Review of: "Effect of Self-Movement on Visually Directed Throwing: Implications for Distance Perception"

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Potential competing interests: No potential competing interests to declare.

In the study at hand, the authors conducted a series of experiments to assess the influence of treadmill running on visual distance perception. The authors aimed to replicate prior findings wherein running on a treadmill led to participants perceiving greater distances than those who performed the task while standing still. However, unlike previous studies, they focused on shorter distances (6 meters). To achieve this, the authors employed two response methods: In Experiment 1, participants engaged in indirect distance estimations of targets located at 6 meters, while in Experiment 2, they utilized a throwing task involving targets positioned at two different heights. The outcomes revealed a distinct influence of treadmill running on distance perception, manifested through increased throwing distances. These findings bear significance as they shed light on the intricate interplay between sensorimotor cues and distance perception. The experiment was competently carried out, the motivations for the experiment are clearly presented, and the design is appropriate to address the research question. However, I would like to suggest minor changes that I believe could have enhanced the manuscript.

1- My first suggestion is to use consistent units throughout the manuscript. I have noticed that at times, you use a scale in centimeters and at other times in meters. I believe it would look neater to use the same scale.

2- What do the "+" symbols in the box plots of Figures 2, 4, and 5 represent? Shouldn't this be explained in the manuscript or in the figure captions?

3- I believe it would be interesting to display the average responses of each participant in the box plots.

Abstract

4- “We propose a model based on the idea that perceived speed of locomotion is the result of mutually inhibitory interactions between visual and proprioceptive motor information”

Have you attempted to measure distance perception by manipulating the speed of the treadmill?

Exp.1

5- In the results of Experiment 1: "As can be observed, matching distances for both conditions are much shorter than 600 cm, which was the reference distance: 369 cm for Running, and 343 cm for Standing."

It would be interesting for the authors to provide information on the variability of responses in the main body of the

manuscript.

6- Procedure of Experiment 1: "In this study, we employed the paradigm of indirect distance indication, utilizing judgments of perceived exocentric extent in the fronto-parallel plane, as well as employing throwing as a means to gauge the participants' perceived distance."

The method used in Experiment 1 to measure perceived distance produced significantly larger underestimations than those observed in Experiment 2 using the ball-throwing method. Do the authors have hypotheses regarding the cause of this difference? Additionally, I wonder why the authors used perceived distance values to present the results of Experiment 1, and bias measures to present the results of Experiment 2. Perhaps using the same magnitude representation in both experiments would facilitate a comparison of the responses obtained from the experiments.

Exp. 2

7- In the introduction of Experiment 2, the authors mention that: "It is assumed that the mental image in memory aligns with the percept, and any errors or biases in the memory image are transferred to the mental spatial image. Although changes in the subject's position information are updated, the mental image remains fixed in relation to the physical environment (Loomis et al., 1992)."

In a study on auditory distance perception conducted in 2012 by our research group, we demonstrated that participants can retain visual contextual information in memory and subsequently use it to perceive the distance of sound sources in complete darkness (see Calcagno et al., 2012; doi:10.1068/p7153).

8- In Figure 3, it would be important to define the abbreviations in the figure caption.

9- When describing the analysis of the distance responses from the ground to the target, the authors state: "Figure 5 shows the error (dg in Figure 3), defined as the difference between the throw distance at ground height and the target's distance. It is noteworthy that the error is minimal in both Standing Conditions, measuring 4.5 cm for HS and 14.5 cm for LS. This suggests that participants are actually aiming at the base of the target rather than the actual target (hoop)".

I am not entirely sure that this result allows us to suggest that the participants were aiming at the ground instead of the hoop. This is because if participants were aiming at the hoop and underestimating their distance, the ball would consistently fall closer to the base than the hoop. Although beyond the scope of this study, it would be interesting to test the authors' hypothesis by repeating the experiment with visual targets placed on the ground.