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Emotional artificial intelligence: The impact of chatbot empathy and emotional tone on consumer satisfaction and word of mouth

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ABSTRACT

This research examines the impact of empathic chatbots on consumer responses, exploring how Artificial Intelligence (AI) emotional skills, particularly the use of specific empathic language and emotional tone, can enhance user satisfaction and word of mouth intentions. Across three experimental studies (n = 643), findings reveal that empathic conversational agents are perceived as warmer and more competent, positively influencing satisfaction and encouraging word of mouth. The study advances existing literature by demonstrating that empathy in chatbots is feasible and effective in creating more affective and socially engaging consumer interactions, thereby mitigating some of the negative perceptions typically associated with AI tools. Warmth and competence were key mediating factors, suggesting that consumers ascribe human-like qualities to chatbot interactions, enhancing their service experience. The findings also highlight the practical benefits of implementing empathic AI in service settings, where language adaptations and rapport-building behaviors can improve service quality perception and consumer trust. Given the rapid integration of AI in consumer contexts, understanding the role of empathic chatbots in shaping customer experience is crucial. Future research directions include examining the empathic chatbot's role across varied service types and exploring its impact on service employees' perceptions. These insights contribute to theoretical and managerial perspectives, advocating for the integration of empathy as a core feature in AI-driven customer service.

1. Introduction

Artificial Intelligence (AI) has been transforming the service landscape by enhancing service accuracy, reducing consumer effort, and increasing convenience throughout the consumption journey (Holebeek et al., 2024; Rohden et al., 2025). While AI systems are typically celebrated for their cognitive strengths, they are often critiqued for lacking social and emotional intelligence – features that may lead users to perceive such technologies as impersonal or uncaring (Ameen et al., 2022; Huang and Rust, 2021). This limitation has spurred a growing body of research at the intersection of affective computing, human-computer interaction, and consumer informatics, with increasing attention to how AI might simulate or augment human-like emotional skills, particularly empathy (Heinisch et al., 2024; McDuff and Czerwinski, 2018; Picard, 2003).

Empathy has the potential to bridge the human-AI gap by enriching affective and social experiences that yield positive outcomes for both consumers and firms, such as increased relationship satisfaction, loyalty, and customer well-being (Jiang et al., 2025; Liu-Thompkins et al., 2022). Recent studies in affective computing and consumer informatics have examined the emotional dynamics of service-robot interactions (An et al., 2025; Filieri et al., 2022; Heinisch et al., 2024), including the potential benefits of empathy and the risks of emotional over-dependence on social chatbots (Laestadius et al., 2022; Lee, 2025). Despite this growing interest, empirical evidence remains scarce regarding how artificial empathy is perceived and how it functions in consumer-chatbot interactions (Liu-Thompkins et al., 2022).

The earlier generation of agents and chatbots relied on rule-based logic and standardized responses, offering little room for affective expressions. In contrast, recent advances in generative AI – particularly Large Language Models (LLMs) – enable chatbots to adapt their language to user tone and intent, thereby allowing these agents to

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demonstrate emotional attributes, including empathy (Ke et al., 2025; Ma et al., 2015). Although it may appear self-evident that empathic chatbots enhance consumer experiences, prior literature reveals a more nuanced reality. Studies have reported mixed results regarding the effectiveness of AI-generated empathy: while some users respond positively, others may perceive empathic cues as inauthentic or manipulative, potentially reducing trust and perceived service quality (Filieri et al., 2022; Lee, 2025). These contrasting outcomes underscore the need to understand better not only whether, but also when and how empathic behaviors in AI-driven service interactions foster positive outcomes.

This research addresses this gap by investigating how AI agents' use of specific language and emotional tone shapes consumer satisfaction and word-of-mouth intentions, and by examining perceptions of warmth and competence as underlying explanatory mechanisms (Pentina et al., 2023). We focus on the service industry, where AI tools – particularly chatbots – have been widely adopted to support customer service, sales, and service recovery (Fan et al., 2023; Zhu et al., 2023). One prevalent AI technology in this industry is conversational agents, specifically chatbots, which are computer programs capable of sustaining coherent interactions and answering consumer questions (Rese and Tranker, 2024). As a growing touchpoint in the consumer journey, chatbots provide a rich context for exploring the role of emotional design features that elicit more human-like responses.

