

WHEN PREDICTION ERRS: EXAMINING THE BRAIN DYNAMICS OF ALTERED SALIENCY IN SELF-VOICE PERCEPTION

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Background: In the last decades, a growing body of evidence has demonstrated that self-generated sensations are perceived differently from externally generated sensory input. Suppression of sensory cortical responses to self-generated stimuli allows for the “tagging” of sensations as self-generated, so that they are not confused with sensations produced by something or someone in the external environment. Critically, when we speak, we also have to monitor the emotional content of our voice. Therefore, investigating what happens when the sensory consequences of a speech act that do not match the prediction differ in emotional value is critical. However, existing studies fail to account for the effects of emotional salience in speech and how it affects prediction and prediction errors when what we hear is not what we intended.

Aims: The current study aimed to investigate the effect of change in self-voice quality on sensory feedback to self-generated and externally generated self-vocalizations.

Method: Twenty-six healthy young adults participated in the experiment. First, participants were instructed to repeatedly vocalize the syllable “ah” with neutral, angry, and pleasure intonation, imagining themselves in scenarios eliciting anger, pleasure, or no emotion. Voice samples were processed to remove background noise before morphing. These vocalizations were morphed to generate neutral-to-angry and neutral-to-pleasure continua using STRAIGHT software. This continua consisted of five stimuli ranging from fully neutral to fully emotional: 100% neutral, 60-40% neutral-emotional, 50-50% neutral-emotional and 40-60% neutral-emotional and 100% emotional. Second, they performed a standardized motor-to-auditory task to generate self-vocalizations step wise changing from fully neutral to fully emotional in quality. During the experimental task, EEG data were recorded using a 128 channel actiCHAMP active system at a digitization/sampling rate of 1000 Hz.

Results: N1 suppression was enhanced in response to changes in the self-voice that corresponded to an increase in emotional content (60/40 neutral-emotional, 50/50 neutral-emotional, 40/60 neutral-emotional).

Conclusions: These results suggest that sensory suppression varies as a function of the perceived salience of the auditory feedback that does not match the prediction. They further substantiate the intricate link between emotion and sensory prediction.

Keywords: Sensory prediction, Voice, Emotion, Event-related potentials, N1

Publications:

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