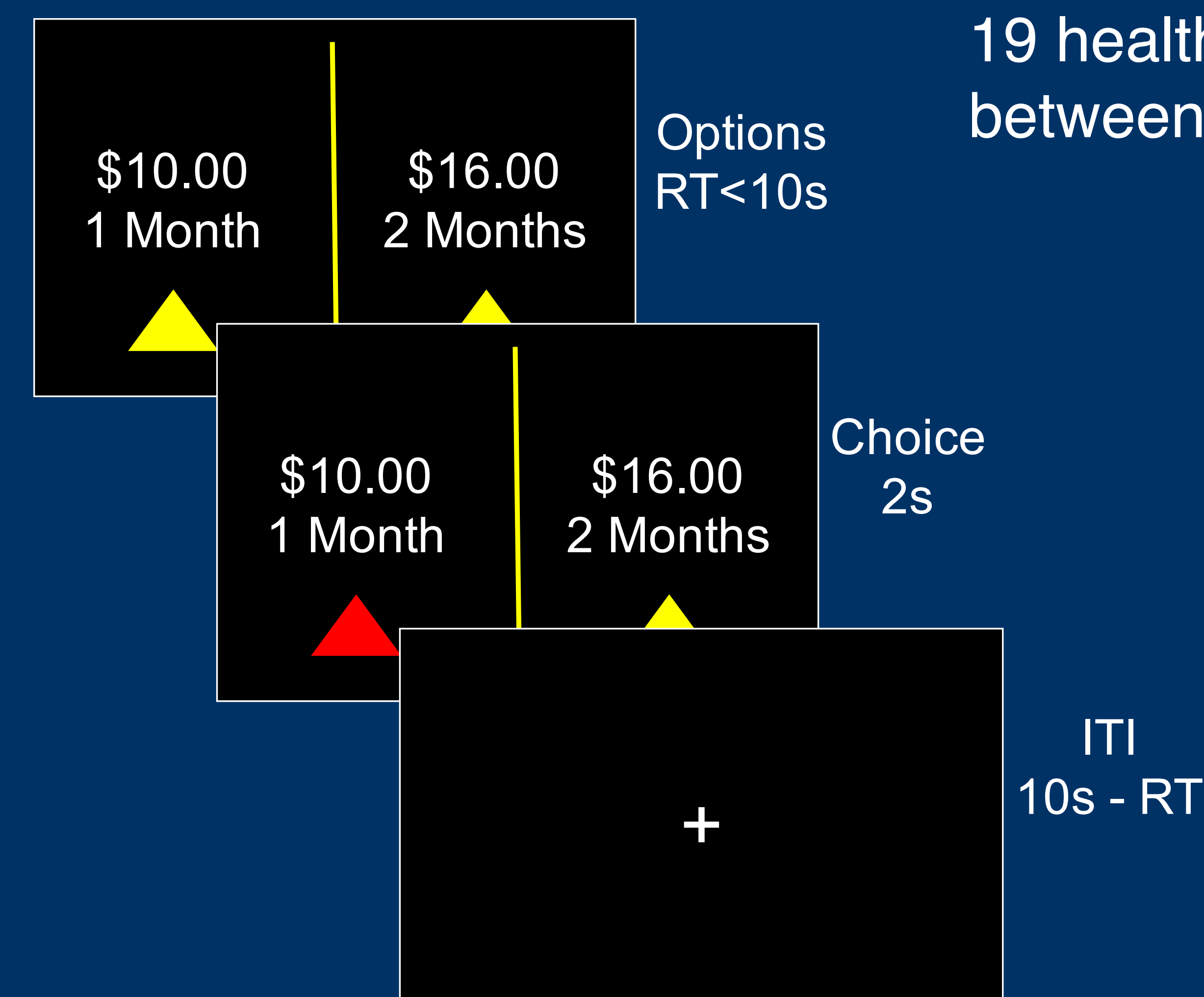


## Introduction

Previous pharmacological and genetic studies have implicated the dopamine system in intertemporal decision making. However, there is almost no evidence for an association between direct measures of dopamine function and neural representations of discounted value in humans. Here, we directly examined how individual differences in dopamine receptors related to prefrontal representations of subjective reward value in healthy humans.

## Methods



19 healthy young adults (ages 18-24) made 84 choices between smaller-sooner and larger-later rewards.

