



## Does aerobic exercise have benefits to those suffering from depression and anxiety?

## INTRODUCTION

Anxiety and depression are two of the most common mental health disorders.

**33.7%**

The population that has anxiety at some point in their life (Bandelow & Michaelis, 2015)

Anxiety is the most prevalent mental health condition. Adolescents with anxiety disorders are also at subsequent risk for later mental health problems. It can also start at any point in a lifetime, with the symptoms impacting everyday life, and persistent symptoms eventually leading to chronic recurrence. Anxiety is occasionally coupled with other disorders as well as addiction, and both psychological and pharmacological treatments are available (Craske & Stein, 2016).

**3-5%**

People with depression between childhood and adulthood (Bhatia & Bhatia, 2007)

**15%**

Children and adolescents that show symptoms of depression (Bhatia & Bhatia, 2007).

Symptoms of depression impact growth and development, school performance, and relationships. Similar to anxiety, both cognitive and pharmacological treatments are available (Bhatia & Bhatia, 2007).

These two mental health disorders are closely associated, however, they can be independent and lead to distinct outcomes (Beuke, Fischer, & McDowall, 2003). With thousands of people coping with anxiety and depression, providing an accessible treatment method may be able to help reduce symptoms and help with the severity of anxiety and depression.

## HYPOTHESIS

If people with anxiety and depression engage in aerobic exercise, then they will see decrease in the severity of their anxiety and depression.

## DEFINITIONS

**Beck Score**

- Also known as the Beck Depression Inventory, it is used to measure and detect depression (Wang & Gorenstein, 2013)

**VO<sub>2</sub> Max Test**

- A test confirming maximum oxygen uptake (Scharhag-Rosenberger et al., 2011)

**Cognitive Behaviour Therapy (CBT)**

- Psychological treatment that has been proved to be one of the most effective treatments for **anxiety** and other mental illnesses (Fulks & Story, 2008).

**Anxiety Sensitivity Index – Revised (ASI - R)**

- Most commonly used measure for anxiety sensitivity (Arnau, Broman-Fulks, Green, & Berman, 2009).

## ANXIETY

(LeBouthiller & Asmundson, 2017)

**Methods:**

- Evaluated the effects of aerobic exercise and resistance training on 48 individuals between the ages of 18-65
- Participants exercised 3 times a week for 4 weeks
- 40 minutes of aerobic exercise on a spin cycle at 60-80% of their max heart rate

**Results:**

- 56% of participants in the aerobic training program had better disorder statuses
- Compared to the waitlist group, the disorder statuses for the aerobic exercise group were statistically significant ( $p=0.032$ )



<http://stjohnscatholichighschool.com/event/cross-country/>

- Symptoms significantly lowered in aerobic and resistance exercise groups by reduction of 12.84 points compared to waitlist group

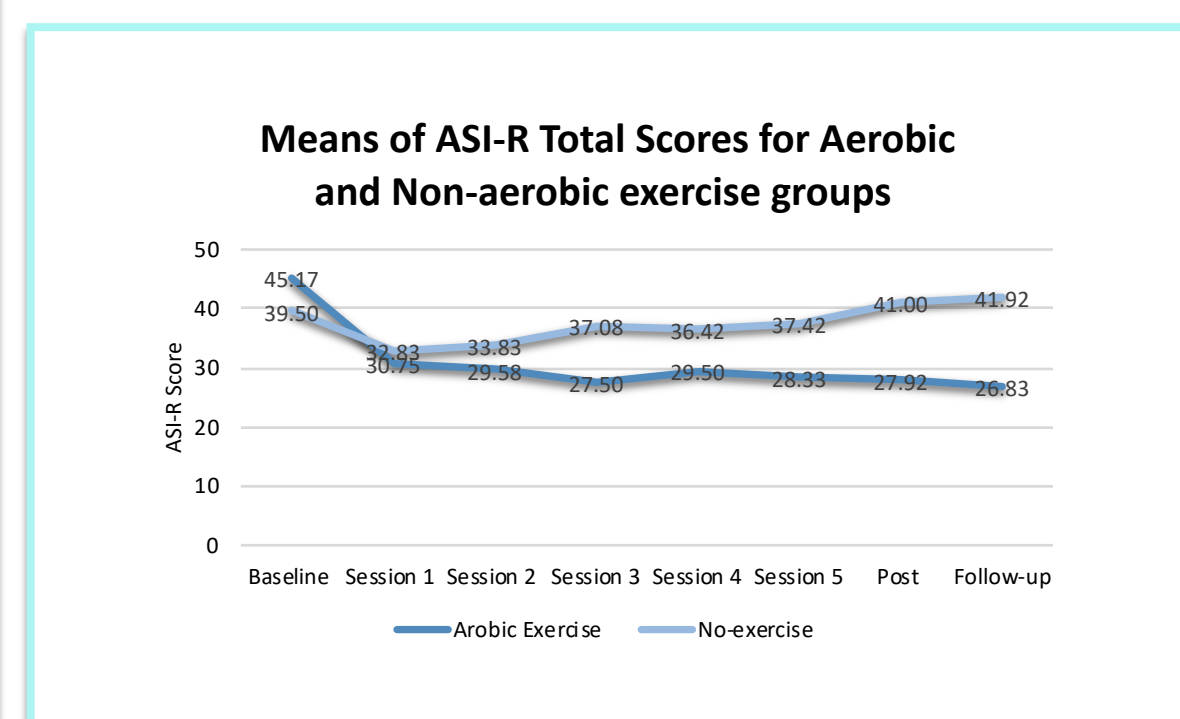
(Beuke, C. J., Fischer, R., & McDowall, J., 2003)

