



The Relationship Between Percent Body Fat and Liking and Wanting



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Introduction

- People who consume foods high in fat and sugar have an increased percent body fat¹
- Individuals with a higher percent body fat show an increased liking, or enjoyment, for foods high in fat^{2,3}
- Obese individuals also show a higher wanting of, or willingness to work for, fatty and sugary foods^{2,3}
- However, it is unclear whether this increased liking is a product of increased percent body fat or dietary consumption
- This experiment sought to determine how:
 1. Diet affects percent body fat, wanting, and liking
 2. Percent body fat correlates with liking and wanting in rats

Methods

Subjects: 36 Male Sprague-Dawley rats

All groups had access to the same number of calories per day:

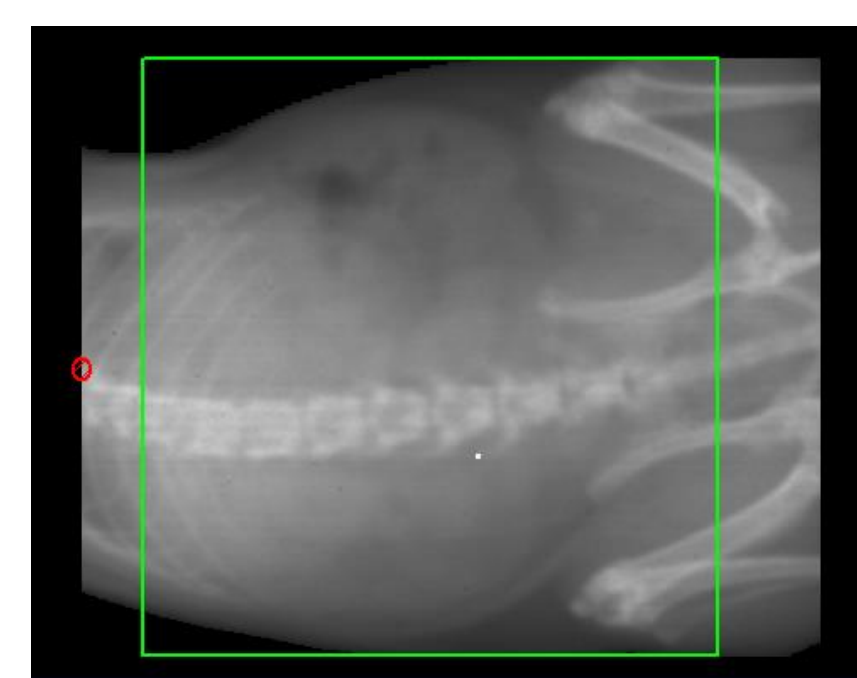
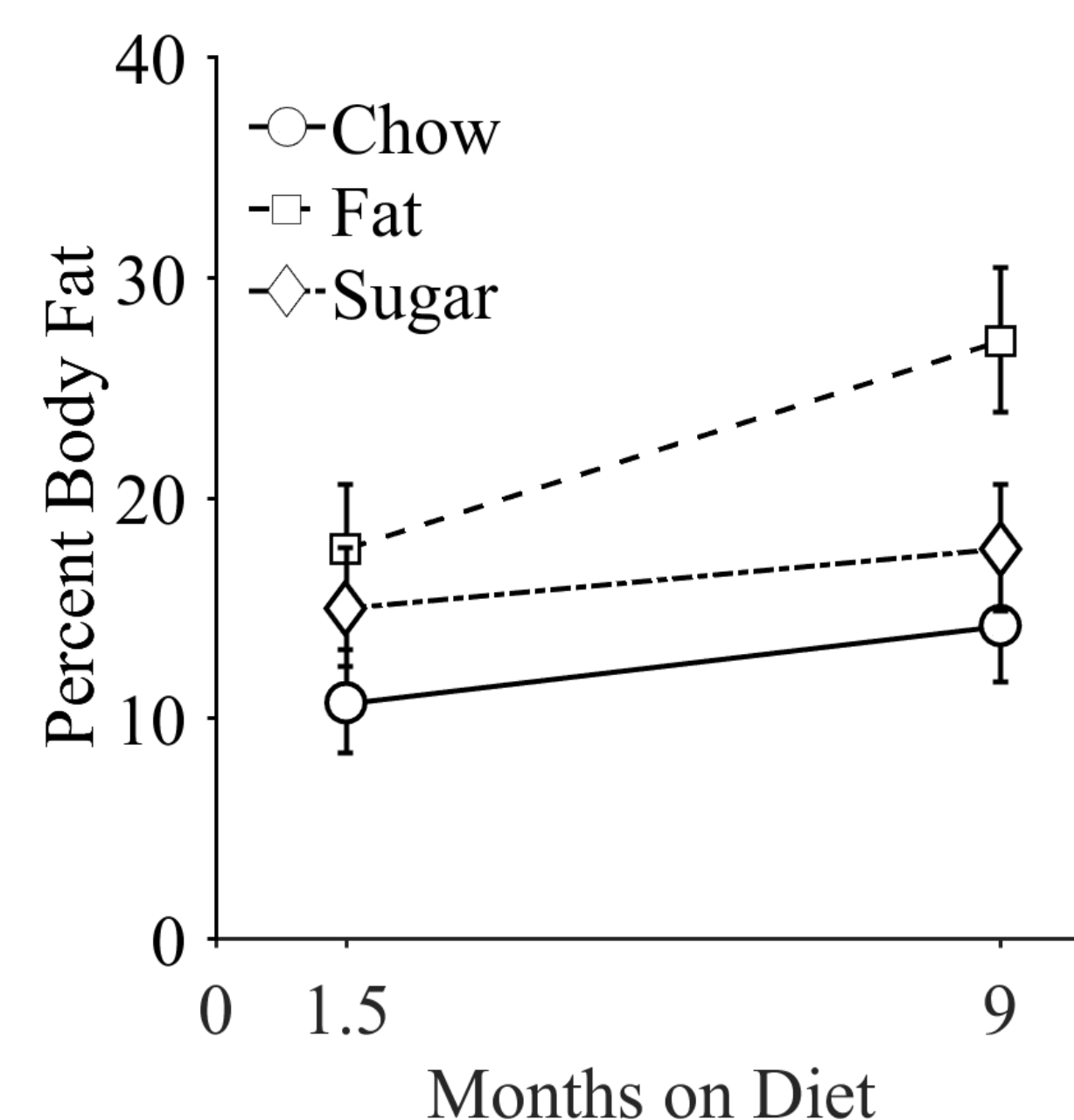
- Chow: 100% rat chow
- Fat: 60% rat chow and 40% Crisco
- Sugar: 60% rat chow and 40% powdered sugar icing

