

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

Stephen C. Walenchok¹, Stephen D. Goldinger¹, and Michael C. Hout²



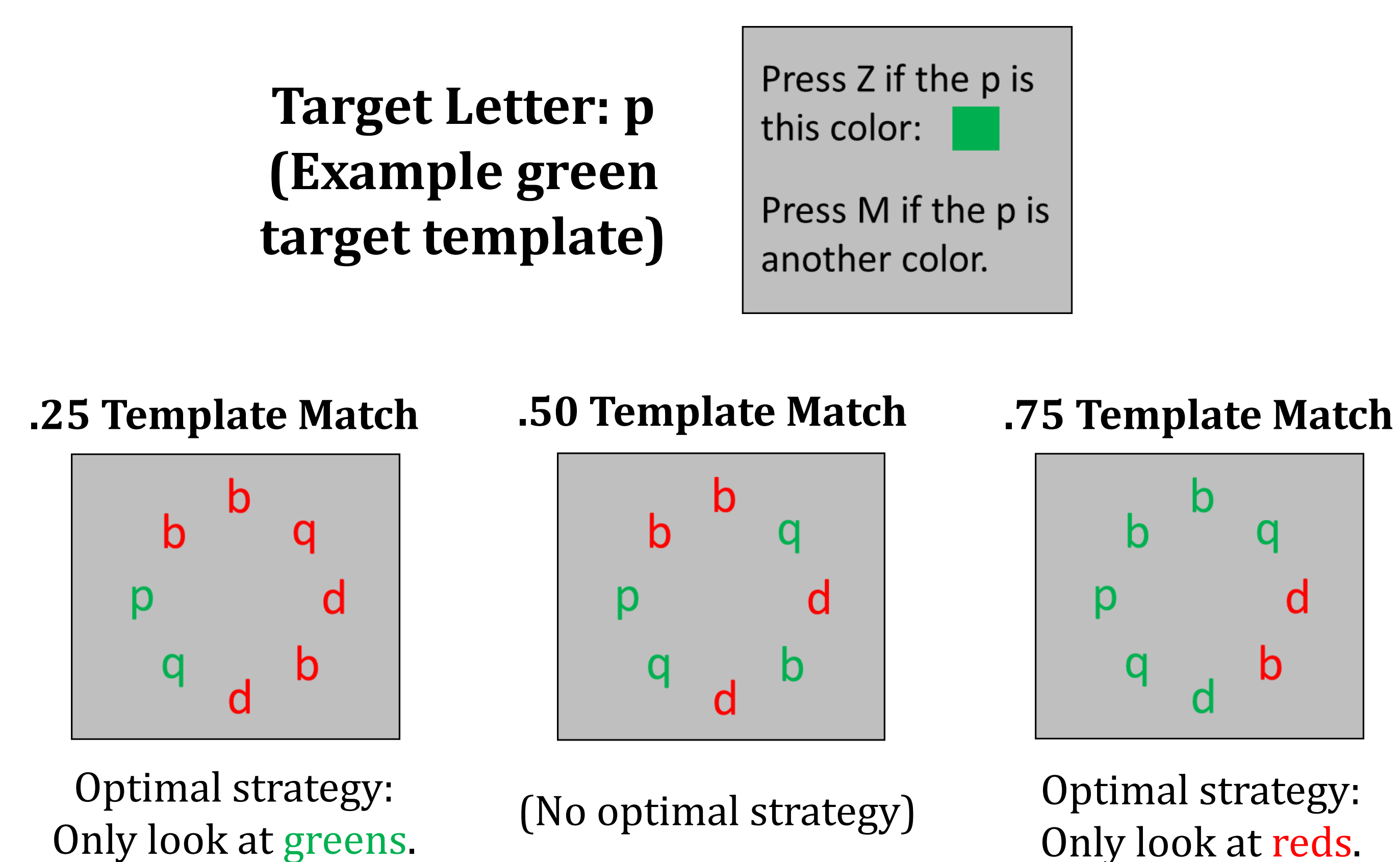
Target-Confirming Bias in Visual Search

- 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 minority 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).

