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Can Negotiators Convey a Tough Impression Through Non-Verbal Hints?

The Psychological Effects of Implicit Power in Human-Computer Negotiations

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ABSTRACT

As intelligent agents become increasingly prevalent on online platforms, understanding how users perceive and respond to agent behavior is critical for effective system design. Although prior research has examined negotiation power primarily through explicit communication, comparatively little attention has been given to implicit power cues embedded in interaction design. This study introduces implicit power as a conceptual framework to explain how users infer power from an agent's behavior and appearance during negotiation. Agent anchors, concession strategies, avatar gender, and facial expressions are conceptualized as implicit power signals. Using a controlled human–agent negotiation experiment, the study empirically validates a structural model that integrates agent design cues with human individual differences. The findings demonstrate that implicit power significantly shapes negotiation outcomes and that the proposed model explains a substantial proportion of variance in user responses. This study provides both theoretical and practical implications for the design of intelligent interactive systems.

KEYWORDS

Human-Computer Negotiation, Psychological Effect, Implicit Power, Anchoring, Avatar Image, Individual Differences

INTRODUCTION

Intelligent systems increasingly engage users in socially complex interactions, including negotiation, persuasion, and decision support. Researchers have investigated and shed light on team roles for artificial intelligence (AI)-based teammates in human-AI collaboration (Siemon, 2022). In online commerce and service platforms, software agents frequently negotiate prices, service terms, or resource allocations with human users (Dai et al., 2021). These interactions are not purely computational; rather, they involve psychological processes through which users interpret system behavior, infer intentions, and evaluate their experiences.

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Research on negotiation has long emphasized the role of power in shaping outcomes (Pinkley et al., 1994; Trif et al., 2023). In human–human interaction, power is often communicated through language, status, or body language. However, in human–computer negotiation, power is conveyed differently. Users infer power not from explicit dominance but from implicit cues embedded in system behavior and interface design, such as starting offers, concession patterns, and visual representations of agents.

Prior studies have examined these cues, such as anchoring, concession tactics, and avatar characteristics, largely in isolation. Consequently, findings across studies remain inconsistent. For example, research has shown that high power can lead to worse negotiation outcomes under certain conditions (Schaerer et al., 2015), a result that challenges conventional negotiation theory. In Schaerer et al.'s research, anchor and power were examined separately. The study found that high-power negotiators set lower anchors, suggesting that anchoring exerted a stronger influence. However, as proposed in the current paper, anchoring represents one aspect of power: implicit power. A lower anchor therefore reduced the negotiator's power and, consequently, diminished negotiation outcomes. Such inconsistencies arise because these cues have not been conceptualized collectively as indicators of a single underlying construct: implicit power.

This study proposes implicit power as a perceptual mechanism through which users interpret and respond to intelligent agents during negotiation. It integrates behavioral negotiation research with human–computer interaction perspectives to develop and empirically validate a model of implicit power in human–agent negotiation. By doing so, the study aims to clarify how agent design choices influence user experience, perceived control, and negotiation outcomes.

BACKGROUND

Human-Computer Negotiation

Human–computer negotiation has emerged as an important research area as intelligent agents increasingly interact with users in commercial and decision-support contexts. Prior work suggested that negotiation agents should not only optimize economic outcomes but also account for social, psychological, and reputational factors when interacting with humans (Mell, 2017; Mell et al., 2021). In e-commerce and service platforms, agents are used to automate or support negotiation processes, thereby reducing cognitive burden while promoting consistency and scalability (Yu et al., 2015).

Early research demonstrated that software agents could achieve negotiation outcomes comparable to, or better than, human negotiators under certain conditions (Chavez & Maes, 1996; Faratin et al., 1998). Subsequent experimental studies further showed that agents could outperform humans in terms of achieved utility and agreement rates, particularly when equipped with well-designed concession strategies (Bosse & Jonker, 2005; Vahidov et al., 2014). These findings motivated growing interest in agent-based negotiation systems that interact directly with human users rather than operating solely in simulated environments.

More recent research has shifted attention from agent performance alone to the human experience of negotiating with agents. Studies showed that human perceptions, such as trust, fairness, and satisfaction, play a critical role in shaping negotiation processes and outcomes (Burgoon et al., 2000; Druckman et al., 2021; Vahidov et al., 2017). As AI systems become increasingly human-like, users often struggle to distinguish between human and agent counterparts, which further amplifies the importance of social cues in human–agent interaction (Byde et al., 2003; Miwa & Terai, 2012).

Advances in conversational agents and negotiation platforms, such as IAGO and chat-based systems, have enabled systematic investigation of how agent behavior, appearance, and strategy influence human responses (Mell & Gratch, 2016; Mell et al., 2018). These platforms provide a foundation for examining not only what agents do but also how humans interpret agent behavior during negotiation.