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 "late" effects.

2.1. "late" effects.

"late" effects: response repetition benefits, decision bias or other post-perceptual accounts at the perceptual level.

"late" effects are explained by a "late" theory. Post-perceptual accounts are explained by priming at the perceptual level.

The experiment

We tried to replicate perceptual priming effects in an accuracy based design (Yashar & Lamy, 2010) while generating to alphanumeric stimuli. Our design also has the advantage of multiple responses (15 consonants), which minimizes any effects of response repetition and visuomotor effects, leaving the results more readily interpreted as perceptual effects.

We presented subjects with a 3x3 consonant matrix where a target would always occupy one of the four corner positions. The displays where present for 10-180 ms.

The subjects' task was to report the odd-one-out letter by pressing the appropriate key on a keyboard. The target identity was determined by color and varied randomly (Figure 1).

Methods

Participants were 8 students at the University of Iceland (3 male), aged 22-28. Each subject participated in at least 10 blocks of 100 trials. Trials following incorrect trials are discarded, since it may be meaningless to speak of repetitions/alternations from an artificial "unseen" trial.

Conditions were equilikely: i.e. probability of target being in position X would always be 1/3. All initial positions were marked by pattern markers, made from strips of black and white 2 cm x 2 cm dot matrices.

Eye movements were controlled for by taking the start of each trial dependent on a successful fixation to a central fixation cross. Eye-movement data was recorded by a Cambridge Research Systems Video Eyetracker.

Eye-stopper waits for successful fixation to a central fixation cross. Eye-movements are either red or blue. This was determined randomly for each trial (P(red)=P(blue)=0.5). Positions were also equilikely, i.e. probability of target being in position X would always be 1/3.

The subjects' task was to report the odd-one-out letter by pressing the appropriate key on a keyboard. The target identity was determined by color and varied randomly (Figure 1).

The effects cannot be explained by reference to visuomotor effects (Habekost & Bundesen, 2008).

"late" effects are explained by decision bias. Post-perceptual accounts are explained by priming at the perceptual level.

The results suggest a perceptual component in PoP. The effects cannot be explained by reference to visuomotor effects (Habekost & Bundesen, 2008).

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Post-perceptual accounts: PoP effects are the result of repeated processing of target features, and the current important of a target feature is affected by its importance on the previous trial.

Pertinence can be adjusted voluntarily by current goals or perceptual categories by differentiating their weight.