Percent Body Fat (PBF): Rat's abdominal body fat was measured at 6 weeks and 9 months post-dietary exposure

Incentive Motivation Task (wanting): The number of reinforcers earned during training was used to measure wanting

Taste Reactivity Task (liking): The proportion of time the rats spent performing hedonic (liking) responses in 60 s was measured while 1 mL of sucrose (.01, .1, 1 M) and corn oil (.06, 1, 32%) solutions was infused into the mouth of the rodent through an intraoral fistula

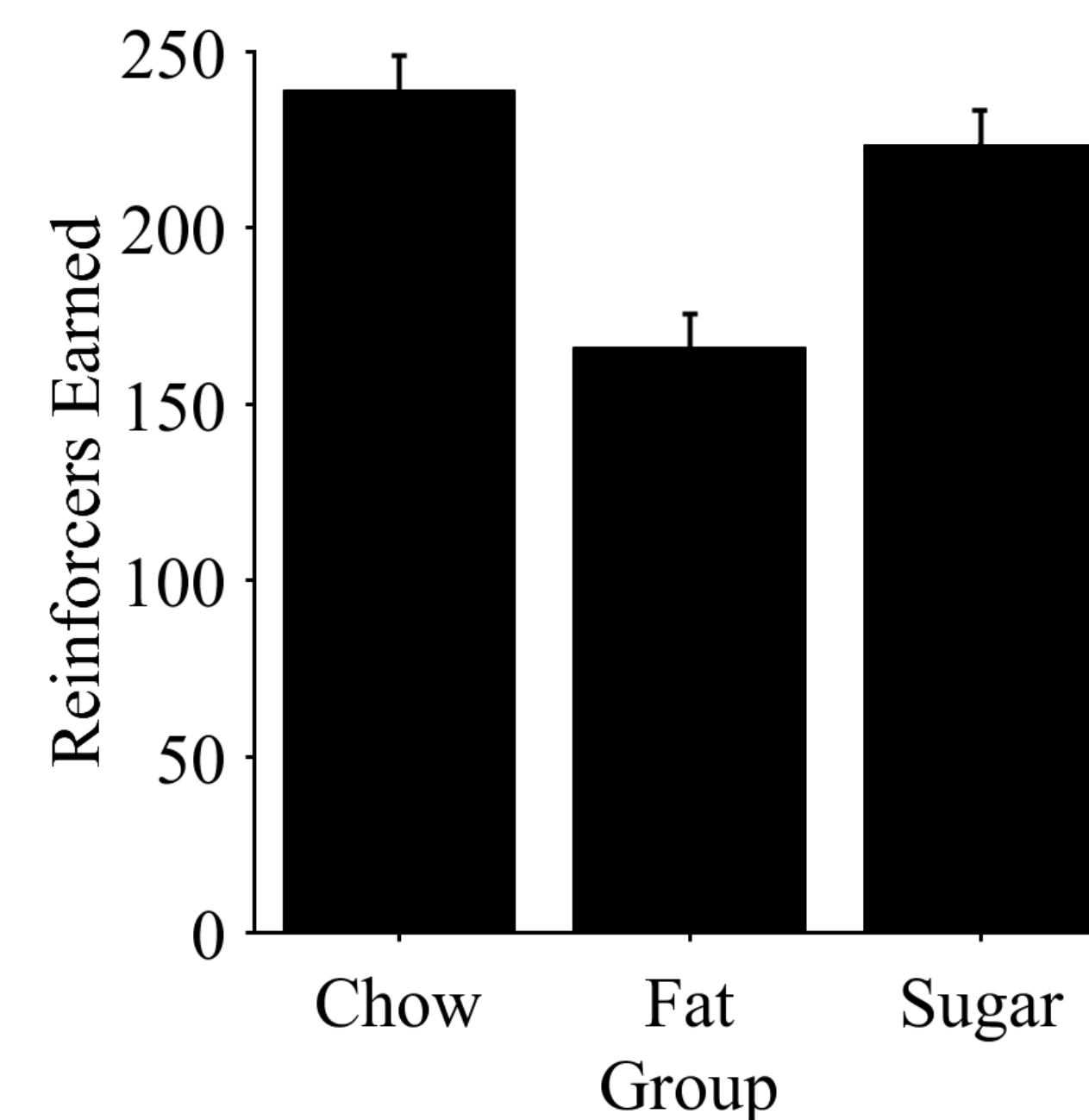
Percent Body Fat



The mean percent body fat measurements after approximately 5 months on the diet show that the fat and sugar group had a significantly higher percent body fat when compared to the control

