

We typically feel in control over the actions we produce. For example, if I reach for a glass of water, I feel a sense of ownership over my action as I grasp the glass and drink from it. View this in contrast to accidentally knocking a glass of water on the floor—I caused the outcome but might not have controlled it. These seemingly simple motor actions and their related outcomes can show us a phenomenon named Sense of Agency (SoA), which is a core and fundamental aspect of human consciousness. Our ability to veridically experience this link between our actions and their outcomes is important for child development and has been linked to several clinical disorders, e.g., schizophrenia. SoA is also thought to play a role in voluntary movement. Notably, a better understanding of SoA has important implications for neurorehabilitation and socially cognizant robotics. Explicit and implicit measures have been used to study SoA. While there is a wealth of research on SoA, it has recently come to the fore that the most common implicit measure of SoA (temporal binding (TB)) may reflect memory processes rather than SoA. To address this issue, we introduce and present data on a novel approach to understanding common measures of SoA (including TB). Here, we implemented two TB measures and an explicit measure in a novel goal-directed extended action task to better understand SoA measures. Participants either watched or produced dot movements to a target of choice and then estimated the duration between two tones that played either upon movement completion (TB1, akin to traditional TB studies) or based on the start and end of movements (TB2). Participants reported stronger explicit SoA during active than passive movements. Results from neither TB version aligned with prediction based on TB-accounts as a reflection of SoA. We discuss memory-based and scaling accounts as alternative interpretations for our data.