High-precision capture of perceived velocity during passive translations

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BACKGROUND
Our intuitive sense of changing velocity during passive movement in the absence of vision depends on the visual-vestibular integration. It is thought to be a dynamic integrative model of traversing space with motion vision, which is a complex process involving sensory fusion and motor control. This model allows us to maintain our orientation and body position relative to the environment.

OUR METHOD: CONTINUOUS POINTING
Continuous pointing has been previously used for kinesthetic estimation (e.g., measuring velocity) but has never been used to capture the continuous perception of velocity during passive transport. In this study, we developed a novel method for measuring velocity that combines the principles of continuous pointing with the concept of self-motion perception.

STIMULI AND APPARATUS
Experiment 1: Three trajectory types, 2 speed levels, 4 target-relative start locations. Presented with robotic wheelchair.

EXPERIMENT 1 RESULTS
Figure 6 (below). Continuous pointing method clearly during passive translations.

EXPERIMENT 2 RESULTS
Figure 7. Difference between perceived and actual velocity during constant-velocity travel, for three trajectory types and two speeds.

CONCLUSIONS
Continuous pointing can be adapted for use in other research domains, including spatial updating, vection, and visual-vestibular integration.

REFERENCES


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