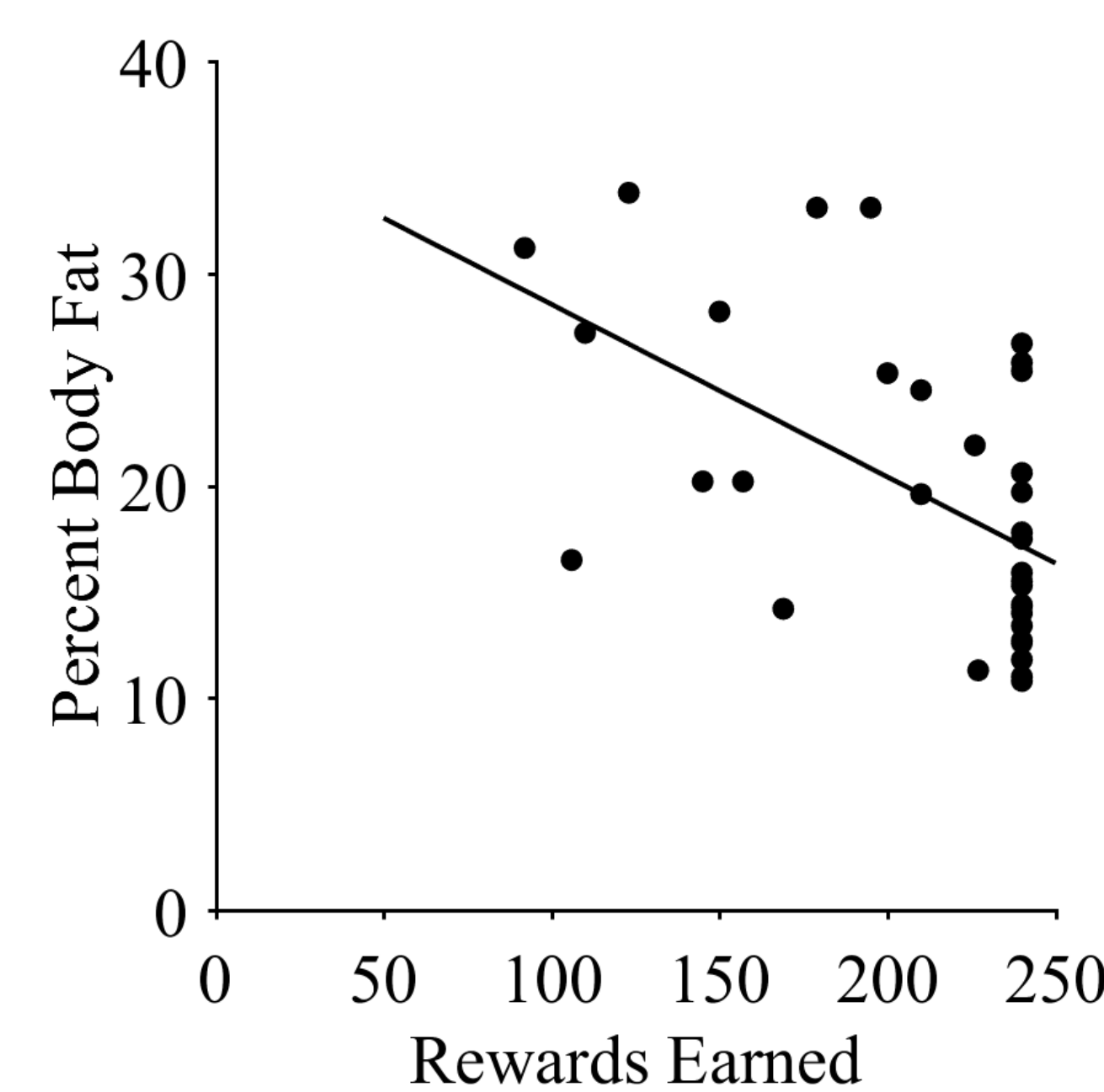
Wanting

Dietary Effects on Incentive Motivation



Rats fed a high fat diet earned significantly fewer reinforcers than the chow control group, suggesting a decreased incentive motivation (or wanting)

