



Handedness and Ease to Grasp an Object Affects Perceived Distance



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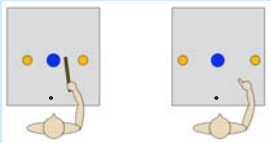
Abstract

Recent research has shown that the ability to act affects perception of spatial layout. For example, as the effort to traverse a distance or climb a hill increases, people's perception of distance and slant increase as well (Proffitt et al., 2003; Bhalla & Proffitt, 1999). In addition, tool use decreases distance estimations to target objects presumably, because of the increased ability to interact with the object (Witt et al., 2005). In the present experiment, we manipulated participants' ability to grasp tools by changing the position of the tool's handle. Several tools were presented at varying distances to the left or right of the observer. The objects were either placed in a position and orientation where they were easy to grasp or hard to grasp. Participants estimated the distances to the tool using a visual matching task. Right handed participants estimated the distance to a tool as farther away when the tool was difficult to grasp than when the tool was easy to grasp. However, left handed participants did not perceive the distance to the tool as farther away depending on the orientation of the handle. To test a possible explanation for this finding, participants were asked to estimate the perceived length of their left and right arms. Right handers perceived their left arm as shorter than their right arm; whereas, left handers perceived both arms to be the same length. These findings support the notion that the ability required to grasp an object affects distance perception.

Introduction

The distances to targets appear closer if the actor is using a tool.

Reach to target with a baton Reach to target with a finger



Witt et al. (2005)



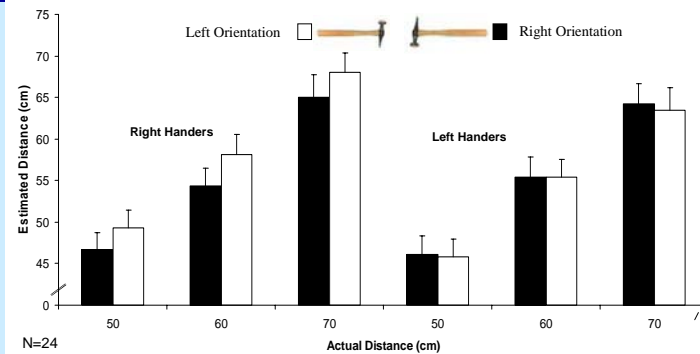
Response times are faster when the handle of the tool matches the responding hand.

Tucker & Ellis (1998)

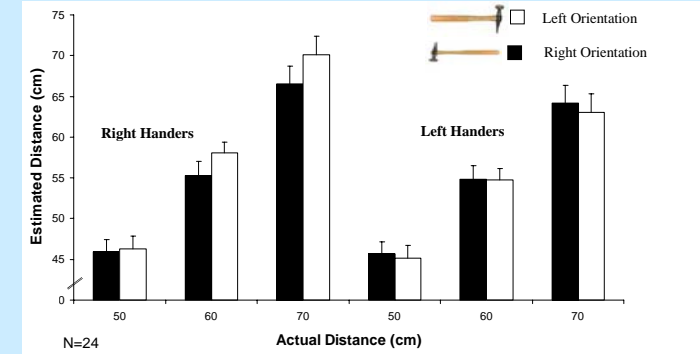
Handed objects are viewed in terms of their action components

Does the ease to grasp a tool affect the perceived distance to that tool?

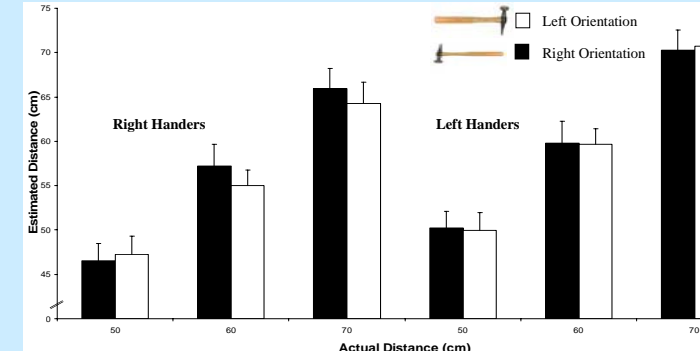
Experiment 1: Side Orientation



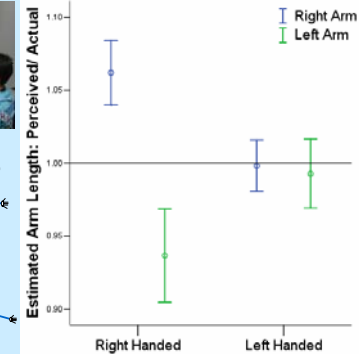
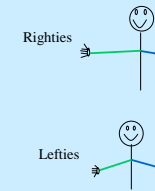
Experiment 2: Center Orientation



Experiment 3: Center Orientation, Non Dominant Hand



Experiment 4: Arm Length Perception



Conclusions

Ease to grasp a tool influences how far away it appears but... only for right handers. Lefties perceive tools at same distance regardless of orientation. Why?



Left handed people live in a right handed world, which forces them to use both hands. Right handed people live in a right handed world, and as a result, they see the world in terms of their right hand.

References

Bhalla, M., & Proffitt, D.R. (1999). Visual-Motor Recalibration in Geographical Slant Perception. *Journal of Experimental Psychology: Human Perception and Performance*, 25(4), 1-21.

Proffitt, D.R., Stefanucci, J., Banton, T., & Epstein, W. (2003). The role of effort in perceiving distance. *Psychological Science*.

Tucker, M. & Ellis, R. (1998). On the relations between seen objects and components of potential actions. *Journal of Experimental Psychology: Human Perception & Performance*, 24, pp 830-846.

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