The Effects of Caffeine on Neurocognitive Function

Erin Heine1, Katie J. Lyman1, Tracey Covassin2, Sherri Stastny1, Thomas Hanson3

1North Dakota State University, Department of Health, Nutrition and Exercise Sciences, Fargo ND, USA
2Michigan State University, Department of Kinesiology, East Lansing, MI, USA
3Minnesota State University Moorhead, Department of Finance, Moorhead, MN, USA

Abstract
Objective: The purpose of this study was to determine the effect of caffeine, as introduced by a popular energy drink, on neurocognitive function in collegiate males. Methods: 24 male participants, 18-28 yrs old, completed two days of testing which included baseline and post-caffeine testing. 48-hours separated the two sessions. During the second day of testing, participants consumed an energy drink or a control and waited 90 minutes prior to performing the ImPACT for post-consumption data. Results: VM: (F(1, 22)=1.31, \( p = .264 \), \( \text{eta}^2 = .06 \)) RT: (F(1, 22)=.05, \( p = .819 \), \( \text{eta}^2 = .003 \)) Conclusions: Researchers determined caffeine from an energy drink, consumed 90 minutes prior to ImPACT testing, has no statistically significant effect on neurocognitive function in collegiate males.

Methods
Day 1
Participants filled out informed consent and Health History Questionnaire
All participants completed baseline ImPACT
Day 2 (48 hrs post baseline)
Participants consumed energy drink (n=12) or placebo (n=12). Participants blinded to the randomized grouping
Refrained from outside caffeine intake until the next testing day (48 hrs)
Refused from outside caffeine intake until the next testing day (48 hrs)
Waiting 90 minutes before testing
Participants randomized and blinded into 2 groups, energy drink or placebo
Participants in ImPACT testing, with second testing

Results

Table 1: Subject Demographics

<table>
<thead>
<tr>
<th>Subjects</th>
<th>N</th>
<th>Age (Years)</th>
<th>Height (in)</th>
<th>Weight (lbs)</th>
<th>Yrs of Completed Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>24</td>
<td>22.375</td>
<td>70.34</td>
<td>185.60</td>
<td>15</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>2.533</td>
<td>2.91</td>
<td>27.59</td>
<td>1.50</td>
</tr>
</tbody>
</table>

Table 1: Subject Demographics

Conclusions and Clinical Significance
+ No statistical significance found on reaction time, memory, or attention aspects of neurocognitive function.
+ Caffeine does not effect ImPACT composite scores after 90 minutes.
+ Important for clinicians because caffeine should not cause error on ImPACT scores.
+ More research is needed on this topic.

Future Research
+ Future research should be conducted to examine the effects of caffeine on males and females.
+ Explore the effects of caffeine on neurocognitive function with multiple times between consumption of caffeine and testing (i.e. 30, 60, 90, 120 minutes).
+ Future research may also wish to study the effect of caffeine on adolescent population.
+ Utilizing caffeine in different forms, such as, supplements, coffee, soda, and others.

References