Short- and long-term effects of dietary manipulations on impulsive choice behavior and motivation in rats

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**Introduction**
- Impulsive choice underlies maladaptive behaviors such as gambling, substance abuse, and obesity
- People with higher percent body fat make more impulsive decisions
- 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; or (3) another related factor, such as diet, causing both
- A previous study showed that rats on a high-fat diet were less impulsive than rats on a normal chow diet
- Energy budget was not controlled
- Used an adjusting procedure, which can result in random behavior
- Impulsive choice task occurred while the rats were off their diet
- Current study: determine the effects of a high-fat and high-sugar diet on impulsive choice and motivation while on and off high-fat and high-sugar diets

**Methods**
- 24 male SD rats
- 8 week diet manipulation
  - Chow
  - Fat
  - Sugar
  - On Diet
    - Impulsive choice task
    - Progressive ratio task
  - Off Diet
    - Impulsive choice task
    - Progressive ratio task

**Impulsive Choice Task**
- SS = 5→10→20 s, 1 p
- LL = 30 s, 2 p

**Data analysis**
- Log Odds of LL choices
- LL = number of larger-later choices
- SS = number of smaller-sooner choices
- \( \log \frac{SS}{LL + 0.5} > 0: \) Self-controlled
- \( \log \frac{SS}{LL + 0.5} < 0: \) Impulsive

**Discussion**
- High-fat and high-sugar diets lead to more impulsive choices while on the unhealthy diet
- Behavioral patterns change when taken off the unhealthy diet, such that the high-sugar diet resulted in more self-controlled choices
- Diet may be the root cause of the relationship between impulsivity and obesity, suggesting a strong need for early behavioral interventions to promote healthy eating

**Motivation**
- All groups were more motivated to work for food when off the diet. Rats on the high-sugar diet were more motivated to work for food overall.

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**References**