

The sense of agency (SA), or sense of control, is the subjective awareness of initiating, executing, and controlling one's own volitional actions in the world.

It is the pre-reflective awareness or implicit sense that it is I who is executing bodily movement(s) or thinking thoughts. In non-pathological experience, the SA is tightly integrated with one's "sense of ownership" (SO), which is the pre-reflective awareness or implicit sense that one is the owner of an action, movement or thought. If someone else were to move your arm (while you remained passive) you would certainly have sensed that it were your arm that moved and thus a sense of ownership (SO) for that movement. However, you would not have felt that you were the author of the movement; you would not have a sense of agency (SA).

Interoception, the sense of the internal physiological state of the body, theoretically underpins aspects of self-representation. Experimental studies link feelings of body ownership to interoceptive **perception**, yet few studies have tested for association between the **sense of agency** and interoceptive processing.

Koreki et al. combined an intentional binding paradigm with cardiac measures of interoceptive processing (behavioural performance on a heartbeat discrimination task, and effects of timing within the cardiac cycle) in twenty-six non-clinical participants as an exploratory study. They found performance accuracy on the heartbeat discrimination task correlated positively with the intentional binding effect, an index of sense of agency ($\beta = 0.832$, $p = 0.005$), even after controlling for effects of age, sex, educational level, **heart rate**, heart rate variability and time accuracy. The intentional binding effect was enhanced during cardiac systole (compared to diastole) in individuals with greater heartbeat discrimination accuracy ($\beta = 0.640$, $p = 0.047$). These findings support the proposal that interoception contributes to mechanisms underlying the emergence of sense of agency ¹⁾.

¹⁾

Koreki A, Goeta D, Ricciardi L, Eilon T, Chen J, Critchley HD, Garfinkel SN, Edwards M, Yogarajah M. The relationship between interoception and agency and its modulation by heartbeats: an exploratory study. Sci Rep. 2022 Aug 10;12(1):13624. doi: 10.1038/s41598-022-16569-6. PMID: 35948567.

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