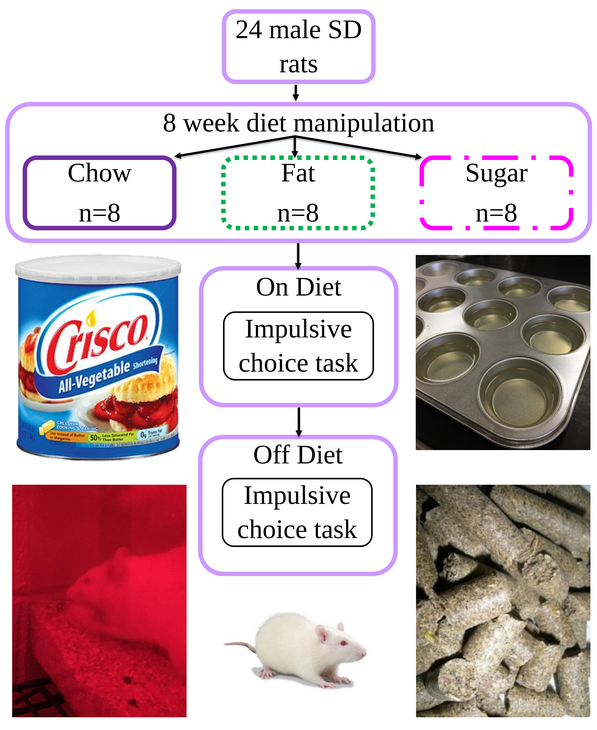
The Effect of Diet on Individual Differences in Impulsive Choice

Catherine C. Hill* , Jesseca R. A. Pirkle, & Kimberly Kirkpatrick
Kansas State University

Introduction

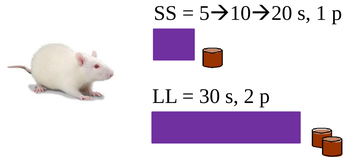
- Impulsive choice underlies maladaptive behaviors such as gambling, substance abuse, and obesity
- People with higher percent body fat make more impulsive decisions[1]
- The correlation between obesity and impulsive choice could be due to: (1) trait impulsivity as the cause of obesity; (2) obesity as the cause of trait impulsivity; (3) another related factor, such as diet, causing both
- People who eat diets high in fat and sugar are more impulsive[2]
- Rat models can help determine the direction of this relationship
- A previous study showed that rats on a high-fat diet were *less* impulsive than rats on a normal chow diet, contrary to what would be expected[3]
- Current study: determine the effect of high-fat and high-sugar diets on impulsive choice and how individual differences in impulsive choice were influenced by diet

