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Introduction

- Emotion regulation has important implications for social and emotional well-being (Gross and Oliver, 2003).
- While ego depletion literature provides a framework for studying the effects of mental fatigue (Muraven & Baumeister, 2000), little is known about the effects of mental fatigue on cognitive reappraisal, a regulation strategy in which the meaning of an emotional stimulus is cognitively reframed.
- Previous studies have shown that the late positive potential (LPP) component of the event-related potential is sensitive to emotion regulation in response to emotional images (Moser et al., 2009).
- We hypothesized that fatigued participants would have more difficulty regulating their emotions and, as a result, would show no difference in the magnitude of the LPP on trials when they were down-regulating vs. viewing a negative image while non-fatigued participants would show a smaller LPP when down-regulating their emotions than when not regulating.

Data Analysis

- EEG data was recorded continuously at 32 sites
- Data was re-referenced offline to average mastoid
- Artifact correction based on Principal Component Analysis was used to remove eye blinks and horizontal eye movements
- Data was baseline corrected to the 200 ms prior to image onset
- Trials containing artifacts were rejected
- The 2 seconds following picture onset were averaged for each condition to allow for visual inspection and determination of time windows
- Mean amplitude for each condition was extracted for three time windows for statistical analysis

Methods

Participants

- University of Wisconsin-Milwaukee students
- Age 18-57 average: 24.5
- 26 Female, 5 male