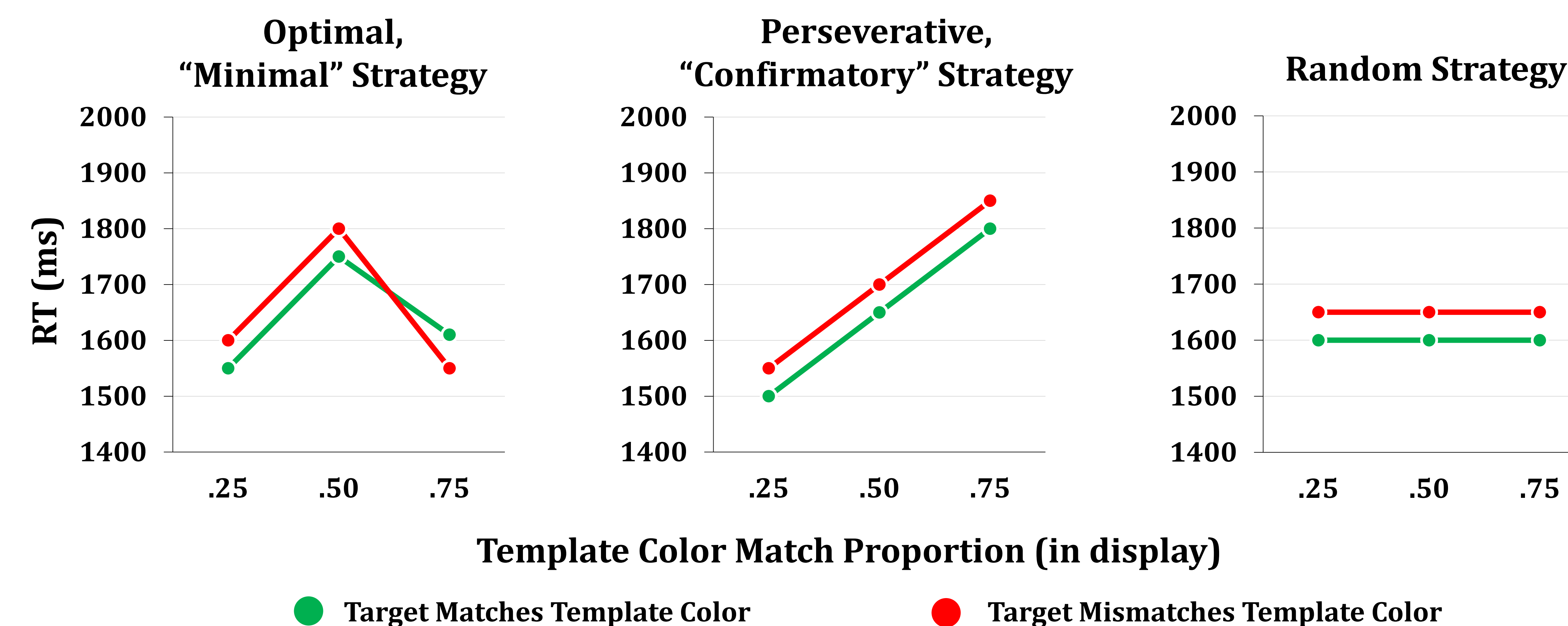
The Present Investigation

- 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?**

Rajsic, Wilson, & Pratt, 2015 (Experiment 3):



Predicted Results



Design

Within-subjects

Example Template Color: ■

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

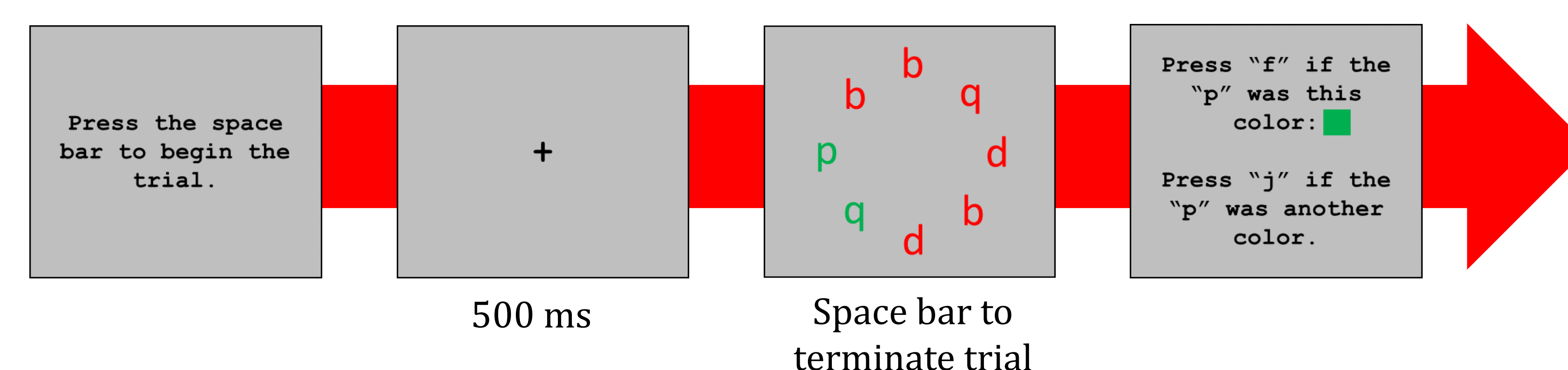
2. Target Color: p p
Template Match Template Mismatch