This study makes a significant contribution to the literature in four key ways. First, we provide empirical evidence on how a chatbot's emotional skill – namely empathy – influences consumer perceptions and behavioral intentions across distinct service contexts, including both high- and low-involvement experiences. Second, we draw on social cognition theory to examine perceptions of technology competence and warmth as mediators of these effects (Cuddy et al., 2008). Third, we highlight that the integration of empathy in AI technologies has implications not only for consumers but also for service employees and marketing practitioners who must engage with these tools in their work environments (Ameen et al., 2022). Thus, our research offers insights into how brands can create more positive experiences for various stakeholders by incorporating higher emotional skills into chatbots. Fourth, by investigating empathy in chatbots, we contribute to the broader domain of human-centered AI, where emotionally attuned technologies are designed to facilitate more authentic, trust-based relationships with users (Boratto et al., 2023; Heinisch et al., 2024).

2. Background and hypotheses

The growth of deep learning and natural language processing technologies has increased interest in AI tools for customer relationship management (Davenport et al., 2020; Huang and Rust, 2021). Marketing AI tools can be classified into four types of intelligence: mechanical (e.g., self-service technologies), analytical (e.g., recommendation systems), intuitive (e.g., adaptive service personalization), and empathic AI (e.g., social companions and emotion-aware bots) (Huang and Rust, 2018).

Research in affective computing has long emphasized the importance of enabling machines to recognize and respond to human emotions (Arya et al., 2021; Picard, 2003). In the context of human-computer interaction, studies suggest that AI-based systems with anthropomorphic characteristics tend to foster greater user trust (Chen et al., 2024). Moreover, attributes such as explainability and fairness can influence reliance on AI systems, even in areas where human interaction is considered indispensable (Purificato et al., 2023).

Chatbots are an example of an AI tool that can assist consumers with various tasks and questions 24/7, thereby increasing the number of service touchpoints while providing a personalized, omnichannel, and interactive experience (Chung et al., 2020; Puntoni et al., 2021). These non-corporeal conversational agents engage users in a consistent and natural language conversation through text- or audio-based environments, supporting both general-purpose and task-oriented interactions (Chaves and Gerosa, 2021; Tran et al., 2021). From the company's perspective, conversational agents support customer service and sales, reduce costs, and optimize service delivery (Klein and Martinez, 2023).

2.1. Social and emotional skills of chatbots

The capabilities of conversational agents can be social or task-oriented (Chattaraman et al., 2019). This research follows the CASA (Computers Are Social Actors) paradigm, which states that although technology is inanimate, users often engage with it as if it were a social agent (Nass and Moon, 2000). Recent research in human-centered AI has highlighted not only the performance dimension and its impact on perceptions of trustworthiness (Boratto et al., 2023), but also their social legitimacy – that is, the extent to which AI is accepted as a legitimate social actor in service interactions (Sun et al., 2023).

Technological advances have increasingly endowed AI tools with sophisticated social capabilities, aligning them more closely with human stereotypes (Ameen et al., 2022; Chen et al., 2024). Social traits such as personality, autonomy, and empathy enable emotionally meaningful interactions between humans and AI agents, fostering a human-centered experience and stronger relationship bonds (Pentina et al., 2023; Mari et al., 2024). Consequently, empathy emerges as a critical predictor of effective performance in sales and service roles (Iglesias et al., 2019).

Empathy is commonly defined as an individual's response to another's observed experiences (Davis, 1983), encompassing both cognitive and emotional dimensions. Cognitive empathy involves adopting another person's perspective and intentionally perceiving and understanding their emotions (Jiang et al., 2025). Conversely, affective empathy stems from sharing emotions and feelings, demonstrating understanding and concern for others' experiences, and is often associated with more altruistic attitudes (Mari et al., 2024; Todd and Burgmer, 2013). Although empathy has traditionally been regarded as a uniquely human capacity (Perry, 2023), recent research suggests that it can be simulated and perceived in AI agents (Mari et al., 2024), particularly in chatbots (Kim and Hur, 2024; Markovitch et al., 2024).

