of an Amber Route project**

I hereby declare that [all of / this aspect of (delete as appropriate)] my project involves no risk of physical, emotional, social or cognitive harm to participants; that I will obtain full informed consent from all participants and provide a full debrief afterwards (using the templates provided); that I will provide full anonymity and/or confidentiality to participants; and that my participants are not a potentially vulnerable population. In addition, I will ensure that all data which I gather is held in a manner which is compliant with GDPR, and will be deleted once it is no longer required (and definitely within 6 years of collection). At all times my study will be conducted in adherence to the ethical policies of the Psychological Society of Ireland and the British Psychological Society.

Student Signature: David O'Hagan Date: 15/11/21

*Appendix B: Ethics Approval*

The following Ethics applications have been approved:

| | |
|---|---|
| Alessia Merkes | Jake Richardson |
| Alison Deegan | Jason Chatham |
| Amy Benton Byrne | Jordan McDonnell |
| Ana Neres Borges | Kate Lifely Stafford |
| Andrea Farrelly | Katie Jenkinson |
| Angela Hegarty | Killian Schonfeld |
| Anita Hovarth | Lukas Dillon |
| Armandas Bendaravicius | Lynda Brady |
| Chloe O'Connor | Mark Byrne |
| Ciara Little | Matthew Delaney |
| Ciaran Nally | Megan Doherty |
| Cliona Gaffney Moran | Molly Kavanagh |
| Clodagh McCarthy | Niamh Dennehy |
| Danny Corbin | Nicholas Rooney |
| **David O'Hagan** | Nora Noone |
| Dora Krstulovic | Owen Cooney |
| Eamonn Cooke | Peter Conlon |
| Eden Bryan | Samual Edomwonyi |
| Emilja Gostautaite | Sarah Flavin |
| Gemma Clabby | Stuart Kavanagh |
| Jack Condron | Yvonne McNulty |
| Jacob Greene | Sabrina Bacinschi |

# *Appendix C: Information sheet*

## Information sheet

**Title of project:** Impact of exercise and procrastination on self-esteem.

You are being invited to take part in the research investigating the impact of exercise and procrastination on self-esteem. This project is being undertaken by David O'Hagan for our major research project as part of the BSc in Applied Psychology, IADT.

Before you decide whether you wish to take part, it is important for you to understand why this research is being done and what it will involve. Please take time to read this information carefully and discuss it with someone you trust. If there is anything that is unclear or if you would like more information please ask, our contact details are at the end of this information sheet. Thank you for reading this.

**What is the purpose of the project?**
The purpose of the current study is to investigate the impact that exercise and procrastination levels have on individuals' self-esteem.

**Why are you being invited to take part?**
You are being invited to participate because the inclusion criteria for this study involves individuals aged between 18-65 years of age.

**What is involved?**
If you choose to participate, a link will be made available which will bring you to an online questionnaire. In this questionnaire you will be asked demographic questions including age and gender. You will then be asked to fill out three questionnaires detailing your exercise levels, procrastination levels and questions relating to your self-esteem. Following this, you will be brought to a debrief sheet and thanked for your participation.

**Do I have to take part?**
You are free to decide whether you wish to take part or not. If you do decide to take part, you will be asked to sign a consent form that lets us know you have read this information sheet and understand what is involved in the research. You are free to withdraw from this study at any time and without giving reasons. If you are a student and decide to take part in this study, there will be no impact on your marks, assessments, or future studies.

**What are the disadvantages of taking part?**
Regarding the current study there are no known disadvantages to taking part. However, if you feel any discomfort from any of the mentioned topics please see the support resources provided at the end of the questionnaire.

**What are the possible benefits of taking part?**
There may be no personal benefits from partaking in this study. However, the information we get from the study will help to increase the understanding of the effects of exercise and procrastination on self-esteem and help an undergraduate psychology student with their studies.

**How will my information be used?**
Data will be collected through an online questionnaire via Microsoft forms. This data will be used to analyze the impact of exercise and procrastination on self-esteem.
Your responses to the questionnaire will be combined with all other participants data and statistically analyzed. No individual's data will be identifiable in the final report. The results of this analysis will be reported in the thesis for the BSc in Applied Psychology in the Dun Laoghaire Institute of Art, Design & Technology. This can be requested through the library at IADT, or by emailing the researcher or his supervisor Dr Liam Challenor at N00183250@student.iadt.ie or Liam.Challenor@iadt.ie .This study may also be published in an academic journal article.

