

What do you want to eat?

Regulatory strategy effects on choice and neural activation

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// BACKGROUND

- Billions of **diet decisions** are made every day. With more than 2/3 of the US population estimated to be overweight or obese¹, many of these decisions are leading to poor health outcomes.
- People do want to improve, with Americans spending over \$70 billion/year in the weight loss market².



• Can regulatory strategies such as reappraisal/up-regulation and suppression/down-regulation be used as effective tools for improving food choice?

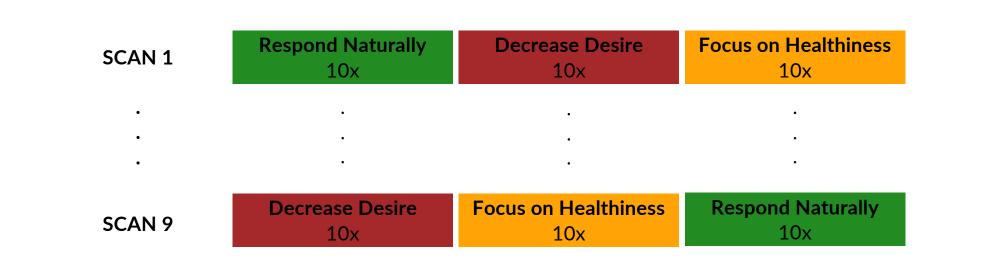
// GOALS

- 1. Investigate both behavioral and neural outcomes of two regulatory strategies--reappraisal and suppression--on choice within subject.
- 2. Model outcomes using DDM to get at underlying processes.
- 3. Look for brain regions that map onto model parameters.
- 4. Synthesize neural and computational results to gain insight into how these strategies may preferentially rely on value modulation vs. behavioral control.

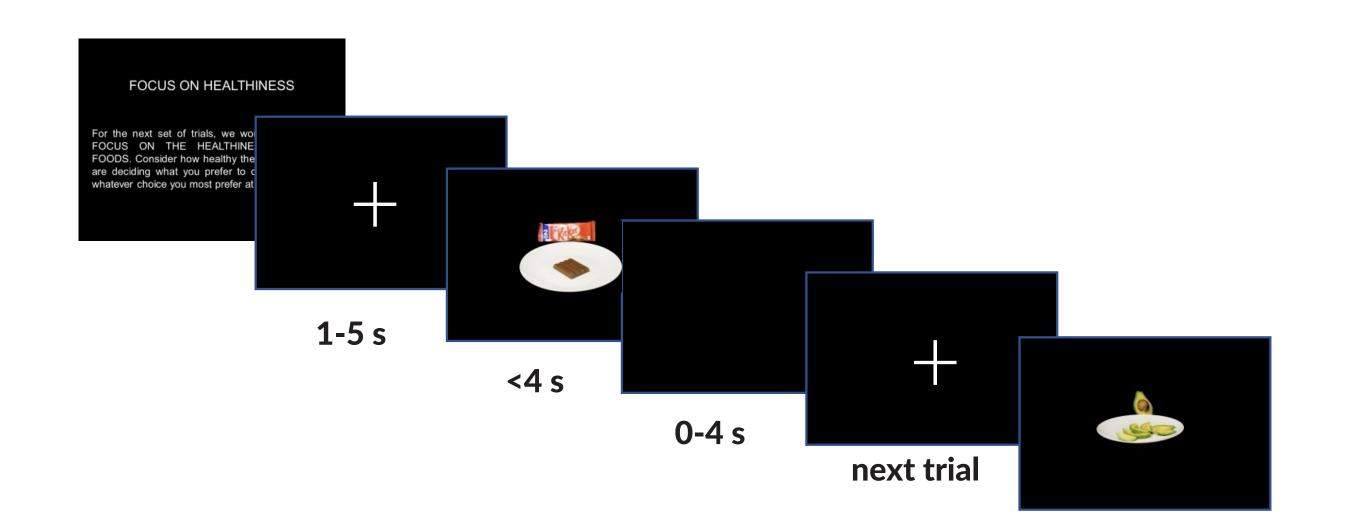
// METHODS

- 1. Fasted subjects (n = 50, F = 34, mean age = 23.1; range = 18–38) rated a wide range of foods for Liking pre-scan, and then for Liking, Taste and Health post-scan.
- 2. In scanner, subjects made choices about these foods under two regulatory conditions (Focus on Health and Decrease Desire) and one control condition (Respond Naturally).