In human-human interactions, empathy is often perceived through tone of voice, body language, and facial expressions. On the other hand, in human-chatbot communication, especially via text, empathy is primarily signaled through language style (e.g., formal vs. informal) and nonverbal elements, such as emojis. Artificial empathy typically encompasses elements such as perspective-taking, empathetic concern, and emotional contagion, without requiring the presence of another human being to work, as AI can identify, emulate, and adapt its responses based on interaction cues (Liu-Thompkins et al., 2022). In low-empathy interactions, consumers generally rate their affective and social experiences higher with human agents than with AI agents. However, this difference tends to disappear in high-empathy scenarios. Therefore, from a social interaction standpoint, a more empathic chatbot adds value to consumer experiences (Liu-Thompkins et al., 2022).

Chatbots that exhibit human-like traits significantly influence key consumer experience outcomes (Araujo, 2018). For example, anthropomorphic design cues, such as visual appearance or conversational style, influence users' information disclosure to chatbot agents (Chen et al., 2024). In service recovery contexts, empathic chatbots reduce consumer anger and improve satisfaction and reuse intentions (Yim, 2024; Haupt et al., 2023). Moreover, research from a frontline employee perspective has shown that chatbots can elicit emotional responses among service staff as well. Interactions with agents perceived as more empathetic or helpful lead to feelings of fairness, closeness, and a desire to continue using them (Gkinko et al., 2022).

In the consumer settings, the literature suggests that more emotive AI can elicit positive consumer reactions. A chatbot with a response style perceived as more empathic can increase consumer retention (Fan et al., 2023), continued intentions to use the AI technology (Guo et al., 2025), and satisfaction levels (Zhu et al., 2023). Furthermore, when AI agents convey empathy toward consumers, this can increase satisfaction,

relationship quality, and even trust in the interaction (Ashfaq et al., 2020).

Another key outcome is the consumer's intention to engage in positive word of mouth (WOM) about the experience. Empathy facilitates forgiveness, enhances reciprocating behaviors, and protects service companies from negative WOM (Bove et al., 2019). Moreover, consumer interactions with more empathic employees lead to more perceived service quality and positive WOM (Markovic et al., 2018). In human-AI interactions, rapport-building with a chatbot has been shown to reduce the spread of negative feedback and increase the likelihood of positive WOM, particularly when expectations are met (Fatima et al., 2024; Yim, 2024). Furthermore, anthropomorphic characteristics in chatbots, such as using a human avatar, have been shown to enhance positive product attitudes and encourage WOM (Chen et al., 2023).

Because empathy is inherently associated with human social interactions, we posit that higher perceived empathy in chatbots will positively influence both consumer satisfaction and willingness to recommend. Accordingly, we propose the following hypotheses:

H1. Chatbots that communicate empathically increase consumer satisfaction with the service experience.

H2. Chatbots that communicate empathically increase consumer intentions to engage in positive word of mouth about the service experience.

While these hypotheses may initially seem intuitive, recent findings suggest that empathy does not always yield beneficial effects. For instance, if perceived as inauthentic or manipulative, chatbot empathy can backfire, resulting in reduced trust and diminished perceptions of service quality (Lee, 2025). Hence, it is crucial to examine how consumers interpret and respond to empathic behavior in specific contexts, such as service chatbots, and to better understand the mechanisms that underpin these effects.

2.2. Competence and warmth

Warmth and competence are foundational dimensions of social cognition that influence how individuals perceive people and technologies in service contexts (Van Doorn et al., 2017). Perceived warmth reflects traits such as friendliness, helpfulness, and caring, whereas perceived competence encompasses traits like intelligence, skillfulness, and efficacy (Cuddy et al., 2008). In service contexts, consumers often infer service quality based on their perceptions of a company's competence and warmth. For instance, appearance-related cues from employees influence inferences about their warmth and competence, which in turn drive customers' behavioral intentions toward them (Scott et al., 2013).

