

The Effects Caffeine has on a 3-minute Rowing Test

This project makes no effort to suggest generalizability. Instead, it was designed to demonstrate competency using lab equipment, capacity to integrate knowledge with application, and understanding of the scientific method.

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INTRODUCTION

- Research question: Does a relative amount of caffeine (2 mg/kg) increase the distance 18-24-year-olds are able to row if implemented 1 hour prior to a 5-minute rowing test when compared to no caffeine?
- The purpose of this study was to analyze the effect of caffeine on 5-minute rowing distance in 18–24-year-olds.
- According to Grgic et. al (2020), caffeine ingestion of doses of 6 mg/kg and 9 mg/kg significantly improved 2000-meter rowing ergometer by approximately 4 seconds (i.e., caffeine ingestions reduced the time needed to complete the distance).
- According to Del Coso et. al (2012), during this study the caffeine beverage was ingested 60 minutes prior to exercise and resulted in an increased maximal exercise by 4% when 6 mg/kg of caffeine was ingested compared to 1 mg/kg. Also, this study found that 6 mg/kg of caffeine ingestion improved knee extensor muscle strength and cycling power production because of a higher voluntary contraction (central effects).
- According to Gutierrez-Hellin et. al (2020), the group that exercised without the caffeine from ingesting the energy drink completed fewer reps compared to those who ingested 3-6 mg/kg of caffeine.

RESULTS

This study showed that the effects of caffeine are dependent upon different variables. These include, how naïve or tolerant a participant is to caffeine and how their body responds to caffeine. The study suggest that caffeine does not always result in more rowing distance among each participant. Some participants were actually able to cover more distance without the caffeine supplementation. According to the data Male 1 rowed 840 meters without caffeine and 870 meters with caffeine. Female 1 rowed 648 meters without caffeine and 704 meters with caffeine. Male 2 rowed 742 meters without caffeine and 725 meters with caffeine. Female 2 rowed 632 meters without caffeine and 680 meters with caffeine. Male 3 rowed 808 meters with caffeine and 800 meters without caffeine. Female three rowed 445 meters without caffeine and 569 meters with caffeine. Based on these results, three out of the four males performed better without caffeine, however, all the female participants performed better with the caffeine supplementation. Two of the participants reported an 8 on the caffeine tolerance scale. Two participants reported a 1 on the caffeine tolerance scale. One participant reported a 4 on the caffeine tolerance scale. One participant reported a 5 on the caffeine tolerance scale. Figure two displays the correlation between the participants and their rowing test results with and without caffeine. The initial test was set at 5 minutes, but difficulty in completing that duration caused the researchers to reduce the test to 3 minutes. A placebo effect may have also taken place among the participants due to the fact that they were informed that they would be given the caffeine.