**How will my data be protected?**
Under the EU General Data Protection Regulation (GDPR) the legal basis for collecting data for scholarly research is that of public interest. The regulations regarding the protection of your data will be followed. Only data which is needed for analysis will be collected. By giving your consent to take part in the study you are consenting to the use of your data as detailed in this information sheet.

The data will be retained by the researcher for at least one year and may be retained for up to 7 years if the results of the study are published in certain capacities (e.g. in a journal article). There is also a possibility that the fully anonymized dataset may be submitted to a journal and made available to other researchers and academics worldwide for verification purposes, but if this occurs it will be ensured that you are not identifiable from the data.
As the supervisor on this project, I, Liam Challenor am responsible for ensuring that all datasets will be stored in accordance with GDPR regulations and those which are not submitted to a journal will be fully deleted on or before January 2027.

You will find contact information for IADT's Data Protection Officer, Mr. Bernard Mullarkey, and more information on your rights concerning your data at https://iadt.ie/about/your-rights-entitlements/gdpr/

**Who has reviewed the study?**
This study has been approved by the Department of Technology and Psychology Ethics Committee (DTPEC).

**What if you have any questions or there is a problem?**
If you have a concern about any aspect of this study, you may wish to speak to the researcher(s) who will do their best to answer your questions. You should contact David O'Hagan at N00183250@student.iadt.ie or their supervisor Dr Liam Challenor at Liam.Challenor@iadt.ie

**Thank you**
Thank you for taking the time to read this information sheet.

## *Appendix D: Consent form*

### Consent form

**Title of Project:** Impact of exercise and procrastination on self-esteem

**Name of Researcher**: David O'Hagan

**Please tick box**

1. I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions *

Yes

2. I understand that my participation is voluntary and that I am free to withdraw at any time *

Yes

3. I understand that data collected about me during this study will not be identifiable when the research is published *

3. I understand that data collected about me during this study will not be identifiable when the research is published *

Yes

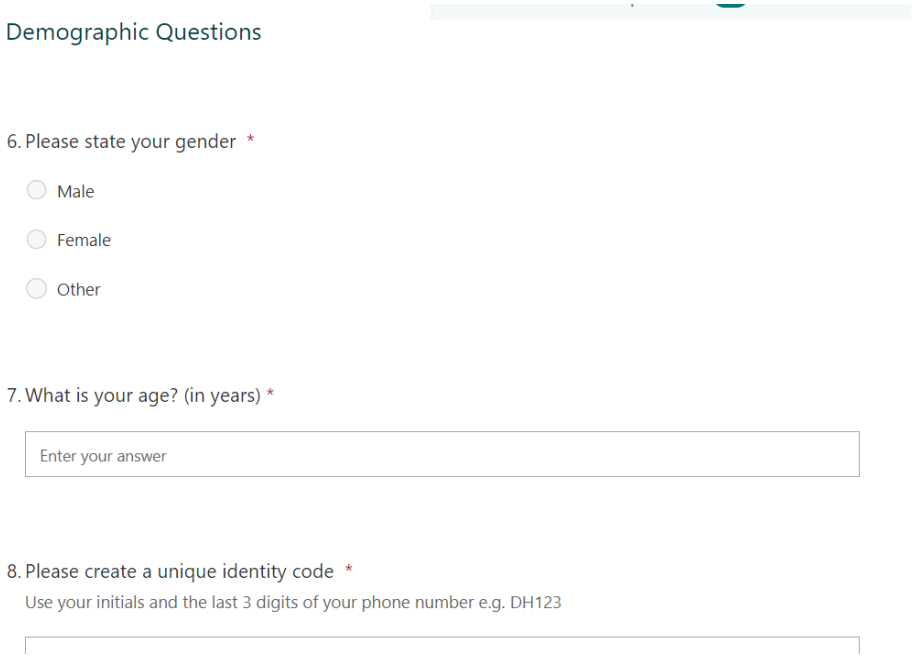
4. I am over 18 *

Yes

5. I agree to take part in this study *

Yes

## *Appendix E: Demographic questions*



Demographic Questions

6. Please state your gender *

- Male
- Female
- Other

7. What is your age? (in years) *

Enter your answer

8. Please create a unique identity code *

Use your initials and the last 3 digits of your phone number e.g. DH123

# *Appendix F: Leisure-Time Exercise Scale*

## Leisure-Time Exercise Scale

Considering a **7-day period** (a week), how many times on average do you do the following kinds of exercise for **more than 15 minutes** during your **free time**

**Please give your answer in numbers**

9. Strenuous exercise (heart beats rapidly)

(e.g., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)

Enter your answer

10. Moderate exercise (not exhausting)

(e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)

Enter your answer

11. Mild/Light exercise (minimal effort)

(e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snowmobiling, easy walking)

Enter your answer

## *Appendix G: Pure Procrastination Scale*

### Pure Procrastination Scale

Below is a list of statements, please indicate how strongly you agree or disagree with each statement.

