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Title: Shape effects on reflexive spatial selective attention and inhibition of return
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Previous work has demonstrated that a peripheral, behaviorally irrelevant cue presented prior to a target may either facilitate or inhibit the response to the target depending on factors such as the spatial location and timing between cue and target. We investigated the effect of shape on the performance of human observers in a cued spatial discrimination task. In each trial, after an initial variable fixation period, a cue was displayed with durations ranging from 83-200 ms across all experiments. After the offset of the cue, a variable delay was introduced (ranging from 33-1600 ms across all experiments) before presentation of a target. The cue and target were randomly offset horizontally at 5 degree eccentricity on either side of fixation. They could appear in either the same or different location. The shapes of the cue and target were randomly the same or different. Observers were instructed to fixate centrally, to ignore the first cue stimulus, and to respond as quickly as possible to indicate the location of the second target stimulus by releasing a corresponding switch (left or right). To minimize the influence of voluntary attention, subjects were told that the shape and the location of the first stimulus had no predictive validity for either the shape or location of the following target. With presentation of either the same or different shaped cue, we found a biphasic spatial cueing effect. Namely, at short delay intervals, median reaction times (RTs) were significantly facilitated for targets presented in the cue location, whereas, at longer intervals, median RTs were slowed for targets in the cue location (inhibition of return, IOR). More importantly, there was a significant effect of the shape of the cue. We found that median RTs were significantly greater when the target shape matched cue shape compared to when they were different. This same-shape suppression was present only when cue and target appeared in the same location at all tested stimulus onset asynchronies (SOAs ranged from 120 ms to 1800 ms with suppression effects slightly decreasing across SOA). Hence, early spatial facilitation was reduced and IOR enhanced when cue and target were the same shapes compared to when they were different. These results demonstrate, for the first time, reflexive shape cueing effects across a wide range of SOAs and are consistent with physiological studies in shape selective neurons in inferotemporal and lateral intraparietal areas showing repetition suppression with repeated presentation of similar shapes.

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