

Chapter 12

The Effects of the Fixation Cue in Inhibition of Return

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ABSTRACT

In experiments examining inhibition of return (IOR), an attentional effect that inhibits the returning of attention to a previously attended location or object, a second cue during the stimulus onset asynchrony (SOA) period is typically used. This is done to control the reorienting of attention from a peripherally cued location back to the central fixation point before the target appears. Recently, there have been numerous studies which demonstrate that fixation cues are effective in revealing IOR. Plenty of factors have been shown to influence the effects of the fixation cue in IOR, including the time onset of the fixation cue, the number of potential target locations, the attentional demands of performing the task, the modality of the fixation cue, and the condition of participants. Here, the authors review previous work that has examined the effects of the fixation cue in IOR.

INTRODUCTION

In this chapter, we first describe the phenomenon of IOR and the definition of the fixation cue which reorients attention away from a cued location back to fixation. Then we discuss the role of the fixa-

tion cue under several conditions successively, including different time onsets of the fixation cue, the number of potential target locations, discrimination tasks and other conditions. Lastly, we conclude with the effects of the fixation cue in IOR and propose directions for future research.

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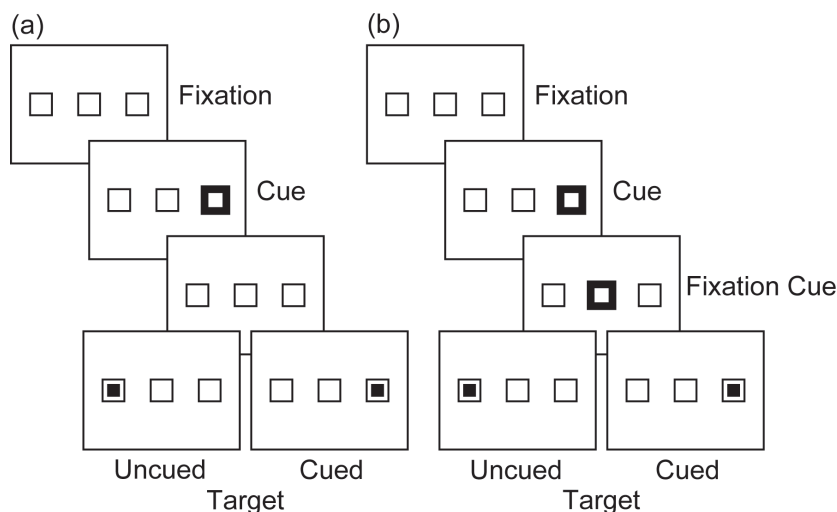
BACKGROUND

Most visual environments contain more information than the human brain can process in real time. To overcome this limited ability, the attention system serves as a filter by selectively orienting attention to particular regions of the visual field. This orienting of attention can be completed through either overt behavior, such as eye movement or the turning of the head, or through covert shifts of attention. Moreover, covert attention shifts can be caused by a strategic decision by the observer, in which case the shift is endogenously controlled. Covert attention shifts can also be in response to a peripheral event, which results in exogenously controlled attention shifts.

Covert orienting of attention is often studied using a cue–target paradigm (see Figure 1a). In this paradigm, the presentation of a spatially uninformative cue at the location of an upcoming visual target reduces target detection and discrimination

reaction time (RT) when the cue–target stimulus onset asynchrony (SOA) is transient (Wright & Ward, 1998). This short-lived improvement in performance is believed to result from an exogenous shift of attention to the cued location. At longer SOAs, however, responses to targets at cued locations actually become slower than responses to targets at uncued locations (Posner & Cohen, 1984). Posner, Rafal, Choate and Vaughan (1985) labeled this later inhibitory effect “inhibition of return” (IOR). Since its discovery, IOR has been observed in a wide variety of experimental situations within the visual, auditory, and tactile modalities, as well as between modalities. IOR has also been observed across a variety of tasks, including detection, localization, and discrimination (Klein, 2000). This ubiquity suggests that the mechanisms underlying IOR are important and general processes involved in the spatial selection of information (Prime, Visser, & Ward, 2006).

Figure 1. Order of events in typical trials. (a) Cue-target paradigm without a fixation cue. A fixation display is followed by a spatially uninformative cue: the brightening of one of the two peripheral boxes equally. After varying intervals the target appears: the presentation of a black square at the cued (right) or uncued (left) location. The subjects are instructed to make a fast detection response as soon as possible. (b) Cue-target paradigm with a fixation cue. The sequence of events is the same as those without a fixation cue except for the presentation of a second central cue at fixation between the onset of the peripheral cue and the onset of the target.



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