Visual Search Experiment

PSY310: Lab In Psychology

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Introduction

A visual search task, is an experimental design which involves the participant to find the target amongst number of distractors. The experiment is one of the major key tools for extracting insights about selective attention and the cognition that goes into attentional processes. The experiment involves locating a specific target, could be any shape, letter etc. amongst distractors that are non-target objects. To understand the cognition that underlies selective attention such as search efficacy the experimenter may play with number of distractors in the experiment or they may make the distractor and the target to look similar. Visual search tasks are important in understanding the visual processing and attention which are important components which come in interplay every day. It helps ensuring safety for people engaging in radiology or air traffic control.

Method

The experiment was conducted with 4 participants, with each of them participating in 200 trials of the experiment. Participant 1, a 19-year-old student of Undergraduate Program, majoring in psychology. Participant 2, a 21-year-old student of Life Sciences, Undergraduate Program. Participant 3, a 20-year-old student of SPS major, Undergraduate Program. Participant 4, a 20-year-old BBA student, Undergraduate Program. The participants were informed about the task and their consent was taken before they participated in the experiment. The experimental setup utilized PsychoPy v2024.1.5 (Peirce et al., 2019). The experiment was displayed on a 14” monitor with a resolution of 1920 x 1200 pixels. The experimental window was of 1100 x 600 pixels. The task consisted of the participant identifying the letter “T” which may be at a random position, amongst a lot of distractors, being the letter “L” at random locations and positions for the visual search experiment. The

participants needed to click on the target or anywhere else on the screen to proceed further. There were 2 conditions, either there were 5 distractors or 10 distractors along with the target present. Since it could take longer to locate the target amid a higher number of distractions than among a lesser number, it is assumed that a greater number of distractions will result in a faster reaction time.

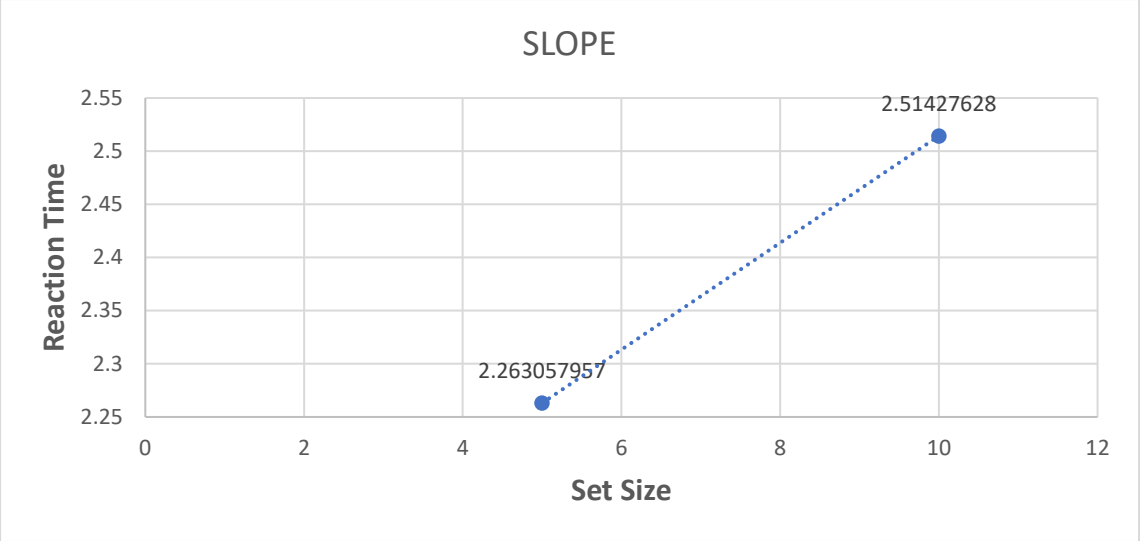
Image A Image B

Figure 1: Image A, has 5 distractors & Image B has 10 distractors amongst the target present.

