TOWARDS A DYNAMIC FIELD MODEL OF INHIBITION OF RETURN

INTRODUCTION

Reaction times tend to be longer than usual for stimuli that appear a certain time interval after a cue at the same peripheral location as the cue (Posner & Cohen, 1984). This effect is called *inhibition of return* (IOR). Explanations of IOR often invoke attentional processes, and sometimes also the linking of representations of stimuli and responses. Our goal is to develop a more ecological/dynamical approach in which IOR is seen as an emergent property of sensori-motor processing. As a first step in this direction, we performed two experiments that differ from most of IOR experiments in that cues and targets could appear at slightly different positions, allowing us to test whether IOR is spatially continuous. This is important because such a spatial continuity is one of the hallmarks of the dynamic model that we aim to apply. Furthermore, the to-be-collected data will allow us to develop the model.

MATERIAL AND METHODS

We measured reaction times for cued and uncued targets. In Exp 1, cued targets appeared at one of two locations: at the same location as the cue or just next to that location. In Exp 2, the spatial cue-target relation was sampled randomly. As in most of IOR experiments, we used several cue-target onset asynchronies (CTOAs).

RESULTS

IOR was observed in both experiments. Exp 1 showed that the effect is slightly weaker for targets appearing just next to the cued location. Exp 2 revealed a spatial continuity of the effect and provided a quantification of the dependence of the effect on the spatial cue-target relation. In agreement with previous results, both experiments showed that the effect depends continuously on the temporal cue-target relation (i.e., on the CTOAs).

DISCUSSION

The continuous dependence of IOR on the spatiotemporal structure of the cue-target relation provides support for the use of dynamic models, because these models are often defined over continuous spaces. We,therefore ,choose to adapt the dynamic field

model for movement initiation proposed by Erlhagen and Schoner (2002). In our version of the model, an activation function is defined over a continuous space that represents the different spatial cue-target relations. The main activation function interacts with additional activation functions that represent sensory inputs and observers' predispositions. A response is triggered when the main activation function reaches a threshold value. We are currently trying to achieve a formulation of the model in which IOR and its spatiotemporal characteristics emerge from the interactions among the different elements in the model. It is our belief that such a model would be a useful addition to the typically more cognitive literature on IOR.

REFERENCES

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