

# Individual differences in dopamine support self-control of everyday desires

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## Introduction

Although laboratory experiments have demonstrated that dopamine impacts one's ability to inhibit impulsive actions, no study to date has shown whether such associations translate to inhibition in everyday life. Using an experience sampling method and positron emission tomography, we show that individual differences in dopamine impacts how conflict with personal goals impacts self-control in everyday life.

We used PET and EMA to examine the relation between **dopamine** and **attempts to resist everyday desires**.

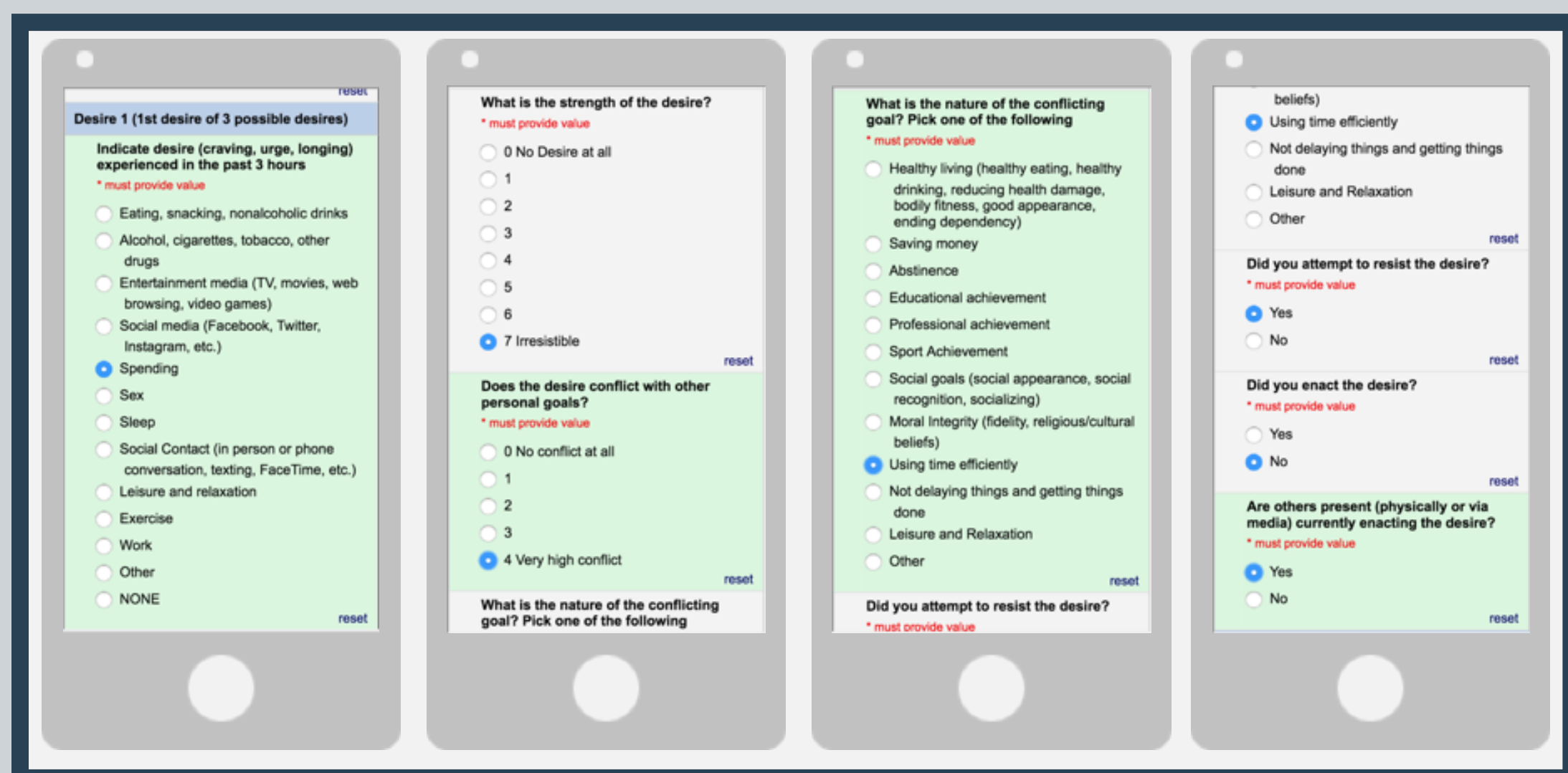


## Methods

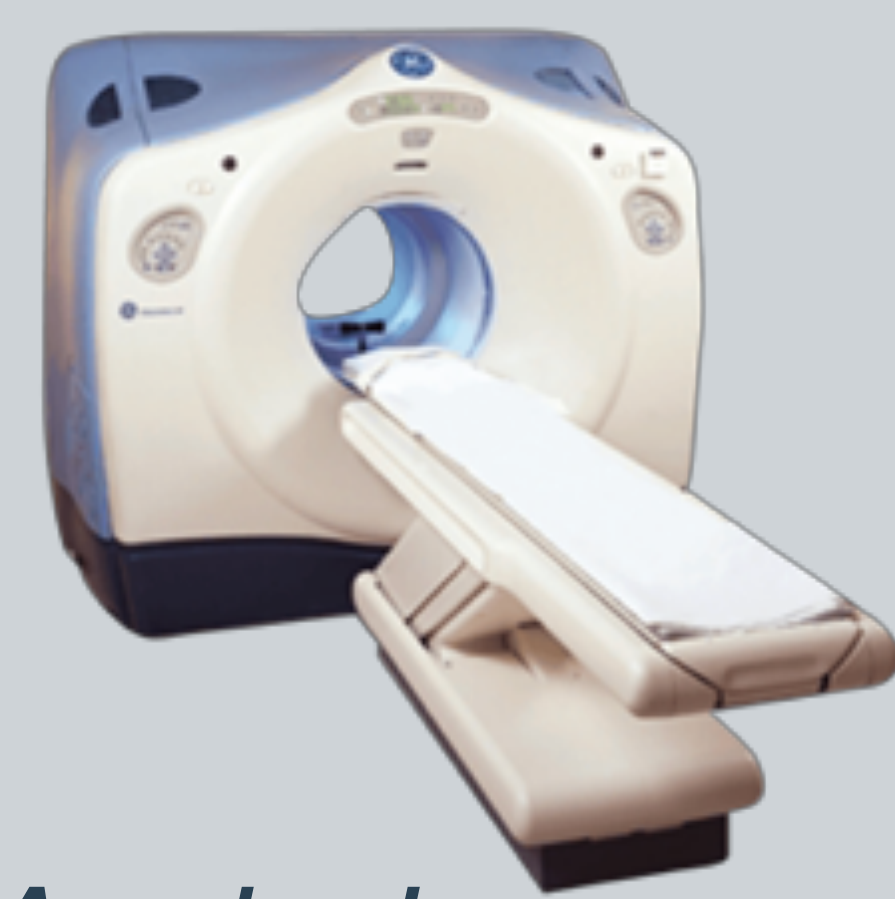
### Experience Sampling

N=74 (41 females),  
ages 18-80  
(M = 38.7, SD = 17.9)

Participants reported  
top desires experienced  
in the last 3 hrs.



Surveys delivered via text messages  
3 times per day for 10 days.