12.

| | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|---|---|---|---|
| I delay making decisions until it's too late | ○ | ○ | ○ | ○ | ○ |
| Even after I make a decision I delay acting upon it | ○ | ○ | ○ | ○ | ○ |
| I waste a lot of time on trivial matters before getting to the final decisions. | ○ | ○ | ○ | ○ | ○ |
| In preparation for some deadlines, I often waste time by doing other things | ○ | ○ | ○ | ○ | ○ |
| Even jobs that require little else except sitting down and doing them. I find that they seldom get done for days. | ○ | ○ | ○ | ○ | ○ |
| I often find myself performing tasks that I had intended to do days before | ○ | ○ | ○ | ○ | ○ |
| I am continually saying "I'll do it tomorrow". | ○ | ○ | ○ | ○ | ○ |
| I generally delay before starting on work I have to do. | ○ | ○ | ○ | ○ | ○ |
| I find myself running out of time. | ○ | ○ | ○ | ○ | ○ |
| I don't get things done on time. | ○ | ○ | ○ | ○ | ○ |
| I am not very good at meeting deadlines. | ○ | ○ | ○ | ○ | ○ |
| Putting things off until the last minute has cost me money in the past | ○ | ○ | ○ | ○ | ○ |

## *Appendix H: Self-Esteem Scale*

### Self-Esteem Scale

Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.

13.

| | Strongly agree | Agree | Disagree | Strongly disagree |
|---|---|---|---|---|
| On the whole, I am satisfied with myself. | ○ | ○ | ○ | ○ |
| At times I think I am no good at all. | ○ | ○ | ○ | ○ |
| I feel that I have a number of good qualities. | ○ | ○ | ○ | ○ |
| I am able to do things as well as most other people. | ○ | ○ | ○ | ○ |
| I feel I do not have much to be proud of. | ○ | ○ | ○ | ○ |
| I certainly feel useless at times. | ○ | ○ | ○ | ○ |
| I feel that I'm a person of worth, at least on an equal plane with others. | ○ | ○ | ○ | ○ |
| I wish I could have more respect for myself. | ○ | ○ | ○ | ○ |
| All in all, I am inclined to feel that I am a failure. | ○ | ○ | ○ | ○ |
| I take a positive attitude toward myself. | ○ | ○ | ○ | ○ |

# *Appendix I: Debrief sheet*

## Debrief sheet

**Title of Project:** Impact of exercise and procrastination on self-esteem.
**Name of Researcher:** David O'Hagan

Thank you very much for taking part in this research study.

This study is designed to investigate and add to existing knowledge of the impact that exercise and procrastination levels have on individuals' self-esteem.

Self-esteem has been a popular research topic within psychology and research examining its relationship with exercise has been growing over the past decade. Additionally, research on procrastination has become an area widely studied, although most of the research focuses on academic procrastination. There is a lack of research investigating these three areas together and how they impact one another, therefore the information you, and others, have provided will help with the understanding of how exercise and procrastination effect self-esteem. If at any point you wish to withdraw your data from this study, you can do so by emailing the researcher or supervisor and asking to have your information withdrawn.

**Withdrawal information**
If you have any questions about this study, or if you would like to withdraw your data from the study, please contact the researcher or supervisor at N00183250@student.iadt.ie or Laim.Challenor@iadt.ie . In your email let them know your unique ID code: your initials and the last 3 digits of your mobile number. If you submit a request for data removal, all data collected from you will be securely deleted. You will be able to remove your data from the study until 1st March 2021, when the data will be combined and analyzed. Data removal will not be possible after that date. Please keep a copy of this information in case you wish to remove your data after leaving this screen.