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
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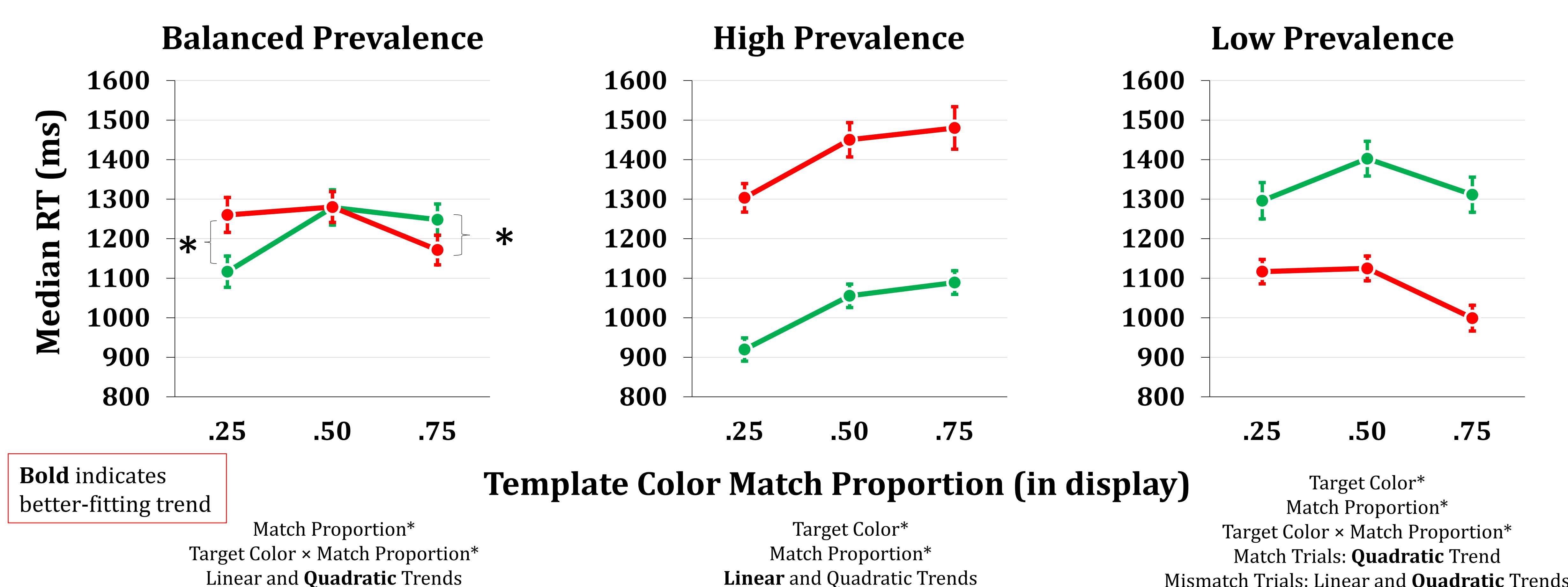
Procedure



