

# Does Cannabis have Residual Effects on Effort?

## Background

- Acute THC administration in humans (Lawn et al., 2016) and rats (Silveira et al., 2016) has been associated with decreased willingness to exert cognitive effort that may explain amotivational behavior during acute cannabis intoxication.
- To date, however, whether decreased cognitive effort is also present following prolonged use (vs. acute use) has yet to be determined.

**Aim:** To examine whether cannabis exposure has residual effects on cognitive effort in non-acutely intoxicated cannabis using adults.

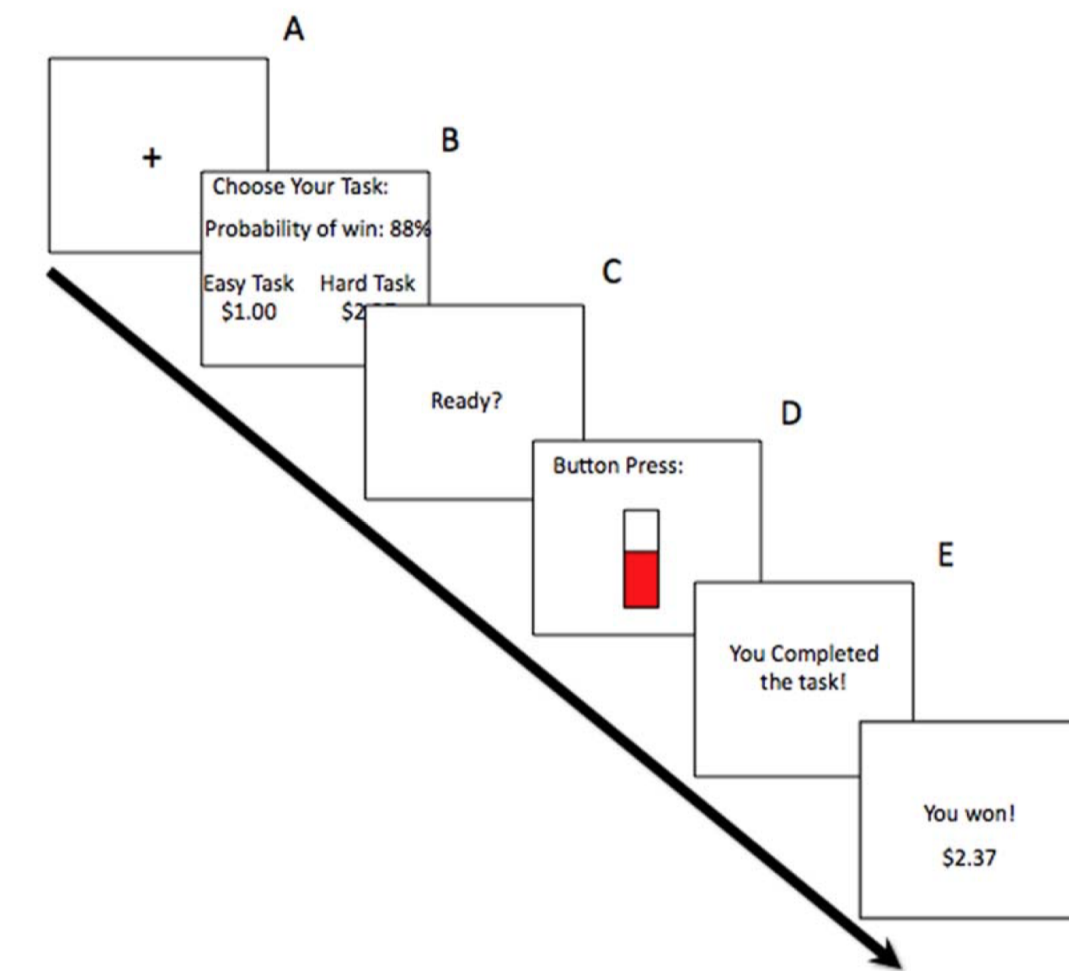
## Methods

### Procedure:

95 adult cannabis users and non-users were recruited from the DFW area to take part in this study. Cannabis users must have used at least 3-4 times per week..

Participants	Users	Non-Users
N	44	51
Sex	21 Female, 23 Male	27 Female, 24 Male
Age	M = 25.95 (SD = 7.92)	M = 24.08 (SD = 7.13)
IQ	M = 111.13 (SD = 14.96)	M = 105.62 (SD = 16.87)
Number of Days of MJ use over past 90 Days	M = 59.14 (SD = 30.88)	N/A
Average grams of Cannabis per use occasion	M = 1.33 (SD = 1.17)	N/A

Participants completed self-reported measures of cannabis use, psychological assessments, and the Effort Expenditure for Reward Task (EEfRT; Treadway et al., 2009).



### Statistical Analyses:

- MANOVA, group was the independent variable (control vs. user) and percent hard trials chosen out of all trials performed (total hard trials chosen), percent hard trials chosen for only low, medium, or high probability, and percent hard trials chosen for only low, medium, or high reward amounts were the dependent variables.
- Pearson correlations were calculated between measures of cannabis use measures (MINI, TLFB, MPS, SUH, THC/CR quantification with GC/MS) and performance on the EEfRT.
- Simple linear regressions were conducted between performance on the EEfRT and psychological assessments.

