

# 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**.

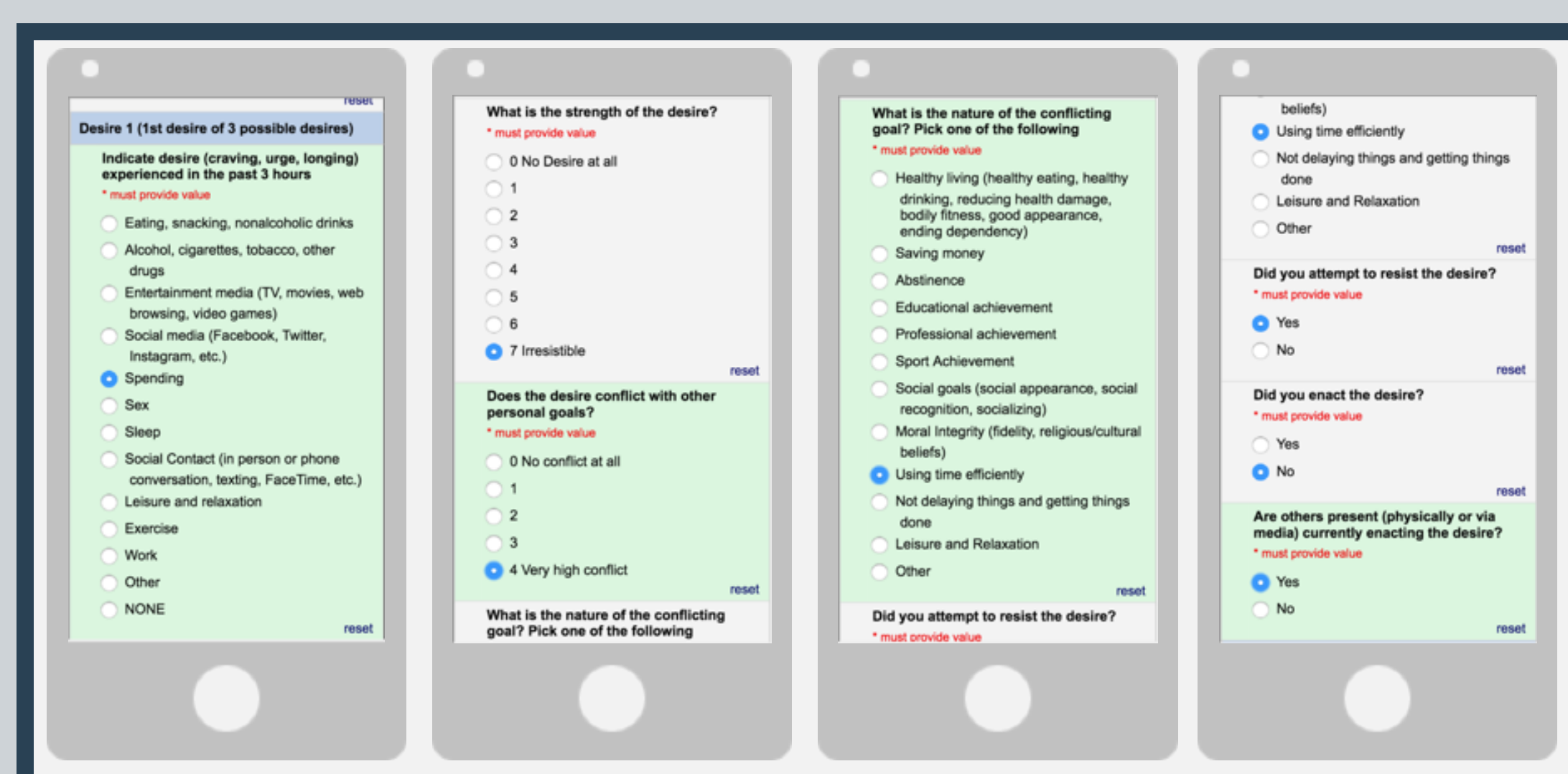


## Methods

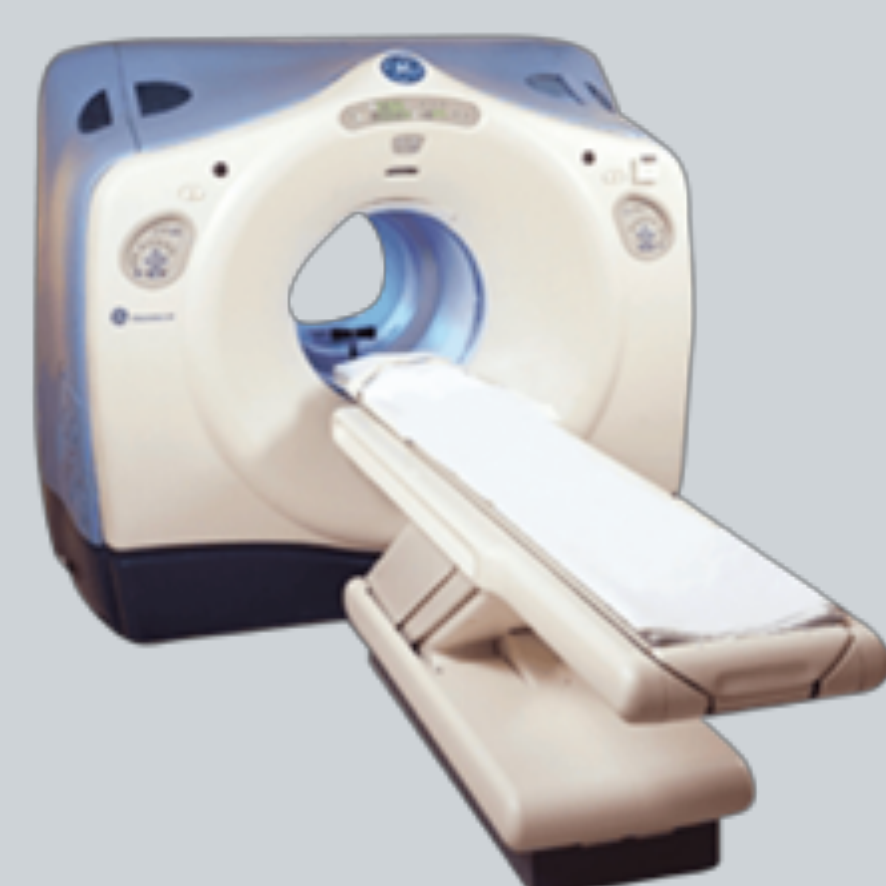
### Experience Sampling

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.