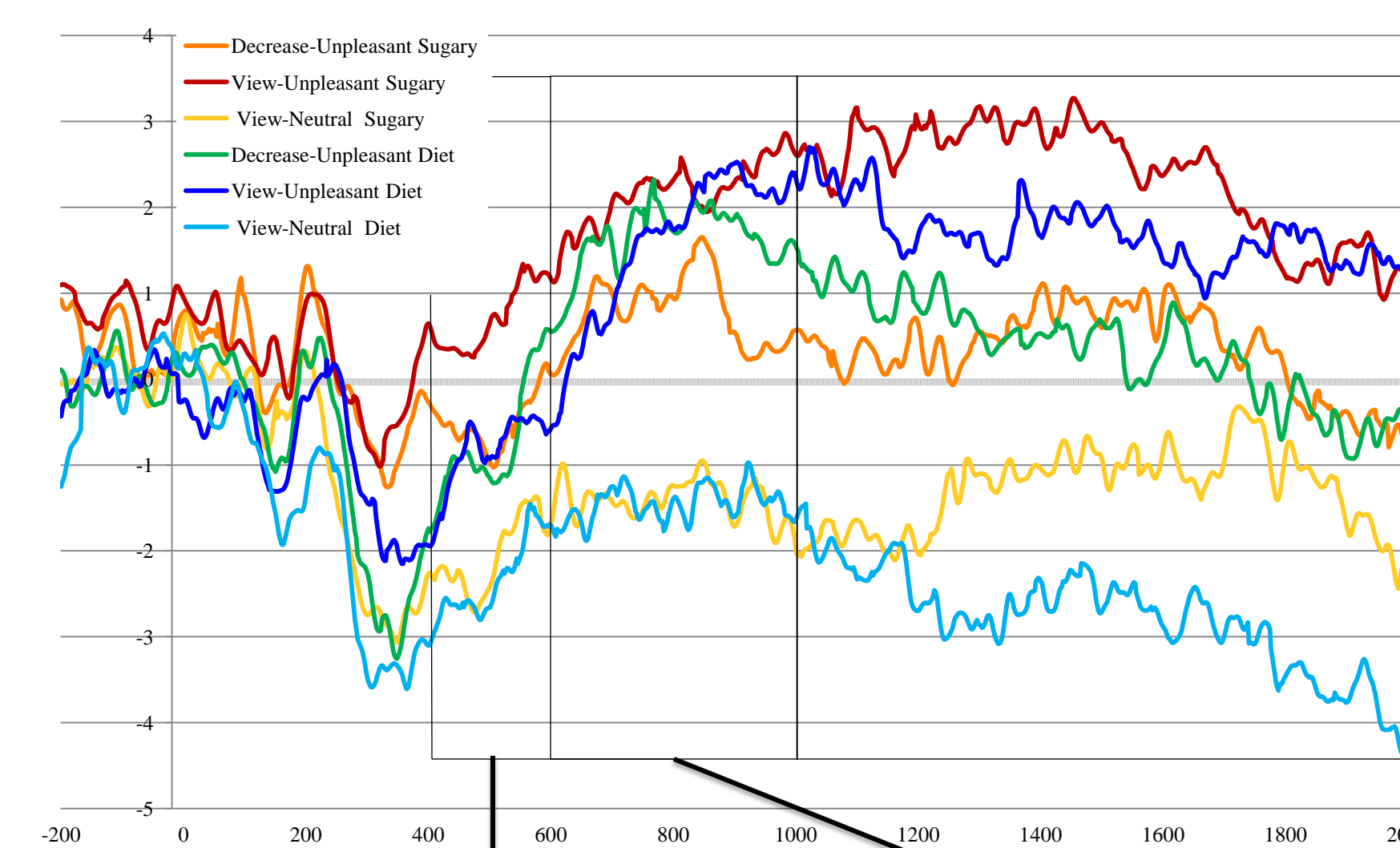
Procedure

- Participants performed two letter crossing tasks consecutively. The first instructed them to cross out every instance of the letter "e" on a sheet of dense text. The other instructed them to cross out every instance of the letter "e" except those that have a vowel right before, after, or one letter away from them in the same word. These tasks are designed to induce mental fatigue.
- Next participants drank a can of either zero calorie or sugary soda, depending on experimental condition. This has been shown to reduce mental fatigue (Hagger, Wood, Stiff & Chatzisarantis, 2010).
- Finally participants viewed a series of unpleasant and neutral images. Before each, they were cued to either to Increase or Decrease their emotional response to the image, or to simply view the image.

