**Introduction**

- Impulsive choice is implicated as a possible factor leading to the obesity epidemic
- People who are obese make more impulsive decisions.
- People who eat diets high in fat and sugar are more impulsive.
- Rodent models have shown that diets high in fat or sugar induce impulsive behavior, as indicated by a preference for the smaller-sooner (SS) reward over the larger-later (LL) reward and increased sensitivity to delay.
- This may explain the relationship between obesity and impulsive choice.
- Current study aims:
  - Replicate the effects of long-term exposure to high-fat and high-sugar diets on impulsive choice.
  - Determine the relationship between body fat percentage and impulsive choice.

**Diet and Body Fat**

- Subjects: 36 male Sprague Dawley rats
- 8 week diet manipulation
- Time restricted with a 4 hr eating window
- Groups (isocaloric diets):
  - Chow (C): 100% rat chow
  - Fat (HF): 60% rat chow and 40% Crisco
  - Sugar (HS): 60% rat chow and 40% powdered sugar
- Body fat percentage
- DEXA scan of abdomen
- Measured after 6 weeks and 9 months on the diet
- Data analysis: repeated measures linear regression
- Fixed effects: diet*time, all lower effects
- Random effects: intercept

**Body Fat in Abdomen**

The HF group (b = 21.59%) and HS group (b = 15.89%) had a significantly higher body fat percentage than the C group (b = 12.15%).

**Discussion**

- Despite similarities in food intake (not shown), the high-fat and high-sugar diets resulted in greater body fat percentage in the abdomen.
- Diets high in fat and sugar induced impulsive behavior, replicating previous research.
  - The high-sugar diet induced a bias for the immediate reward.
  - The high-fat diet failed to induce a significantly greater bias for the immediate reward, as has been found previously.
  - Both the high-fat and high-sugar diet resulted in greater sensitivity to delay, as previously reported.
- While diet increased impulsive behavior, body fat percentage did not correlate with impulsive choice.
- The results suggest that the correlation between obesity and impulsive choice in humans may be driven by diet.
- Future research should investigate the mechanism by which diet induces impulsive choice behavior (e.g., D2 receptors, DAT, insulin, and leptin).

**Correlations**

<table>
<thead>
<tr>
<th>Data analysis</th>
<th>Impulsive Choice</th>
<th>DEXA Scan</th>
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<tbody>
<tr>
<td>Correlation between body fat percentage and mean LL choices (as a measure of bias, left) and the standard deviation of choice across phases (as a measure of sensitivity to delay, right).</td>
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<tr>
<td>Bias: Mean impulsive choice and body fat were not significantly correlated, r = .11</td>
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<td>Sensitivity: Standard deviation of impulsive choice was not correlated with body fat percentage, r = .27</td>
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</table>

**References**


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