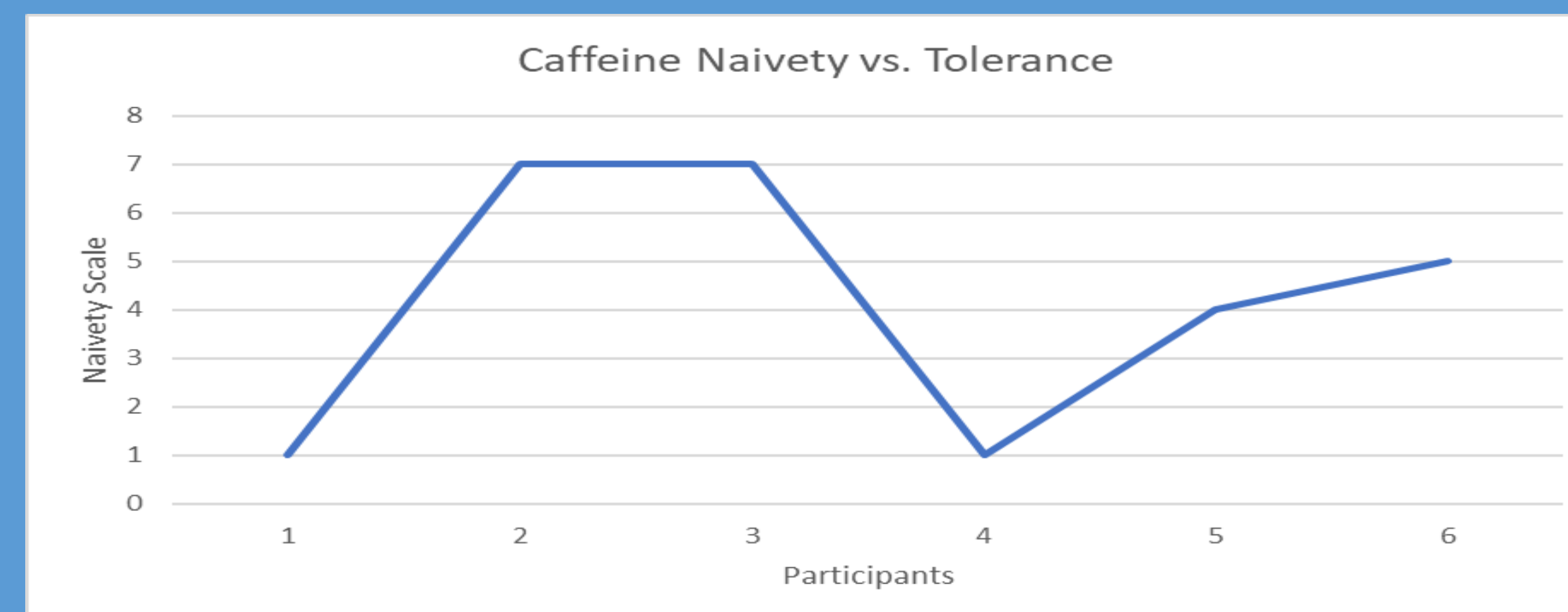
METHODS

During this lab experiment, there will be 3 females and 3 males that complete a 3-minute rowing test. Once arrived at the testing environment, the equipment will be assessed to make sure that it is working correctly and cleaned. Once the participant arrives their weight will be calculated, and the correct dosage of caffeine will be calculated. The participant will also be asked on a scale of 0-10 how much caffeine they intake. The relative dosage of caffeine will be calculated by multiplying the participants weight by 2 milligrams per kilogram of bodyweight. The participant will be informed to meet with us 1 hour and 30 minutes prior to the next test to be given the correct dosage of caffeine. The rowing test will be 3 minutes and will examine the distance rowed, in meters, with and without caffeine and there will be a day gap between both trial tests. Before the participants begin the rowing test, they will be asked to do a 2-minute walk on the treadmill at a speed of 3 mph ay zero resistance. After the test is performed for both trial runs, the equipment will be cleaned properly and will be shut off. After both tests have been completed by the participants the data will be compared to examine the difference between the test with caffeine and the test without caffeine.