Methods



Choice

Impulsive Choice Task

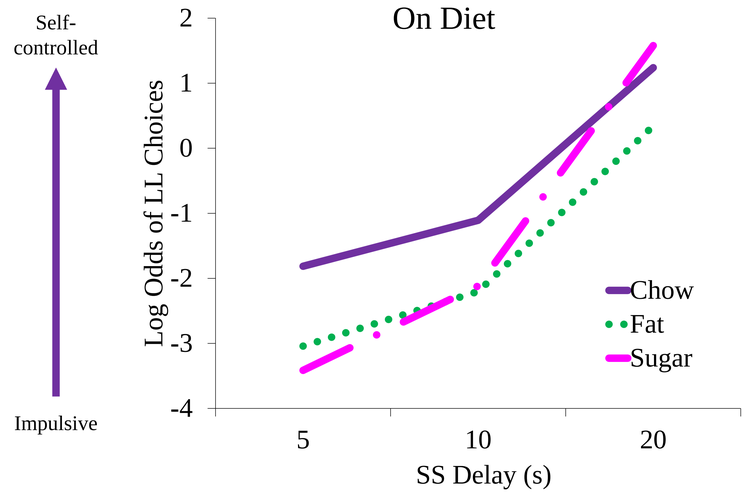


Data analysis

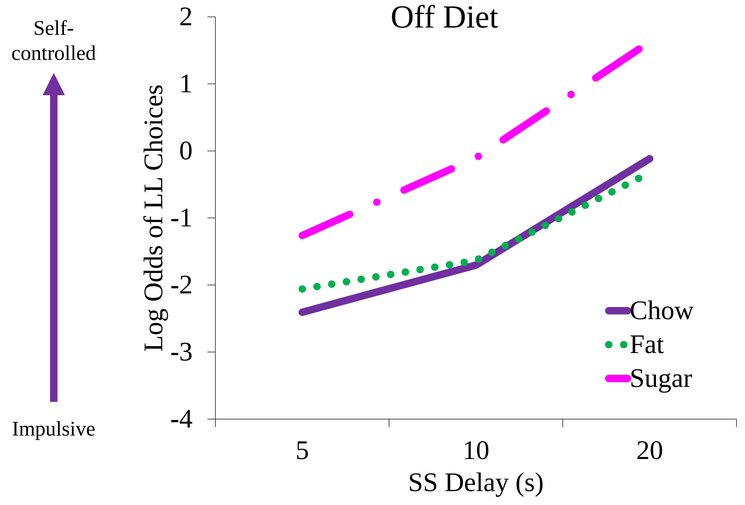
Log Odds of LL choices
- LL=number of larger-later choices
- SS=number of smaller-sooner choices

$$log\frac{LL+.5}{SS+.5}$$

>0: Self-controlled
<0: Impulsive

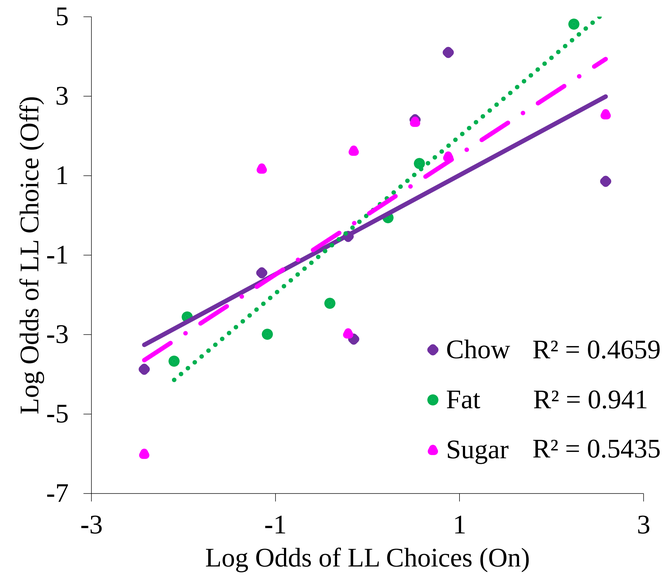


As SS delay increased, all groups made fewer impulsive choices. High-fat and high-sugar diets led to more impulsive choices when the SS delay was 5 and 10 s.



As SS delay increased, rats in all groups made fewer impulsive choices. High-sugar diet led to more self-controlled choices for all delays.

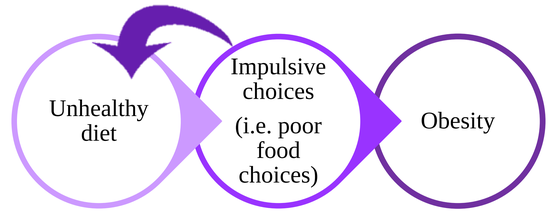
Correlation



Individual differences in impulsive choice on and off the diet were highly correlated for all groups.

Discussion

- High-fat and high-sugar diets led to more impulsive choices
- Diet affected the overall level of impulsive choice, but not the individual differences in impulsive choice
- Diet influenced impulsive choice and could play a key role in the relationship between impulsive choice and obesity, suggesting a strong need for early behavioral interventions to promote healthy eating



References

1. Rasmussen, E. B., Lawyer, S. R., & Reilly, W. (2010). Percent body fat is related to delay and probability discounting for food in humans. *Behavioural Processes*, *83*, 23-30.
2. Lumley, J., Stevenson, R. J., Oaten, M. J., Mahmut, M., & Yeomans, M. R. (2016). Individual differences in impulsivity and their relationship to a Western-style diet. *Personality and Individual Differences*, *97*, 178–185.
3. Narayanaswami, V., Thompson, A. C., Cassis, L. A., Bardo, M. T., & Dwoskin, L. P. (2013). Diet-induced obesity: dopamine transporter function, impulsivity and motivation. *International Journal of Obesity (London)*, *37*, 1095-1103.

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*Email: cchill1@ksu.edu