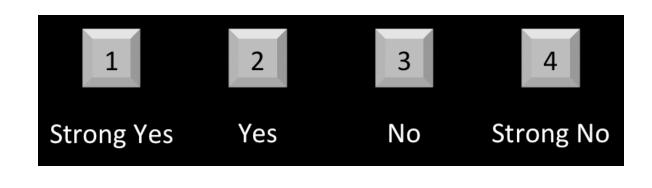
Run Structure



Trial Format

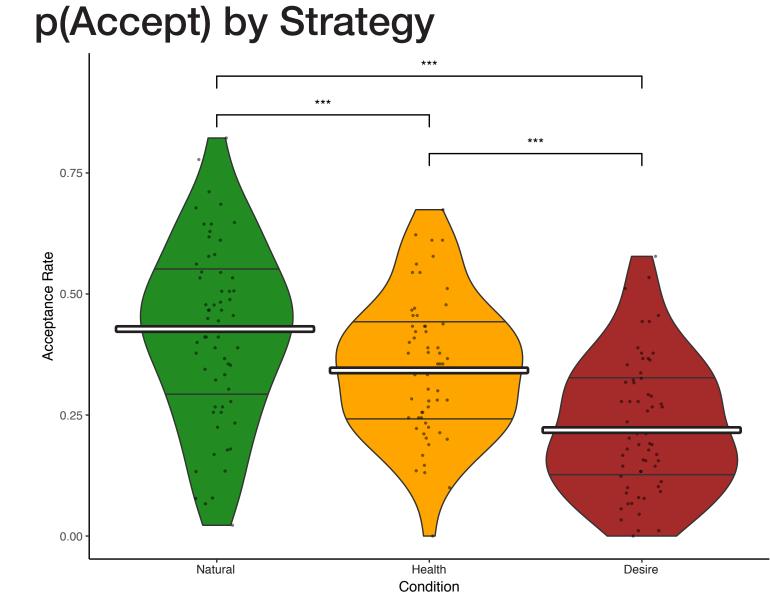


Response

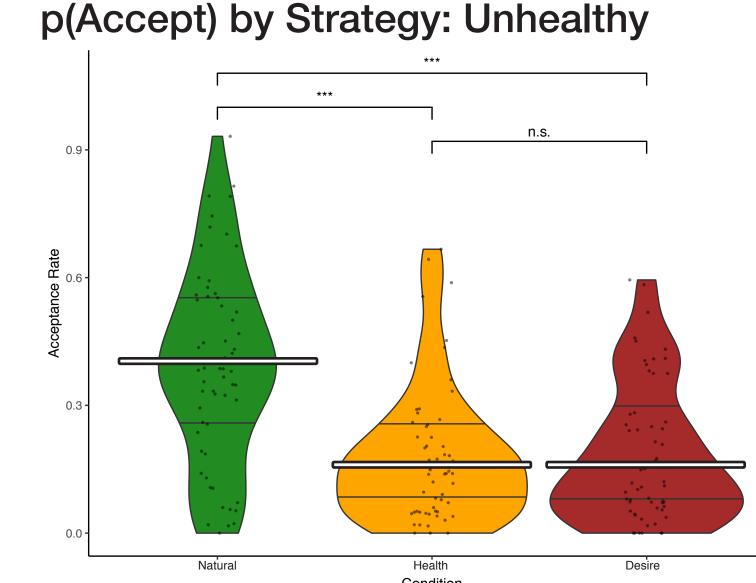


// RESULTS

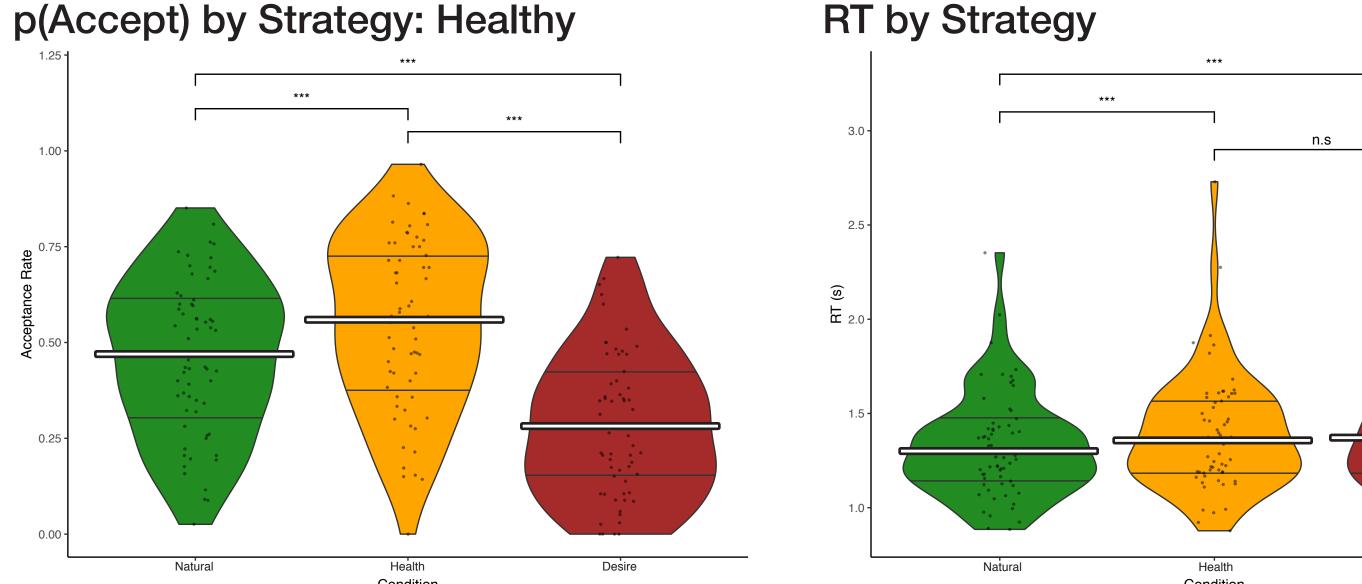
