RESEARCH NOTE

**Your Name goes here**

Searching for a target: Serial vs. parallel processing in visual search

**Abstract** Your summary goes here. It should include one background sentence introducing the topic of visual search, one sentence describing the participants, one sentence describing the task, and two sentences describing the main results. The Abstract should be typed as one paragraph.

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**Introduction**

You should begin by introducing the topic of *visual search.* Why is it important? Cite your textbook (Myers & DeWall, 2021) as a reference for the importance of this topic.

Next, describe the difference between a *single-feature search* and a *conjunctive search,* and refer to Figures 1 and 2 as examples. Cite the Wikipedia article as a reference (“Visual search,” 2012).



Figure 1. Example of a difficult visual search task. (Adapted from Wikimedia Commons, 2006.)



Figure 2. Example of an easy visual search task. (Adapted from Wikimedia Commons, 2006.)

Then describe the purpose of our experiment—as a replication of some of the original research findings. State the three hypotheses in this experiment: one about the type of search, one about the number of objects, and one about the interaction reflected in the slope of the RT line graphs. Cite the article by Treisman and Gelade (Treisman & Gelade, 1980) and the article by Nakayama and Silverman (Nakayama & Silverman, 1986) as references for the three hypotheses.

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**Method**

*Participants.* Describe the participants in this study (number, age group, gender).

Then explain how they were recruited and whether they received any compensation for participating.

*Design.* Every experiment involves at least one independent variable (that gets manipulated) and at least one dependent variable (that gets measured). Name and describe the two independent variables and the two dependent variables in this experiment, and explain why each is an independent or dependent variable.

*Apparatus and procedure.* Using the Treisman and Gelade article as a model, describe how the stimulus materials were presented (the sequence of events in each trial). You may need to take another look at the practice trials in the actual experiment.

Then describe how the participants responded. Describe the procedures this experiment used to collect the behavioral responses from the participants. You may need to review the practice trials of the actual experiment.

Finally, describe the number of practice trials and the number of test trials, and state the approximate length of the testing session.

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**Results**

Before you begin writing this section, plot your own RT results in the middle section of your data sheet (bar graph for Overall RT, line graph for RT by Condition). Plot the pooled RT results for all the students who participated in this experiment at the bottom of your data sheet.

Begin the Results section by reminding the reader about the two dependent variables that were measured in this experiment. Using information from the pooled results, describe the statistical analyses that were performed on the data from the participants.

Describe the pattern of pooled RT results for each of the two “main effects”. Include the t-value, degrees of freedom, and p-value for each effect. Support your description with a simple table of RT results that reports the mean and standard deviation for each cell of the design, and refer the reader to Table 1.

|  |  |  |  |
| --- | --- | --- | --- |
| **Reaction****Time** | FeatureSearch | ConjunctiveSearch | *Overall* |
| 4 objects | 469 (57) | 664 (89) | 566.5 |
| 16 objects | 580 (64) | 1076 (112) | 828.0 |
| *Overall* | 524.5 | 870.0 | 697.3 |

Table 1. Mean RT and standard deviation for each cell of the experimental design.

*Search type.*

Next, construct and include a simple bar graph that displays the pooled results comparing feature search and conjunctive search (Fig. 3). Use the “overall” values from the bottom row of the table above.

Figure 3. Effect of Search Type on Mean RT.

Error bars indicate the 95% confidence interval.

Refer the reader to Figure 3, and state whether the results supported the major hypothesis about the effect of search type.

*Number of objects.*

Then, construct and include a simple bar graph that displays the pooled results comparing four objects and sixteen objects (Fig. 4). Use the “overall” values from the right column of the table above.

Figure 4. Effect of Number of Objects on Mean RT.

Refer the reader to Figure 4, and state whether the results supported the major hypothesis about the effect of number of objects.

*Interaction of search type and number of objects.* Describe the pattern of pooled RT results for the “interaction effect”. Include the t-value, degrees of freedom, and p-value for the comparison of 4 and 16 objects for feature search, and the t-value, degrees of freedom, and p-value for the comparison of 4 and 16 objects for conjunctive search. Support your description by referring to the table of RT results above.

Then, construct and include a simple line graph that displays the pooled results, comparing the slope of the line for feature search across 4 and 16 objects with the slope of the line for conjunctive search across 4 and 16 objects (Fig. 5). Use all four of the main cell values from the table above.

Figure 5. Interaction of Search Type and Number of Objects.

Refer the reader to Figure 5, and state whether the results supported the major hypothesis about the interaction of search type and number of objects.

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**Discussion**

*Overall findings.* Remind the reader of the difference between “feature search” and “conjunctive search” on a visual search task. Briefly describe the general pattern of results from earlier studies using the visual search paradigm (and cite the articles by Treisman and Gelade and Nakayama and Silverman again here).

Next, summarize the results from our participants in the feature search and conjunctive search conditions (no statistics here, please). Did our results support the hypotheses derived from the earlier studies?

Finally, describe the difference between “parallel processing” and “serial processing.” According to Treisman’s Feature Integration Theory, what type of processing is needed in conjunctive search as compared to feature search? In which type of search does the “pop-out” phenomenon appear? How does Treisman’s theory relate to our results?

*Individual variability.* Write one or two sentences explaining that the average results from a group of participants are more reliable than the results from any one participant.

Construct and include a simple line graph (Fig. 6) displaying your own results on this visual search task.

Figure 6. Interaction of search type and number of objects for a single participant.

Then, as an example of individual variability, compare your own individual results to the pooled results, and refer the reader to Figure 6. Describe how the pattern of your results is similar to or different from the pooled results. Be sure to attach your Data Sheet / Graph Page to your typed lab report!

Conclude with a short paragraph suggesting future studies that could be performed to follow up on these results.

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**References**

Myers, D. G., & DeWall, C. N. (2021). *Psychology: Thirteenth edition in modules.* New York: Worth Publishers.

Nakayama, K., & Silverman, G. H. (1986). Serial and parallel processing of visual feature conjunctions. *Nature, 320,* 264–265.

Include the reference for the Treisman and Gelade article, strictly following the model provided in the Nakayama and Silverman reference above.

Treisman, A. M.,

Use this Wikipedia reference exactly as it stands. APA style does not allow punctuation after the URL.

Visual search. (n.d.). In Wikipedia. Retrieved February 5, 2012, from http://en.wikipedia.org/wiki/Visual\_search

**Acknowledgments**  I wish to thank Dr. Thomas Ludwig for providing the computer software used for data collection and for the statistical analyses.