

# Caffeine's Effects on Exercise Performance in Adolescents and Young Adults

Angela D'Adamo

## Introduction

- The use of caffeine as an ergogenic aid is becoming increasingly common among young athletes
- Despite its popularity, it is unclear whether caffeine affects exercise performance

## Research Question

- How effective is caffeine in enhancing physical performance in adolescents and young adults who use it as an ergogenic aid?



## Hypothesis

- When taken in low to moderate doses, caffeine will improve physical abilities and performance among adolescents and young adults aged 12-24

## Conceptual Framework

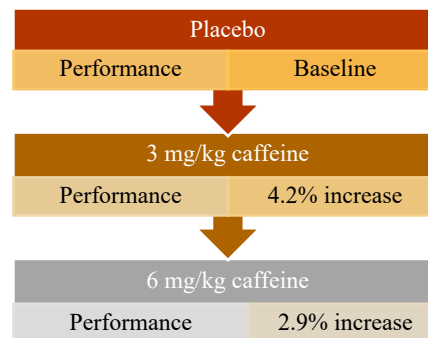
- The Placebo Effect: the analysis of the way a person's complex, psychosocial surroundings affect the brain (Benedetti & Amanzio, 2011)
- Occurs due to the psychobiological phenomena that takes place with the application of a false substance and can be explained by expectation, verbal suggestions, or classical conditioning (Rozenkrantz et al., 2017)

## Main Case Studies/Data

- Beedie et al. (2006) examined a potential dose-dependent placebo effect of caffeine on exercise performance in 4 trials. In 2 trials, participants were informed of receiving caffeine or a placebo before consumption. In the following 2 trials, they were informed of receiving 4.5 mg/kg and 9.0 mg/kg doses, respectively. Results from each trial provide evidence that prior knowledge of dosing may have influenced performance.

	Caffeine	Placebo	Caffeine 4.5 mg/kg	Caffeine 9.0 mg/kg
Increase in power	2.2%	-1.4%	1.3%	3.1%

- Desbrow et al. (2011) tested 2 varying doses of caffeine on endurance while cycling in a double-blinded trial with results from a placebo condition used as baseline levels. Results showed that a caffeine dose of 3 mg/kg of body mass increased endurance by 4.2% but increasing the dose to 6 mg/kg did not provide additional improvements.



## Research Problems Encountered

- Scarcity of research examining caffeine's ergogenic effects among young adults
- Studies often included confounding variables
- There are many aspects of exercise performance to be considered as outcomes
- Potential tolerance and withdrawal to caffeine in research participants made the results of studies questionable

## Main Conclusions

- When taken in doses not exceeding 200 mg, caffeine ingestion improves endurance and cognitive function, thus enhancing exercise performance (Spriet, 2014)
- In line with the theory of the placebo effect, results from studies examining caffeine's effects on exercise performance indicate that participants with prior knowledge of dosing and expectations about caffeine may have greater improvements in performance

## References

- Beedie, C. J., Stuart, E. M., Coleman, D. A., & Foad, A. J. (2006). Placebo effects of caffeine on cycling performance. *Medicine and science in sports and exercise*, 38(12), 2159–2164. doi:10.1249/01.mss.0000233805.56315.a9
- Benedetti, F., & Amanzio, M. (2011). The placebo response: how words and rituals change the patient's brain. *Patient education and counseling*, 84(3), 413–419. doi:10.1016/j.pec.2011.04.034
- Desbrow, B., Biddulph, C., Devlin, B., Grant, G. D., Anoopkumar-Dukie, S., & Leveritt, M. D. (2012). The effects of different doses of caffeine on endurance cycling time trial performance. *Journal of sports sciences*, 30(2), 115–120. https://doi.org/10.1080/02640414.2011.632431
- Rozenkrantz, L., Mayo, A., Ilan, T., Hart, Y., Noy, L., Alon, U., & Manalo, E. (2017). Placebo can enhance creativity. *PLoS ONE*, 12(9), e0182466. doi:10.1371/journal.pone.0182466
- Spriet, L. (2014). Exercise and Sport Performance with Low Doses of Caffeine. *Sports Medicine*, 44(Supplement 2), 175–184. doi:10.1007/s40279-014-0257-8