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Proceedings of the Annual Meeting of the Cognitive Science Society

Title

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Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 47(0)

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Publication Date

2025

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Peer reviewed

Measuring Belief Expectancy Violations in Psychotherapy with EEG

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Abstract

In psychological counseling, how individuals respond to statements that align with or contradict their personal beliefs can significantly influence therapeutic engagement and outcomes. While prior research has investigated belief processing in decision-making and judgment, its neural underpinnings in therapeutic contexts remain underexplored. This study addresses this gap by using electroencephalography (EEG) to examine the neural correlates of belief expectancy violations, focusing on the N400 event-related potential (ERP) component. In an experimental paradigm simulating counselor–patient interactions, participants were presented with statements that either confirmed or contradicted their preexisting beliefs. Our results show that belief-incongruent statements elicited significantly larger N400 amplitudes compared to belief-congruent ones. These findings suggest that the N400 may serve as a neural marker of belief expectancy violations in counseling-relevant contexts. This work advances our understanding of the cognitive and neural mechanisms underlying belief processing in psychotherapy and highlights the potential of EEG-based measures in informing future psychotherapeutic approaches.