The position of a reference matters when judging egocentric distances

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When subjects have to point at a sphere in total darkness, with only vergence providing information about the position of the sphere, their judgements are biased. To examine whether the presence of other visible structures would reduce the bias we examined two additional conditions. In one of the conditions there was a reference cube at a fixed position (within each session). In the other condition a similar cube was presented at a random position for each new sphere. We found that regardless of whether the reference cube's position was stable or not, it improves the accuracy of responses. However, the improvement depended on the reference's position relative to the target. When the cube was further away from the subject than the target, the pointing responses became more accurate, but when the cube was closer to the subject than the target it did not make any difference. It appears that subjects only use objects that are further away to calibrate distance.

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