Results

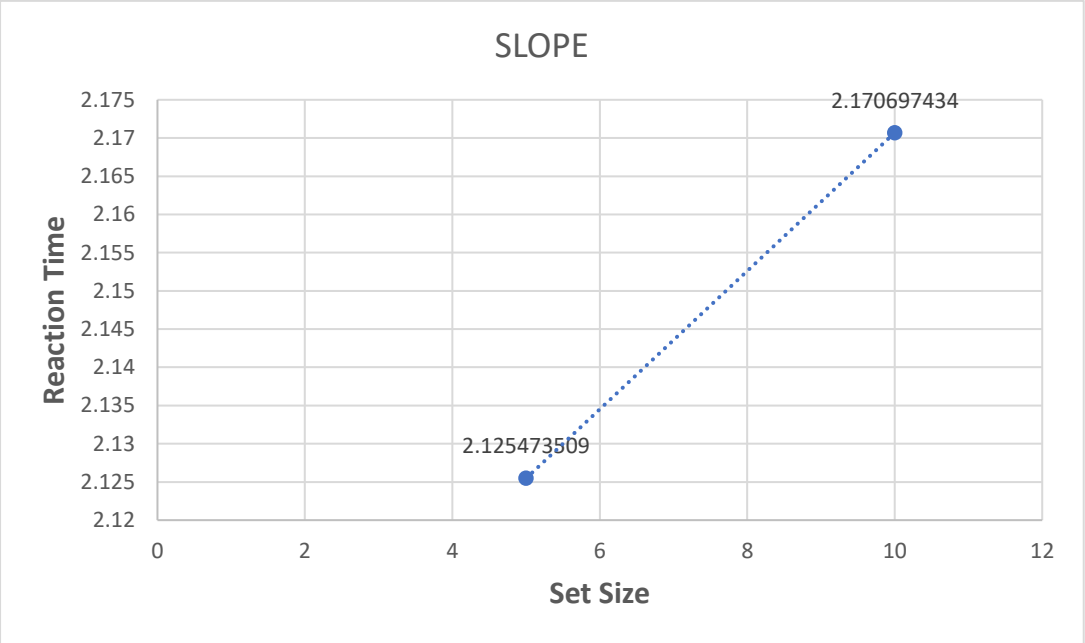
Only accurate trials were important in calculating Mean Reaction Time for both set sizes that were 5 and 10.

For Participant 1, the average reaction time for a set size of 5 is 2.2630, while for a set size of 10, it is 2.5142. This data was used to plot the graph 1 shown below. The slope of the reaction time is 0.0502, which is 50.2 ms/item, indicating that as the set size increased, participants' reaction time also increased. Specifically, the reaction time for set size 10 was higher compared to set size 5.



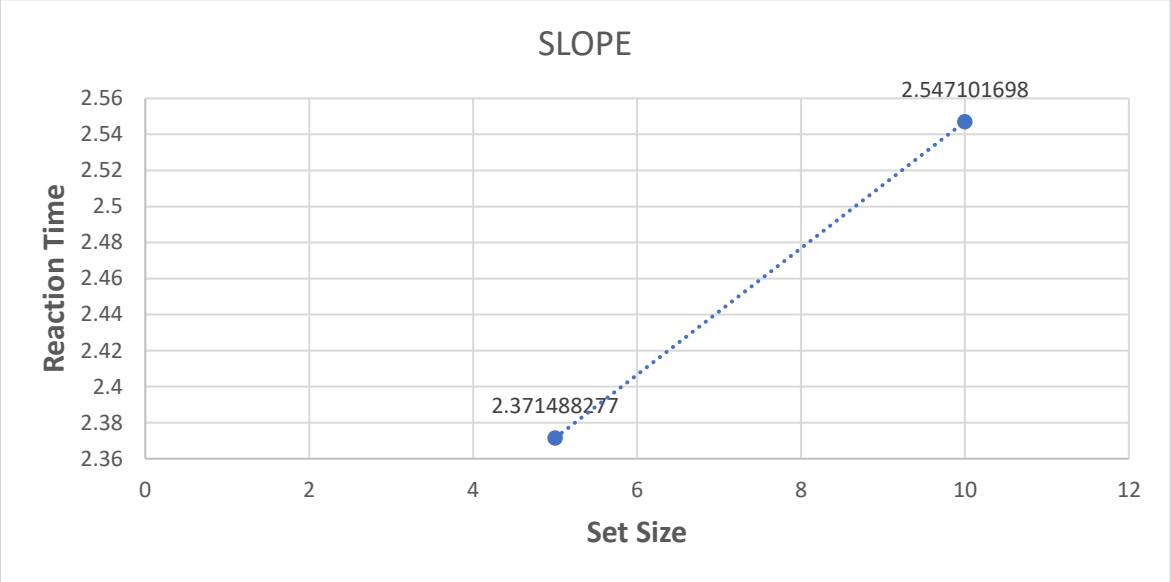
Graph 1, slope of the first participant

For Participant 2, the average reaction time for a set size of 5 is 2.1254, while for a set size of 10, it is 2.1706. This data was used to plot the graph 2 shown below. The slope of the reaction times is 0.0090, which is 9.0 ms/item, indicating that as the set size increased, participants' reaction time also increased. Specifically, the reaction time for set size 10 was higher compared to set size 5.



