Support for Faculty Scholars Award (SFSA)

Application Form

Applications must be submitted to the OVPR by 5:00 p.m. on the published application deadline. Refer to the SFSA guidelines, available on the OVPR website, for information regarding eligibility, allowable expenses, and other submission details. Applicants must complete each item on this application form. Completed applications are limited to a maximum of 1500 words on 3 pages or less, including any figures, tables, and the budget information. Applications greater than 3 pages will be returned without review. All applications must be signed by the faculty member and the department chair.

Name __Nicholas Hanson__ Date ___9.30.16___

Department _HPHE_ College _Education & Human Development_

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Faculty rank _Assistant Prof_

Title of proposed work _Effect of caffeine on 10K running performance_

Amount requested $2,000

Date and title of any previous SFSA or FRACAA project _2015-2016__

(Time flies when you are having fun. The effect of exercise on the subjective experience of time)

1. Provide an abstract/succinct summary of the proposal (50 words or less):

   Time flies when you are having fun. The effect of exercise on the subjective experience of time

2. Describe your proposed work (e.g., objectives or goals, activities, timeline, outcomes, products, or other relevant information), including the connection, if one exists, with any previous SFSA or FRACAA project.
Title: Effect of caffeine on 10km running performance in the heat

Summary

Caffeine is one of the most widely used drugs in the world and it is often used by athletes to enhance performance. Many studies have suggested that it does in fact elicit performance benefits. However, its benefit during endurance sports taking place in hot, humid conditions is unclear.

Project Description

This purpose of this study is to examine the effect of a widely used drug (caffeine) on running performance in hot, humid conditions. The study will take place in the Human Performance Laboratory at Western, which is equipped with a state-of-the-art environmental chamber. In this chamber the temperature can be adjusted anywhere from -10°C (14°F) to 50°C (122°F). The relative humidity can be controlled as well, from 25% to 85%. A study such as this will allow continued use of the environmental chamber. Since exercise-related studies in the laboratory are very time intensive, a graduate student to assist with data collection would be very helpful.

Endurance running is a very popular sport, and many events are held year round. A large number of those events take place during the summer months in hot, humid conditions. Thermoregulation for humans is difficult in these conditions, because the working skeletal muscles and the skin are competing for resources. The muscles need adequate blood flow to continue performing and the skin needs blood flow to keep core temperature from getting too high. A recent review on the neurophysiology of human performance in the heat was published (Roelands, De Pauw, & Meeusen, 2015). In this review, it was clearly stated that the effect of caffeine on performance in hot conditions is currently not well understood. Of the studies mentioned in the review that did investigate the effect of caffeine on performance, the results were equivocal. One study showed an increase in core temperature with caffeine administration, but no performance benefit (Cheuvront et al., 2009). Another study showed similar results (Roelands et al., 2011). Two studies did find a significant benefit (Ganio et al., 2011; Pitchford, Fell, Leveritt, Desbrow, & Shing, 2014) but one of these did not use a placebo and the other used a very low dose of caffeine (3 mg/kg body mass).

This study will involve highly trained runners as participants (~12 should be sufficient according to a power analysis). We plan to elicit participation from the student population, as well as from local running clubs and running stores. They will be asked to come to the lab for four total visits, a time commitment of ~4 or 5 hours. The first will be a VO2max test, which will allow us to gain valuable information about their level of cardiorespiratory fitness. The second, third and fourth visits will be self-paced 10 kilometer runs in hot, humid conditions (~82°F and 65% relative humidity). The three conditions, which will be randomized and double-blind, will include 1) a low dosage of caffeine, 2) a moderate dosage of caffeine, and 3) a placebo. Throughout each
trial, the participant will be asked to run as if it were a legitimate race. We will constantly
monitor their core temperature through the use of an ingestible pill that transmits to a wireless
Bluetooth receiver. We will also assess heart rate (HR) and their rating of perceived exertion
(RPE) throughout testing. Repeated-measures ANOVAs will be used to look for an effect of caffeine on the tested variables.

Timeline

November 2016 — Identify graduate student to assist with study

December/January 2017 — Prepare HSIRB proposal and submit for approval. Identify
recruitment strategies and potential participants for the study

February-June 2017 - Data collection

July 2017 — Final analyses, begin to prepare manuscript for submission to journal

August-October 2017 — Complete manuscript and submit. Prepare and submit abstract to
regional and national meetings of the American College of Sports Medicine (ACSM)

Significant/ Original Contribution of this Research

The use of caffeine is highly prevalent in both the general population and in athletes. It is
commonly believed that it can help improve performance by acting on the central nervous
system. It is a drug that is not currently banned by any athletic organization, so it is a highly
studied “performance-enhancing drug” or PED. Although many studies have been performed
with this drug, the methodologies used are widely different and often don’t include a placebo.
Additionally, the effect of caffeine in hot, humid conditions is not as well known.

As previously mentioned, the Human Performance Laboratory is equipped with an
environmental chamber. This is a very expensive piece of equipment that most exercise
science/exercise physiology laboratories do not have. This may be a reason that knowledge
about endurance performance in hot, humid conditions is not as well understood. This allows
us to run a controlled experiment in hot, humid conditions, and add to the body of knowledge
on human performance.

Plans for Dissemination

I plan to submit the results from this study to two conferences: the Midwest ACSM conference,
which is due mid-September, and the national ACSM conference (typically due early
November). I will also prepare a manuscript for submission to a journal; likely high-impact
factor candidates are the International Journal of Sports Physiology & Performance or the
Journal of Strength & Conditioning Research.

Value for faculty Member and WMU
This line of research is not fully related to the FRACAA grant that I was awarded, but both involve the investigation of exercise and human performance. This is an area that needs further research, and it is a way to get a graduate student involved with research. I currently teach the graduate Exercise Physiology II course, and most students are very interested in this area of research (ergogenic aids and performance physiology). If accepted, it will allow for a student to present at a regional conference. It will hopefully lead to a published manuscript as well, which would benefit me, the student involved and the university. I want to continue to present on behalf of WMU at national conferences, and publish in respected journals to show the world what we are doing at this university.

Budget

(Note: a minimum of 36 ingestible core temperature pills will be needed. There are some available for use in the lab, but not enough to fully complete this study. Subject payment allows us to obtain volunteers and retain them throughout the study period. It is very time-intensive and they should be compensated accordingly)

Core temp pills ($42 each x 12; plus $15 shipping cost) $519
Caffeine pills ($40) $40
Subject payment ($50 each x 12 subjects) $600
Graduate student ($14/hr x ~60 hours; fringe of 7.65% included) $841
Total $2,000

References


3. Describe how the proposed work will make (a) a significant and (b) original contribution to the discipline.

4. Describe the mechanism for dissemination.

5. Describe how the proposed work will enhance your reputation and that of WMU.

6. Provide an itemized budget and budget justification. A proposed budget greater than the allowed maximum amount of $2,000 will disqualify the proposal. Such a proposal will not be reviewed. Fully justify why the budgeted expense is necessary for the project.

Faculty member signature: ____________________________

Acknowledgement of Department Chair:
☑ The department chair acknowledges submission of the SFSA application.
☑ The department chair acknowledges the proposed expenses are reasonable and necessary.

Chair's signature: ____________________________ Date: 9/30/16

For OVPR use only:
Faculty member completed previous reporting requirements: Yes______ No______
Funding decision: Funded ______ Not funded: ______

Date received: SEP 30 2016
Research and Sponsored Programs

Application for Support for Faculty Scholars Award

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