Although traditionally linked to human agents, these dimensions have also been applied to human-computer interactions. For example, warm language can lead users to perceive digital agents as more anthropomorphized and socially competent (Xu et al., 2023). Similarly, conversational tone and personalized messaging enhance chatbot credibility and perceived expertise (Rese and Trankner, 2024), suggesting that warmth and competence can be attributed to AI systems under certain communicative conditions.

Previous research has investigated these perceptions in various contexts, including consumer responses to bank services (Güntürkün et al., 2020), frontline employee characteristics (Scott et al., 2013), and AI-based interactions (Kim and Hur, 2024). In the case of chatbots, warmth and competence have been shown to emerge from design elements such as anthropomorphic language, interaction fluency (Yang et al., 2024), and the timing of responses (Xu et al., 2023). However, little is known about whether and how empathy, as an emotional expression, may serve as a source of these perceptions.

Previous literature has linked empathy and kindness to perceptions of warmth, but competence is not necessarily associated with empathy. One can elicit warmth perceptions while reducing competence perceptions in the same situation (Liu and Lin, 2018). Therefore, empathy as a way of fostering a sense of competence may sound counterintuitive. Nonetheless, research has demonstrated that technology on the service frontline can enhance perceptions of warmth and competence, which, in turn, may affect consumer satisfaction, engagement, and well-being (van Doorn et al., 2017). We therefore expect that a more empathetic chatbot would elicit a perception of warmth, given how close and emotionally connected humans feel towards an empathic agent.

We propose that chatbot empathy serves as a critical antecedent of consumers' perceptions of warmth and competence. Empathic expressions can foster emotional closeness, attentiveness, and humanness, qualities closely tied to the perception of warmth. Simultaneously, when a chatbot demonstrates social awareness and emotional intelligence, it may also be seen as more capable of managing interactions effectively, thereby enhancing perceived competence, even when that competence is not strictly functional or task-related.

Although prior research has primarily associated competence with utilitarian attributes such as accuracy or speed (Xu et al., 2023), we argue that emotional expressiveness, particularly in the form of empathy, can also signal competence in relational tasks, such as understanding consumer needs or navigating emotionally charged service encounters. In this regard, cooperative tone, appropriate emotional responses, and context-sensitive language may contribute to both the emotional and cognitive evaluation of the chatbot, reinforcing perceptions of warmth and competence simultaneously.

Based on this theoretical rationale, we propose the following hypotheses:

H3. Empathic chatbot communication increases perceived warmth, which in turn will positively impact (a) consumer satisfaction and (b) word of mouth intentions.

H4. Empathic chatbot communication increases perceived competence, which in turn will positively impact (a) consumer satisfaction and (b) word of mouth intentions.

Fig. 1 illustrates the hypothesized model, detailing the proposed relationships between chatbot empathy, the mediators (warmth and competence), and the outcome variables (satisfaction and word of mouth).

3. Study 1

3.1. Methods

3.1.1. Participants

A total of 108 Portuguese consumers participated in the study. Participants ranged in age from 18 to 65 years ($M = 33.00$, $SD = 13.13$), and 75 % identified as female. Recruitment was conducted via social media platforms (Facebook and Instagram) using a voluntary convenience sample, with no financial incentives offered. Eligibility criteria required participants to be 18 years or older.

3.1.2. Design

To test the main effect, we conducted a single-factor, between-subjects experimental study that manipulated perceived empathy level expressed by a chatbot during an interaction. Participants were randomly assigned to one of two conditions.

3.1.3. Materials and measures

The use of written scenarios to simulate consumer-AI interactions is well established in the literature and provides strong internal validity (e.g., Holthöwer and van Doorn, 2023; Sun et al., 2023). Participants were instructed to imagine they were interacting with a chatbot to track a package awaiting delivery. In the low-empathy condition (control), the chatbot responded with neutral, standardized messages (e.g., "Type the

