Interpersonal coordination in a "leader-follower" relationship during balance tasks on a balance board

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Introduction: Joint action tasks require temporal and spatial coordination between performing partners (Sebanz et al., 2006). This study focuses on a precision task on a balance board in a "leader-follower" relationship to elucidate how both partners coordinate their movements and how visual restriction of one partner modulates the interaction. Methods: Participants (10 unisex pairs) stood pairwise on a circular plate (diameter 1.5 m) that was pivoted on a spherical joint allowing 2D-movement. The joint task was to guide a ball through a labyrinth to a goal (iPad) by jointly shifting their weight on the balance board. One subject of the pair was assigned as "leader" ("L") and one as "follower" ("F"). In condition 1–"free", both partners could see the labyrinth. In condition 2–"no screen (ns)", vision to the labyrinth was obstructed for "F." In 3–"no partner (np)," view between partners was restricted (wall). Testing order was counterbalanced. Movement of the partners was captured by using a reflective marker on the spine (C7). Three parameters were derived for analysis: time needed to complete the task, pathway of C7 (PC7), and cross-correlation between "L" and "F" (repeated-measures ANOVA, post hoc: Bonferroni–Holm). Results: Significant differences in completion time were found between conditions, $F(2,18) = 13.05$, $p < 0.001$, $\eta^2 = 0.59$; free < ns; free < np; ns = np), but no significant differences in PC7 for either "L" or "F." Mean cross-correlation of PC7 was not significantly different between "L" and "F" in mediolateral (ml) and anteroposterior (ap) directions ($0.57 < r < 0.77$; 7 ms < lag < 232 ms). Discussion: Visual restriction of the "F" on both the computer screen and the partner leads to decreased temporal performance in the jointly executed task. Analysis of PC7 shows that movement sway of the "L" is always increased compared to the "F," but the difference becomes significant when vision of "F" is restricted, underlining the dependence on specific visual information. Cross-correlation analysis of PC7 did not show the expected interpersonal-coordinative pattern. Reference: Sebanz, N. et al. (2006), *TiCS*, 10.

Vision and expertise in swimming starts: Do they mix?

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Vision is commonly cited as the dominant sensory modality involved in the control of many sports skills. Despite coach interest, the role of vision in a swim start and it's interaction with expertise has not been established and was the purpose of the current experiment. Twelve highly skilled swimmers drawn from the Australian Institute of Sport (AIS) swimming program and 7 less skilled swimmers participated. Data collection was completed at the AIS indoor pool using the "wetplate" analysis system. This system comprised an instrumented start block with a modified Kistler force platform integrated with four synchronized machine vision cameras to capture above and below water activity to 15 m. This system provided the following dependent variables associated with swim start performance: reaction time (s); horizontal take-off velocity (m/s), water entry angle (deg), maximum start depth (m), breakout distance (m) and time (s), and time intervals at 5 m and 15 m (s). After a typical warm-up and a familiarization trial, participants were required to complete five start trials under four different visual conditions over four testing sessions. The four visual conditions were: 1) normal vision where participants wore normal swim goggles; 2) central vision only where the goggle lenses were occluded except for a 10 mm diameter circle in the center of the lens; 3) peripheral vision only where the central lens of the goggles were completely occluded; and 4) full occlusion where the goggles were completely occluded and no visual information was available. A series of Group × Visual Condition repeated measures ANOVAs were used to evaluate any differences in performance across the four visual conditions and level of expertise. Preliminary results revealed numerous expertise differences in select aspects of start performance; however, the influence of the visual conditions was less clear. These preliminary findings suggest that, for skilled performers relative to lesser skilled performers, vision is not an essential source of sensory information used to control a swim start.

Explicit response codes modulate the influence of emotional stimuli on approach-avoidance behavior and selectively impact subjective emotional experience

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The influence of emotion on motor behavior can be modulated by implicit cues such as the distance between an individual and affective environmental content. Explicit cognitive processes elicited when evaluating affective meaning can also impact the degree to which emotions impact motor actions. How implicit and explicit factors interact to influence emotional reactions and ensuing whole body movements remains unspecified. We sought to determine the impact of explicit positive (e.g., Toward) and negative (e.g., Away) instructional codes on implicit approach (e.g., forward gait) and avoidance (e.g., backward gait) behaviors made under different emotional conditions. Participants completed 28 forward and 28 backward gait initiation trials following exposure to emotional images. In two separate trial blocks, the direction of gait was instructed using Toward or Away response codes to targets located in the anterior and posterior directions. Pleasant emotional stimuli facilitated initial step velocity for gait in the forward ($p = .042$) and backward directions ($p = .025$). Additionally, compatibility between instruction cue and the direction walked in the first trial block (e.g., Toward, Forward-Backward) facilitated forward (both ps < .05) and backward (both ps < .05) step force following exposure to pleasant stimuli. Finally, participants rated all images as more arousing (all ps < .05) and less pleasant (all ps < .05) when there was incompatibility between instructional cue and direction of gait initiation in the last block of trials (e.g., Away, Backward-Forward). Results suggest that explicit instructional codes impact implicit approach-avoidance behavior based on compatibility with movement direction and congruence with emotional content. Furthermore, these findings provide support for embodiment perspectives, which emphasize the influence of movement on emotional processing. Theoretical and functional implications are discussed.