PET scan with the high-affinity D2 receptor (DRD2) tracer [18F]fallypride to identify regional binding potential (BP<sub>ND</sub>) in the ventral striatum.

Choice data fit with a hyperbolic discounted value function and softmax decision slope.

Estimated time discount rates (k) were used to calculate the subjective value of the chosen option for each trial.

$$SV = \frac{A}{1 + kD}$$

(Hyperbolic discount function)

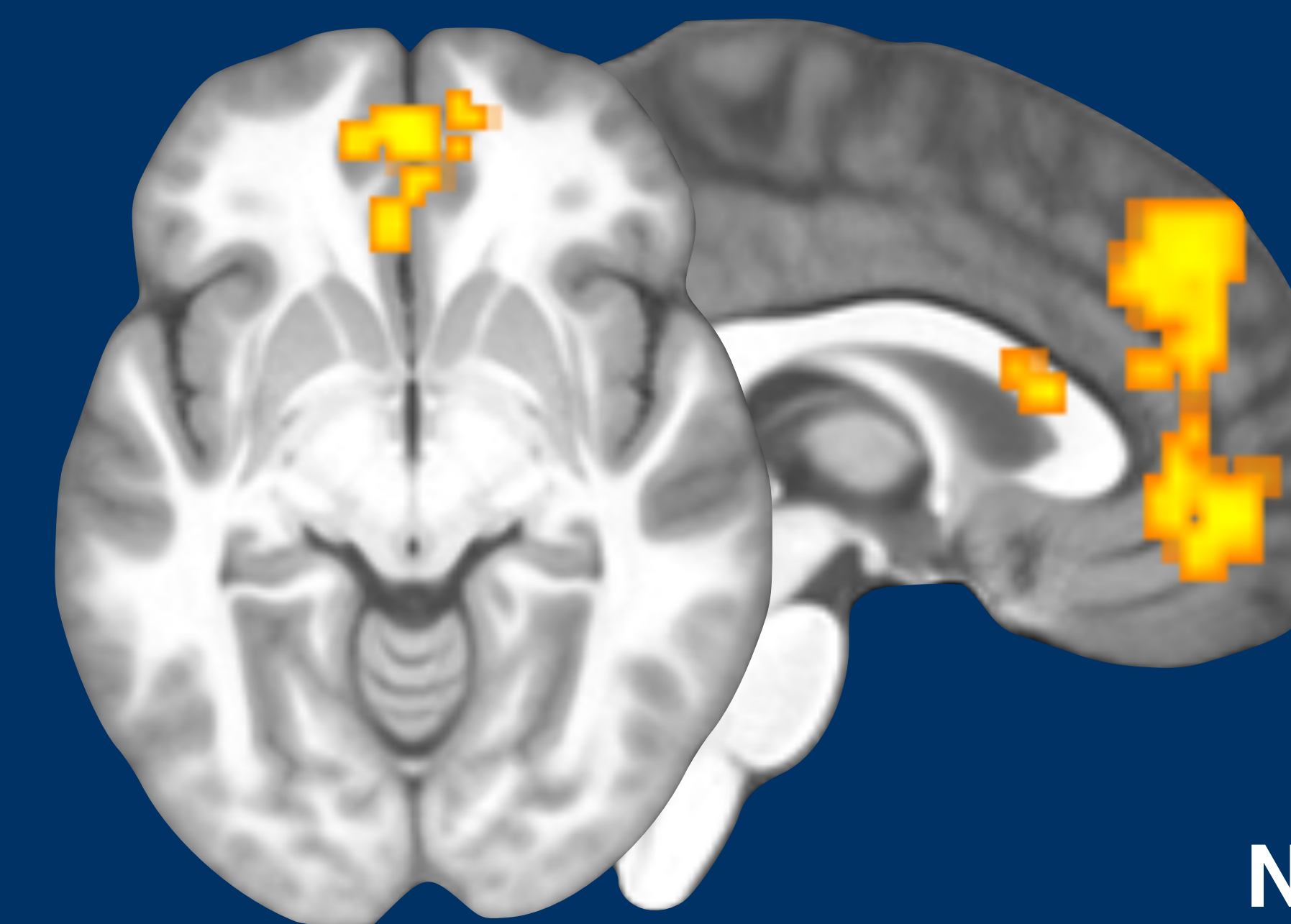
$$P_{a,t} = \frac{\exp^{q_t(a)m}}{\sum_{i=1}^n \exp^{q_t(a)m}}$$

(Softmax decision slope)

FMRI data processing was carried out using MRIQC, fmripreg, and FEAT in FSL using standard procedures.