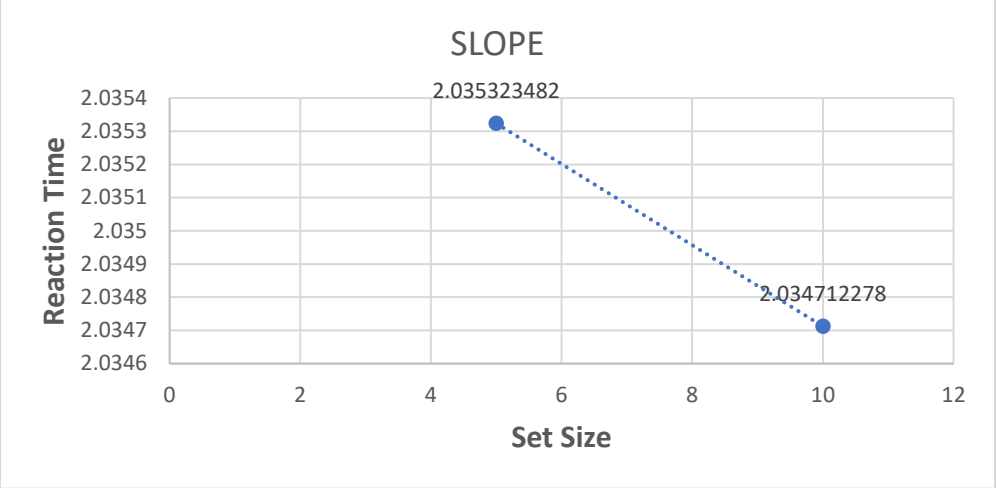
Graph 2, slope of the 2nd participant

For Participant 3, the average reaction time for a set size of 5 is 2.3714, while for a set size of 10, it is 2.5471. This data was used to plot the graph 3 shown below. The slope of the reaction times is 0.0351, which is 35.1, indicating that as the set size increased, participants' reaction time also increased. Specifically, the reaction time for set size 10 was higher compared to set size 5.



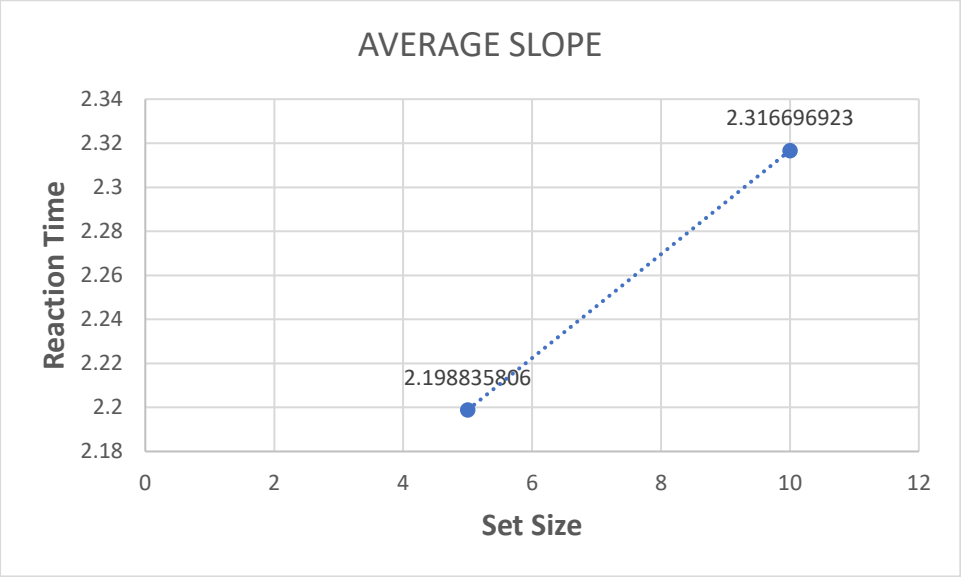
Graph 3, slope of the 3rd participant

For Participant 4, the average reaction time for a set size of 5 is 2.0353, while for a set size of 10, it is 2.0347. This data was used to plot the graph 4 shown below. The slope of the reaction time is -0.0001, indicating that as the set size increased, participants' reaction time decreased. Specifically, the reaction time for set size 5 was higher compared to set size 10.



Graph 4, slope of the 4th participant

Respectively, the average Reaction Time for set size 5 and set size 10 calculated for all the participants show that as the set size increases, so does the reaction time for the same. With the mean RT set size 5 is 2.1988 and the mean RT for set size 10 is 2.1366. The slope for the same is 0.02357, and value being 23.57 ms/item. As shown in graph 5.



Graph 5, Average Slope

Discussion

The number of distractors present or more accurately, the set size determines changes in reaction time. It is observed that reaction times increases with increase in set sizes, except the 4^{th} participant in regard to the data gathered from this particular experiment. The insight gained is that participants may take longer to identify the target or may spend more time searching for the target amongst a greater number of distractors. The slopes of the graphs demonstrate a participant's sensitivity to the set size, indicating that accuracy increases with concentration, and concentration leads to reduction in reaction time, which is more likely to occur with smaller set sizes (fewer distractors).

References

Wolfe, J. & Brigham and Women's Hospital, Harvard Medical School. (2023). Visual search. In *Oxford Research Encyclopedias, Psychology*. https://search.bwh.harvard.edu/new/pubs/OxfordEncyPsych_VisualSearch2023.pdf

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