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The Relationship Between Delay Discounting & Exploitation Behavior

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The Relationship Between Delay Discounting & Exploitation Behavior

Kaylyn J. Johnson, Rock Lim, Amanda R. Merner, and Heath A. Demaree

Abstract

Individuals make decisions about whether or not they will explore or exploit their environment every day, but it is unclear how impulsivity, or an individual's rate of delay discounting, impacts this decision. It is hypothesized that individuals with higher rates of delay discounting exhibit more exploitative behaviors. Participants in this study were given a questionnaire asking them to choose between receiving a small reward immediately or a larger reward at a later time to measure their rate of delay discounting. They were then asked to complete the Horizon Task, which measures a person's directed exploration, random exploration, and exploitation. Delay discounting and exploitation were found to have a non-significant correlation. As such, we found no evidence that delay discounting relates to exploitative behavior.

Background

Delay Discounting

Delay discounting has implications in decision-making, specifically the degree to which an individual exhibits self-control or acts impulsively (da Matta, 2012). One is said to have a high rate of delay discounting, and therefore is seen as more impulsive, if they prefer small, immediate rewards relative to larger, delayed rewards (da Matta, 2012).

Explore/Exploit Phenomenon

Explore versus exploit decision-making involves a person choosing to either explore a relatively unknown option or exploit a known, good option (Krebs, Kacelnik, and Taylor, 1978). For example, choosing to go to a new restaurant would be an exploratory decision, whereas going to your favorite restaurant would be an exploitative decision.

Horizon Task

The Horizon Task measures how much an individual decides to explore or exploit their options. In this task, participants have to choose between two "slot machines" (with different reward structures; one slot machine pays more than the other, on average) based on limited and controlled information beforehand (Wilson, 2014). Participants chose which slot machine to select over relatively short (5 trials) or long (10 trials) durations. Exploitation occurred when participants selected the optimal slot machine.

Hypothesis and Aim

Aim: Determine whether individuals with a high or low rate of delay discounting exhibit greater exploitation behavior.

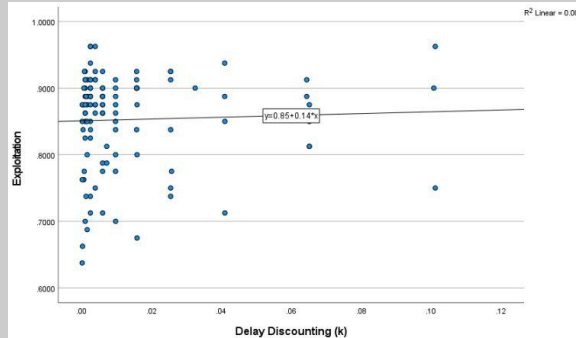
Hypothesis: Young adults will be more inclined to exhibit exploitative behavior on the Horizon Task if they have high rates of delay discounting because of the relationship between this trait and high rates of impulsivity.

Methods

Participants were recruited from an undergraduate introductory psychology course at Case Western Reserve University, totalling 112 participants who ranged in age from 18-22. Individuals were instructed to complete all tasks and evaluations in this experiment on a computer. Demographic data was collected from the participants initially. Participants next completed the 27-item Monetary Choice Questionnaire (Kirby, Petry, & Bickel, 1999) to evaluate the level of delay discounting. They were asked questions encompassing whether they would like to take an immediate, smaller reward, or wait a period of time for a delayed, larger reward. The difference in the amount of money and amount of time between each reward varied to allow for measure of the degree each individual discounted. Each participant was then asked to participate in the Horizon Task in order to measure the degree to which they exploited, randomly explored, or strategically explored.

Results

It was found that there was a non-significant correlation between delay discounting and exploitation, $r(111) = -.012$, $p = .90$



Conclusions and Discussions

Based on our results, we can conclude that there is not evidence to support a relationship between delay discounting and exploitation. Although there may simply be no relationship between these constructs, there are other explanations, as well.

First, we note that the delay discounting measure asked hypothetical questions whereas participants were actually rewarded based on their answers to the Horizon Task. The delay discounting measure asked participants a number of questions about whether they preferred smaller, immediate rewards or larger, delayed rewards. It was purely hypothetical in nature, and no actual rewards were given to participants in response to their responses. Conversely, participants were given financial rewards based on their answers to the Horizon task, providing participants with the motivation to do well and allowing for a presumably accurate measure of exploitation. Second, the delay discounting measure and the Horizon task asked questions over different time horizons. Whereas the delay discounting measure asked participants about their preferences over weeks and months, the Horizon Task asked people to make decisions with more immediate effects (over the course of seconds or minutes). It is possible that these task differences may account for the inability to detect a significant relationship between delay discounting and exploitation. Or, of course, a significant relationship may simply not exist.

References

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