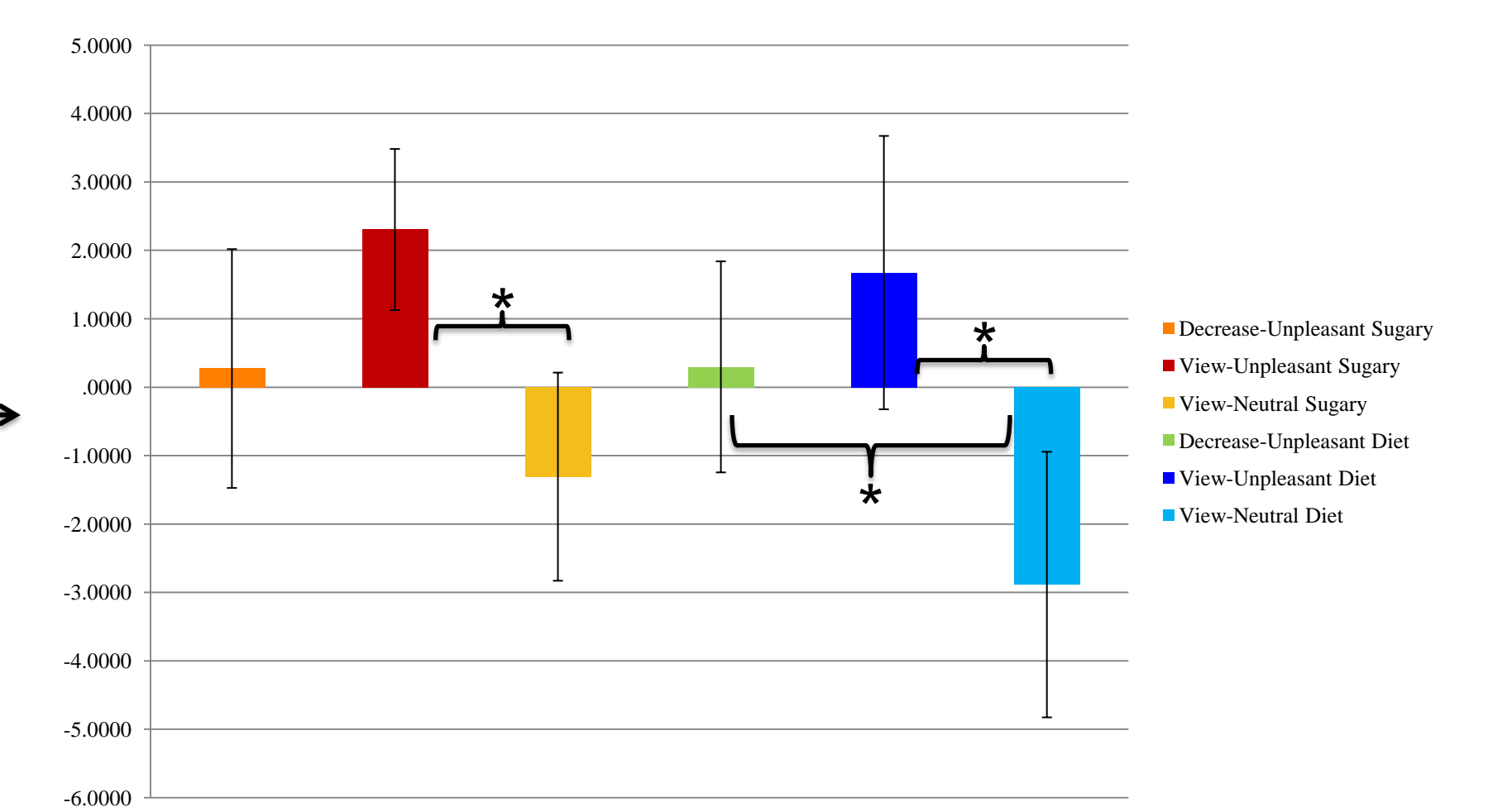
Results

- No mean LPP amplitude difference between decrease and view-unpleasant trials for either the sugary drink or diet drink group for any time window examined.
- The sugary drink group showed no mean LPP amplitude difference between decrease and view-neutral trials for any time window examined. However, for the diet drink group decrease trials were significantly higher than view-neutral trials for the 600-1000 ms and 1000-2000 ms time windows, as well as marginally significant for the 400-600 ms time window.
- For both sugary and diet drinks there was a significant difference on mean LPP amplitude between view-unpleasant and view-neutral trials for all time windows except the 400-600 ms time window, in which the diet drink group showed no significant difference.
- For increase trials there was no mean LPP amplitude difference between increase and view-unpleasant in any time window for either the sugary drink group or the diet group.

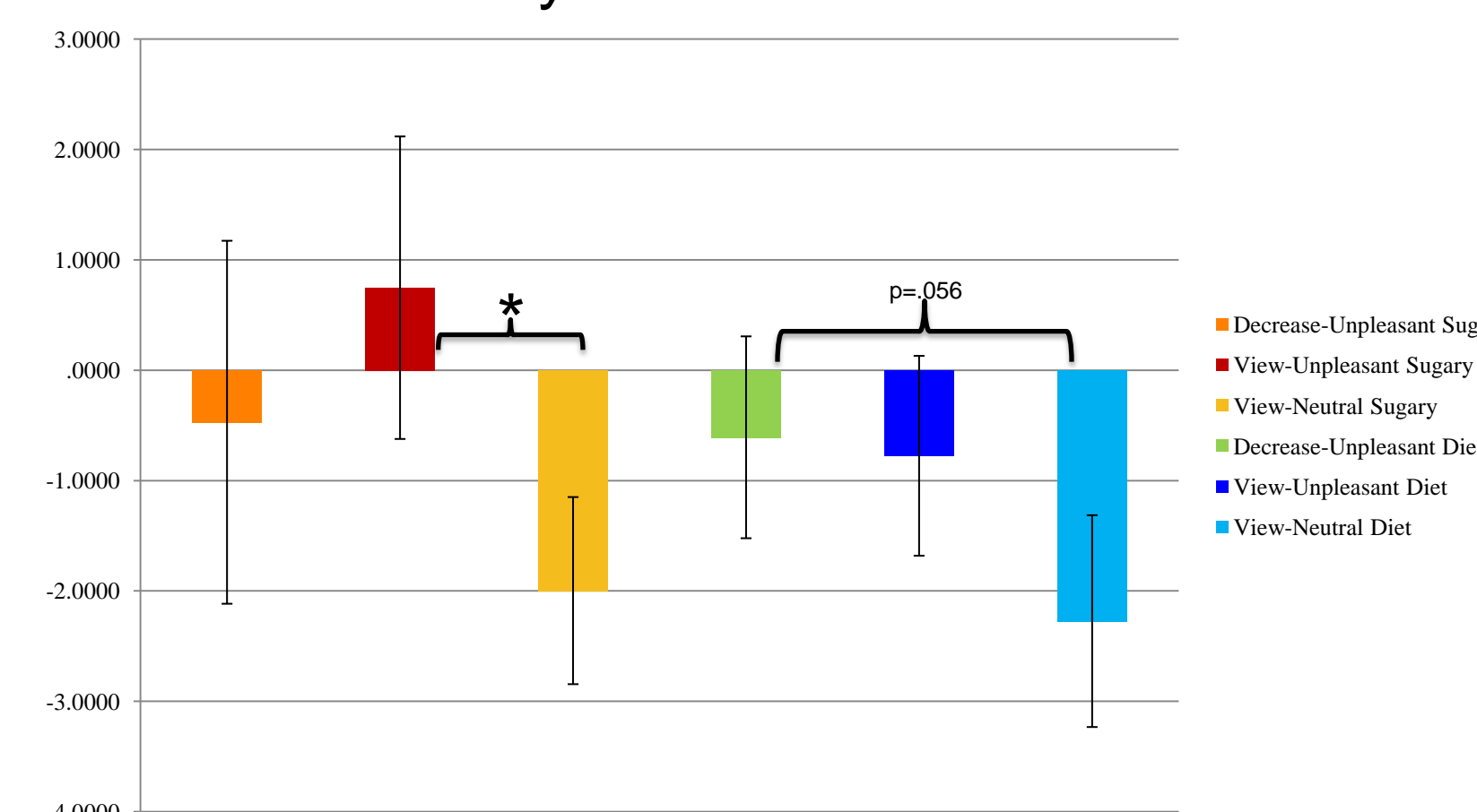
Group Mean Waveforms for First 2 s After Picture onset at Electrode Cz by Condition