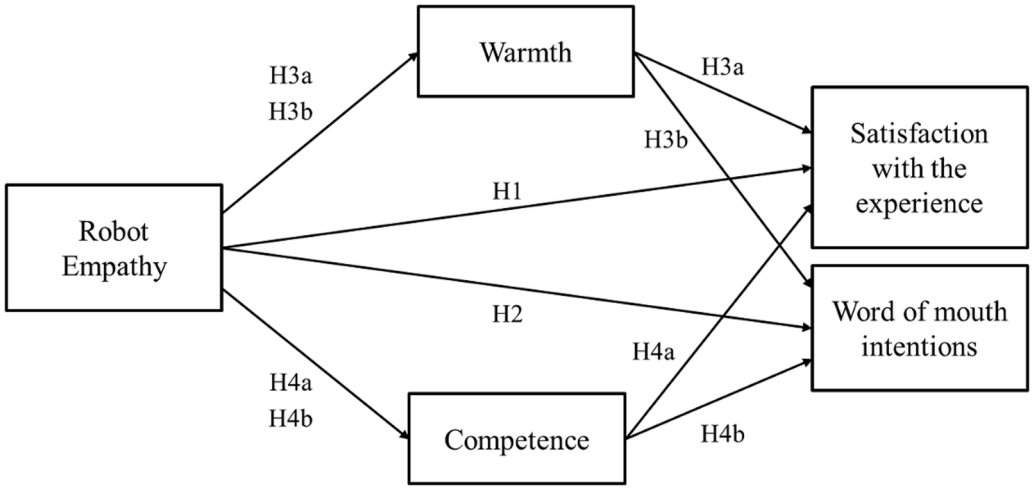

Fig. 1. Conceptual model.

number of your parcel"). In the high-empathy condition, the chatbot used a friendlier and more personal tone (e.g., "I hope to help you find your package. Type the number of your parcel"). The specific stimuli presented to each group are available in Appendix 1.

After reading the scenario, participants responded to measures of satisfaction (four items adapted from Chung et al., 2020) and word-of-mouth intentions (three items adapted from Babin et al., 2005). A manipulation check assessed perceived empathy by asking participants to indicate the extent to which they agreed that the chatbot was empathic. Given evidence that trust in AI-driven systems differs from trust in traditional technologies (Fernandes and Oliveira, 2021), we included control variables to account for potential confounds: trust in AI, privacy risk perception (Rohden and Espartel, 2024), and demographic variables. All constructs were measured using 5-point Likert scales ranging from "totally disagree" to "totally agree". A complete list of items and sources is Available in Appendix 2.

3.1.4. Procedure

Participants accessed the study through a Qualtrics link, read the scenario corresponding to their assigned condition, and then completed the questionnaire containing the dependent variables, manipulation check, control variables, and demographic questions.

3.2. Results

Independent-samples t-test confirmed that there were no significant differences between experimental conditions in terms of trust ($t(106) = 1.93$, $p = .06$) or perceived privacy risk ($t(106) = .26$, $p = .795$), indicating successful randomization across groups. The manipulation check confirmed the effectiveness of the empathy manipulation ($t(106) = 5.92$, $p = .001$): participants in the low-empathy condition perceived the chatbot as less emotionally skilled ($M = 2.73$, $SD = 1.19$) than those in the high-empathy condition ($M = 4.00$, $SD = 1.03$).

To test H1 and H2, we conducted independent-samples t-tests comparing participants' responses across conditions. The analysis assessed whether the two scenarios (low *vs.* high empathy) produced different levels of satisfaction and WOM intentions (dependent variables). The effect on satisfaction was significant ($t(106) = 3.64$, $p = .001$), with participants in the low-empathy condition reporting lower satisfaction ($M = 3.44$, $SD = .85$) than those who interacted with the high-empathy chatbot ($M = 3.97$, $SD = .67$), confirming H1. Similarly, WOM intentions were significantly higher in the high-empathy condition ($M = 3.73$, $SD = .82$) than in the low-empathy condition ($M = 3.37$, $SD = .89$; $t(106) = 2.18$, $p = .031$), confirming H2.

3.4. Discussion

Study 1, conducted in a delivery service context, demonstrates that consumers can recognize and respond positively to chatbots that employ empathic language and a more emotional tone. Specifically, participants who interacted with the high-empathy chatbot reported higher satisfaction with the experience, replicating and extending previous findings on the role of emotional tone in chatbot communication (Zhu et al., 2023).