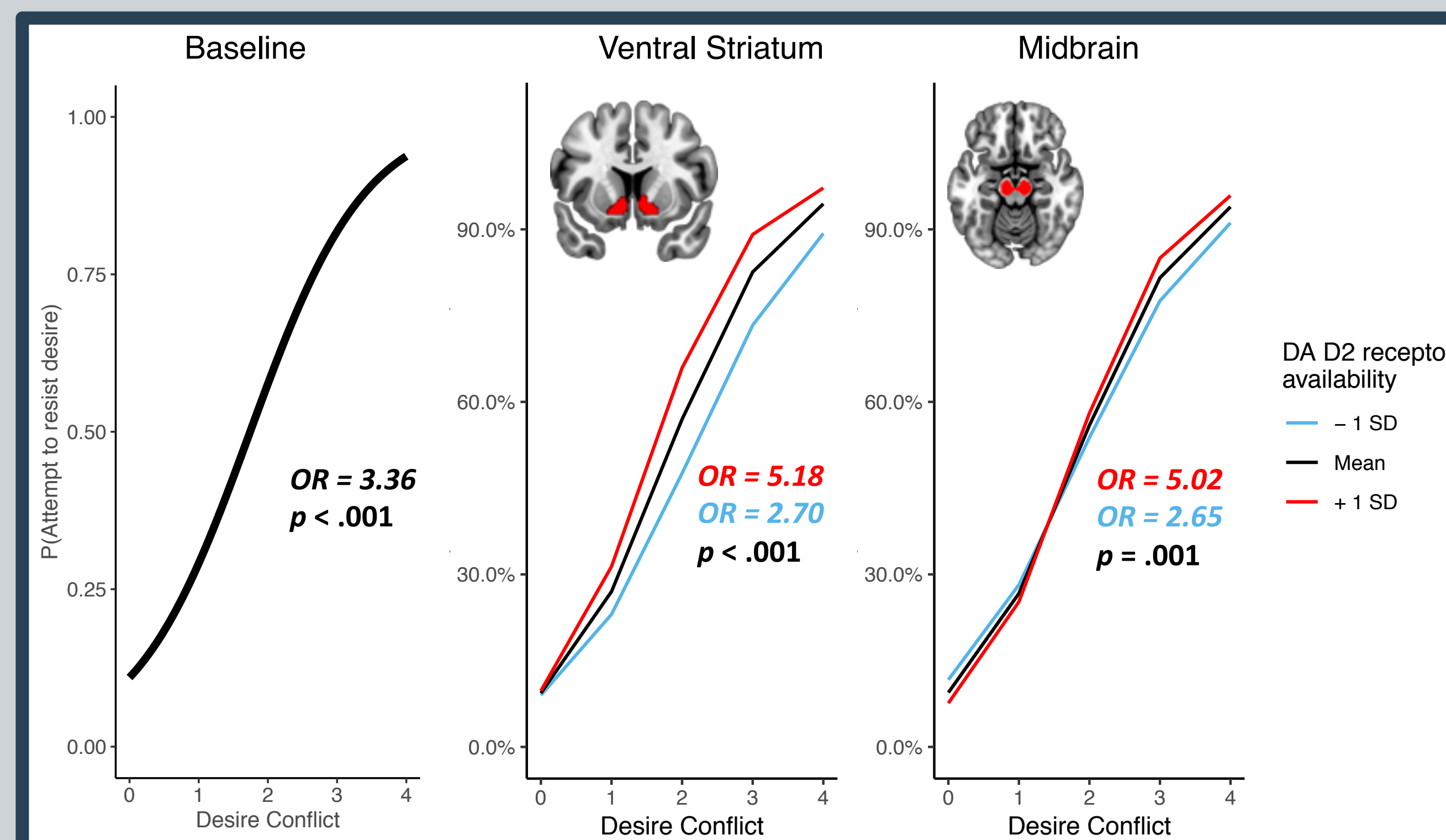
### PET Scanning

[<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.

