

DISSOCIABLE EFFECTS OF AGENCY AND OWNERSHIP ON SPEECH PERCEPTION

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Grant 146/20

Background: Speech production relies on a forward model that predicts the sensory consequences of one's vocal actions. When auditory feedback matches these predictions, event-related potentials (ERPs) of the electroencephalogram (EEG) are attenuated, supporting two partly overlapping experiences: agency (the sense of causing the action) and ownership (the sense that the voice belongs to oneself). Whether early sensory attenuation effects dissociate these experiences is unknown.

Aims: The present study aimed to dissociate the neural correlates of agency and ownership during speech feedback monitoring using a novel EEG paradigm.

Methods: We recorded EEG from 50 participants during a voice playback task. Agency was manipulated by contrasting self-chosen (self-generated) and unchosen (other-generated) words; ownership contrasted the participant's own voice and the experimenter's voice. Sensory attenuation of the N1 and P2 ERPs was measured, and their cortical generators were source-localized with eLORETA.

Analysis: We applied a multi-method analytical framework used to treat the various data sets (narratives, art and statistics) produced through the study. Approaches included: IPA & Co-interpretation with children, sensory ethnography, thematic analysis and critical discourse analysis. A statistical analysis was applied to the data collected through the online questionnaires. Descriptive statistics were calculated for demographic data and for computing experience types in childhood, continuing experiences into adulthood, and how adults respond to children when they report extra-sensory experiences.

Results: The findings reveal a functional and temporal dissociation between the two core components of the self. Specifically, the N1 component was selectively modulated by voice ownership (identity), whereas the P2 component was more sensitive to agency (outcome contingency), suggesting that ownership precedes and subsequently impacts agency. These findings were corroborated by source localization analyses, which further identified distinct neural networks for each dimension: ownership engaged a fronto-temporal network, including the insula, whereas agency recruited inferior parietal and somatosensory regions. Importantly, an interaction between agency and ownership emerged in the P2 time window, suggesting that while these processes can be dissociated, they also converge during self-monitoring in speech.

Conclusions: These findings reveal a temporal and spatial dissociation between voice agency and ownership. They further suggest that the forward model integrates both sensorimotor predictions and memory-based representations to support a coherent sense of self in vocal communication.

Keywords: Voice, Agency, Ownership, Self, Forward model

Publication:

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