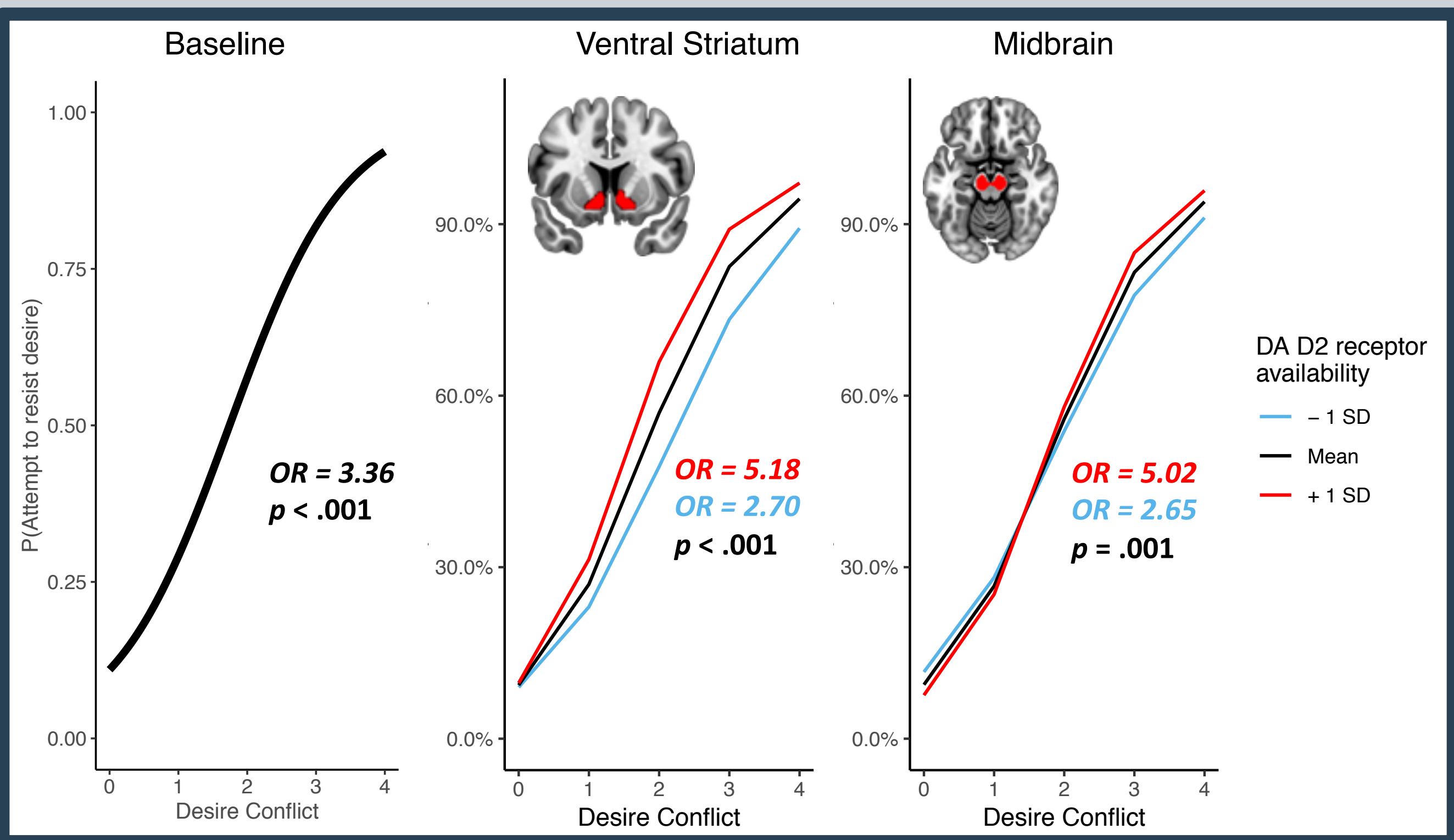
### PET Scanning

[<sup>18</sup>F]fallypride, GE Discover STE PET  
Mean D2R receptor availability was derived  
for each participant from a priori ROIs in the  
ventral striatum, midbrain, and amygdala with  
partial-volume correction.