Each subject's data was fit with a parametric convolved regressor representing the subjective value of the chosen option for each trial.

## Results

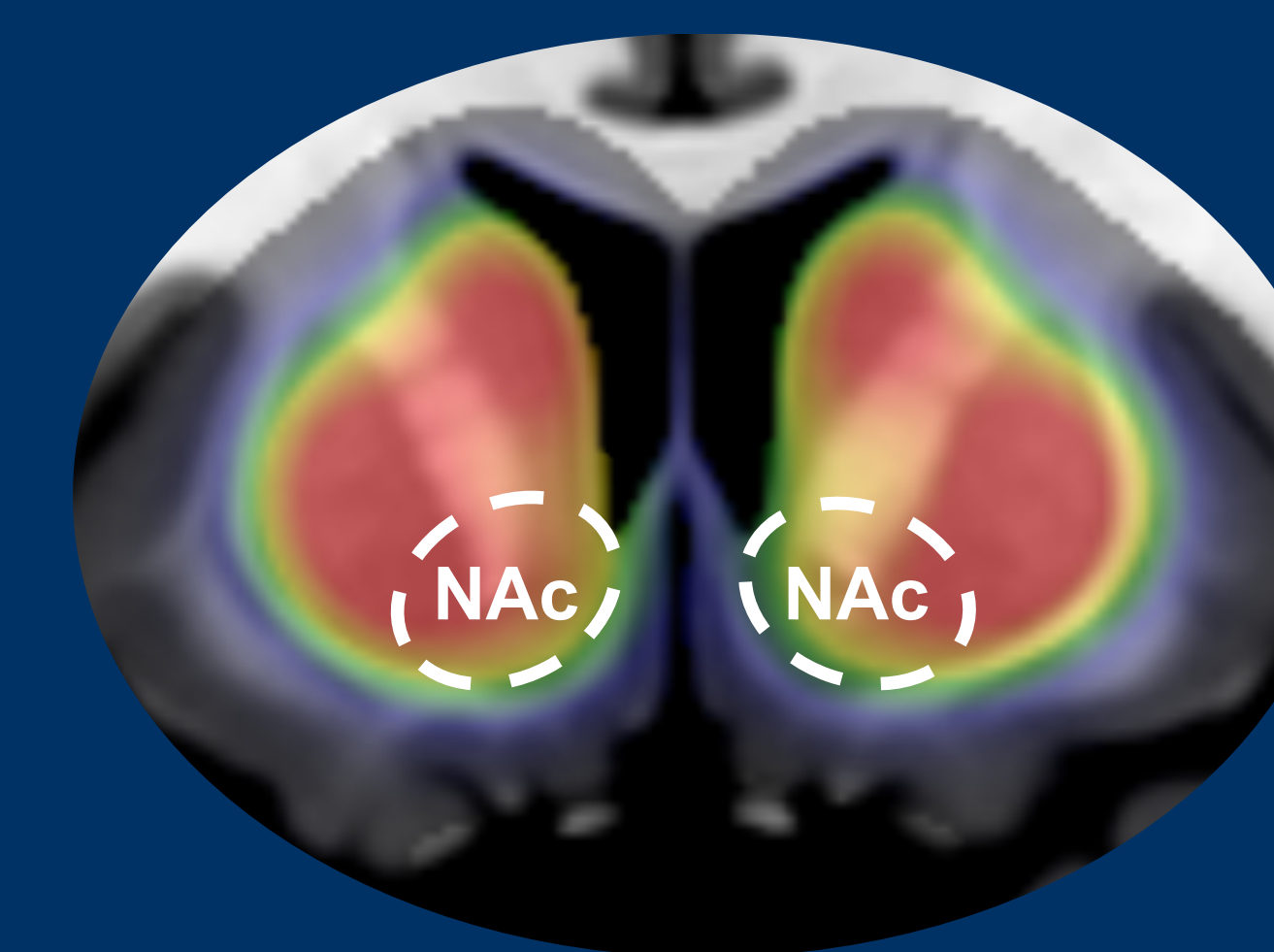


Left: Mean effect of SV of the chosen option parametric modulation (shown cluster corrected  $Z > 2.3$ ,  $p < .05$ )

