Review of: "Throwing is affected by self-movement"

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Potential competing interests: No potential competing interests to declare.

Title: Throwing is affected by self-movement

This is an interesting study that aims at investigating the effect of running on distance perception, by performing two experiments with different methodologies. This study would extend our knowledge about the relationship between body movement and distance perception.

I have some comments that could aid the rationale of the study and the discussion of the findings.

Major points:

- The title does not seem to represent the work properly: to my understanding, it is not the throwing per se that has been modulated by running vs standing conditions (i.e., kinematics of the gesture), but the performance of the throwing (reaching the target). In addition, Experiment 1 did not involve any throwing. The authors could maybe think of a more suitable title for the found results.
- Abstract: “this study aimed to investigate the influence of running on a treadmill on distance perception”. To my understanding, as the authors claimed, a similar study has already been performed (Santillan & Barraza 2019). I would reword this first sentence to actually represent the novelty of the present study (i.e., the shorter distances involved and the throwing task). Globally, through the text, the link between the two performed experiments and the final aim of the study could be more consistent.
- The authors often refer to an overestimation of the perceived distance (page 3), but then they expect an underestimation effect due to space compression (page 4). Can it be clarified?
- Even though the authors refer to a previously used methodology, perhaps the method of Experiment 1 can be explained more, with a figure if it helps.
- It is true that running influenced distance perception leading to larger estimates, but this helped getting closer to the real distance of targets (600 cm), increasing their accuracy in the estimation. Besides, in the Introduction, the authors report what a previous study claims (Santillan and Barraza, 2019) “running on a treadmill […] produces a misperception of egocentric distance”. Can the authors discuss this aspect more in details, perhaps in the Discussion section?

Minor points:

- It would be preferable to insert the number of each equation next to the interested equation: this way, the link to them through the text will be clearer.
- Do the authors think that the results would be found also among not-athlete participants? The task of throwing a light

ball to a relatively close target does not seem to be undoable by young and healthy people. And what would you expect comparing walking vs standing, instead of running?

- It is preferable to refer to participants with they/them pronouns (vs he, page 4).
- Results Experiment 1 and 2: What is represented in the plots? Do the crosses represent outlier values? There's need to clarify this. Moreover, t values and effect sizes of each analysis should be added.
- It think it is important to report the parameters and results from G*power analysis (page 4).
- “The results of Experiment 1 demonstrated the presence of perceived distance compression at a distance of 6 m, indicating that running on a treadmill influences distance perception and leads to larger distance estimates” (page 6): I am not sure that this two sentences are strictly related. They are both true, but the second sentence is not a consequence of the first one. I would rephrase it for clarity.
- Method of Experiment 2: “without the aid of vision" seems to suggest that participants are blindfolded. If I understood the description correctly, “without visual feedback” would be a better description of the setup.
- Can the letters of Figure 1 be clarified in the caption?
- Procedure Experiment 2: Which is the reason to train participants to two distances at 550 and 650 meters? And why two target heights were selected?
- Results of Experiment 2: F(1,N), what does N stand for? Effect size could be added and pairwise comparisons to explore the interaction could be explained more in details (only one p value is reported).
- Discussion: when discussing about multisensory integration, I would add literature from Ernst and Banks (2002) and many others.
- Discussion: the authors claim that “the overestimation observed in the Running condition can be attributed to the presence of locomotive proprioceptive information without corresponding visual information”. What do the authors expect if a visual cue is added in this experimental environment on throwing experiment (e.g. optic flow)?
- Discussion: could the short distance be due to physical strength? About this, have the authors noticed any differences in female and male participants?
- Discussion: have the authors performed analyses on Figure 4 data?