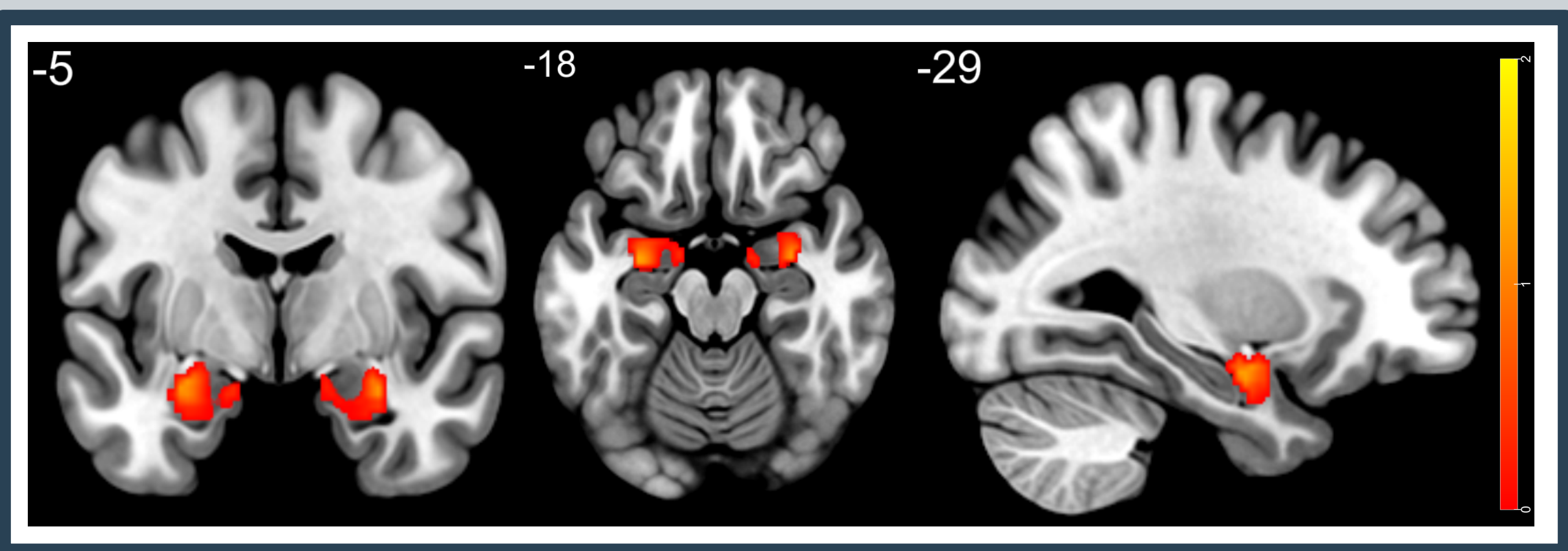
### Analysis

EMA & D2R data were analyzed using mixed-effects logistic  
regression in R with the lmer4 package. We used random  
intercepts for participants and surveys. Exploratory voxelwise  
analyses were performed using FSL.

