*Lab Report -7*

*Delay Discounting Task*

*PSY310 – Lab in Psychology*

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*Github Link –*

**Introduction**

Delay discounting is the tendency to choose smaller immediate rewards over larger delayed rewards. The mechanism underlying this behaviour is called instant gratification theory and the impulsivity associated with wanting something that is desirable sooner than later. Harmful behaviours like substance use, binge eating, delaying studies etc are all examples of delay discounting. Behaviour analysts term the smaller sooner reward the impulsive choice and the larger later reward the self-controlled choice. This task is usually used to study the individual differences among human beings by looking at the decisions they make. Research findings also suggest that impulsivity is not a uniform trait and can vary when studied in different context or domains like health, loss etc. (Myerson, 2017). Personality traits are one of the most important individual differences that are studied using Eysenck Impulsivity Scale are also correlated with delay discounting rates. For example, emphasizing the role of individual differences, traits like sensation-seeking and extraversion predict preferences for immediate rewards over delayed rewards. (Eysenck, 1977). fMRI studies show that individual differences in delay discounting are also associated with distinct patterns of brain activity, specifically regions that involve decision making and self-control (PFC). (Koban, 2023)

In this experiment the participants are supposed to choose between immediate smaller rewards and delayed larger rewards, enabling us to understand human decision making, further revealing information regarding human behaviour.

**Method**

The experiment was done on 4 participants who were the students of Ahmedabad University of 21 years. The experiment was designed on Psychopy software on 16” laptop. Firstly, a cross fixation was added of size (w,h) = (0.05, 0.05) with position (0,0). Then a text was added with a line of code that constructed a string that displayed two monetary rewards - one that would be available immediately (reward\_today) and the other that would be delayed (future\_reward). This code is set to every repeat so that the value of the parameter is updated with every trial. Then a key response was added to the two text options for the participants to select one of those. LoopType was added as random with nReps equal to 14, and then lastly, conditions file was uploaded. The participants were supposed to make a decision between the two monetary rewards.

**Results**

The table below shows the geometric means of the participants derived from the k values or the discounting values of the participant. K - value is equal to [(future\_reward/reward\_today) – 1]/delay. The K-value tells us how the participants view the deal. K or the discounting parameter is estimated by calculating the geometric mean of the transition point in responses. The two values of when the responses change from either “t to l” or “l to t”. The larger the K - value/ Geomean the more the participant will discount the future, meaning the participant is more impulsive in decision making and tend to go for immediate rewards rather than future rewards and vice-versa for smaller k-value.

|  |  |
| --- | --- |
| **Participant** | **K / Geomean** |
| **1st** | 0.159084963 |
| **2nd** | 0.565194165 |
| **3rd** | 0.06450154 |
| **4th** | 0.15908 |

**Discussion**

Discounting value can be a marker for individual differences, but it’s not the excellent indicator because these rates do not generalize to other decisions made in lab or real world. Research also shows that discounting rates can be misleading sometimes as these can vary depending on the context of the study or also the type of reward, hence limiting its generalizability. There are other external factors like stress, hunger etc which can influence discounting rates, which are not accounted for in the model. Impulsivity is a multi-dimensional construct and hence cannot be measured by a single marker as it may capture temporal aspects but it lacks to capture the motor impulsivity or lack of foresight etc.

# References

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Koban, L. (2023). An fMRI-Based Brain Marker of Individual Differences in Delay Discounting. *The journal of neuroscience*, 1600-1613. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10008056/>

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