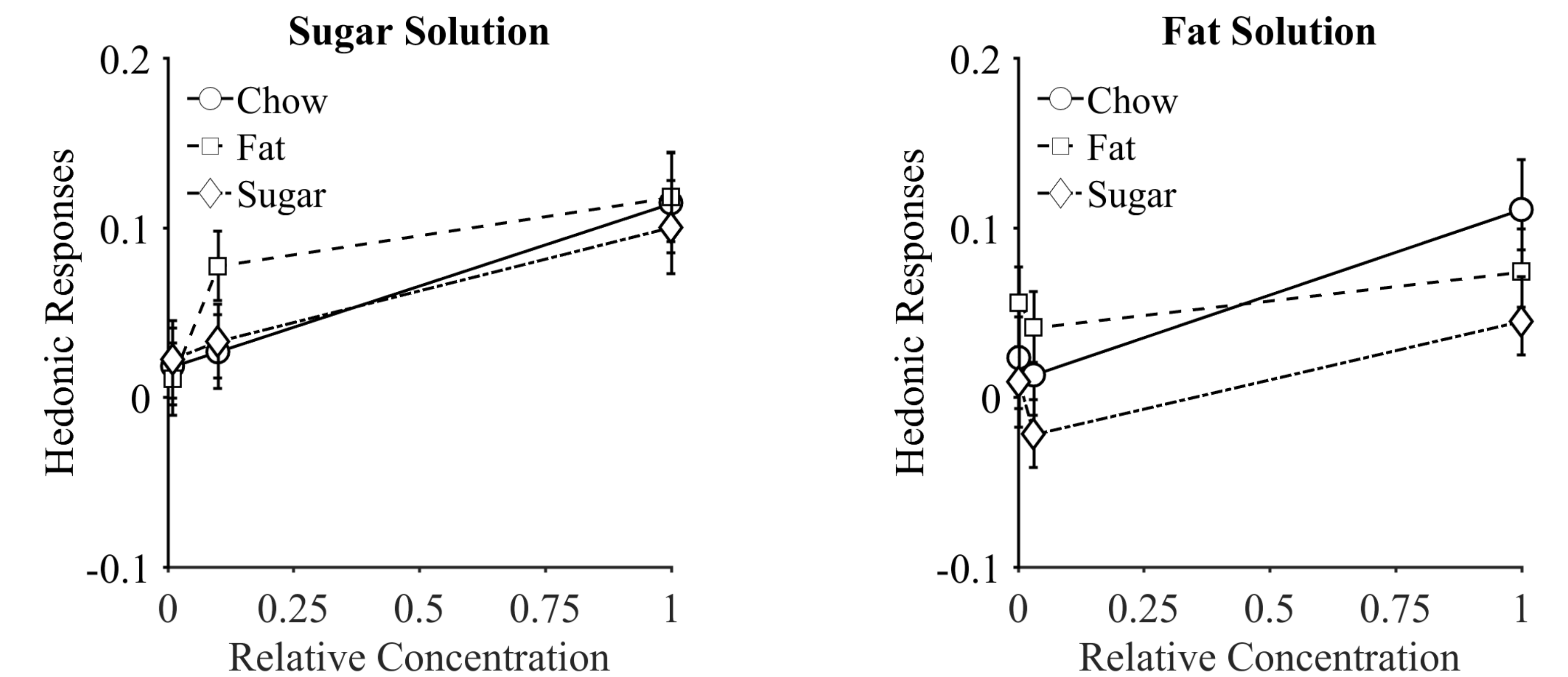
Incentive Motivation Correlations



The mean reinforcers earned during the last initial training session was significantly correlated with percent body fat ($r = -.729$)