// Behavioral







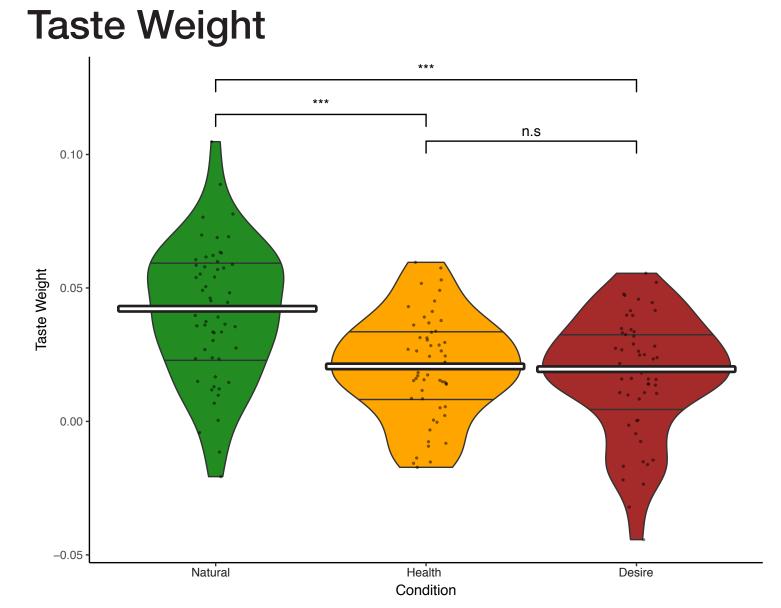
•The health condition can be seen as a more "intelligent" mode of regulation, as it increases participants' acceptance rates of healthy foods.

