The Relationship Between Exercise and Stress

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PSY 312: Statistics and Data Analysis
Fall 2020

Introduction:

In recent times, mental health has become a much less taboo topic, thus leading to the exploration of many avenues in attempt to foster positive psychological wellbeing. In order to have a proficiently functioning society, establishing various routes to sustain proper mental health is a dire necessity.

Current research available explores the benefits exercise can have on overall mental health; Shields, Matt, & Coifman (2016) illustrated that individuals with higher levels of physical activity demonstrated greater abilities of emotional adaptivity in shifting contexts. This psychological flexibility is an important factor in achieving and sustaining positive mental health. Further, it was found that boys with Attention Deficit Hyperactive Disorder (ADHD) who underwent High Intensity Interval Training (HIIT) faced beneficial consequences such as quality of life outcomes – more specifically, increases in self-esteem and friend relationships (Meßler, Holmberg, & Sperlich, 2018).

While previous research has focused on the broad impacts of exercise upon mental health, the specification of individual facets has been left widely untouched. The current study aims to further existing research by assessing how exercise can impact the level of stress faced by an individual.

Methods:

Participants and Design:

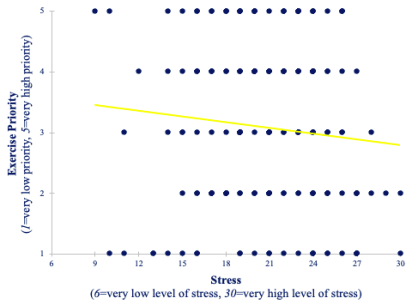
Participants included volunteer students from Lebanon Valley College, (N = 190, 63 males and 124 females). Ages of participants ranged from 18 to 63 (M_{age} = 24.6). Participants completed a survey of 41 questions designed to gain educational intellect of students enrolled in Psychology 312 (Statistics & Data Analysis) at LVC.

Materials:

This study consisted of a 6-item scale based on the primary dependent variable of stress. In this study, stress is being assessed with relation to the broad variable of exercise. An example of one item from the primary DV scale itself would be rating the statement "I experience stress daily" on a scale of strongly disagree to strongly agree. In order to distinguish some of the various aspects that fall under the category of exercise, there are three specific dependent variables that are being discussed in this study. The first DV would be priority of exercise which is presented by the statement "I make exercising a priority" and rated on a scale of strongly disagree to strongly agree. Another DV is relief from exercise which is rated on the same scale of strongly disagree to strongly agree using the statement "exercising makes me feel relieved". The last DV is exercise intensity using the statement "what type of exercise do you typically participate in" and was rated on a scale of 1 = low intensity, 3 = high intensity.

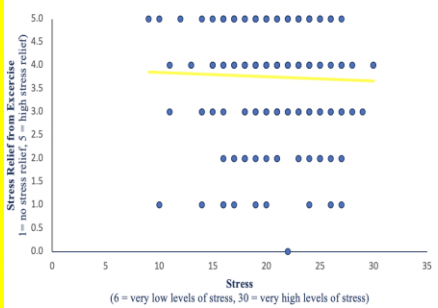
Results:

Figure 1:
Participants' Stress Ratings Compared to their Prioritization of Exercise



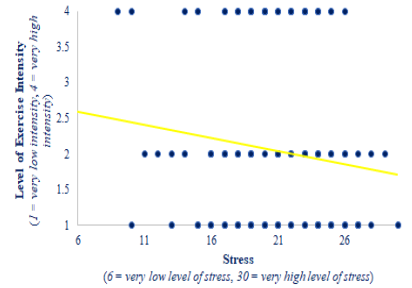
It was hypothesized that as exercise priority increased, stress would decrease; a Pearson Analysis was completed to determine the relationship between these two variables. As dictated by the correlation coefficient, the variables seemed to have an inverse relationship (as one increased, the other decreased), but the strength of the relationship was extremely weak (see Figure 1). Additionally, the test did not yield significance (r = -.097, n = 189, p = .092 (one-tailed)); the effect size found was extremely small (r^2 = .0094). Further, an issue was found in the CI data since the range crossed zero, meaning we cannot ascertain the true direction of the correlation (95% CI = [-.236, .046]).

Figure 2:
Participants' Stress Ratings Compared to Relief from Exercise



The initial hypothesis that as exercise increases, stress relief will also increase, was rejected based on the results. Using a Pearson Analysis test, a weak, negative correlation was found between the variables as well as an insignificant p-value, indicating an insignificant effect (r = -.028, n = 188, p = .352 (one-tailed)), both reject the original hypothesis. The effect size is incredibly small (r^2 = $7.84x10^{-4}$) showing it is consistent with the nonsignificant correlation, meaning the hypothesis was rightfully rejected. The confidence interval data showed that the range of the correlation crosses 0 meaning that the DV correlation could be either negative or positive which is also rejecting the hypothesis.

Figure 3:
Participants' Stress Ratings Compared to Intensity of Exercise



It was hypothesized that as exercise intensity increased, stress would decrease. A Pearson Analysis was used to interpret the relationship between the two variables. The correlation coefficient indicated a relatively weak, inverse relationship between the two variables (see Figure 3). However, the test yielded a significant result (r = -0.125, p = 0.043 (one-tailed)). Additionally, the effect size was not consistent with this finding because it was very small (r^2 = 0.02). Furthermore, the confidence interval data also showed inconsistencies with the significance of the test. The CI data shows that it crosses zero which means the correlation can be either positive or negative (95% CI = [-0.3, 0.02]).

Discussion:

Hypothesis Support

The first hypothesis was as exercise priority increased, stress would decrease. After analyzing the data, this hypothesis would be rejected due to the insignificant p-value. The consistency between the small effect size and nonsignificant p-value also leads us to reject the hypothesis. Similarly, the CI data contradicted the correlation coefficient by crossing zero; since we do not know the real direction of the relationship, this leads to the rejection of the hypothesis

After analyzing the data for the second hypothesis, as exercise increases, stress relief will also increase, we would reject this hypothesis. The Pearson analysis yielded a non-significant p-value which was consistent with a very small effect size therefore rejecting the hypothesis. Moreover, the CI data showed that we cannot discern directionality because it crosses zero further adding to our rejection of the hypothesis.

The third hypothesis that was tested was as exercise intensity increases, stress would decrease. The hypothesis would be supported by a significant p-value. However, the small effect size shows inconsistency with this result therefore rejecting the hypothesis. Additionally, the CI data further rejects the hypothesis because it crosses zero therefore, we cannot truly assess the directionality of the correlation leading to more support for the rejection of the hypothesis.

Data Based Limitations

Problems:	No Problems:
• Precision	• Linearity
• Strength	• Outliers
• Effect Size	• NDP
• Inconsistencies	

Conclusions

Due to its mixed quality, we cannot conclude that the data has practical significance. The data resulted in a multitude of problems including issues with precision within the confidence interval data and many inconsistencies were found. However, the data did not have any problems with outliers or linearity. The NDP assumption, overall, was not violated. If the data were practically significant, then we could apply the data by using it as an educational tool to teach college students about the benefits of exercise on stress. College students experience a lot of stress throughout their educational careers, so teaching them about these benefits could help them in the long run of avoiding the physical and mental consequences stress can have on an individual. In addition to the variables that were already tested, we could further our research by researching the effects body image (1 = very negative body image and 5 = very positive body image) has on stress and exercise. If an individual has a very negative view of their body image, it could increase their stress levels. Additionally, a negative body image could also influence your exercise habits in attempt to attain the desired look.