In addition, the study provides new evidence regarding consumers' word-of-mouth intentions, a response variable that has received limited attention in the context of empathic AI. Participants in the high-empathy condition were more likely to recommend the service and share their positive experience, suggesting that human-centered AI can foster relational outcomes traditionally associated with human interactions.

These findings are particularly relevant for omnichannel service environments, where chatbots increasingly function as frontline service agents. Despite the promising results, further research is needed to uncover the mechanisms underlying these effects, specifically how empathy shapes consumer perceptions of the chatbot's social and functional qualities. These aspects are examined in greater detail in Study 2.

4. Study 2

4.1. Methods

4.1.1. Participants

A total of 207 responses were collected through an online Qualtrics survey. After excluding 22 responses due to extremely short (< 70 seconds) or long (> 480 seconds) completion times, the final sample comprised 185 valid participants ($M_{age} = 30.00$, $SD = 9.98$; 64 % female). Participants were recruited through social media platforms and other online channels. Random assignment placed 91 participants in the low-empathy condition and 94 participants in the high-empathy condition.

4.1.2. Design

Study 2 employed a single-factor, between-subjects experimental design manipulating the chatbot's empathy level (low vs. high), replicating the structure of Study 1 in a different service context.

4.1.3. Materials and measures

Instead of a parcel-delivery scenario, participants were presented with a chatbot-assisted restaurant reservation. In the low-empathy

condition, the chatbot provided straightforward, standardized responses (e.g., "Your reservation is confirmed"); in the high-empathy condition, the chatbot adopted a more personal and emotional tone (e.g., "I believe this will be the ideal atmosphere for a celebration. Your reservation is confirmed"). Full details of the stimuli are available in Appendix 1. A pretest confirmed the effectiveness of the empathy manipulation (t (62) = -2.51, p = .012), indicating that participants perceived the chatbot as more empathic even without a live interaction.

The dependent variables (satisfaction and WOM intentions) were measured using the same scales applied in Study 1. In addition, Study 2 included measures of perceived warmth and competence (three items each, adapted from Xu et al., 2023), familiarity with chatbot interactions (adapted from Rohden et al., 2025) as a control variable, and one additional manipulation-check item ("This chatbot was friendly"). All constructs and items are listed in Appendix 2.

4.1.4. Procedure

Participants accessed the study via a Qualtrics link. After reading the assigned scenario, they completed the measures of satisfaction, WOM intentions, perceived warmth, perceived competence, familiarity with chatbot interactions, and the manipulation check.

4.2. Results

All multi-item scales demonstrated high reliability: satisfaction (α = .93), WOM (α = .94), competence (α = .83), and warmth (α = .93). The manipulation check, using an independent-samples t-test, confirmed a significant difference in perceived empathy between groups (t (183) = -6.89, p = .001), with respondents in the low-empathy condition (M = 3.33, SD = 1.08) perceiving the chatbot as less empathic than those in the high-empathy condition (M = 4.36, SD = .96). Participants also rated the scenarios as differing in friendliness (t (183) = -5.94, p = .001), with those interacting with the more empathic chatbot perceiving it as friendlier (M_{high} = 4.59, SD = .69) than those in the low-empathy condition (M_{low} = 3.87, SD = .93). There were no significant differences across groups in terms of trust in AI (t (183) = .83, p = .408), familiarity with the technology (t (183) = .88, p = .378), or privacy concerns (t (183) = .83, p = .408).

The main effect was assessed using independent-samples t-test. Results confirmed a significant impact of chatbot empathy on satisfaction with experience (t (183) = -2.42, p = .016), with participants in the low-empathy condition reporting lower satisfaction (M = 4.05, SD = .88) than those in the high-empathy condition (M = 4.35, SD = .80). Similarly, empathy significantly influenced WOM intentions (t (183) = -2.59, p = .010), with lower intentions in the low-empathy condition (M_{low} = 3.75, SD = 1.05) than in the high-empathy condition (M_{high} = 4.13, SD = .93).

