Differences in similarity effects across target categories

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Background

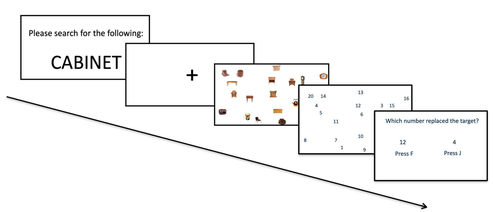
- **Target/distractor similarity** in visual search is known to influence categorical search performance [1].
- The degree to which category members vary from each other (**variability**) also affects search performance.
- Attentional guidance is best when the target categories are homogenous (low variability) likely due to template precision [3].

Current Study

- We examined whether target/distractor similarity effects are moderated by category variability.
- Eye tracking was used to get the measures of **attentional guidance** and **verification**.
- We hypothesized that a benefit of a precise search template in low variability (LV) targets would only be present in search among low similarity distractors compared to high similarity distractors.

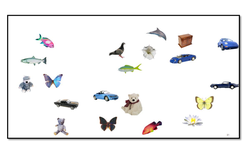
Method

- Using a **within-subjects design**, we manipulated two independent variables: target **variability** (continuous, measured through MDS [2]) and **target/distractor similarity** (low/high).
- Attentional guidance and verification were measured with eye tracking (Eyelink 1000+)
- 63 University of Richmond students were presented with 15 practice trials followed by **5 blocks of 48 experimental trials** (Color *N* = 32; Greyscale *N* = 31).



Experiment Trial Progression

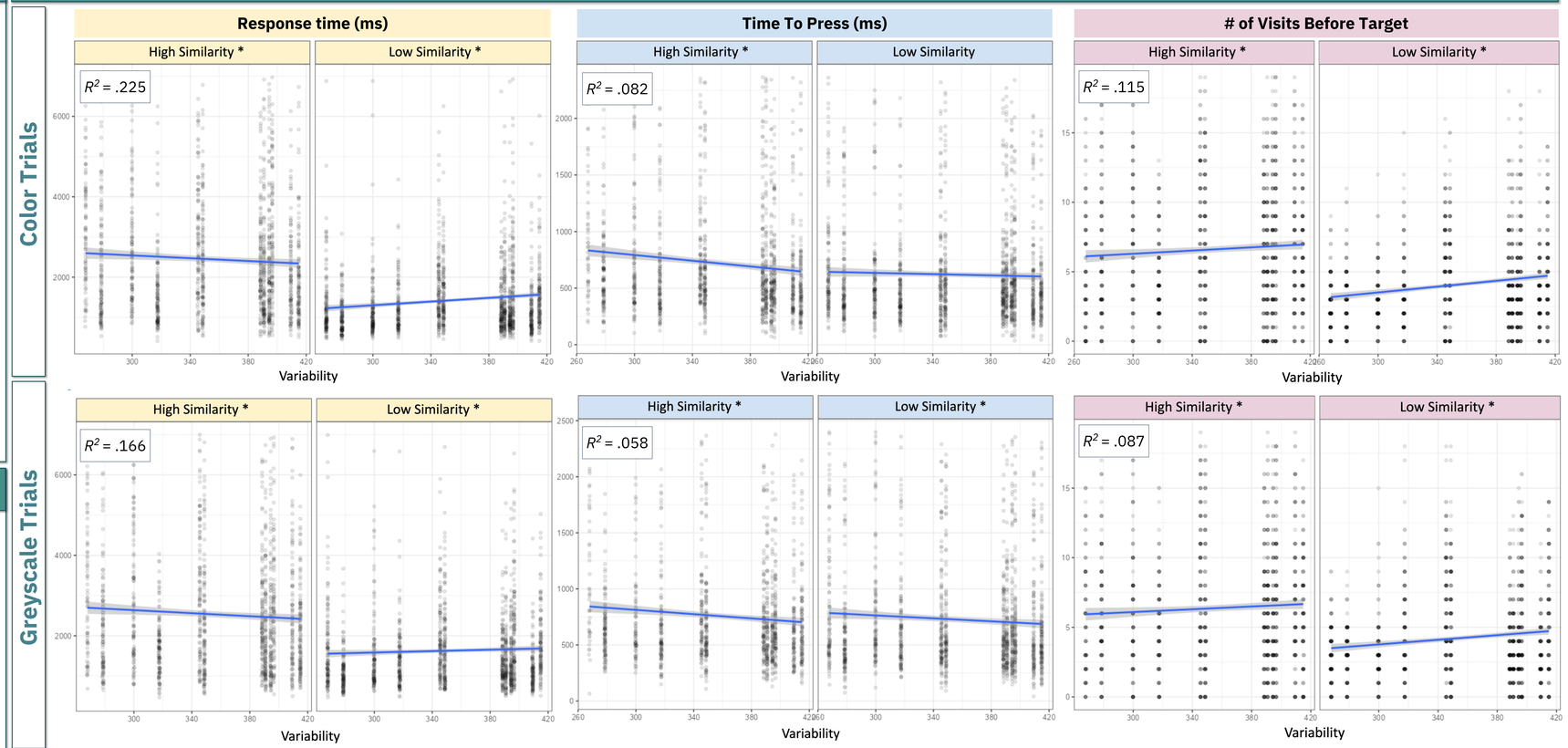
Find CABINET



Low distractor similarity

High distractor similarity

Results



Conclusions

- Having a precise search template (low variability) creates **more opportunity for interference**, so the benefit of a precise template is "washed out" in high similarity distractors response times.
- Color provided a benefit for verification but was **not the source of the interaction** which means that searchers might use other dimensions (e.g. shape, size) to verify targets.
- In target verification, **a precise search template could be a source of disadvantage** for high similarity targets since searchers might have to check more distractors after they found a target.
- No significant interactions were uncovered in the attentional guidance measures which may be due to the number of items in the search array. Additional analyses can be conducted to look at scan paths.

References

[1] Alexander, R., & Zelinsky, G. J. (2011). Visual similarity effects in categorical search. *Journal of Vision*, *11*(8), 9. https://doi.org/10.1167/11.8.9

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[3] Hout, M., Robbins, A., Godwin, H. J., Fitzsimmons, G., & Scarince, C. (2017). Categorical templates are more useful when features are consistent: Evidence from eye movements during search for societally important vehicles. *Attention, Perception & Psychophysics*, *79*(6), 1578–1592. https://doi.org/10.3758/s13414-017-1354-1