Validity of using reaction time as a basis for determining motor laterality

To the Editor: In a recent letter to the editor, Dr. Derakhshan (2006) responded to a study conducted by Gonzalez and colleagues (2006a) that explored a potential hemispheric specialization for the visual control of action independent of subject handedness. In his letter, Dr. Derakhshan suggested that an important variable of concern, which was measured but not reported by Gonzalez et al., is that of reaction time. In this case, it was argued that this measure is an effective means of determining in which cerebral hemisphere (right vs. left) lies the “control center” for movement, based on the side of the body that can be more rapidly brought into motion.

In reply to this request Gonzalez et al. (2006b) emphasized that the visuomotor advantage they reported was distinctly different from any notion of a hemispheric dominance for a command center and that movements in their study were not speeded, thus rendering reaction time measures unreliable. Although I fully accept this response, I feel compelled to express my own concern for the efficacy of using simple reaction time measures as a means of determining “neural handedness” or the location of the motor center. Certainly, Dr. Derakhshan provided substantial evidence from clinical sources indicating a correlation between left hemisphere laterality and right-hand leading when comparing left- and right-hand reaction times in right-handed individuals. However, ignored in this argument are the results from two decades of study in the area of motor control that have consistently generated the contradictory result—a left-arm (right-hemisphere) reaction time advantage in the preparation and execution of movements made by right-handed individuals (Barthélemy and Boulinguez 2001, 2002; Boulinguez and Nougier 1999; Bradshaw et al. 1990; Carson et al. 1990, 1993, 1995; Velay et al. 1999, 2001).

Although the simplicity of measuring reaction time makes it an attractive means of assessing motor laterality, given the polarity of results from clinical and motor control approaches to study, it is difficult to endorse such a practice. Rather, a more involved process of determining limb/hemisphere specialization is likely necessary, including a mixture of hand-preference scales and limb-performance measures in association with brain-imaging techniques.

REFERENCES

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