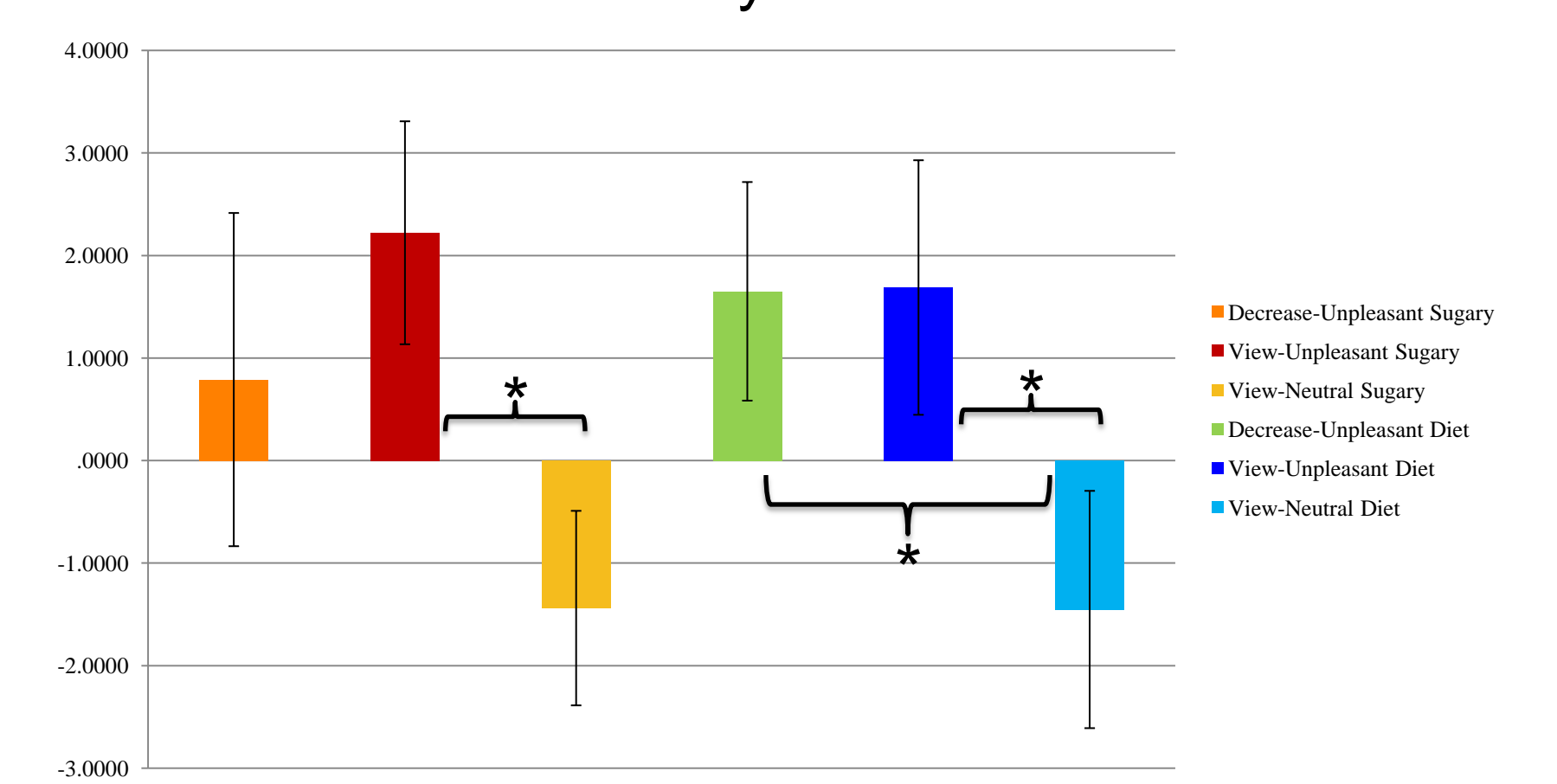
Mean Amplitude 1000-2000 ms After Picture Onset by Condition



