

Find one fast, or find them all slow: Do collaborative visual searchers search more quickly or more thoroughly?

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Challenges in Visual Search

- Professional visual searchers (e.g., baggage screeners) face challenges that make their jobs difficult, leading to a significant risk of errors.
- Particularly in airport baggage screening, such categorical hybrid searches exceed the capacity of visual working memory, and involve looking for loosely defined targets.

Previous Work

- In a previous study (Lopez et al. 2015), we sought to find out how working with a partner would aid in the efficiency and accuracy of search.
- We found that working in pairs elicited selective benefits: Team searchers produced better hit rates and faster target location times, but equivalent false-alarms and total search times.

The Current Investigation

- We conducted a laboratory experiment specifically designed to mimic challenges faced by professional searchers.
- Our goal was to determine the effectiveness of instilling specific search strategies amongst collaborative teams.

Method

- N = 69 teams; four collaboration conditions (solo, collaborative, memory, visual).
- Memory target set of 24 categories (e.g., teddy bears, printers).
- Required to achieve 80% accuracy on a category recognition task before proceeding to search.
- Participants viewed arrays of 32 real-world objects, finding 0-3 targets on each trial.
- Feedback and points accrued were displayed after each trial (+1 point for every “hit” and -1 point for every “miss” or “false alarm”).
- Encouraged to score as many points as possible.

Experiment 1: Find Fast

- Participants instructed to find one target as quickly as possible.

Experiment 2: Find All

- Participants instructed to search thoroughly to find all possible targets.

Strategy Conditions



Visual

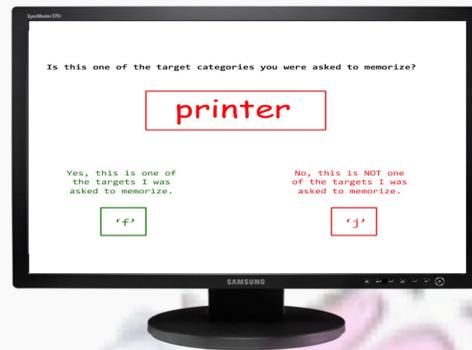


Memory

- Ps instructed to primarily search on their side of the computer screen.

- Ps instructed to primarily search for their 1/2 of the 24 category memory set.

Procedure: Target Memorization



- Target categories displayed for 3 seconds each, then memory tested using 2AFC test.
- Two cycles of this procedure were passed with 80% accuracy or better, before people could start search.

Procedure: Visual Search



Experiment 1: Find Fast

- Participants tried to find a single target as quickly as possible.

Experiment 2: Find All

- Participants tried to find all instances of targets that appeared.



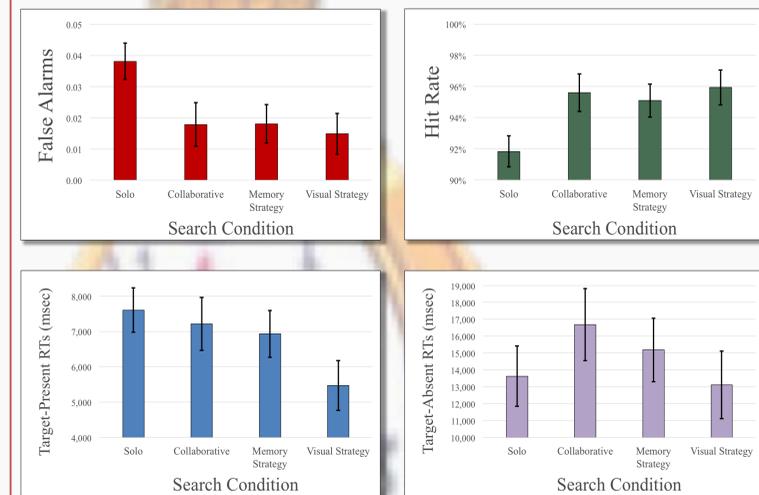
- People clicked on each target they found; hits were then bordered in green, false-alarms in red (in Find All exp).



- After each trial, the correct target items were shown, along with specific feedback about hits, false-alarms, misses, and total points accrued.

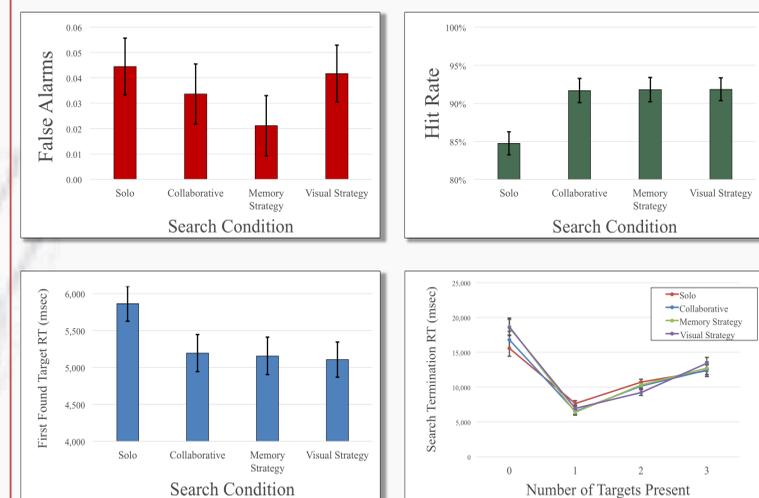
Results

Experiment 1: Find Fast



- False-alarms were less frequent among teams, relative to solo searchers.
- Hit rates were higher among teams.
- There were trends for faster target-present RTs among teams, but they were non-significant.
- Similarly, target-absent RTs did not differ among groups.

Experiment 2: Find All



- False-alarms were no different across groups.
- Hit rates were higher among teams, relative to solo searchers.
- There was a non-significant trend for teams to locate their first target more quickly.
- And there was no difference in overall search RTs among groups.

Conclusions

- Working in pairs mostly affords benefits to the accuracy of search, but not necessarily the speed of finding targets, or terminating the search.
- We found that, surprisingly, the search strategies did not actually provide any further benefits to working in a collaborative pair. Future work will ensure that strategies were followed closely.
- Ongoing work is being directed at the effectiveness of collaborative search strategies on overcoming the low-prevalence effect (e.g. Hout et al., 2015; Godwin et al., 2015).

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