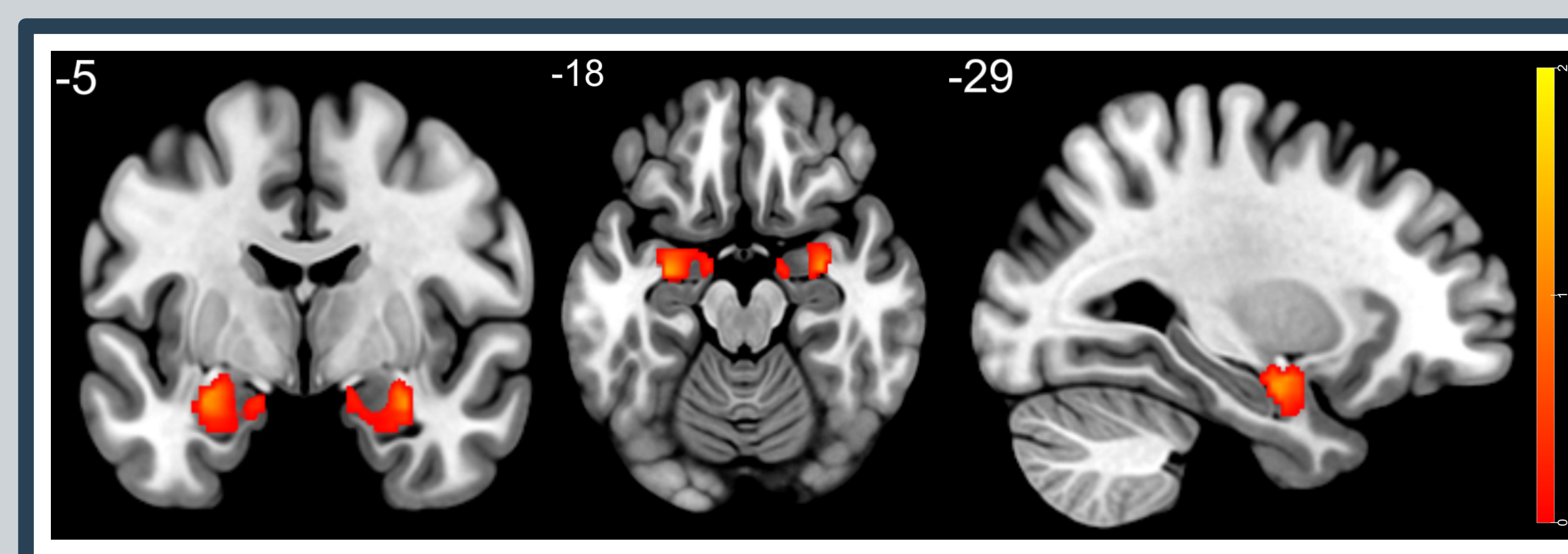
### Analysis

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.