## Conclusion

- These results support and extend previous findings of reduced cognitive effort following acute exposure to THC (Lawn et al., 2016 & Silveira et al., 2016).
- High amounts of THC metabolites predicting reduced hard trial choices could indicate that increased THC is detrimental to decision-making, which has been shown in previous studies, as choosing to expend more effort for a low reward magnitude and a small chance of receiving the reward is a disadvantageous choice in the EEfRT (Casey & Cservenka, 2020).
- The impulsivity results are also consistent with previous findings in decision-making in substance use disorders, where substance users are more prone to choose options which lead to smaller reward gains sooner rather than larger rewards later (Verdejo-García et al., 2008). In this instance, the amount of effort involved in the hard trials may discount the subjective value of the reward at a steep rate in cannabis users, such that they are less likely to choose that option compared to non-users.

## Results

Figure 1. MANOVA Comparing EEfRT Performance Between Users and Non-Users

\*  $p < .05$   
\*\*  $p < .01$

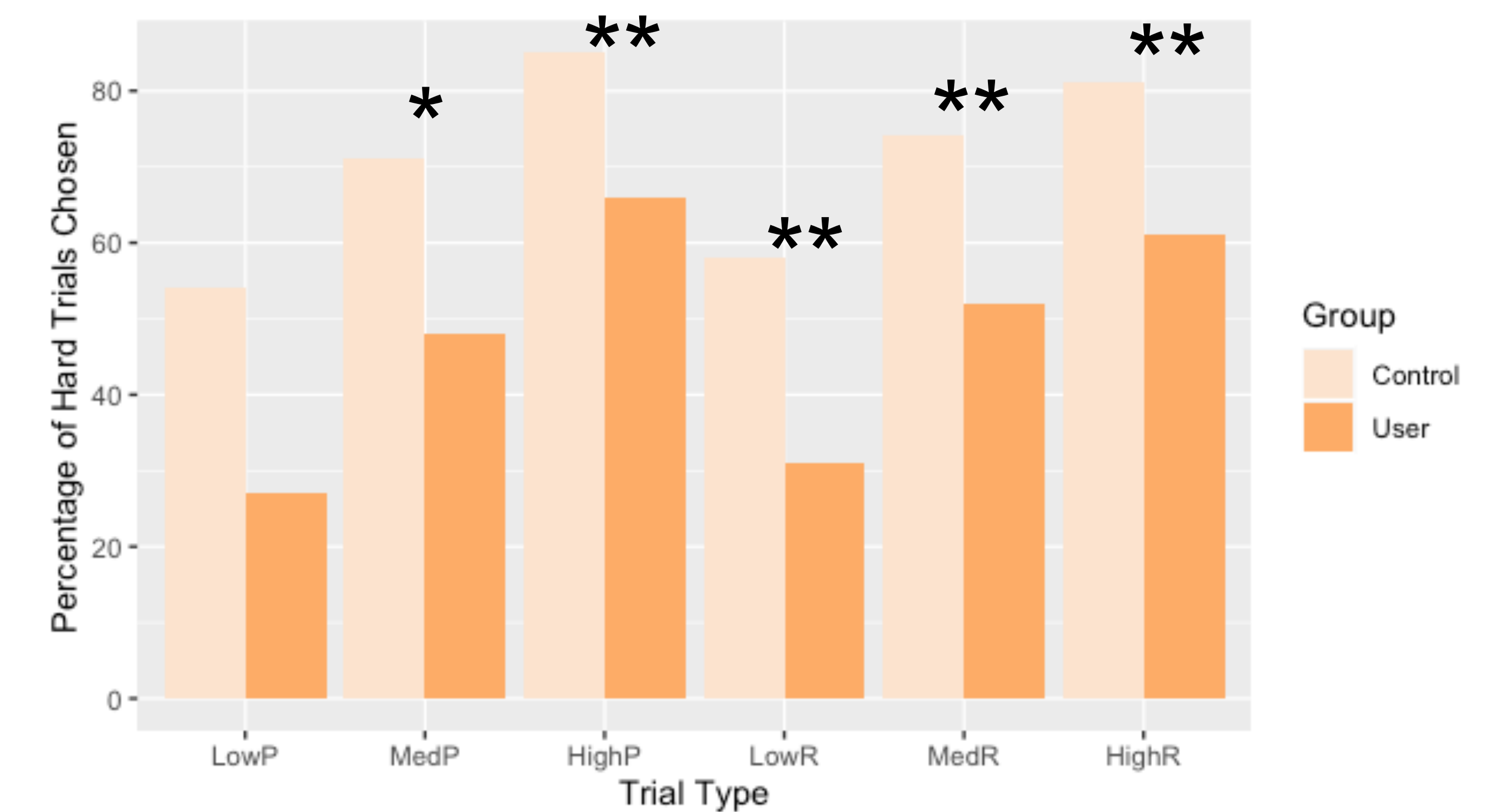
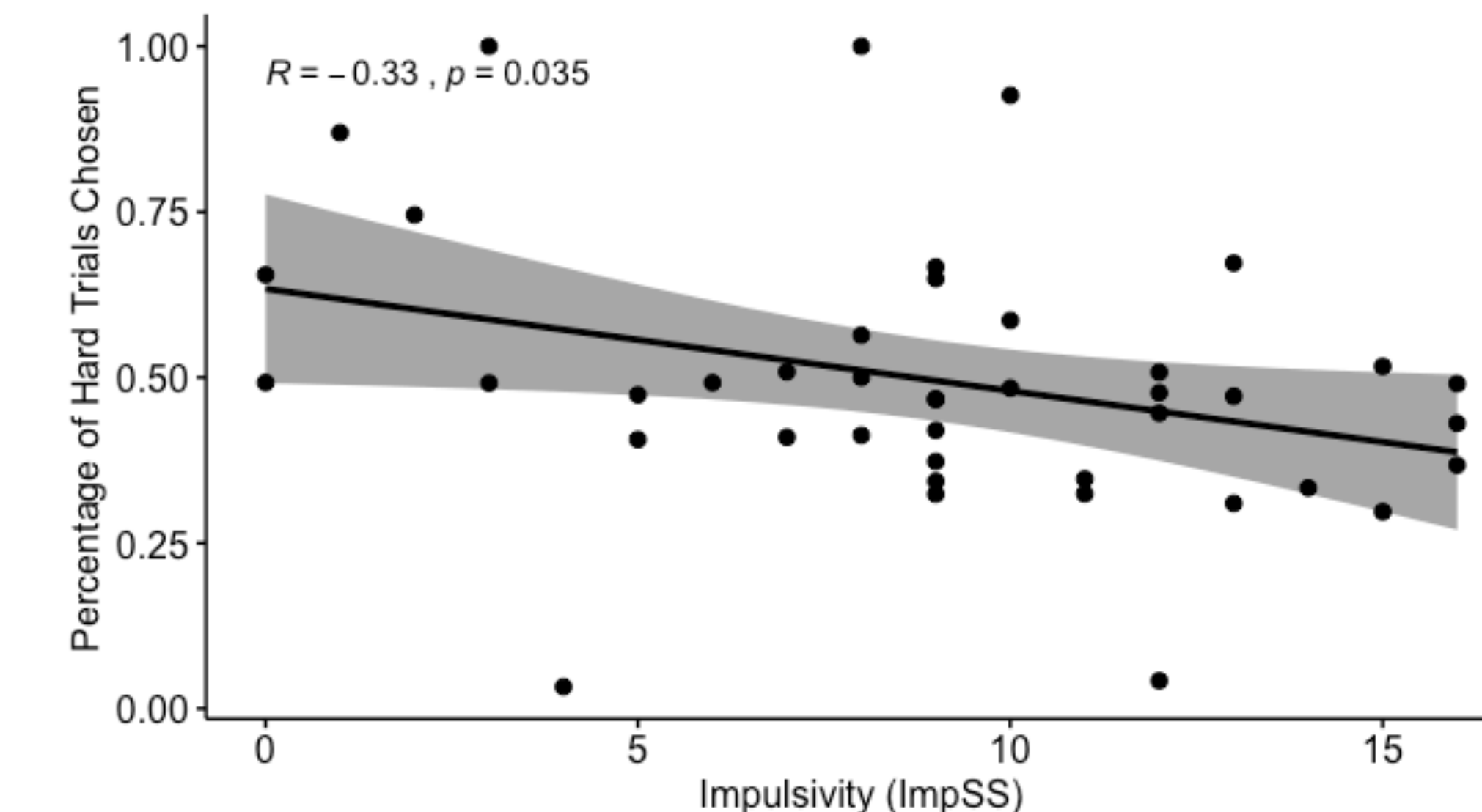


Table 1. Correlations Between Cannabis Users' EEfRT Performance and Cannabis Use Variables

		Percent Hard Trials Chosen	Percent Hard Low Probability 12%	Percent Hard Medium Probability 50%	Percent Hard High Probability 88%	Percent Hard Low Reward \$1.24-2.41	Percent Hard Medium Reward \$2.50-3.40	Percent Hard High Reward \$3.49+
THC/CR calculated ratio	Correlation	.391	.496	.305	.178	.415	.347	.232
	Significance (2-tailed)	.065	.016*	.157	.417	.049*	.105	.288
Number of Cannabis smoking days out of the past 90 Days (TLFB)	Correlation	.208	.315	.210	-.017	.062	.377	.128
	Significance (2-tailed)	.340	.143	.336	.937	.779	.076	.561
Grams of Cannabis per Use Occasion (TLFB)	Correlation	.009	.147	.025	-.159	-.012	.003	.014
	Significance (2-tailed)	.968	.504	.910	.467	.957	.990	.951
	df	21	21	21	21	21	21	21

Figure 2. Linear Regressions Predicting Amount of Hard Trials Chosen on the EEfRT from Behavioral Variables in Cannabis Users



## References

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