Reply to Dr. Derakhshan

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In his letter to the editor, Dr. Derakhshan has provided an alternative view to the sensory-modality–based hypothesis of handedness proposed in Goble and Brown (2008b): that of the one-way callosal traffic model. However, this latter model of motor laterality—based primarily on a series of seemingly complementary clinical findings—cannot be fully reconciled with the results of the present study in question. Dr. Derakhshan has compared the target-matching task used by Goble and Brown (2008b) to that of drawing lines of a particular length based on a memory template. In this case, he suggests that the “faster” dominant arm will be prone to overshoot errors (i.e., make wider excursions) than the nondominant arm regardless of whether the movement is carried out in an on-line/feedback-based fashion or using a memory-based template. Based on the constant-error findings of Goble and Brown (2008b), there is indeed a tendency toward greater overshooting by the dominant (preferred) arm in the contralateral remembered proprioceptive matching task (Fig. 4). However, in contrast to what is predicted by Derakhshan’s model, this asymmetry is not due to arm differences in movement speed because the two arms moved at similar peak speeds and with the same movement duration (see movement kinematics in RESULTS section and Fig. 6). Further, interhemispheric transfer cannot explain the asymmetry, given that the dominant arm showed undershooting during the analogous contralateral remembered visual target-matching task and during ipsilateral remembered visual and proprioceptive matching.

In light of these discrepancies, it is our opinion that the sensory-modality–based hypothesis of handedness still presents the most cogent explanation of the data presented in Goble and Brown (2008b). This hypothesis has been formulated on the basis of numerous studies of upper limb sensorimotor asymmetries over the past century (for review see Goble and Brown 2008a) and extends robust findings over the past quarter century, implicating a nonpreferred arm/hemisphere advantage for proprioceptive position-matching tasks (Colley 1984; Goble and Brown 2007; Goble et al. 2005, 2006; Riolo-Quinn 1991; Roy and MacKenzie 1978).

REFERENCES


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