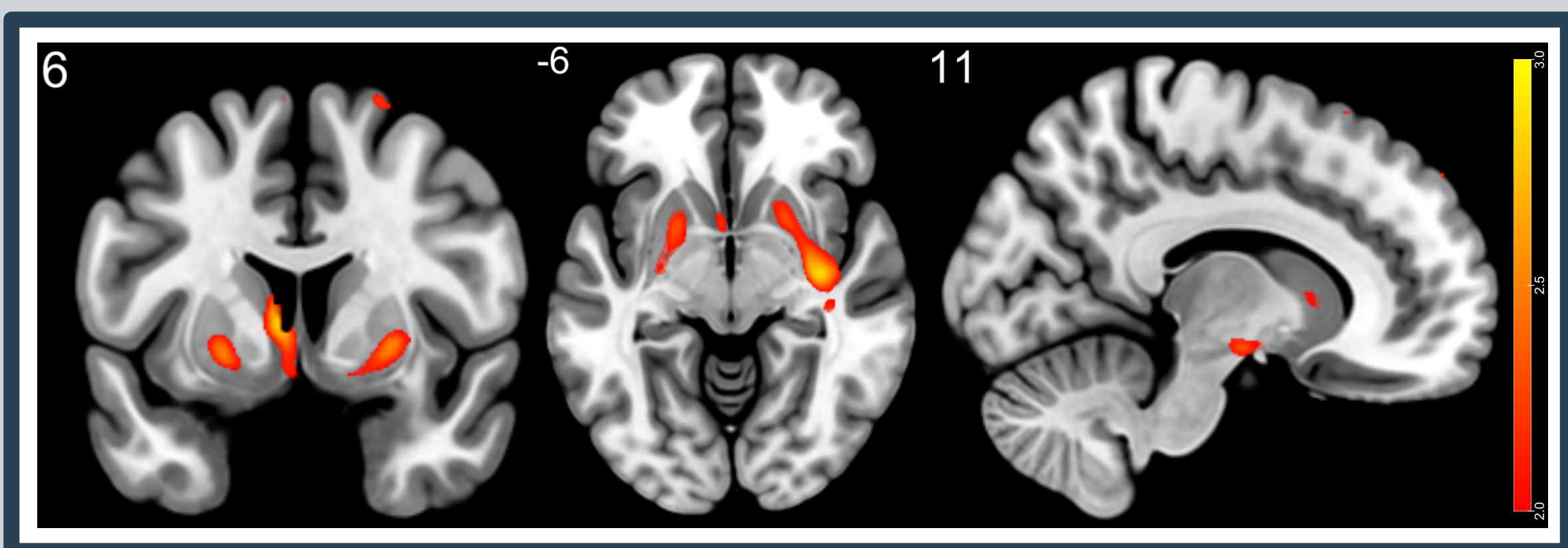
## Results



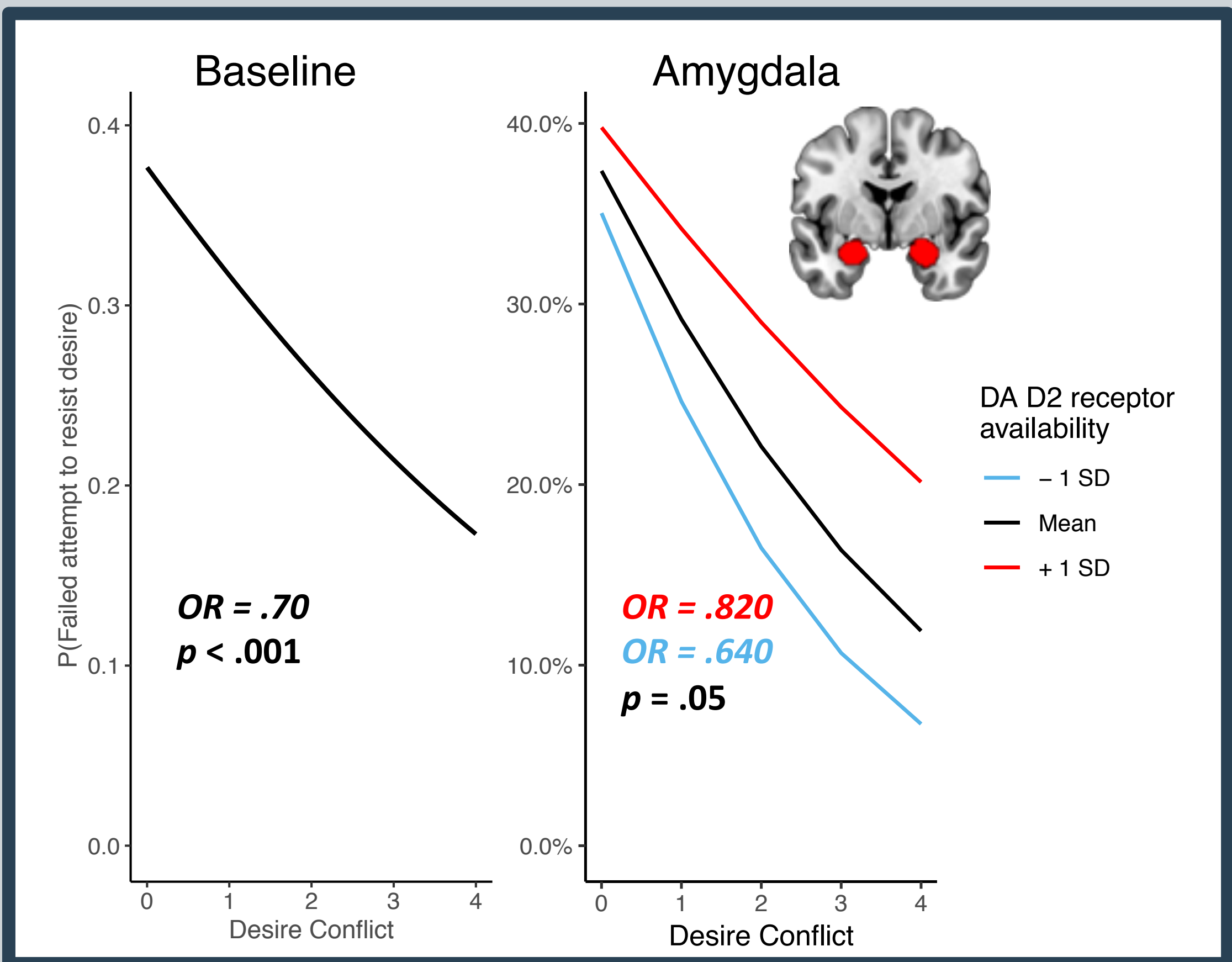
**Above:** (Left) Logistic regression of degree of conflict with  
personal goals on attempts to resist desires. (Right)  
Individuals with fewer ventral striatum and midbrain D2Rs  
are less likely to attempt to resist desires in spite of conflict  
with personal goals.



**Above:** Unthresholded exploratory voxelwise  
effect of individual differences in desire conflict  
slope on failed attempts to resist desires



**Above:** Unthresholded exploratory voxelwise effect  
of individual differences in desire conflict slope on  
attempts to resist desires.



**Above:** (Left) Logistic regression of degree of conflict with  
personal goals on failed attempts to resist  
desires. (Right) Individuals with higher amygdala  
D2Rs are more likely to fail in their attempts to resist  
desires in spite of conflict with personal goals.

## Conclusion

The observed effects suggest  
that individual differences in  
mesolimbic dopamine shape

how people weigh personal goals in their decisions to self-control their desires. The effects  
observed in the amygdala suggests a possible mechanism by which dopamine supports  
the impact of negative affect on self-control.

**Lower VS and midbrain but higher amygdala D2Rs**  
predicted lower attempts to resist desires and greater  
failed attempts in spite of conflict with personal goals.

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