

Good research paper on effectiveness of energy or caffeinated drinks

[Food & Diet](#), [Coffee](#)



Caffeinated Beverages and their Effects on Attention Performance Tasks

Methodology

As per the requirements of the study, we will try to understand how the consumptions of energy caffeinated drinks affect the Attention Task performance for participants. We will conduct this test on 20 participants (10 male and 10 female) selected randomly from a major college campus in the area. Since the participants in the experiment will be college students, we expect them to be within the age range of 20-25 years. From the initial group, participants will be screened to meet the requirements of the test. The selected 20 participants will be asked to take the Conner's Continuous Performance Task (Conners, 2004). The Continuous performance test is considered one of the best ways to measure attention and vigilance behaviour of participants. This test is also used to identify patients with Attention Deficit and Hyperactivity Disorders. The Continuous Performance Task measures the attention and impulsivity level of the participants. In this particular experiment we will use the computerized version of the Conner's Continuous Performance Test III. We will use 20 computers and run this test twice to ensure all participants undergo the process. In this version of the test letters of the alphabet are presented in front of the participants for 250ms, the respondent will be instructed to press the keyboard every time they see the letter ' X'. There will be six blocks for this test, each of these blocks will contain three sub blocks with 20 letters in them. Therefore there will be eighteen sub blocks and the inter stimulus intervals for each sub block will vary from 1-4 seconds, so that the participants will not get

used to the pattern of the test. The order of the inter stimulus intervals (ISI) will be mixed and participants will have no inkling about the order in which the letters will appear. The letters presented to the participants will be large and approximately 1 inch in size. The instructor will ask all participants to read through the test procedure on the computer screen. A small trial of 20 letters will run twice to help participants get used to the procedure. The test will take approximately 14 minutes per participant, therefore we will collect the baseline data for 60 participants in one hour.

In the next phase of the experiment, the participants will be asked to consume 300ml of a caffeinated energy drink that will be given in an unmarked opaque plastic cup. Participants will be given the drinks separately, so that they do not discuss or try to guess the contents of the drink. 30 minutes after consumption of the caffeinated drinks the participants will be again asked to take the Conner's Continuous Performance test.

All subjects will be paid for participating in the experiment. The data collected from the 60 participants will be on two aspects, the test performance score on Inattentiveness and omission, and reaction times. The data collected will be the dependent variable, while the presence or absence of caffeine in the system will be the independent variable or the repeated measures for the related groups.

Analysis

We will first run normality tests on the data obtained from the study using IBM SPSS v 22 software. Since the sample size is above 50, we will use the

Shapiro Wilk test to understand the distribution of the data since we have sample size of less than 50 individuals. If the data has a single peak, we will use parametric tests like paired sample T-test or repeated measures ANOVA to see how the test scores differ between the two conditions. On the other hand, if the data is not normally distributed, we will use Wilcoxon Signed Rank test to see if there is a difference between the attention performances scores before and after caffeine consumption from the baseline.

Participant screening

The participants will be asked to fill up an information questionnaire, they will be selected based on the results of the questionnaire. Participants who have a history of psychological disorders will be excluded. The participants who are presently or have in the last few months consumed psychotropic medication or medication that affects CNS will be excluded. Participants, who have a familial history of violence, domestic abuse, divorce or mental disorders will be excluded. Participants will be asked if they are presently feeling depressed or stressed due to any circumstances, those who respond in the affirmative will be removed from the experiment. The remaining participants will be asked to stay away from alcohol or caffeine (tea, coffee, chocolates, ice cream etc.) for 48 hours and the experiment will be performed on the second day of screening. This will be done because serum caffeine has a half-life of 5-6 hours (Statland & Demas, 1980). All participants will be asked to consume the same recipe of salad and water before appearing for the experiment. On the day of the experiment participants will

be allowed to ease into the experiment setup for 5 minutes and after a brief instruction video the study will commence.

Data Collection

The responses of the participants will be measured in terms of accuracy and response times. Accuracy will be measured in the percentage of ' X' detected vs. presented, so the participants will be exposed to different number of ' X's at each computer in both trials. The reaction time will be automatically measured by the computer in milliseconds. Data will be generated for each of the 20 participants, which will be presented in the form shown in figure 1 and figure 2. The numerical scores as shown in figure 1 will be copied into SPSS software and exploratory and frequentist statistical analyses will be run.

Hypothesis

For this experiment, we hypothesize that the caffeine trials will improve the test performance of the participants (n= 20). The null Hypothesis for this study (Ho) is that there will be no significant difference in test performance between the two trials.

Predictions

Over the course of years, a number of studies have tried to ascertain the effects on caffeine on bodily functions. Studies show that in subjects exposed to small amounts of caffeine , the level of alertness increased(Zwyghuizen-Doorenbos, Roehrs, Lipschutz, Timms, & Roth, 1990). Various other studies also looked at the effects of caffeine on the driving alertness of the

subjects (Brice & Smith, 2001). There is a significant corpus of literature that exists on the effects of caffeine on the alertness level of human subjects, however we plan to conduct the tests in a more controlled environment. Based on the existing literature review we can predict that the test group will show significant improvement in attention task performance compared to the control group.

References

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- Conners, B. C. K. (2014). *Conners' Continuous Performance Test III (CPT III V. 5)*.
- Michael, N., Johns, M., Owen, C., & Patterson, J. (2008). Effects of caffeine on alertness as measured by infrared reflectance oculography. *Psychopharmacology*, 200(2), 255-260.
- Statland, B. E., & Demas, T. J. (1980). Serum caffeine half-lives. Healthy subjects vs. patients having alcoholic hepatic disease. *American Journal of Clinical Pathology*, 73(3), 390-393.
- Zwyghuizen-Doorenbos, A., Roehrs, T. A., Lipschutz, L., Timms, V., & Roth, T. (1990). Effects of caffeine on alertness. *Psychopharmacology*, 100(1), 36-39.

Supporting Information

In the below figure we see that in a study by Michael, Johns, Owen, & Patterson, (2008) it was found that the reaction time of participants treated

with caffeine dropped within 30 minutes of consumption and stayed lower than the control group even 4 hours after the treatment. Therefore we can see that the caffeine increases alertness and reduces latency in behaviour response times in subjects.

Budget

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