**Data protection**
Your data will be treated according to GDPR regulations. You will find contact information for IADT's Data Protection Officer, Mr. Bernard Mullarkey, and more information on your rights concerning your data at https://iadt.ie/about/your-rights-entitlements/gdpr/

**Support resources**

Although the aim of this study is to investigate self-esteem, discussing this topic may cause issues for some people. If you have been affected by the content of this study in any way, the organizations below may be of assistance:

https://www.mentalhealthireland.ie

https://www.hse.ie/eng/services/list/4/mental-health-services/

https://www.stpatricks.ie/care-treatment/programmes-therapies/our-programmes-and-therapies/healthy-self-esteem-programme

Thank you again for taking the time to participate in this research.

If you have any questions about this study, please contact the researcher or supervisor Dr Liam Challenor at N00183250@student.iadt.ie or Liam.Challenor@iadt.ie

## *Appendix J: SPSS output*

**Between-Subjects Factors**

| | | Value Label | N |
|---|---|---|---|
| Total Procrastination (Binned) | 1 | Low | 182 |
| | 2 | High | 174 |
| Exlevel | 1 | Sedentary | 53 |
| | 2 | Moderately active | 29 |
| | 3 | Active | 274 |

**Descriptive Statistics**

Dependent Variable: Total Self-Esteem

| Total Procrastination (Binned) | Exlevel | Mean | Std. Deviation | N |
|---|---|---|---|---|
| Low | Sedentary | 28.64 | 6.075 | 22 |
| | Moderately active | 29.38 | 6.500 | 16 |
| | Active | 29.56 | 5.357 | 144 |
| | Total | 29.43 | 5.527 | 182 |
| High | Sedentary | 22.19 | 6.258 | 31 |
| | Moderately active | 22.77 | 4.729 | 13 |
| | Active | 24.87 | 5.786 | 130 |
| | Total | 24.24 | 5.875 | 174 |
| Total | Sedentary | 24.87 | 6.912 | 53 |

| | | | | |
|---|---|---|---|---|
| | Moderately active | 26.41 | 6.587 | 29 |
| | Active | 27.34 | 6.030 | 274 |
| | Total | 26.89 | 6.258 | 356 |

**Levene's Test of Equality of Error Variances[a,b]**

| | | Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|---|---|
| Total Self-Esteem | Based on Mean | .604 | 5 | 350 | .697 |
| | Based on Median | .559 | 5 | 350 | .731 |
| | Based on Median and with adjusted df | .559 | 5 | 337.461 | .731 |
| | Based on trimmed mean | .600 | 5 | 350 | .700 |

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.[a,b]

a. Dependent variable: Total Self-Esteem

b. Design: Intercept + Progroups + Exlevel + Progroups * Exlevel

**Tests of Between-Subjects Effects**

Dependent Variable: Total Self-Esteem

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Corrected Model | 2629.742[a] | 5 | 525.948 | 16.328 | .000 |
| Intercept | 106900.584 | 1 | 106900.584 | 3318.657 | .000 |

| | | | | | |
|---|---|---|---|---|---|
| Progroups | 1358.114 | 1 | 1358.114 | 42.162 | .000 |
| Exlevel | 159.899 | 2 | 79.949 | 2.482 | .085 |
| Progroups * Exlevel | 50.767 | 2 | 25.383 | .788 | .456 |
| Error | 11274.202 | 350 | 32.212 | | |
| Total | 271380.000 | 356 | | | |
| Corrected Total | 13903.944 | 355 | | | |

a. R Squared = .189 (Adjusted R Squared = .178)

b. Computed using alpha = .05

**Estimated Marginal Means**

**1. Total Procrastination (Binned)**

**Estimates**

Dependent Variable: Total Self-Esteem

| Total Procrastination (Binned) | Mean | Std. Error | 95% Confidence Interval Lower Bound | 95% Confidence Interval Upper Bound |
|---|---|---|---|---|
| Low | 29.191 | .641 | 27.930 | 30.453 |
| High | 23.277 | .647 | 22.005 | 24.549 |

**Pairwise Comparisons**

Dependent Variable: Total Self-Esteem

| (I) Total Procrastination (Binned) | (J) Total Procrastination (Binned) | Mean Difference (I-J) | Std. Error | Sig.[b] |
|---|---|---|---|---|
| Low | High | 5.914* | .911 | .000 |
| High | Low | -5.914* | .911 | .000 |

