# COGNITIVE MODERATORS OF LOSS AVERSION

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## Research Question

Is the notion of loss aversion moderated by attention and limits of working memory?

## Abstract

Loss aversion is said to be a robust phenomenon which maintains that people's preferences towards avoiding losses is greater than procuring equivalent gains in a situation involving losses and gains.This study explores **whether loss aversion is merely a function of preference, or the decision making may be mediated by attention and working memory.** It was hypothesized that participants' decision making and performance in a given task would be affected by how instructions are posed in loss/gain conditions. Participants were divided into four groups based on gain/loss conditions and asked to complete an identical task of responding to target stimuli in an oddball paradigm. Although the study results showed no statistically significant results in terms of the accuracy, a low negative correlation was found between the average reaction time and the number of button press response to the target stimuli. Additionally, various trends emerged including
higher response accuracy in the control group over gain condition and a longer reaction time in the gain condition in comparison to loss condition.

## Methods

**Participants**

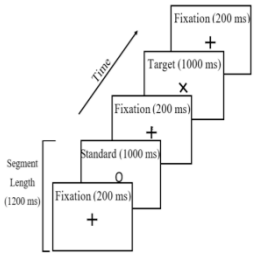
- 75 participants (43 Females, 32 Males)
  - Age: 18 years to 42 years (M = 21.24, SD = 3.58)
  - Ethnicity: Asian (48%),White (36%),Hispanic (12%), Black (2.7%), Other (1.3%)

**Apparatus**

The experiment was programmed using Javascript in the Vue framework and hosted in Linode (a cloud service provider). A domain was registered to allow participants to access the study.

**Procedure**

Participants were presented with stimuli in an oddball paradigm. They were asked to respond to the target stimulus (X) by pressing the spacebar on their keyboards, while inhibiting their responses for the standard stimulus (O). The ratio of standard (O) to target (X) was 16:6 (160:60 events).




Independent samples t-tests and Pearson's Correlations were computed on SPSS to analyze the data.

## Experimental Design

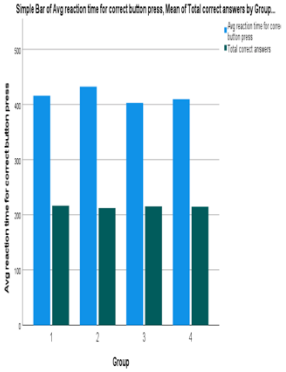
An **independent measures design** was used to conduct the experiment. Participants were randomly divided into four groups based on loss/gain conditions as follows:
Group 1: Press the spacebar when you see an X. (Control Group)
Group 2: Press the spacebar when you see an X. You will gain 10 performance points for each correct response to "X".
Group 3: Press the spacebar when you see an X. You are given 1000 game points to start. You will lose 10 performance points to every incorrect response to "X".
Group 4:Press the spacebar when you see an X. You will gain 10 performance points to every correct response to "X", and lose 10 performance points to every incorrect response to "X".

- **Independent Variable**: Loss/Gain Condition
- **Dependent Variable**
  - Accuracy: Correct button presses (to "X") and inhibition (to "O").
  - Reaction time: Difference between time of stimulus onset and button press for target
  - Consistency: Regularity of response throughout the experiment

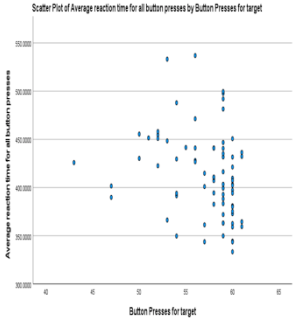
## Results

- An independent samples t-test on the reaction time for correct responses to the target stimulus showed a trend participants in Group 2 had longer average reaction time to the target stimulus ($M$ = 432.31, $SD$ = 55.37) in comparison to Group 3 ($M$ = 403.04, $SD$ = 37.62), $t(29.50) = 1.88$, $p = .06$

- An independent samples t-test on the total correct responses indicated a trend towards participants in Group 1 showing higher scores ($M$ = 216.76, $SD$ = 2,61) than participants in Group 2 ($M$ = 212.44, $SD$ = 9.30), $t(19.80) = 1.89$, $p = .07$.




- A low negative correlation was shown between the overall average reaction time and the button press response to target stimuli, r(73)= - .29, p= .02 such that higher reaction time among the participants was associated with decreased count of total button press response to the target.




## Discussion and Limitations

- A low but significant negative correlation was found between reaction time and consistency of participants' response to the target stimulus. It may be due to participants being cautious with their responses and taking longer time to process the stimulus before responding, perhaps as a function of loss aversion.
- No other significant differences were observed across the the conditions based on the measures of accuracy, reaction time, and consistency.
- Some interesting trends emerged in the results including that participants in the gain condition had longer reaction time to the target stimulus, than those in the loss condition. It may tie in with the negative correlation found between the reaction time and consistency of response to target stimulus. Those in loss condition may have experienced increased alertness, which implies the role of attention and working memory as modulators of loss aversion in the given task.
- Interestingly, another trend showed that participants in the control condition condition had higher correct responses than those in the gain condition, implying the incentive of gaining points may have potentially backfired on their performance.
- The lack of significant differences but the presence of certain trends may be due to a small sample size, which is a major limitation to the study.
- The study required participants to have access to a computer in order to engage in the task, which may have contributed to convenience sampling.
- Because participants had to use their own computers to complete the experiment, the variations in device specifications may have caused minor discrepancies in their performance.