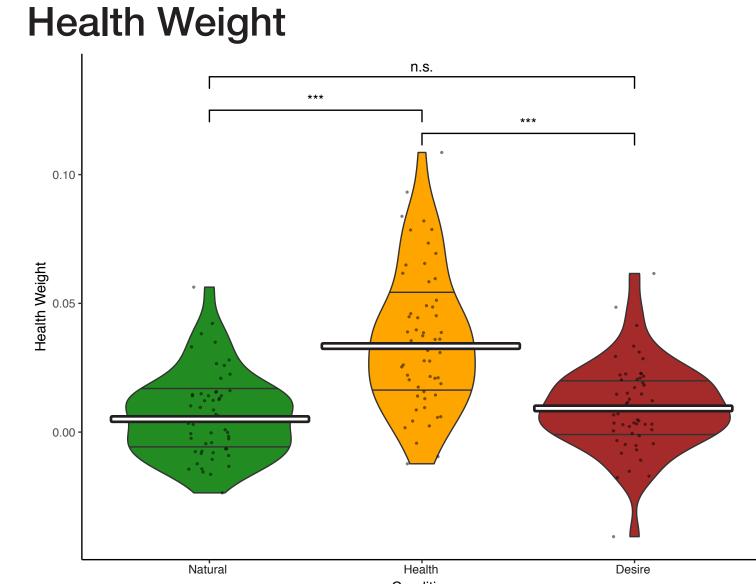


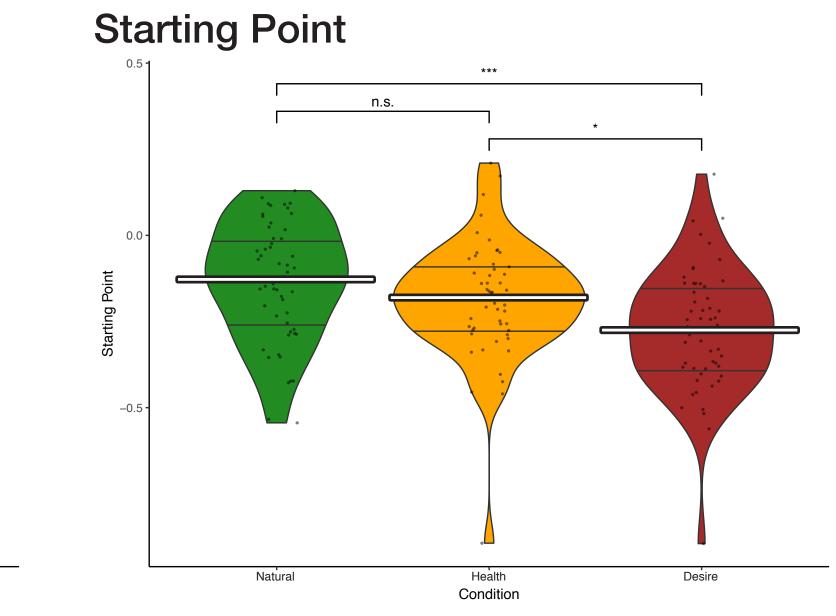
// Drift Diffusion Model

5 Parameter DDM

- threshold
- non-decision time
- starting point
- drift Taste
- drift Health







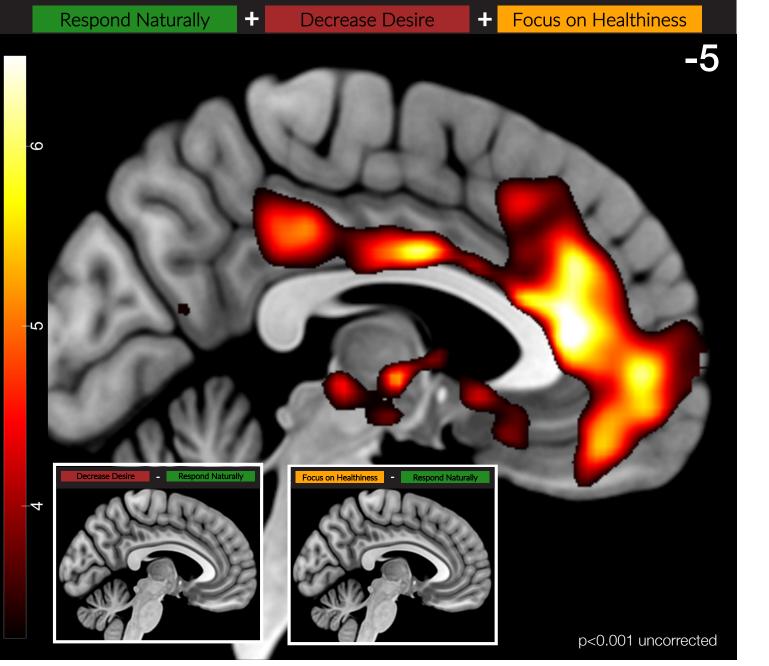
Main effect

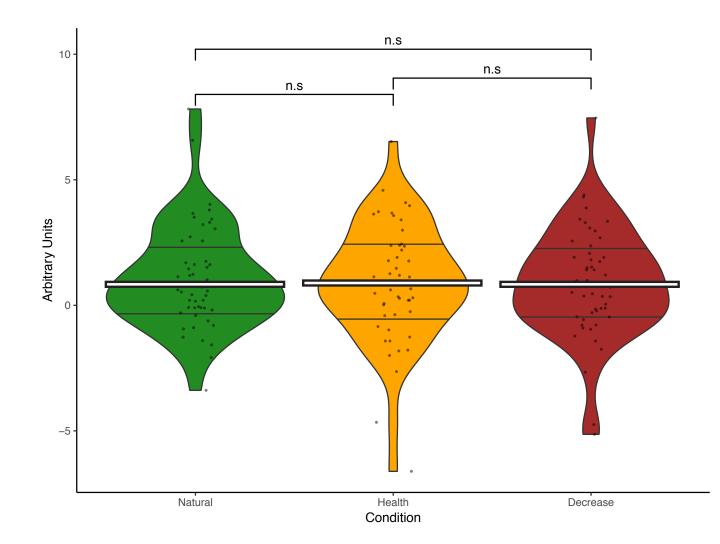
•Taste weight lower in **both** regulatory conditions. •A higher weight on Health (value modulation) drives the higher acceptance rates of healthy foods in the **Health** condition. •Starting point bias for the **Decrease** condition is significantly closer to the **No** threshold than other