Diet-induced Impulsivity: An Investigation of Bias and Sensitivity to Delay

Catherine C. Steele*, Jesseca R. A. Pirkle, Ian R. Davis, & Kimberly Kirkpatrick
Department of Psychological Sciences, Kansas State University

Introduction
- Impulsive choice is related to many maladaptive behaviors such as gambling, substance abuse, and obesity.
- People who consume diets high in fat and sugar make more impulsive choices.
- The effects of diet on impulsive choice can be studied in rodents by measuring a preference for a smaller-sooner (SS) reward over a larger-later (LL) reward.
- Time discrimination deficits have been implicated as a mechanism leading to impulsive behavior.
- Primary goals: Investigate how high-fat (HF) and high-sugar (HS) diets affect impulsive choice.

Methods
Subjects: Male Sprague Dawley rats
8 Week Diet Manipulation
- HF: 60% rat chow and 40% fat
- HS: 60% rat chow and 40% sugar
- C: 100% rat chow
All groups had access to the same number of calories per day

Experiment 1
- Impulsive choice: On Diet
- SS Delay (s)
- Proportion of LL Choices

Experiment 2
- Impulsive choice: Off Diet
- SS Delay (s)
- Proportion of LL Choices

Rats fed a HF or HS diet had a larger bias for the immediate reward and showed greater sensitivity to the changing delays.

Discussion
- HF and HS diets induced a bias for the immediate reward.
- HF and HS diets resulted in greater sensitivity to delay that continued once removed from the unhealthy diet.
- The increased sensitivity to delay displayed by the high-fat group may result from deficits in timing discrimination.
- Behavioral interventions could be used to treat obesity by addressing the timing deficits that contribute to impulsive choice.

References

Acknowledgements
Thank you to the members of the Kirkpatrick RTD lab, especially Amanda Crawford, Christian Davis, and Jeremy Lott for your help with this project.

*Email: cchill1@ksu.edu