Multiple Target Templates are Maintained without a Cost to Precision

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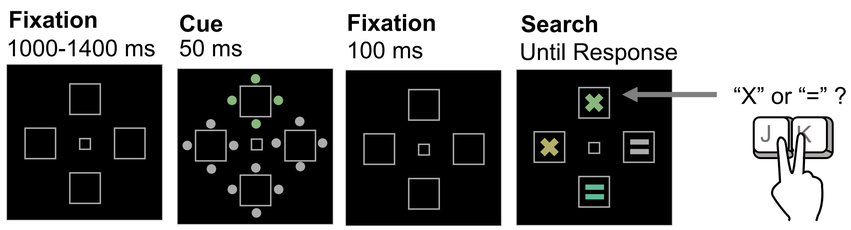
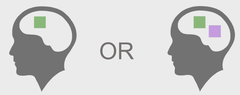
BACKGROUND

- Attentional templates bias the processing of items possessing target-defining features[1]
- Such templates are more narrowly represented when distractors resemble targets[2]
- While multiple templates can be maintained simultaneously[3], are such representations similarly narrowed by search context (**Exp. 1**)?
- If so, does set size constrain template precision in a fashion similar to that typically shown for working memory (**Exp. 2**)?

GENERAL METHOD

512 trials across 8 blocks.



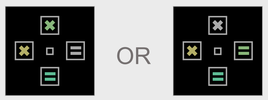


OR

One or two target colors assigned that remained constant.

OR

Cue color either exactly matched the target color or differed by a specified value in hue space (e.g. 30°).



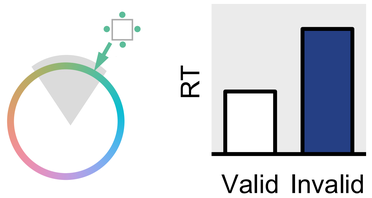
OR

The cue **validly** (25%) or **invalidly** (75%) predicted the target location.

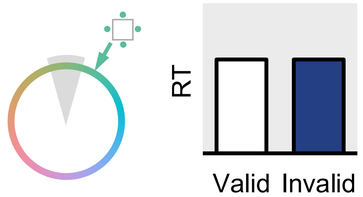
INFERRING TEMPLATE PRECISION

Contingent capture is selective to target features, so if an irrelevant color cue produces a validity effect, it can be assumed that the color falls within a prioritized region of hue space.

Broad Template
Cue falls within prioritized region



Narrow Template
Cue falls outside of prioritized region



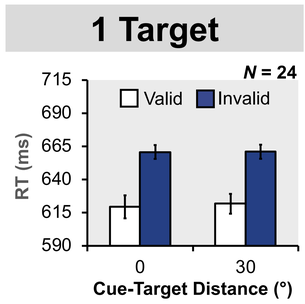
EXP. 1: DISTRACTOR-DEPENDENT TEMPLATE NARROWING

Easy Search

Half of the participants were given easy search displays, allowing for broad target representation.

Difficult Search

Half of the participants were given difficult search displays, requiring narrow target representation.

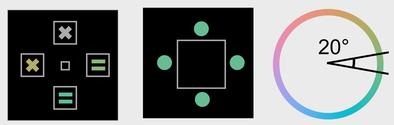


Attentional capture by broad color category.

Attentional capture selective to target color(s).

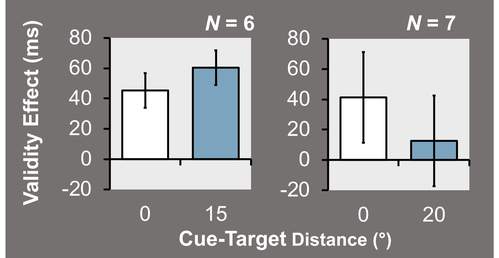
Both single and multiple target templates are malleable by target distractor relationships.

EXP. 2: SINGLE- VERSUS DUAL-TARGET TEMPLATE PRECISION

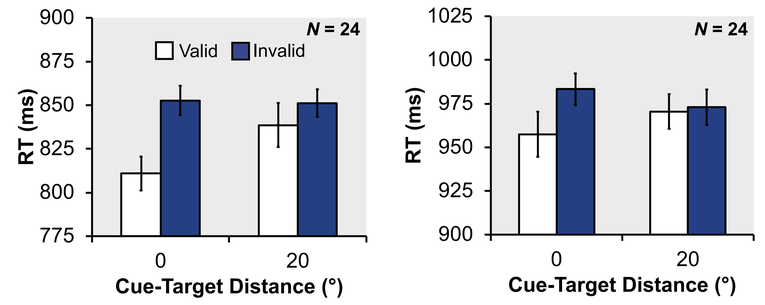


All participants were given difficult search displays. Irrelevant color cues were 20° away from the target value in hue space.

PILOT: SINGLE TARGET TEMPLATE PRECISION



Target color differentiated from non-target color at distance of 20° in hue space for single target template.



Multiple target templates are represented with the same precision as single target templates.

We show that multiple target templates can be flexibly narrowed in accordance with task demands. Critically, the representational precision of such templates appears insensitive to set size. This may be owed to reliance on long-term memory rather than working memory, since target colors remained constant. Alternatively, we suggest that this result points to a dissociation between the active processes that reflexively bias the processing of memory-matching information and more deliberative retrieval processes.

1. Folk, Remington, & Johnston (1992). *J. Exp. Psychol. Hum. Percept. Perform. 18*(4); **2.** Geng, DiQuattro, & Helm (2017). *J. Exp. Psychol. Hum. Percept. Perform. 43*(12); **3.** Irons, Folk, & Remington (2012). *J. Exp. Psychol. Hum. Percept. Perform., 38*(3).