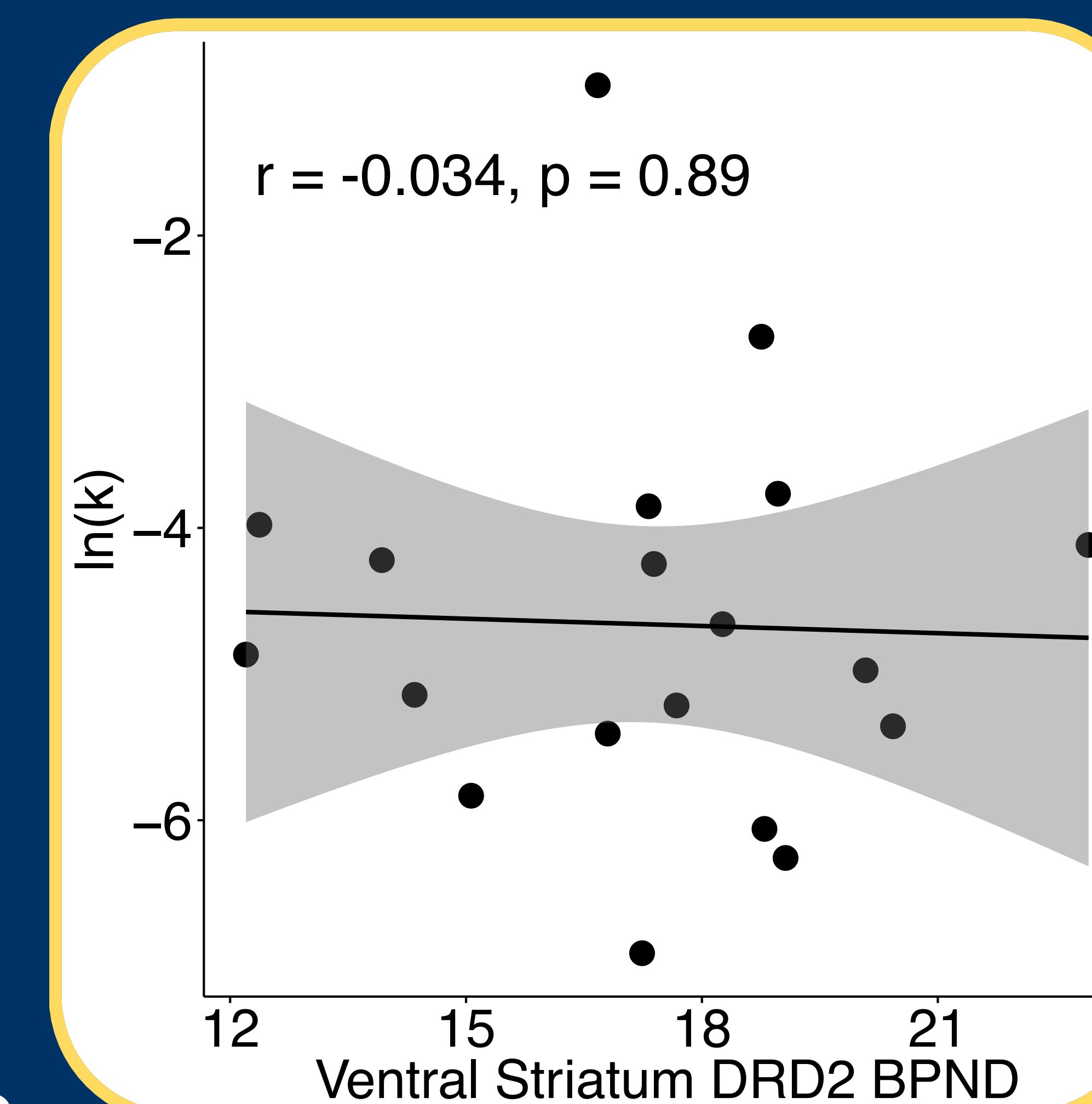


Left: a priori mask from Harvard-Oxford Atlas used to extract mean effect of SV for linear regression

