Affective versus Cognitive Predictors of Craving

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Background

A major goal of **translational neuroscience** is to predict real-world health behaviors

Self-control is the ability to inhibit impulses in favor of goals. It is usually measured with cognitive laboratory tasks (e.g., Stop Signal, Stroop, Go-No Go)

The ecological and predictive validity of **cognitive tasks** has been called into question by recent research[1]

Fewer studies have examined the ability of tasks that measure affective processes (e.g. craving) to predict real-world health-risking behaviors

Current study: *Do neural patterns related to "craving" and "inhibitory control" predict both in-task and real-world craving ?*

Methods

Cue Reactivity Task

117 adults (ages 34-55) with **self-control problems**:

x 2 runs, 26 trials each: 50% neutral, 50% personalized risk cues

Pattern Expression Analysis

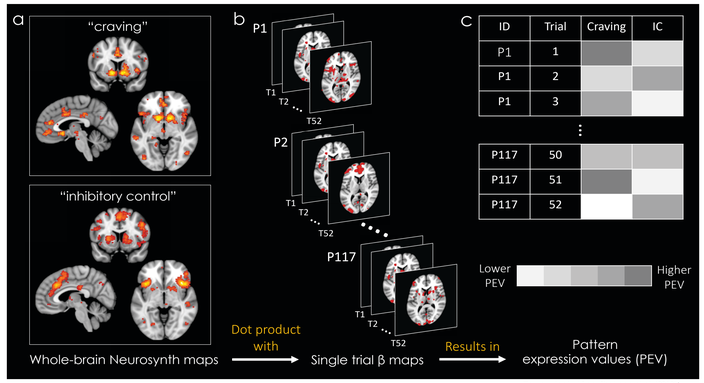


Figure adapted from Shahane et al. (2018)[2]

Real-world Craving Outcomes

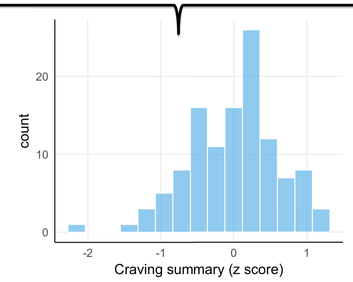
-Questionnaire of Smoking Urges[3]

-Brief Substance Craving Scale[4]
-Cocaine Craving Questionnaire[5]
-Heroin Craving Questionnaire[6]
-Marijuana Craving Questionnaire[7]
-Meth Craving Intensity Yesterday
-Craving Experiences Questionnaire[8] (Prescription pills)

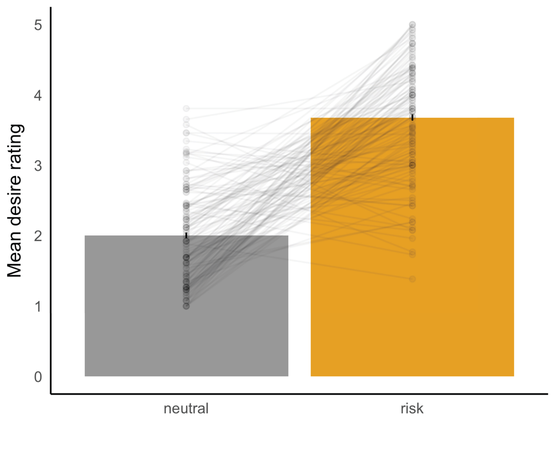
-Food Craving Inventory[9]

-Brief Substance Craving Scale[4]
-Alcohol Craving Questionnaire[10]
-Penn Alcohol Craving Scale[11]

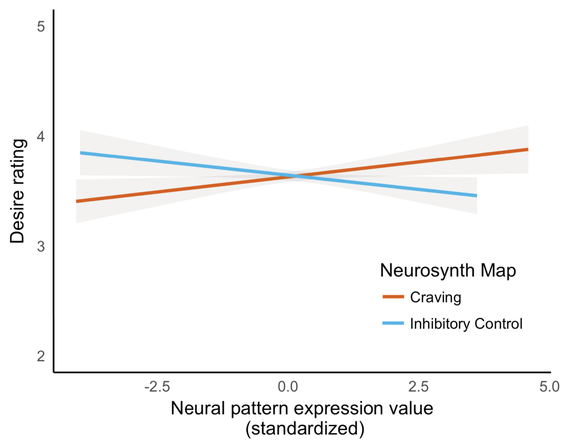
Craving summary variable:



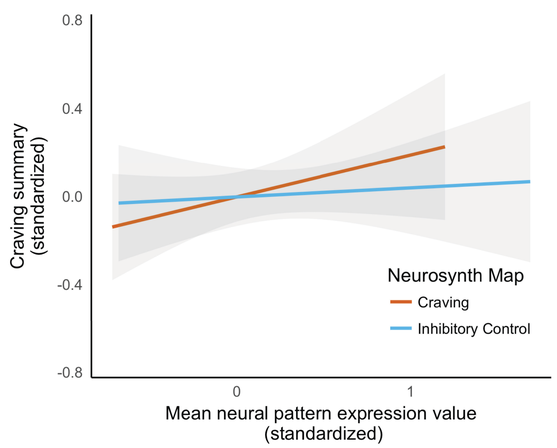
Results



Manipulation check: Participants rated personalized risk cues as more desirable than neutral images



During risk trials, higher trial-level expression of "craving" and "IC" patterns predicted higher and lower desire ratings, respectively



Higher average expression of "craving" pattern (across risk trials) predicted higher levels of real-world craving

Conclusions

Using a "brain-as-predictor" approach, this analysis showed that neural expression of both "IC" and "craving" patterns predicted craving during a Cue Reactivity Task

However, only "craving" pattern expression predicted real-world craving

As participants were given no explicit instructions to regulate their responses to the stimuli during this task, it can only be inferred that *implicit* IC does not seem to predict real-world craving

However, this finding may be more relevant, as tasks that explicitly engage IC may have limited ecological validity and maximize experimental effects over capturing individual differences[12]

Future work should further explore whether task-based measures of affective/motivational processes have more real-world applicability than executive functioning tasks

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