



# The effect of dopamine drugs on reward discounting: A systematic review & meta-analysis

James Meade<sup>1</sup>, Lucy Greenwald<sup>1</sup>, Katlyn Hurst<sup>1</sup>, Jaime J. Castrellon<sup>1,2</sup>, Gregory R. Samanez-Larkin<sup>1,2</sup>

<sup>1</sup>Center for Cognitive Neuroscience, <sup>2</sup>Department of Psychology, Duke University

## Introduction

Although numerous studies have suggested that pharmacological alteration of the dopamine system alters reward discounting, these studies have yielded inconsistent findings. Here, we conducted a pre-registered systematic review and meta-analysis to evaluate dopaminergic drug-mediated effects on reward discounting of time delays, probabilities, and physical effort requirements in studies of healthy humans, non-human primates, and rodents.

## Methods

Studies were identified using PubMed. We limited studies to healthy animals excluding effects in human patient groups or animal models of human disorders. This produced a total of 1,343 articles to screen for inclusion/exclusion. Using random-effects with maximum-likelihood estimation, we meta-analyzed placebo-controlled drug effects for (1) DAT, (2) D1-like agonists, (3) D1-like antagonists, (4) D2-like agonists, and (5) D2-like antagonists.

From 1,343 studies, we meta-analyzed 119 studies testing the impact of DA drugs on reward discounting behavior.

## Conclusions

These findings suggest a nuanced relationship between dopamine and discounting behavior and urge caution when drawing generalizations about dopamine-mediated effects on reward-based decision making. Future analyses will test interactions with cost type (time, probability, and effort).

## Results