**Method**

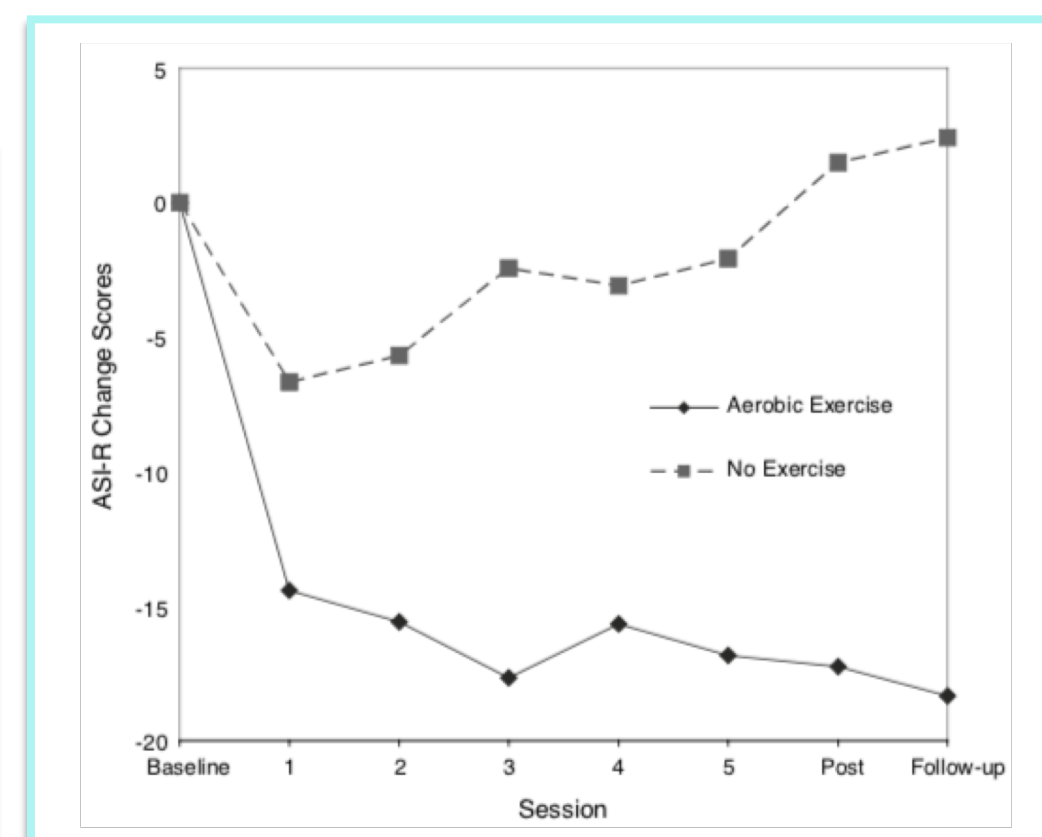
- Assessed the effectiveness aerobic exercise has on participants with anxiety.
  - CRITERIA:** get a score above the non-clinical mean ( $>26$ ) on the ASI-R questionnaire
- 24 students (19 females) from ages 18-27 where assigned to complete 6 sessions of 20-minute aerobic exercise (60-90% MHR) over the course of 2 weeks.
- Controlled group (No-exercise): Weekly check-in with the lab six times over the 2-week period to complete ASI-R questionnaire

**Results**

- The No-exercise group did not report significant changes in ASI-R scores
- The Aerobic exercise group results remarkably declined from baseline to the other session was statistically significant at  $p<.05$
- A decrease of ASI-R scores occurred immediately after the start of the program.



