

Attentive tracking of multiple moving objects in a real 3D environment

Anis Ur REHMAN

1. Introduction

In this study, we investigated multiple object tracking in a real 3D environment. In Experiment 1, we examined whether the targets on different planes could be tracked simultaneously if the moving objects stayed at the same depth throughout a trial. In Experiment 2, we tested whether the targets on different depths could be tracked easily if the depth between them was kept 6 cm. In Experiment 3, targets and distractors were distributed equally over each plane at the beginning of a trial. In Experiments 4 and 5, the targets and distractors were presented on different depth planes separately at the start of the trials. In Experiment 6, the conditions used in Experiments 3 and 4 were intermixed to investigate whether or not the unpredictability of distribution of objects at the beginning affects attentive tracking to a depth-changing target.

2. Results and Discussions

The results of Experiment 1 indicate that tracking was not affected by visual distance (relative to the observer) when all objects were presented on a single plane. Similarly, the results of all-Ts-far and all-Ts-near conditions showed no effects of depth with higher performance levels. However, an increase in depth between the planes hindered attentive tracking when both planes had two targets each (Figure 1).

The results of Experiment 6 suggest that, even when distribution of objects varied at the beginning of each trial, participants can focus their attention on a particular depth or across two depth planes depending on the initial state trial by trial, and they cannot reset their focused attention from a particular plane to two planes during attentive tracking (Figure 2).

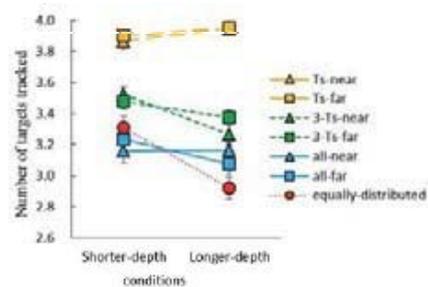


Fig.1. Results of Experiment 1

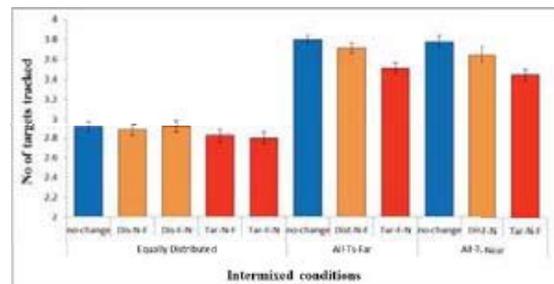


Fig.2. Results of Experiment 6

3. Conclusions

In conclusion, our findings suggest that humans can attentively track targets in the same way as if they are on a single plane when in fact the targets are presented on different depth planes in some situations. The efficiency of the attentive tracking in depth is critically dependent not only on the distance but also on an initial state of distribution of the targets. In addition, human have flexible ability to set their attention on a particular depth or across two depths according to the initial position of the objects in a real 3D space.