Expertise and attunement to kinematic constraints

ABSTRACT

Three experiments were undertaken to ascertain the extent to which expertise in natural anticipatory tasks is characterised by superior attunement to the biomechanical (kinematic) constraints of the movement pattern being observed. Twelve world-class and twelve non-expert badminton players were required to predict the depth of an opponentøs stroke from either video displays or point-light displays of the opposing playerøs hitting action. The information available within the displays was manipulated through temporal and/or spatial occlusion. Consistent with predictions that can be derived from the constraint-attunement hypothesis (Vicente and Wang, 1998 Psychological Review 105 33 ó 57), experts showed: (i) an unchanged pattern of information pick-up when the display was reduced from video to point-light and only kinematic information was available; (ii) superior information pick-up from kinematic features that non-experts could use; and (iii) attunement to early kinematic information from the lower body to which non-experts were not sensitive. Consistent with predictions that can be derived from a common-coding perspective (Prinz, 1997 European Journal of Cognitive Psychology 9 129 ó 154), the anticipation of stroke depth was facilitated more for experts than non-experts when the perceptual display provided linked segment information reminiscent of the cross-segmental torque transfers that occur during expert movement production.

Keyword: Attunement; Kinematic; Motion perception; Motor skills; Movement; Distance perception