We conducted mediation analyses (Process Model 4 with 5.000 bootstraps) with satisfaction as the dependent variable. A more empathic chatbot is perceived as warmer (b = 1.29, t = 9.74, p = .001), warmth positively predicted satisfaction (b = .59, t = 10.90, p = .001). The direct effect of empathy on satisfaction remained significant (b=-.46, t = -3.85, p = .001), and the indirect effect was also significant (b = .89, LLCI = .6884, ULCI = 1.11), confirming the mediation of warmth (H3a). Likewise, a more empathic agent was perceived as more competent (b = .28, t = 2.44, p = .016), and competence positively influenced satisfaction (b = .30, t = 2.42, p = .017). The direct effect of empathy on satisfaction was not significant when competence was included in the model (b = .10, t = 1.02, p = .307), but the indirect effect was significant (b = .24, LLCI = .055, ULCI = .432), confirming the mediation of competence (H4a).

When we consider word of mouth as the dependent variable, warmth again positively predicted WOM (b = .66, t = 10.06, p = .001). With warmth in the model, the direct impact of chatbot empathy on WOM remained significant (b = -.47, t = -3.26, p = .001), and so was the indirect effect of warmth (b = .84, LLCI = .644, ULCI = 1.06), hence confirming H3b. Perceived competence also positively predicted WOM (b = .82, t = 11.19, p = .001). When competence was included in the model, the direct effect of empathy on WOM was no longer significant (b = .15, t = 1.31, p = .190), while the indirect effect was significant (b = .23, LLCI = .044, ULCI = .406), indicating full mediation and confirming H4b.

4.3. Discussion

Study 2 confirmed that a more emotional tone in chatbot responses is associated with higher perceptions of empathy and leads to positive consumer responses, also in hospitality settings. In contrast to the utilitarian delivery context of Study 1, the restaurant scenario reflects a more hedonic and emotionally involving service interaction. These results suggest that empathic chatbots are valued across varying levels of consumer involvement, reinforcing the view that empathy contributes meaningfully to service quality perceptions and user satisfaction (Guo et al., 2025).

Furthermore, the research findings shed light on perceptions of competence and warmth as underlying mechanisms that positively influence consumer satisfaction and word of mouth. Previous research has explored how perceptions of chatbot warmth and competence influence user satisfaction (Xu et al., 2023); however, it has not considered the emotional skills of chatbots, specifically their empathetic characteristics.

Building on these results, we aim to test the robustness of these mechanisms in another service context where consumers are typically more accustomed to digital tools – namely, the hotel reservation process. Therefore, Study 3 focuses on chatbot interaction in the hospitality industry, where booking via digital channels is already well established.

5. Study 3

5.1. Methods

5.1.1. Participants

After excluding invalid responses (timeouts or incomplete submissions), the final sample comprised 286 valid participants. Of these, 140 were assigned to the low-empathy condition and 146 to the high-empathy condition. The average participant age was 31 years (SD = 11.33), and 56 % identified as female. Participants were recruited online through social media platforms, and data were collected via a Qualtrics survey.

5.1.2. Design

Study 3 employed a single-factor, between-subjects experimental design, again manipulating the chatbot's empathy level (low vs. high), but in a new service context: a hotel reservation.

5.1.3. Materials and measures

The manipulation followed the same structure as in Study 2. Participants were asked to imagine booking a hotel room online for a wedding anniversary with the assistance of a chatbot. In the low-empathy condition, after learning about the special occasion, the chatbot responded with a standard, neutral message (e.g., "Your reservation for the suite is confirmed"). In contrast, in the high-empathy condition, the chatbot offered a more tailored and emotionally attuned response (e.g., "I believe the suite is a great choice to celebrate this moment. Your reservation is confirmed"). Full scenarios are provided in Appendix 1.

The measures for satisfaction, WOM intentions, competence, and warmth were identical to those used in Studies 1 and 2.

5.1.4. Procedure

The data collection procedure mirrored the earlier studies. After accessing the Qualtrics link, participants were randomly assigned to one of the two conditions, read the scenario corresponding to their assigned

condition, and completed the measures of satisfaction, WOM intentions, competence, warmth, and demographic questions.