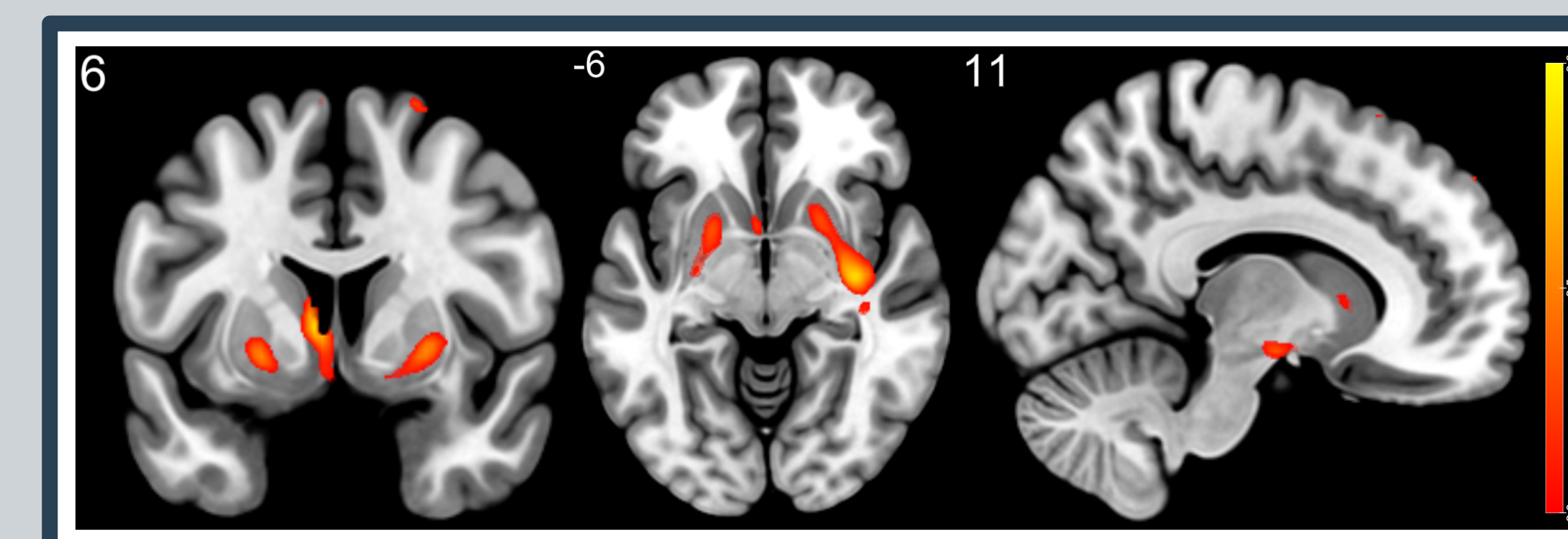
## Results



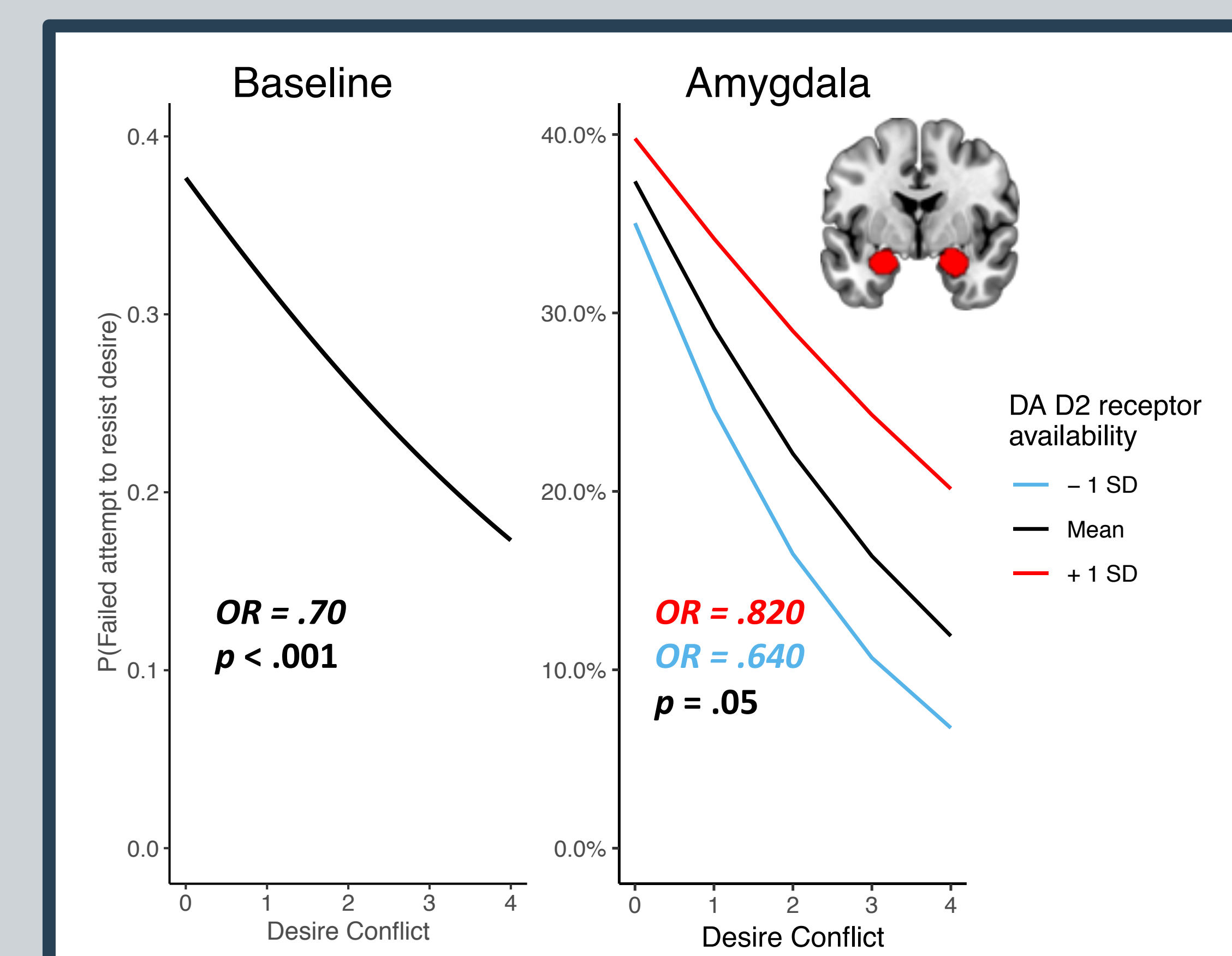
Above: (Left) Logistic regression of degree of conflict with personal goals on attempts to resist desires. (Right) Individual with fewer ventral striatum and midbrain D2Rs are less likely to attempt to resist desires in spite of conflict with personal goals.



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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