

Caffeine is a Stressor

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Abstract

The purpose of this study is to examine whether caffeine causes stress. The participant's heart rate will be recorded before and after drinking a shot of espresso to measure the difference in heart rate. The participant will also use a scale to assess their stress level before and after espresso intake. The heart rates and stress levels of the participant before and after consuming the espresso will be compared. If the heart rate post-espresso is higher by 25% and if the participant rates their stress as higher, this will show caffeine causes stress. This is important because if we know what causes stress, we can avoid it.

Caffeine is a Stressor

I believe consuming caffeine causes stress. We need to know if caffeine stresses people so it can be avoided. Stress is hard to measure because it is a psychological state rather than a physiological one. Blood pressure and heart rate can be used as a construct for stress. When we drink caffeine, we tend to feel jittery, anxious, and maybe even light-headed. According to Jack E. James (1997), caffeine is consumed on a day-to-day basis by 80% of the planet's population. That is why it is imperative to examine caffeine's effect on people.

Caffeine's effect on stress can be measured on its effect on blood pressure. James and Greg (2004) found that the ingestion of dietary caffeine modestly but steadily increases blood pressure. This relates to my belief that caffeine causes stress, through the construct of stress causing a rise in blood pressure. Along the same line, Bennett, Rodrigues and Klein (2013) found participant systolic blood pressure elevated from the baseline after caffeine administration, then the blood pressure stayed raised throughout the recovery period, after stress. Furthermore, a study done by Lane and Williams (1987) shows that a rise in blood pressure happens after caffeine consumption in participants who consume caffeine daily. Lastly, during mental stress, caffeine adds to the escalation in blood pressure (Lane & Williams 1985). Their findings support what I believe will happen to a person's blood pressure after ingestion caffeine during mental stress.

When a person is stressed, their fight-flight response may be heightened, and the presence of caffeine boosts that response (Frag, et al. 2006). We know that the sympathetic nervous system is engaged during times of distress, and is associated with elevated blood pressure. We also know that the body wants to maintain homeostasis, vasodilation aided by

stress may occur to counteract the rise in blood pressure caused by caffeine (Lane & Williams, 1985).

Mental stress can be exhibited through anxiety and depression, and weekly caffeine consumption has been positively correlated with these manifestations of stress (Richards & Smith, 2015). In addition to the psychological side, caffeine, specifically in coffee, has compound physiological effects on the human body, and stronger doses of caffeine and heightened consequent stress levels increase these physiological effects (Sawyer, Julia & Turin, 1982; Shapiro, Lane, & Henry 1986). Both of the psychological and physiological effects that caffeine has on people support my belief that caffeine is, in fact, a stressor. Pincomb, Lovallo, Passey, Brackett, & Wilson (1987) performed a study showing that caffeine adds to the risk of stress-related health concerns. This is concerning for the world's population, and further demonstrates my belief of caffeine causing stress. It is therefore my belief that consuming 80 mg of caffeine, approximately the amount in a 2 oz shot of espresso, will increase stress by 25%.

Method

Participant

The participant of this experiment will be a student of the SUNY Broome Community College general psychology class, PSY 110-15 course in the spring of 2017. The volunteer may be male or female, and between the ages of 18 and 60. The participant must not be overly sensitive to caffeine, and also should not consume caffeine of any kind in the morning prior to the experiment.

Materials and Apparatus

For this study, I will need the Biopac MP40 to measure the participant's heart rate. I will need a chair for the participant to sit in, the stress assessment scale (see appendix A), and a 2 oz shot of espresso.

Procedure

Before the experiment is conducted, I must have informed consent from the participant. The steps of the experiment will be explained fully and then consent will be given before any other steps are completed. After consent is granted, I will have the participant sit down in the chair. The participant will be hooked up, his/her resting heart rate will be measured using the Biopac MP40, he/she will assess their stress using the scale, and their heart rate will be recorded for 5 minutes. The participant will then consume the espresso shot. The participant will then sit in the chair for 30 minutes, and heart rate will be recorded throughout this process. After the next 30 minutes, the participant will again fill out the scale and the Biopac MP40 will be unhooked from the participant. The participant will be debriefed so I can be sure he/she is okay. Once determined to be alright, the participant may leave the experiment.

Method of Analysis

When the experiment is finished, the participant's resting heart rate and his/her heart rate after consuming the espresso shot will be compared. The difference between the heart rates will be analyzed to determine if caffeine raised the amount of stress. Heart rate will be used as a construct for measuring stress. The results from the self-assessment scale will also be analyzed to determine if the participant's stress level increased. If the participant's heart rate increased by 25% after consuming the espresso and if their stress level rose, this will show that caffeine causes stress which will support my hypothesis.

Appendix A

Please answer the following assessment, with 1 meaning you strongly disagree and 7 meaning you strongly agree.

1. I am stressed.

1 2 3 4 5 6 7

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