Adapted from the data Table II of the mean ASI-R score for Aerobic exercise and No-exercise.

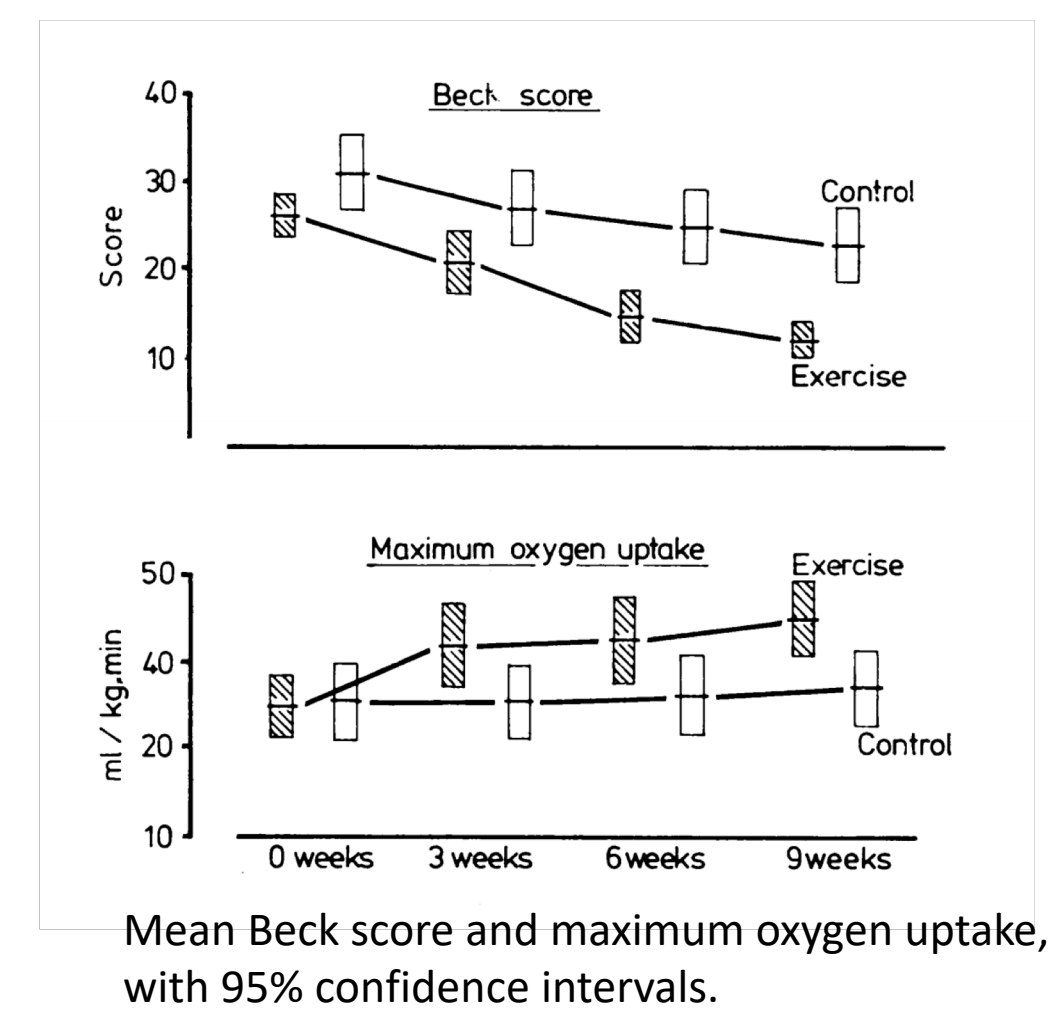


## DEPRESSION

(Martinsen, Medhus & Sandvik, 1985)

**Research Question**

- Does systematic aerobic exercise have an antidepressant effect on depressed psychiatric patients?