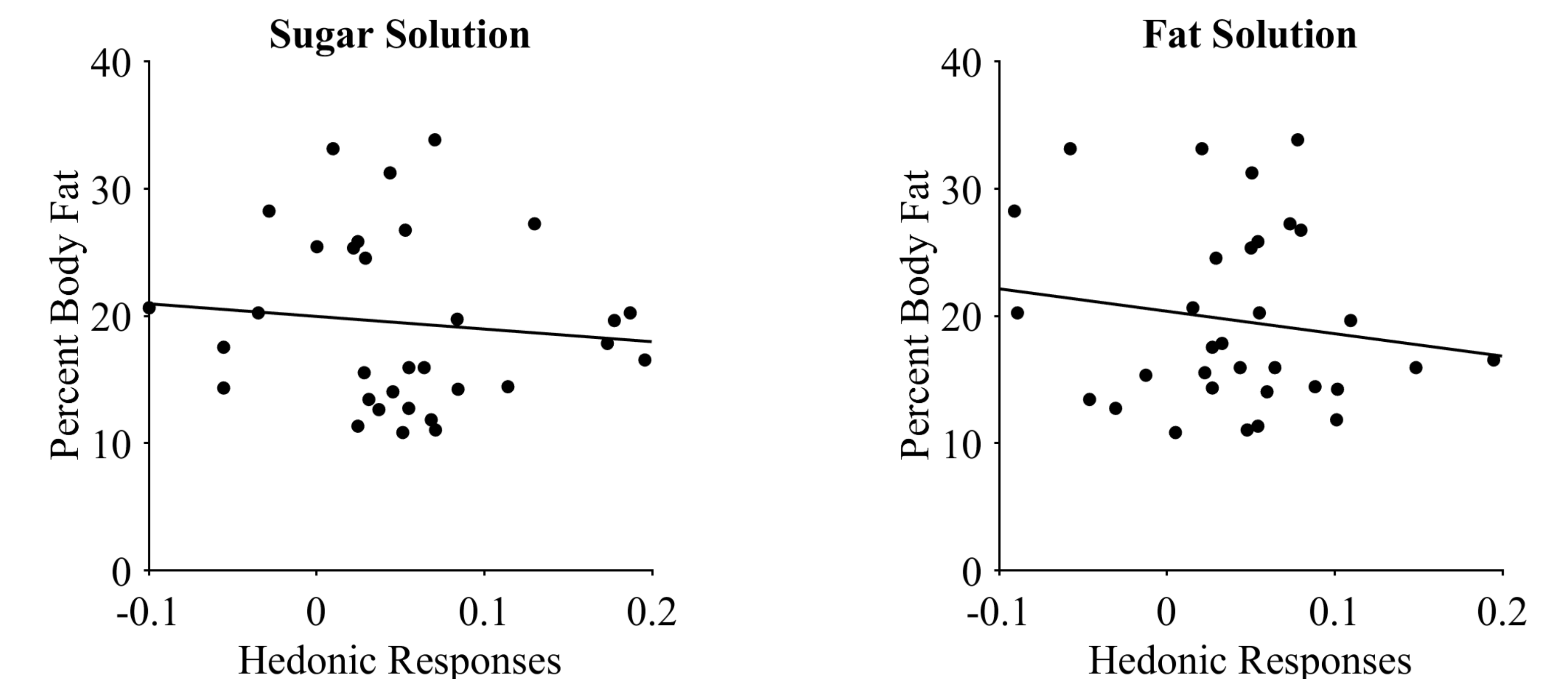
Liking

Dietary Effects on Taste Reactivity



The groups did not significantly differ in the proportion of time rats spent performing hedonic responses in 60 s to varying oil and sucrose concentrations indicating that the groups did not differ in their liking of the fat and sucrose solutions

Taste Reactivity Correlations



The proportion of time rats spent performing hedonic responses in 60 s to varying oil and sucrose concentrations was not correlated with percent body fat for the sucrose ($r = -.379$) or fat ($r = -.339$) substance

Discussion

- Rats fed diets high in fat and sugar had increased percent body fat percentages
- Rats fed a high-fat diet showed a decreased wanting for food rewards.
- Wanting was negatively correlated with percent body fat, consistent with previous literature²
- Impaired incentive motivation could cause a potential challenge for behavioral interventions needed to treat obesity
- Diet did not alter liking nor was percent body fat correlated with liking
- Overall, wanting may play a bigger role in long-term overconsumption of unhealthy foods, as a result of motivational changes associated with dietary exposure

References and Acknowledgements

1. Miller, W. C. (1990). Diet composition, energy intake, and exercise in relation to body fat in men and women. *The American Journal of Clinical Nutrition*, 52(3), 426-430.
2. Rodin, J. (1973). Effects of obesity and set point on taste responsiveness and ingestion in humans. *Journal of Comparative and Physiological Psychology*, 89(9), 1003-1009.
3. Lampure, A. et al. (2016). Associations between liking for fat, sweet or salt and obesity risk in French adults: A prospective cohort study. *The International Journal of Behavioral Nutrition and Physical Activity*, 74(13).

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