A Color in Working Memory Does Not Become a Search Target, but it Does Interfere with Color Search

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BACKGROUND

- Fixation rates show a dual-target cost when searching for two colors compared to a single color (Menneer et al., 2007; Stroud et al., in press).
- A ‘split-target’ cost reveals that as the similarity between the target colors decreases, search efficiency also decreases (Stroud et al., in revision).
- Simultaneous representation of two targets is difficult.
- Research suggests a link between attention and working memory (Han & Kim, 2004; Woodman et al., 2001; Woodman & Luck, 2004).

RESEARCH QUESTION

- Does working memory for color rely on the same representation that guides color search?

GENERAL PROCEDURE (5 EXPERIMENTS)

**Task I:** Indicate the presence or absence of a T in a display of offset Ls. The T always appeared in a specified target color for each subject.

**Task II:** Keep an item in working memory during search.

**Working Memory Task:**

<table>
<thead>
<tr>
<th>Experiment</th>
<th>WM object</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: No memory task</td>
<td></td>
</tr>
<tr>
<td>2: Color Patch</td>
<td></td>
</tr>
<tr>
<td>3: Single Letter</td>
<td>A</td>
</tr>
<tr>
<td>4: Oriented Bar</td>
<td></td>
</tr>
<tr>
<td>5: Dot Pattern</td>
<td></td>
</tr>
</tbody>
</table>

**Search Task:**

**WM Task (color patch):**

- Colors on the x-axis signify the number of color steps from the target T.
- Lines represent the number of steps in color space between the target color and WM color.

**Results:** Probability of Fixation

\[
p (\text{fix}) = \frac{\text{Number of times object color is fixated}}{\text{Number of times object color is presented}}
\]

**Results: Error Rate and RT**

**Summary and Conclusions**

- Holding a color in working memory interferes with eye movement guidance in color search.
- Despite this interference, the color held in working memory does not receive additional fixations. The search color is not confused with the memory color.
- The visual search target is represented separately from color working memory, but the two representations appear to draw on shared resources.
- Other types of visual information in working memory interfere less with color search.

**FURTHER WORK**

- Does working memory for oriented bars disrupt search for oriented bars similar to the current results?
- Does working memory for other types of visual information (e.g., color patch, single letter, dot pattern) disrupt search for oriented bars?

REFERENCES


