Examining Confirmatory Strategies in Visual Search: People are more flexible than you think

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Target-Confirming Bias in Visual Search

- Recent research from Rajsic, Wilson, and Pratt (2015) suggests that people are biased to use a “target-confirming” strategy in visual search.
- Specifically, people were shown an initial target letter to search for throughout the experiment, along with a “template color” (Exp. 3). In each trial, the target letter either matched or mismatched the template color with equal probability; however, people rigidly relied on this color to guide search. RTs revealed a stubborn, perseverative pattern, even though the optimal strategy was always to look at the majority of colored letters in the display, regardless of whether they matched the template color or not, using process-of-elimination if necessary.
- People also perseverated with this confirmatory strategy even after being explicitly informed of the optimal, minimal strategy prior to search. This finding suggests that confirmation bias in search may be involuntary (Rajsic, et al., 2015).

The Present Investigation

- However, a type of involuntary learning is also robust in visual search: the effect of target prevalence. Studies of prevalence effects have shown that with sufficient experience, people automatically become biased to perceive frequent items, while simultaneously becoming biased against perceiving rare items (Hout, et al., 2015; Wolfe, et al., 2007).
- If people automatically learn prevalence information in visual search, might they adopt a more optimal search strategy, if the target rarely matches the provided template color?

Design

Within-subjects

Example Template Color: Green

1. Template Color Match Proportion (.25, .50, or .75, as in Rajsic, et al., 2015)

2. Target Color: 
   
   Template Match | Template Mismatch

Between-subjects:

Prevalence Group:

Balanced: Target matches template color, 50% of trials
High: Target matches template color, 85% of trials
Low: Target matches template color, 15% of trials

Procedure

Press the space bar to begin the trial.
500 ms
Space bar to terminate trial

Results

Balanced Prevalence

High Prevalence

Low Prevalence

Conclusions

- Target prevalence strongly influences the search strategies that people adopt. When search targets frequently match the template color, people prefer a confirmatory strategy; i.e., primarily utilizing the template color to guide search.
- In contrast, when targets rarely match the template color, people demonstrate a more flexible pattern in which they restrict attention to the smaller subset of colored letters in the display.
- Surprisingly, people also use this optimal strategy when target color prevalence is equated, utilizing the smaller subset color to guide search. They flexibly switch between mental color templates, depending on the characteristics of the current display, in contrast to the findings of Rajsic, et al., 2015.

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References


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