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Effect of global perspective jitter on visually induced postural sway

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Abstract

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● **Heading in the right direction: does the location of the centre of outflow matter?**
B J Rogers, J Beer (Department of Experimental Psychology, University of Oxford, South Parks Road, Oxford OX1 3UD, UK; e-mail: bjr@psy.ox.ac.uk)
Walking paths to a close target with subjects wearing displacing prisms are typically curved, suggesting that the (displaced) visual direction of the target is more important than optic flow in controlling locomotion [Rushton et al, 1998 *Current Biology* **8** 1191 – 1194; Rogers and Dalton, 1999 *Investigative Ophthalmology & Visual Science* **40**(4) S764]. However, the centre of outflow and other singularities of the flow field are displaced away from the fovea when prisms are worn, which might not be optimal for deriving the point of impact. We compared walking paths in three situations, with subjects: (i) wearing prisms and fixating the intended target; (ii) not wearing prisms, but with gaze directed to one side (causing the centre of outflow to be displaced away from the fovea); (iii) wearing prisms and with gaze directed to one side (bringing the centre of outflow back onto the fovea). Using a sample of ten observers, we found no significant differences in the extent of path deviation between conditions (i) and (iii), suggesting that having the centre of outflow displaced away from the fovea is of little consequence. Second, there were no significant differences between conditions (i) and (ii), suggesting that the prisms themselves are not a source of artifact.

● **Effect of global perspective jitter on visually induced postural sway**
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Previous research has shown that adding global perspective jitter to radial flow decreased vection onsets and increased vection durations (Palmisano et al, 2000 *Perception* **29** 57 – 67). This was a surprising finding because the visual jitter in these displays simulated random horizontal/vertical impulse self-accelerations which should have produced sustained visual – vestibular conflict (previously thought to always impair vection). We examined whether there was also a jitter advantage for visually induced postural sway. While viewing the visual displays, observers stood on a Kistler force platform with two optical displacement sensors (MEL Mikroelektronic GmbH M5/200) aligned to the centres of their backs and to the midlines of their right calves (each device was sampled at 200 Hz). This enabled sway amplitudes and frequencies to be calculated along both their sagittal and coronal axes. We found that adding global perspective jitter to radial flow increased both fore – aft and lateral sway in our standing observers. On the basis of these results, we conclude that the horizontal/vertical jitter not only increased the vection in depth induced by radial flow, but it also induced additional horizontal/vertical jittering vection.

● **Effect of observer's translation on the spatial memory of a target within walking distance**
C Yoshida, T Inui (Graduate School of Informatics, Kyoto University, Yoshida-hommachi, Sakyo-ku, Kyoto 606-8501, Japan; e-mail: yoshida@cog.ist.i.kyoto-u.ac.jp)
We investigated how translation of the observer's position affected the behavioural characteristic of pointing to targets within walking distance. Subjects observed a target 2 m ahead for 2 s. During a delay of 3 s, they moved their own bodies either to the right or to the left, either 40 cm or 80 cm, then pointed to the remembered target location. Subjects showed pointing errors displaced toward the body position after translation irrespective of the translation distance. The pointing error could be related to the weighted sum of two types of pointing error. One type is a linear function of the distance from the translated body position to the target location. This type of error would occur in the transformation process solely from the egocentric spatial representation of the target, with reference to the translated body position, to the final pointing position. The other is a displacement toward the frames of target presentation area. This type of error would occur in the transformation solely of the allocentric representation with reference to the frames. Depending on whether subjects did or did not move, the weight of the error due to egocentric spatial representation varied.
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● **Motion and colour latencies are task-dependent**
W J Adams, P Mamassian (Department of Psychology, University of Glasgow, 58 Hillhead Street, Glasgow G12 8QB, Scotland, UK; e-mail: wendy@psy.gla.ac.uk)
It has been suggested that we are aware of some visual attributes more quickly than others (Moutoussis and Zeki, 1997 *Proceedings of the Royal Society of London, Series B* **264** 393 – 399). Also, there is evidence that visual information for perception is processed separately from that for action [eg Milner and Goodale, 1995 *The Visual Brain in Action* (New York: Oxford University Press)].