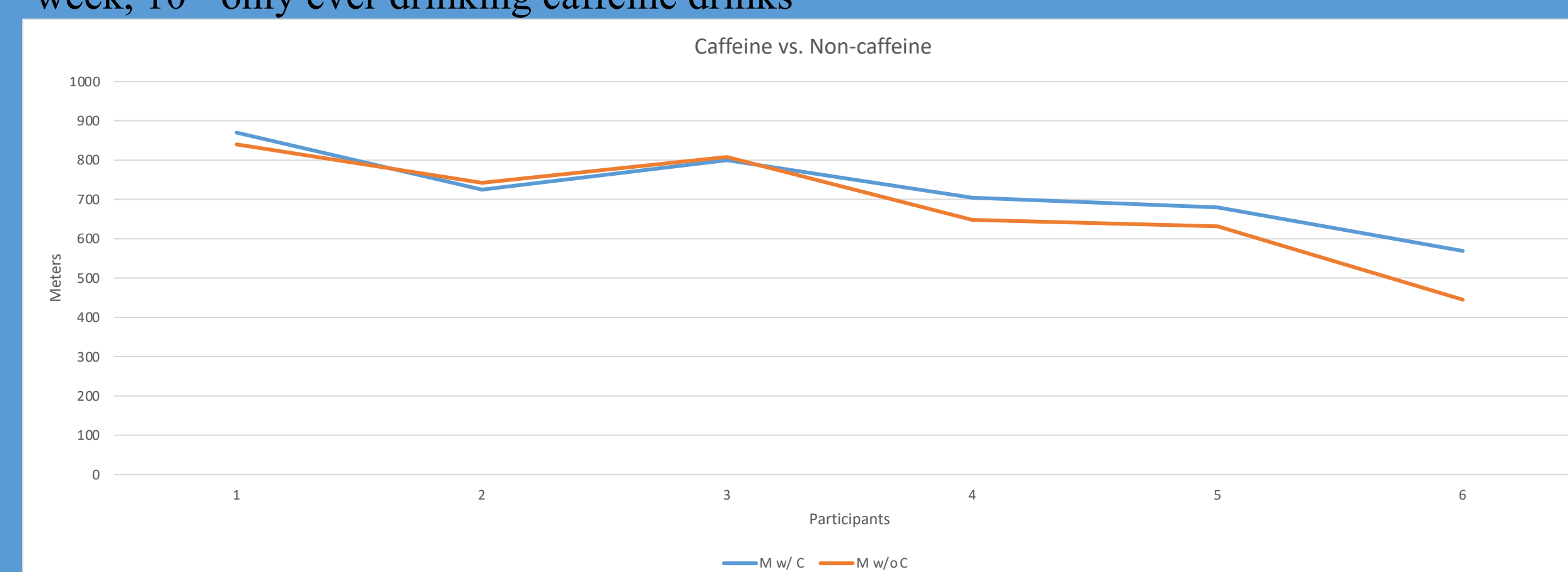
FIGURES & CHARTS

	Wt. (kg)	CD (mg/kg)	M w/ C	M w/o C	
Male 1		79.5	159	870	840
Male 2		123.3	246.6	725	742
Male 3		70.4	140.9	800	808
Female 1		75	150	704	648
Female 2		79.5	159	680	632
Female 3		62	124	569	445

Note. Wt.=weight, CD=caffeine dosage, M w/ C=meters with caffeine, M w/o C=meters without caffeine



Note. 0= none ever, 1= 1 drink per week, 2= 2 drinks per week, 3= 3 drinks per week, 4= 4 drinks per week, 5= 5 drinks per week, 6= 2 drinks each day 3 days a week, 7= 2 drinks per day 4 days a week, 8= 3 drinks per day 5 days a week, 9= 4 drinks per day 7 days a week, 10= only ever drinking caffeine drinks



Note. M w/ C= meters with caffeine, M w/o C= meters without caffeine

DISCUSSION

According to Grgic et. al (2020), caffeine ingestion of doses of 6 mg/kg and 9 mg/kg significantly improved 2000-meter rowing ergometer by approximately 4 seconds (i.e., caffeine ingestions reduced the time needed to complete the distance). According to Del Coso et. al (2012), during this study the caffeine beverage was ingested 60 minutes prior to exercise and resulted in an increased maximal exercise by 4% when 6 mg/kg of caffeine was ingested compared to 1 mg/kg. Also, this study found that 6 mg/kg of caffeine ingestion improved knee extensor muscle strength and cycling power production because of a higher voluntary contraction (central effects). Based off the evidence found in this study is where the ingestion of caffeine an hour prior to the test came from. According to Gutierrez-Hellin et. al (2020), the group that exercised without the caffeine from ingesting the energy drink completed fewer reps compared to those who ingested 3-6 mg/kg of caffeine. Based off the evidence found in this study is where the 2.0 mg/kg of caffeine was determined.

It is hypothesized that the study will reveal that in addition of 2.0 mg/kg of caffeine will increase the distance the individual is able to row in a 5-minute test. Once the pilot study was conducted, we decided to reduce the 5-minute test to a 3-minute test due to how tough the test was to preform. After preforming the pilot study, the addition of a warm-up was added to both the non-caffeine and caffeine test. The warm-up consisted of doing a 2-minute walk on the treadmill at a speed of 3 mph with zero resistance.

REFERENCES

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