**Pairwise Comparisons**

Dependent Variable: Total Self-Esteem

| (I) Total Procrastination (Binned) | (J) Total Procrastination (Binned) | 95% Confidence Interval for Difference[b] | |
|---|---|---|---|
| | | Lower Bound | Upper Bound |
| Low | High | 4.123 | 7.705 |
| High | Low | -7.705 | -4.123 |

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

**Univariate Tests**

Dependent Variable: Total Self-Esteem

| | Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|
| Contrast | 1358.114 | 1 | 1358.114 | 42.162 | .000 | .108 |
| Error | 11274.202 | 350 | 32.212 | | | |

**Univariate Tests**

Dependent Variable: Total Self-Esteem

| Noncent. Parameter | Observed Power[a] |
|---|---|

| | | |
|---|---|---|
| Contrast | 42.162 | 1.000 |
| Error | | |

The F tests the effect of Total Procrastination (Binned). This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

**2. Exlevel**

**Estimates**

Dependent Variable: Total Self-Esteem

| Exlevel | Mean | Std. Error | 95% Confidence Interval | |
|---|---|---|---|---|
| | | | Lower Bound | Upper Bound |
| Sedentary | 25.415 | .791 | 23.859 | 26.971 |
| Moderately active | 26.072 | 1.060 | 23.988 | 28.156 |
| Active | 27.216 | .343 | 26.541 | 27.891 |

**Pairwise Comparisons**

Dependent Variable: Total Self-Esteem

| (I) Exlevel | (J) Exlevel | Mean Difference (I-J) | Std. Error | Sig.[a] | 95% Confidence Interval for Difference[a] |
|---|---|---|---|---|---|
| | | | | | Lower Bound |
| Sedentary | Moderately active | -.657 | 1.322 | 1.000 | -3.838 |
| | Active | -1.801 | .862 | .112 | -3.875 |
| Moderately active | Sedentary | .657 | 1.322 | 1.000 | -2.524 |
| | Active | -1.144 | 1.114 | .916 | -3.823 |
| Active | Sedentary | 1.801 | .862 | .112 | -.274 |
| | Moderately active | 1.144 | 1.114 | .916 | -1.536 |

**Pairwise Comparisons**

Dependent Variable: Total Self-Esteem

| (I) Exlevel | (J) Exlevel | 95% Confidence Interval for Difference<br>Upper Bound |
|---|---|---|
| Sedentary | Moderately active | 2.524 |
| | Active | .274 |
| Moderately active | Sedentary | 3.838 |
| | Active | 1.536 |
| Active | Sedentary | 3.875 |
| | Moderately active | 3.823 |

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

**Univariate Tests**

Dependent Variable: Total Self-Esteem

| | Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|
| Contrast | 159.899 | 2 | 79.949 | 2.482 | .085 | .014 |
| Error | 11274.202 | 350 | 32.212 | | | |

**Univariate Tests**

Dependent Variable: Total Self-Esteem

| | Noncent. Parameter | Observed Power[a] |
|---|---|---|
| Contrast | 4.964 | .497 |
| Error | | |

The F tests the effect of Exlevel. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

**3. Total Procrastination (Binned) * Exlevel**

Dependent Variable: Total Self-Esteem

| Total Procrastination (Binned) | Exlevel | Mean | Std. Error | 95% Confidence Interval Lower Bound | 95% Confidence Interval Upper Bound |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Low | Sedentary | 28.636 | 1.210 | 26.257 | 31.016 |
| | Moderately active | 29.375 | 1.419 | 26.584 | 32.166 |
| | Active | 29.562 | .473 | 28.632 | 30.493 |
| High | Sedentary | 22.194 | 1.019 | 20.189 | 24.198 |
| | Moderately active | 22.769 | 1.574 | 19.673 | 25.865 |
| | Active | 24.869 | .498 | 23.890 | 25.848 |

