One Step Closer to my Heart: Cardiac Cycle is Coupled with Footsteps in Typical but not in Depersonalisation Individuals

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Résumé

Human bodies are highly dynamic systems, constantly moving both inside and in the outside world to secure survival. The mechanisms underlying the interplay between exteroceptive and interoceptive self-related sensory signals are key to understanding the sense of self and its disturbances (Park and Blanke 2009). Previous work showed that the bodily self is not fixed but constantly updated through dynamic sensory feedback, including sound feedback (Tajadura-Jiménez et al. 2012; 2015). Depersonalisation (DP henceforth) is a very common phenomenon that makes people feel detached from their bodily self (Sierra & Berrios 1997). We conducted a study investigating the dynamic coupling between bodily movements from inside the body (i.e., cardiac signals) and bodily actions in the world (e.g., walking) in 60 participants with high and low occurrences of DP. Participants were invited to walk while wearing headphones displaying their natural footstep auditory feedback across frequency bands in three conditions (control, high frequency, low frequency), following a procedure from Tajadura-Jiménez and colleagues (2015). In parallel, we recorded participants' cardiac signals in real time, as well as gait biomechanics, which were used as an implicit measure of changes in perceived body weight across conditions. We found that in typical controls walking pace is significantly coupled with the systolic cardiac phase, whereas in people detached from their bodies (high DP) this coupling is absent. Our study reveals,

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for the first time, that real-time cardiolocomotor coupling is altered in DP individuals, with important implications for dynamic body-based potential therapy.

Mots-Clés: depersonalisation, bodily self, cardiolocomotor coupling, cardiac cycle, dynamic sensory feedback