**Method**

- 43 clinically depressed patients between the ages of 17-60 (mean age: 40)
- For 9 weeks, patients performed 1 hour of aerobic exercise 3 times a week

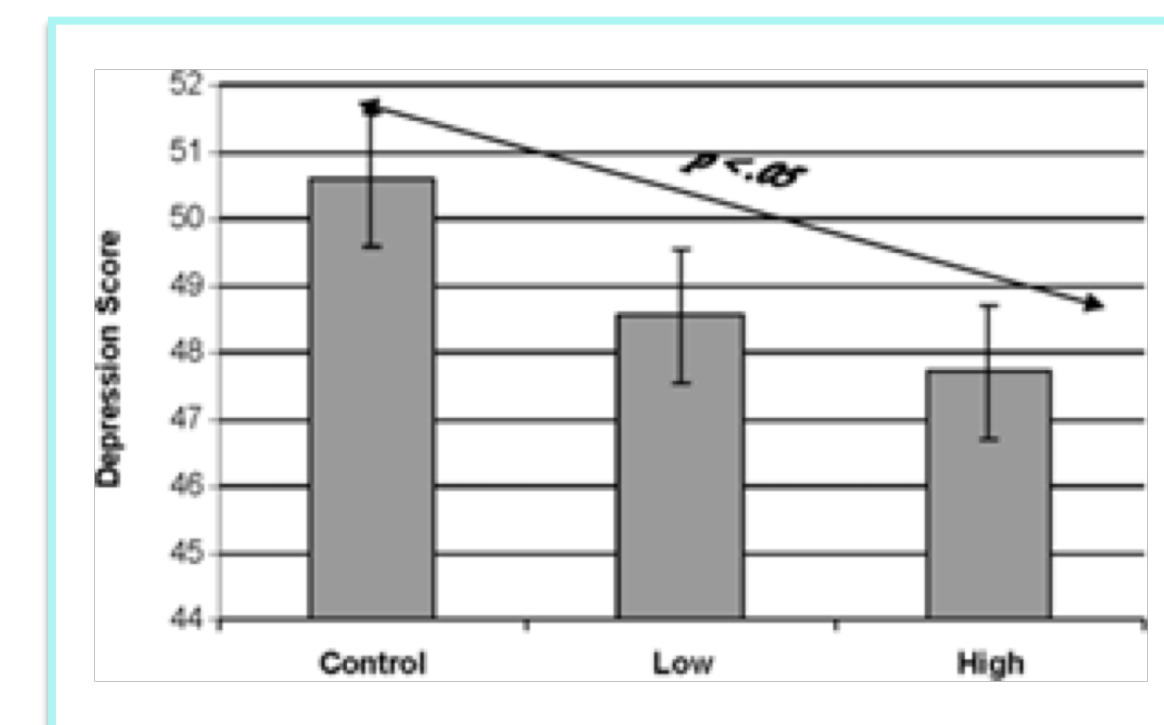
**Results**

- Moderate increase in maximal O<sub>2</sub> increase by 15-30% was sufficient enough to have an antidepressant effect
- Depression measured in Beck Score (BDA), lower scores correlate to less depression
- ( $p<0.05$ ) indicates a clear statistical significance
- Larger VO<sub>2</sub> maxes correlate with a lower beck score (lower depression)

(Petty et al., 2009)

**Research Question**

- Is there a dose-response relationship between aerobic exercise and depressive symptoms/self-worth?



Effect of exercise on post-test total score from the Reynolds Child Depression Scale.

**Method**

- 207 sedentary, overweight children were randomly assigned to either low or high dose AE programs for 13 weeks.
- Before and after the program, they were asked to complete two self-report questionnaires; one assessing depressive symptoms, and one assessing feelings of self-worth.

**Results**

- Baseline depression score and BMI z-score change revealed a dose-response benefit of the intervention for the depression score ( $p = .045$ ).
- Pairwise comparisons on the depression score indicated that the 40 min group was significantly lower than the control group ( $p = .02$ ) and, while not statistically significant, the 20 min group was lower than the control group ( $p = .07$ ).
- However, the difference between the 20 min and 40 min groups was not significant ( $p = .27$ ).

## CONCLUSION

**Conclusion (Anxiety)**

- Aerobic exercise had been found to decrease anxiety in groups of people. However, more studies should be done involving a larger variety of people with more variability in their ages (LeBouthiller & Asmundson, 2017).
- Studies have shown that a single 20-minute session of aerobic exercise can decrease anxiety. It is an affordable alternative way to reduce anxiety (rather than CBT) that not only makes you healthier physically but mentally (Beuke, Fischer, & McDowall, 2003).

**Conclusion (Depression)**

- Aerobic exercise can be an effective treatment of depression by reducing negative emotions and increasing calmer emotions, overall benefitting the mental health of an individual (Martinsen, Medhus & Sandvik, 1985)
- Engaging in regular, vigorous aerobic exercise with peers in an organized setting decreased depressive symptoms in dose-response fashion among overweight children. (Petty et al, 2009)

**Final Conclusion**

- Aerobic exercise has been shown to be linked to a decreased severity of symptoms in both anxiety and depression, and so the hypothesis is retained
- Further research should be done involving more diverse cohorts of participants so these findings can be generalized to a larger population.

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