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CORE: Modeling Cognitive Resistance Evolution in Belief-Constrained Dialogue

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Abstract

Modeling the irrational defense mechanisms inherent in belief revision remains a critical challenge for computational persuasion. Current approaches often prioritize surface-level linguistic fluency, lacking the grounded psychological mechanisms to address active cognitive resistance. We introduce Cognitive Resistance Evolution (CORE), a computational framework that simulates the dynamic interaction between a strategic persuasion interventionist and a defensive cognitive agent. Crucially, CORE integrates a Cognitive Dissonance Monitor (CDM) to perform objective semantic verification, ensuring that the agent’s real-time resistance level evolves based on valid belief alignment rather than mechanical formulas. Experiments across multiple large language models reveal distinct patterns of strategy utilization, characterizing unique intervention patterns. Our results demonstrate that CORE successfully operationalizes Cognitive Dissonance Theory as a flexible cognitive scaffold, enabling the realistic simulation of psychological cascades in high-conflict dialogue.

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