**Post Hoc Test**

**Exlevel**

**Multiple Comparisons**

Dependent Variable: Total Self-Esteem

| | (I) Exlevel | (J) Exlevel | Mean Difference (I-J) | Std. Error | Sig. |
|---|---|---|---|---|---|
| Tukey HSD | Sedentary | Moderately active | -1.55 | 1.311 | .466 |
| | | Active | -2.47* | .852 | .011 |
| | Moderately active | Sedentary | 1.55 | 1.311 | .466 |
| | | Active | -.92 | 1.108 | .683 |
| | Active | Sedentary | 2.47* | .852 | .011 |
| | | Moderately active | .92 | 1.108 | .683 |
| Scheffe | Sedentary | Moderately active | -1.55 | 1.311 | .500 |
| | | Active | -2.47* | .852 | .016 |
| | Moderately active | Sedentary | 1.55 | 1.311 | .500 |
| | | Active | -.92 | 1.108 | .708 |
| | Active | Sedentary | 2.47* | .852 | .016 |
| | | Moderately active | .92 | 1.108 | .708 |

| | | | | | |
|---|---|---|---|---|---|
| Bonferroni | Sedentary | Moderately active | -1.55 | 1.311 | .717 |
| | | Active | -2.47* | .852 | .012 |
| | Moderately active | Sedentary | 1.55 | 1.311 | .717 |
| | | Active | -.92 | 1.108 | 1.000 |
| | Active | Sedentary | 2.47* | .852 | .012 |
| | | Moderately active | .92 | 1.108 | 1.000 |

**Multiple Comparisons**

Dependent Variable: Total Self-Esteem

| | (I) Exlevel | (J) Exlevel | 95% Confidence Interval Lower Bound | Upper Bound |
|---|---|---|---|---|
| Tukey HSD | Sedentary | Moderately active | -4.63 | 1.54 |
| | | Active | -4.47 | -.46 |
| | Moderately active | Sedentary | -1.54 | 4.63 |
| | | Active | -3.53 | 1.69 |
| | Active | Sedentary | .46 | 4.47 |
| | | Moderately active | -1.69 | 3.53 |
| Scheffe | Sedentary | Moderately active | -4.77 | 1.68 |
| | | Active | -4.56 | -.37 |
| | Moderately active | Sedentary | -1.68 | 4.77 |
| | | Active | -3.65 | 1.80 |
| | Active | Sedentary | .37 | 4.56 |
| | | Moderately active | -1.80 | 3.65 |
| Bonferroni | Sedentary | Moderately active | -4.70 | 1.61 |
| | | Active | -4.52 | -.42 |
| | Moderately active | Sedentary | -1.61 | 4.70 |
| | | Active | -3.59 | 1.74 |
| | Active | Sedentary | .42 | 4.52 |
| | | Moderately active | -1.74 | 3.59 |

Based on observed means.

The error term is Mean Square (Error) = 32.212.

*. The mean difference is significant at the .05 level.

**Independent Samples Test**

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | |
|---|---|---|---|---|---|
| | | F | Sig. | t | df |
| Total Self-Esteem | Equal variances assumed | 2.108 | .148 | -2.661 | 325 |
| | Equal variances not assumed | | | -2.427 | 68.159 |

**Independent Samples Test**

| | | t-test for Equality of Means | | |
|---|---|---|---|---|
| | | Significance | | |
| | | One-Sided p | Two-Sided p | Mean Difference |
| Total Self-Esteem | Equal variances assumed | .004 | .008 | -2.468 |
| | Equal variances not assumed | .009 | .018 | -2.468 |

**Independent Samples Test**

| | | t-test for Equality of Means | | |
|---|---|---|---|---|
| | | | 95% Confidence Interval of the Difference | |
| | | Std. Error Difference | Lower | Upper |
| | Equal variances assumed | .927 | -4.292 | -.644 |

| | | | | |
|---|---|---|---|---|
| Total Self-Esteem | Equal variances not assumed | 1.017 | -4.497 | -.439 |

**Correlations**

| | | Total Procrastination | Total Exercise | Total Self-Esteem |
|---|---|---|---|---|
| Total Procrastination | Pearson Correlation | 1 | -.123* | -.492** |
| | Sig. (2-tailed) | | .020 | .000 |
| | N | 356 | 356 | 356 |
| Total Exercise | Pearson Correlation | -.123* | 1 | .146** |
| | Sig. (2-tailed) | .020 | | .006 |
| | N | 356 | 356 | 356 |
| Total Self-Esteem | Pearson Correlation | -.492** | .146** | 1 |
| | Sig. (2-tailed) | .000 | .006 | |
| | N | 356 | 356 | 356 |

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

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

(i) Pure Procrastination Scale

**Reliability Statistics**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| .926 | .927 | 12 |

(ii) Rosenberg Self-Esteem Scale

**Reliability Statistics**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| .912 | .913 | 10 |

(iii) Godin Leisure-Time Exercise Scale

**Reliability Statistics**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| .388 | .409 | 3 |