conditions. Suggests lower acceptance rate in the Decrease condition are partially driven by an initial bias to say no to all options (behavioral control).

Main effect

// Neural

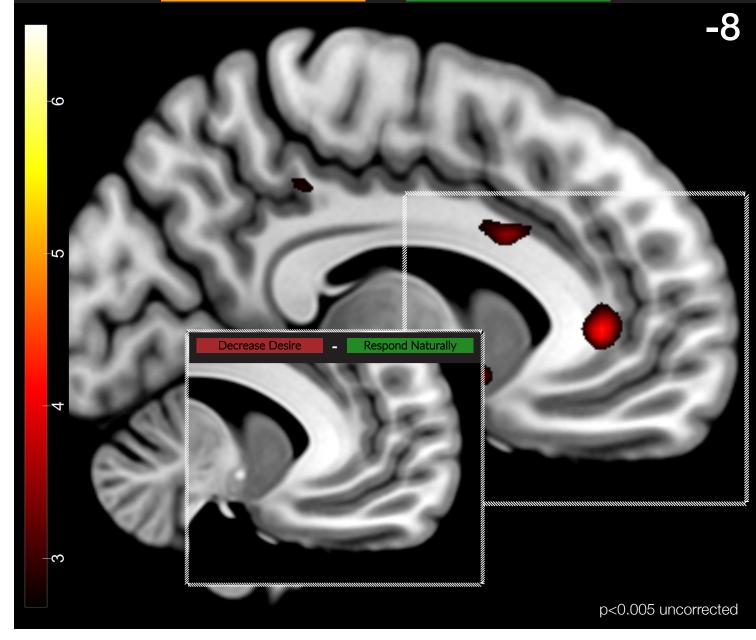
Response Value as regressor

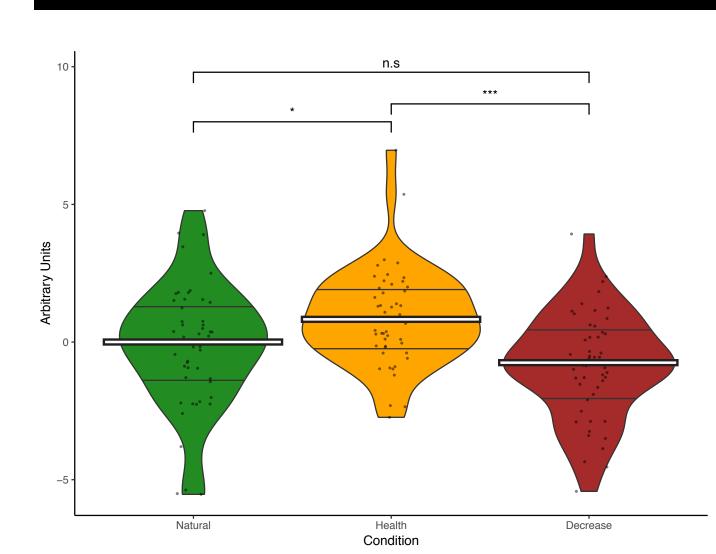




 Decision value elicited similar goal-consistent activation in vmPFC in all conditions.

Health as regressor





ROI analysis indicated that a regressor based on subject ratings of ysis of the main effect of condifood healthiness correlated with increased activity in the vmPFC (p<ANOVA? pairwise?).

