All targets are not created equal: Some targets are often missed in hybrid visual search tasks

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Background

Past work on hybrid visual memory search has found that people can successfully search for large numbers of target images in a visual array (Wolfe, 2012).

Although visual long-term memory has a massive storage capacity (Brady, Konkle, Alvarz, & Oliva, 2008), it is unclear if all of the individual target images in a hybrid search task are encoded with equal accuracy. Additionally, little is known about how successfully encoded items are represented internally.

The current study examined two questions relating to the internal representation of targets in a hybrid search task:

1) Are all targets encoded with equal accuracy?

1) Do people search using representations of each individual exemplar, or do they rely on abstracted prototypes to guide search?

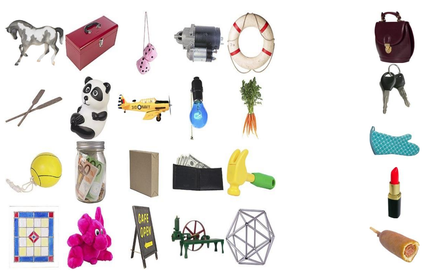
Procedure

Memorize 30 items from 1 of 2 memory sets:

Categorical Search

large category small category

Mixed Search



large category small category

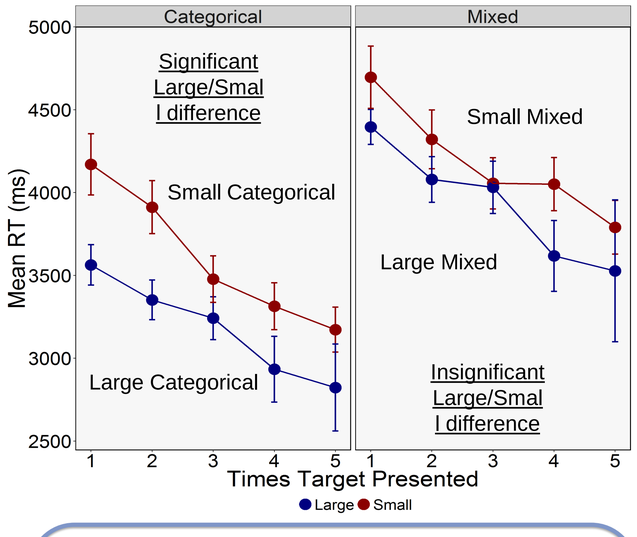
Targets were shown in a random, intermixed order for memorization. Observers were not made aware of the arbitrary category size in the mixed condition.

After successful memorization

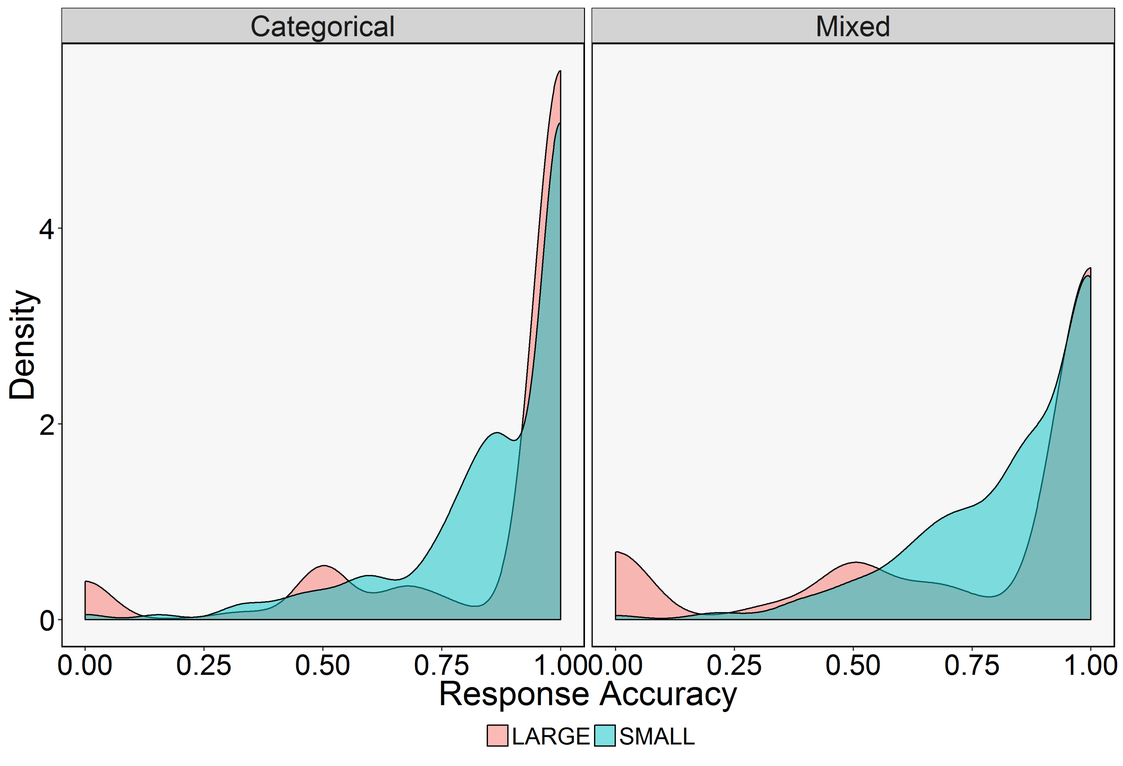
Search for any one of 30 targets:

In the categorical search condition, strollers and footwear appeared as targets with equal frequency. Distractors came from categories that did not overlap with any targets.

Results



RTs in the categorical condition were faster when more exemplars were available, suggesting that when searching for items within a category, a greater number of exemplars may create a more useful search template.



In hybrid search tasks, targets from large, categorically diverse memory sets are often missed altogether.

Conversely, observers are most accurate when searching for a small number of items, regardless of categorical diversity.

This finding suggests that it is necessary to consider the implications of unequal encoding in hybrid search tasks.