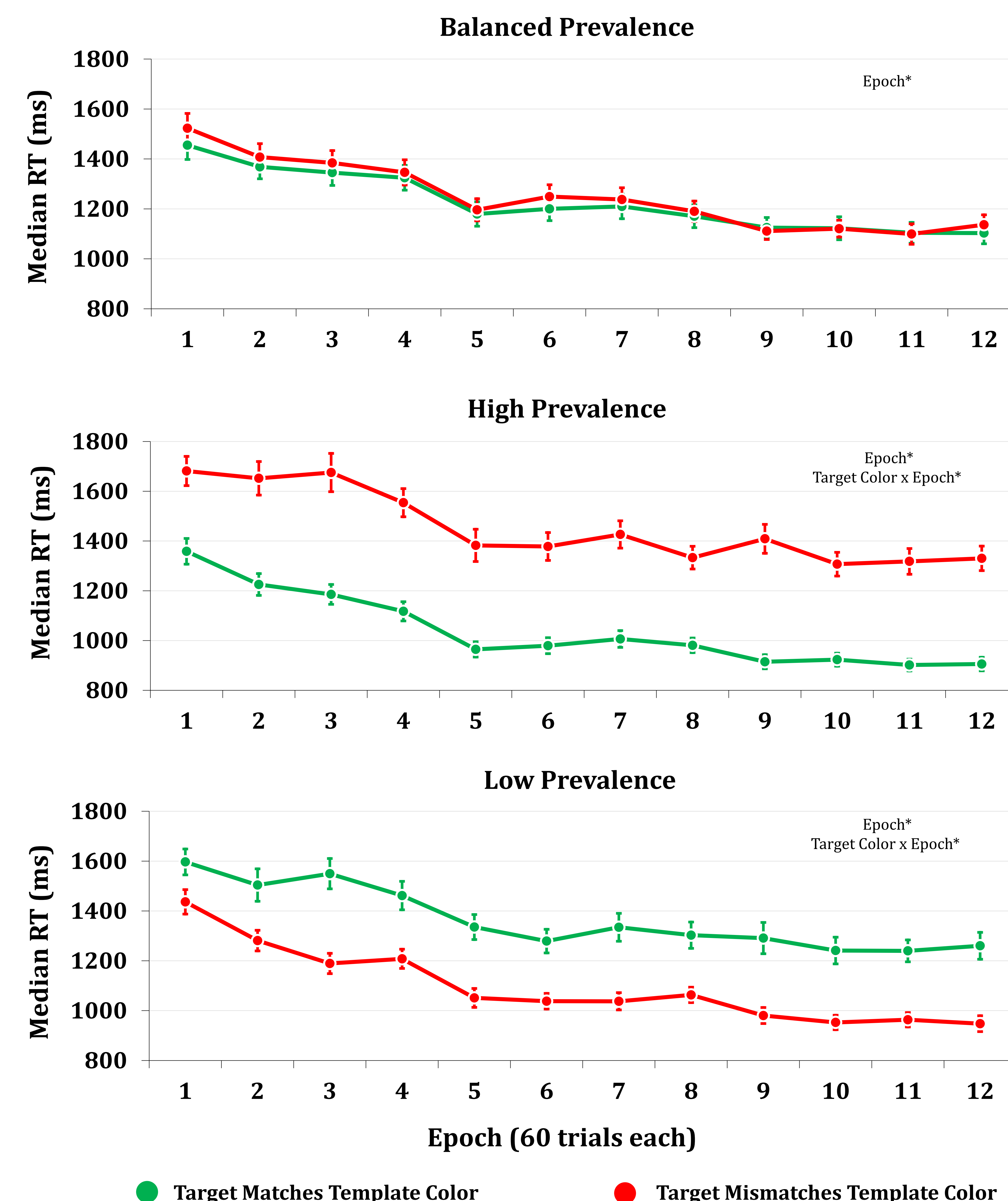
Conclusions

- 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.**

Results



Prevalence Effects Over Time



References

- Hout, M. C., Walenchok, S. C., Goldinger, S. D., & Wolfe, J. M. (2015). Failures of attention in the low-prevalence effect: Evidence from active and passive visual search. *Journal of Experimental Psychology: Human Perception and Performance*, 41(4), 977-994.
- Rajsic, J., Wilson, D. E., & Pratt, J. (2015). Confirmation bias in visual search. *Journal of Experimental Psychology: Human Perception and Performance*, 41(5), 1353-1364.
- Wolfe, J. M., Horiowitz, T. S., Van Wert, M. J., Kenner, N. M., Place, S. S., & Kibbi, N. (2007). Low target prevalence is a stubborn source of errors in visual search tasks. *Journal of Experimental Psychology: General*, 136(4), 623-638.

For more information and reprints, please contact Stephen Walenchok at swalench@asu.edu.