Positions priming in briefly presented search arrays

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Position and color priming in briefly presented search arrays

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Introduction
In efficient visual search, priming of pop-out (PoP; Maljkovic & Nakayama, 1994, 1996) is usually reported as a speeded response when a target feature is repeated on consecutive trials.

Feature facilitation accounts: Sensitization to features via short-term memory. Priming at perceptual level.

Post-perceptual accounts: PoP affects response times, not accuracy, via response repetition benefits, decision bias or other ‘fate’ effects.

Questions:
1. Do color and/or position repetitions increase accuracy at brief exposure durations?
2. If so, is a category weighting account a viable hypothesis?

Methods
Participants were 8 students at the University of Iceland (3 male), ages 22–28. Each subject participated in at least 16 blocks of 108 trials. Trials following incorrect trials are not included in the analysis. PoP was defined as a speeded response when a target feature is repeated on consecutive trials. PoP measures are the latency difference between the ‘no-repetition’ and the ‘both-repetitions’ condition.

Results
- A 2x2 within subjects analysis revealed significant main effects of position and color repetition (p < 0.001 and 0.003, respectively). No interaction was found between the two (p = 0.619).
- Position priming effects ranged from 2.5–11.4 pp, between subjects.
- Color priming effects ranged from 1.7–11.8 pp, between subjects.
- All subjects showed the same pattern of lowest accuracy under the ‘no-repetition’ condition and highest accuracy under the ‘both repeated’ condition. These within-subject differences ranged from 10–23 pp.

Figure 1: (1) a trial (black arrow) and (2) between trial stimulus arrays (red arrow).

Figure 2: Weight equation and rate equation.

Figure 3: Exposure durations vs. mean score.

References

Conclusions
- PoP affects accuracy at very brief exposures.
- The effects cannot be explained by reference to response related mechanisms.
- The results suggest a perceptual component in PoP. This does in not exclude response related PoP.
- A simple additive TVA model can be fitted quite well to experimental data.
- Recent literature suggests that repetition are the result of multiple mechanisms (see Lamy & Yashar, in press; Kristjánsson & Campana, 2010).

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