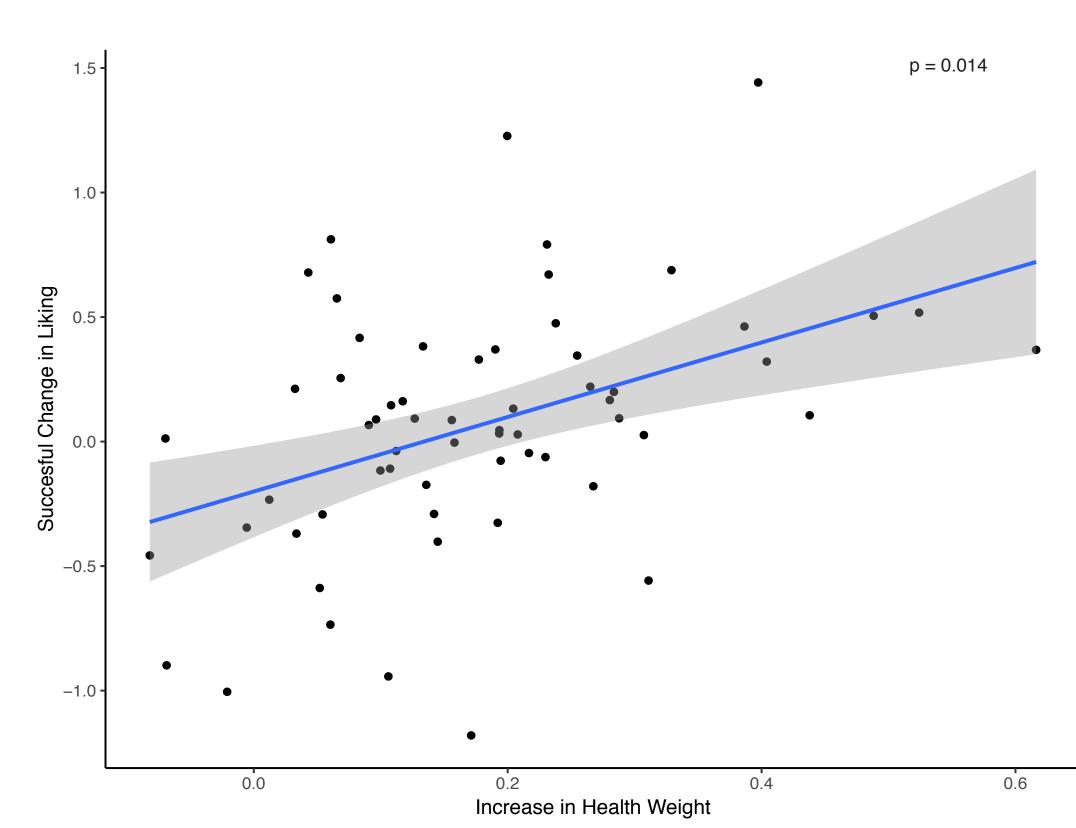
A small volume corrected analtion showed reduced activation in the vmPFC when contrasting the Decrease and Natural conditions--this was not seen in the Health-Natural contrast.

There was significant activation in TPJ and vlPFC in **both** regulatory conditions when contrasted with the Natural condition(whole brain corrected), suggestive of these regions involvement in implementing regulatory strategies.

// Lasting Effect?

Health Condition

Successful Change in Liking ~ \Delta Health Weight * \Delta Taste Weight



1. Success is defined as a subject increasing their Liking rating of a healthy food, and decreasing their Liking rating of an unhealthy food. The change is calculated by:

post-task Liking rating - pre-task Liking rating

* r_dlPFC shows a between condition effect for lasting change

// DISCUSSION

- 1. Regulation strategies of both up-regulation (Health condition) and down-regulation (Decrease Desire condition) decrease acceptance rates of food offers, but only in the Health condition is acceptance biased toward healthy options.
- 2. Neurally, regulation does not alter the representation of decision value in the vmPFC.
- 3. Both regulatory conditions see increased activation in both L TPJ and L vlPFC, suggesting general involvement in regulation strategies.
- 4. Representation of the health attribute in vmPFC on Health trials suggests value modulation. Starting point bias in DDM model for Decrease condition is consistent with behavioral control.
- 5. Next steps include looking at subject trial-by-trial variation, and MVPA.

// REFERENCES

. Centers for Disease Control and Prevention. (2014) National Health and Nutrition Examination Survey. Retrieved from https://www.niddk.nih.gov/health-information/health-statistics/overweight-obesity 2. Research and Markets. (2019). The U.S. Weight Loss & Diet Control Market. Retrieved from https:// www.researchandmarkets.com/reports/4753379/the-u-s-weight-loss-and-diet-control-market. 3. Gross, J. J., & Muñoz, R. F. (1995). Emotion Regulation and Mental Health. Clinical Psychology: Science and Practice, 2(2), 151–164.

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// FURTHER INFORMATION

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