Dissociation between self-reported awareness and objective performance during reaching movements in anosognosia for hemiplegia

Paul M. Jenkinson

Department of Psychology, University of Hertfordshire, UK.

Catherine Preston

Department of Neuroscience, Karolinska Institutet, Sweden.

Roger Newport

School of Psychology, University of Nottingham, UK.

The 'comparator' model of motor control and awareness proposes that an ongoing comparison of predicted and actual sensory feedback forms the basis of motor awareness, via the detection of sensorimotor discrepancies. This model has also been used to explain anosognosia for hemiplegia (AHP; i.e. unawareness of paralysis following stroke), in terms of a failure to detect such discrepancies combined with a pathologically exaggerated reliance on motor intentions to inform awareness. In this talk I will discuss recent work by Preston, Jenkinson & Newport (2010), which assessed the proposed failure to detect sensorimotor discrepancies in a patient with AHP (GG), using the non-paralysed arm. In so doing, we aimed to provide direct empirical evidence regarding the operation of the motor comparator(s). Goal-directed reaching movements made by GG using the non-paralysed (right) arm were either modified by a computer or left unperturbed. Comparison with hemiplegic and young, healthy controls revealed that GG was unable to detect computer-generated visual perturbations as large as 20°. Remarkably, GG claimed on all occasions that his movements were unperturbed, uncorrected or accurate, and he also failed to notice large corrective movements that he made when attempting to compensate for the visual perturbations. These results suggest that the comparators implicated in AHP are functioning at a sub-optimal level, and that monitoring of both the right and left arms might involve a common right-hemisphere network. Furthermore, the presence of large corrective movements, despite verbal reports of perfect performance, reveals a dissociation between subjective self-reports of motor awareness and objective performance in this case of AHP.