Mean Amplitude 400-600 ms After Picture Onset by Condition



Mean Amplitude for 600-1000 ms After Picture Onset by Condition

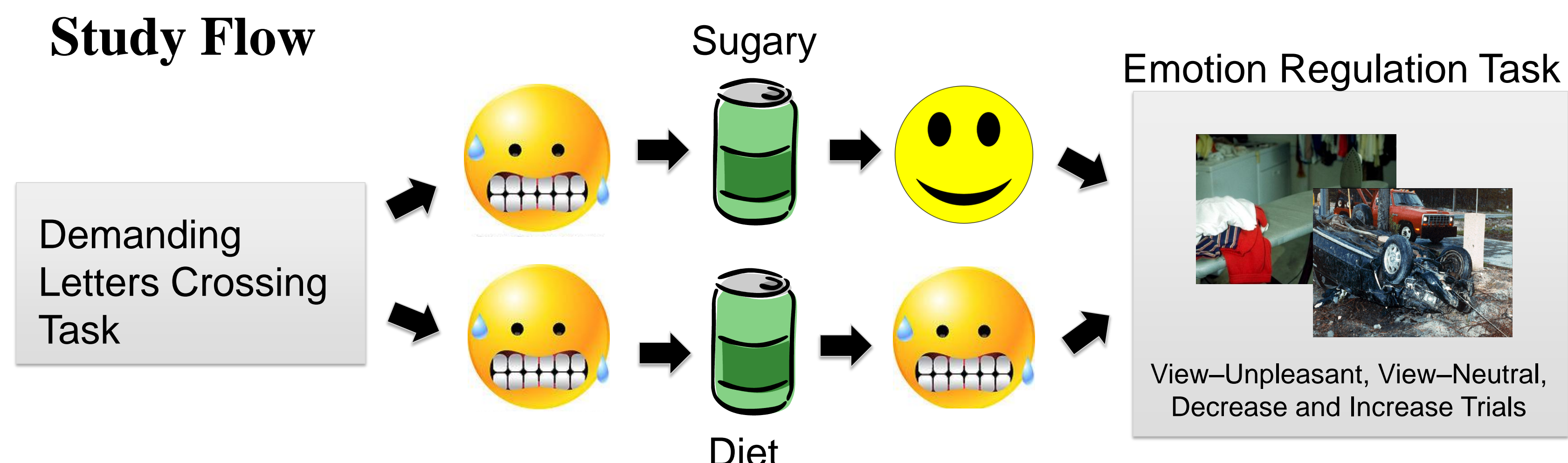


Note. * indicates difference at $p < .05$ level.

Conclusions

- The hypothesis that the sugary drink group would have a higher mean amplitude LPP for view-unpleasant trials, than for decrease trials, while the diet drink group would show no difference between view-unpleasant and decrease trials was not supported. Neither the sugary drink group or the diet group showed a statistically significant difference between decrease and view-unpleasant trials on mean LPP amplitude at any time window examined.
- While this may imply that neither group exhibited successful emotion regulation as measured by mean LPP amplitude, this may, in part, be due to lack of power due to an insufficient sample size.
- Although the hypothesis was not supported, there was a bigger difference between decrease and view neutral trials for the diet group than the sugary group. This may imply that the sugary group was more successful at regulating emotions, but more research is needed to determine if this is a robust effect.

Study Flow



Literature Cited

- Muraven, M. & Baumeister, R. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin*, 120 (2), 247-259.
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