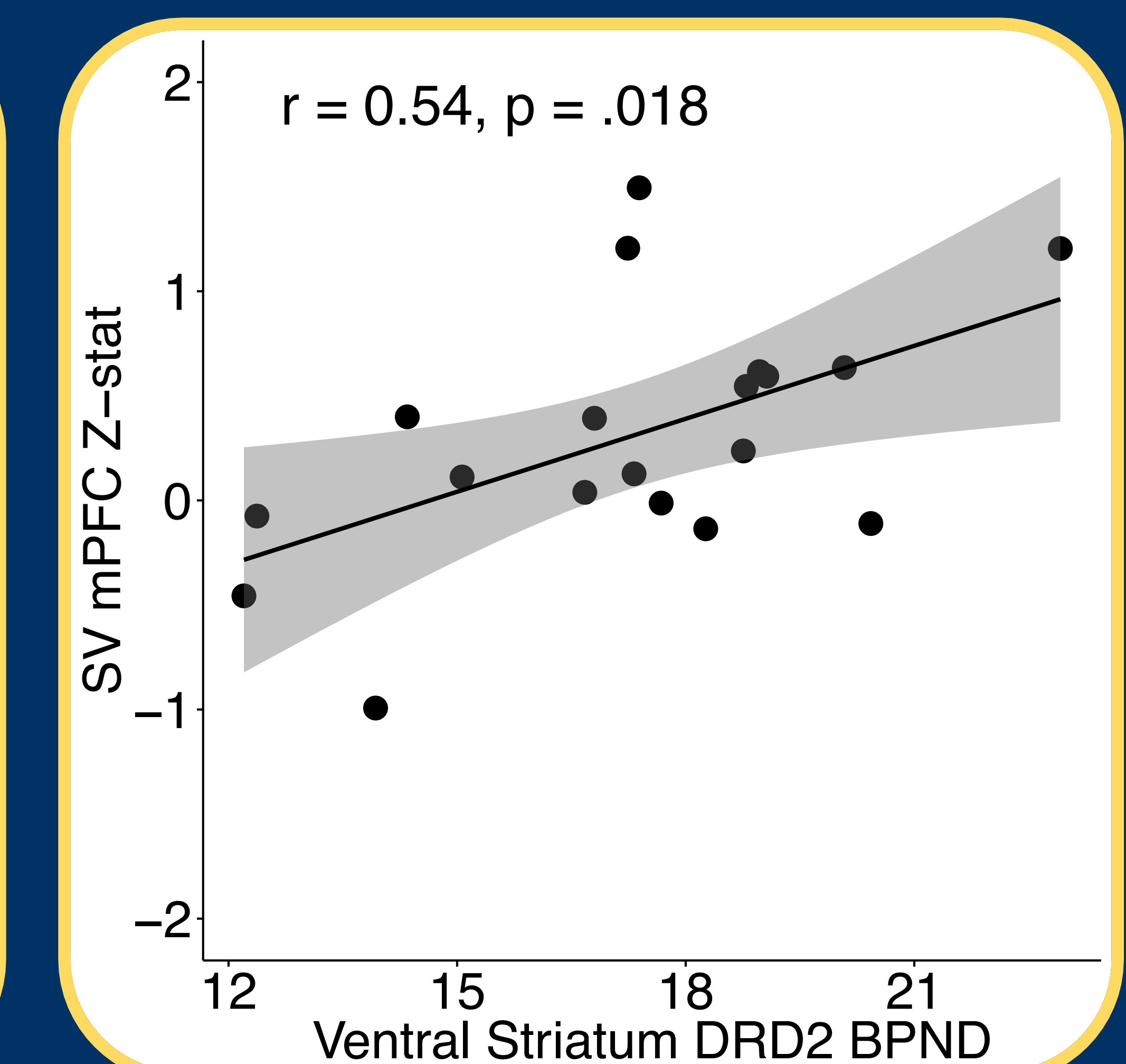
Below: Mean BP<sub>ND</sub> map depicting binding in the nucleus accumbens (NAc)



No correlation between DRD2 and impulsive choices



Positive correlation between DRD2 and SV representations



## Conclusions

These findings provide evidence for DRD2 influence on representation of subjective reward value. Results are consistent with DA drug effects on neural representations of subjective reward value.

Lack of a direct link between DRD2 and impulsive choice suggests a computational mechanism.

*This work was supported by a grant from the National Institute of Drug Abuse (R21DA033611)*

*We thank all those who contributed to the OpenNeuro platform, which facilitated this analysis.*