5.2. Results

All scales showed appropriate reliability: satisfaction (α = .93), WOM (α = .94), competence (α = .89), and warmth (α = .94). The manipulation worked as expected: an independent-samples t-test revealed significant differences in empathy perceptions (t = (284) = -5.36, p = .001), with participants in the low-empathy condition perceiving the conversational agent as less emphatic (M_{low} = 3.31, SD = 1.09) than those in the high empathy condition (M_{high} = 3.98, SD = 1.01). Likewise, there was a significant difference in perceive friendliness (t (284) = -4.82, p=.001), with lower friendliness perceptions in the low empathy condition (M_{low} = 3.53, SD = 1.02) relative to the high-empathy condition (M_{high} = 4.09, SD = .95). No significant differences emerged for trust (t (284) = -1.51, p = .132), familiarity with the technology (t (284) = -.14, p = .892), or privacy concerns (t (284) = -1.68, p = .096).

Chatbot empathy significantly influenced satisfaction (t = 284) = -2.90, p = .004), with participants in the low empathy condition reporting lower satisfaction levels (M = 3.69, SD = .88) compared to those who saw the highly empathic chatbot (M = 3.99, SD = .85). A similar pattern emerged for WOM intentions (t (284) = -3.68, p = .001): participants interacting with a less empathic chatbot reported lower intentions (M = 3.47, SD = 1.03) than those interacting with the high-empathy chatbot (M = 3.90, SD = .92).

We conducted mediation analyses (Process Model 4 with 5.000 bootstraps) with satisfaction as the dependent variable. A more empathic chatbot was perceived as warmer (b = .76, t = 6.32, p = .001), and warmth positively predicted satisfaction with the experience (b = .59, t = 15.70, p = .001). The direct effect of empathy on satisfaction was not significant (b=-.15, t = -1.81, p = .072), whereas the indirect effect was significant (b = .50, LLCI = .353, ULCI = .659), confirming the mediation of warmth (H3a). Likewise, empathy increased perceptions of competence (b = .21, t = 2.14, p = .034), which in turn positively influenced satisfaction (b = .82, t = 21.54, p = .001). The direct effect of empathy remained non-significant (b = .12, t = 1.96, p = .05), while the indirect effect of perceived competence explains the variance in satisfaction (b = .20, LLCI = .011, ULCI = .370), confirming H4a.

When WOM intentions served as the dependent variable, the influence of warmth perceptions on intentions to engage in WOM was significant and positive (b = .70, t = 17.56, p = .001). With warmth in the model, the direct impact of chatbot empathy on WOM was not significant (b = -.10, t = -1.20, p = .233), while the indirect effect was significant (b = .53, LLCI = .369, ULCI = .701), supporting H3b. Similarly, perceptions of competence triggered by a more empathetic chatbot elicited WOM intentions (b = .86, t = 18.41, p = .001). When competence was included in the model, the direct effect of empathy on WOM remained significant (b = .24, t = 3.08, p = .002) and so was the indirect effect (b = .18, LLCI = .016, ULCI = .342), confirming the mediation of competence perceptions on WOM intentions.

5.3. Discussion

Study 3 provides additional evidence that interacting with an empathic chatbot positively influences satisfaction and WOM intentions, even in a high-involvement hotel booking context. Therefore, empathy is an alternative to mitigate the negative perceptions commonly associated with AI tools, promoting a shift from a solely functional and cognitive focus to an emotional approach that includes aspects such as chatbot empathy (Ameen et al., 2022).

Importantly, this study replicates and extends the mediation results of Study 2, which suggest that warmth and competence perceptions explain the relationship between chatbot empathy and positive consumer outcomes. Notably, the effect of empathy on warmth perceptions appears especially pronounced in this context. Although these results are based on independent samples, they may suggest that in hotel-related interactions, where users are more accustomed to digital self-service, empathic cues are particularly salient.

6. Conclusion

With the rapid adoption of AI technology in marketing, it is crucial to understand how consumer interactions with chatbots can be optimized (Kim and Hur, 2024; Markovitch et al., 2024). While the functional benefits of AI, particularly conversational agents, are well documented, this research investigated the impact of interaction with chatbots that present empathy as an emotional skill (Liu-Thompkins et al., 2022). Across three experimental studies, our findings consistently demonstrate that chatbots that use specific language and emotional tone elicit more positive human responses.

6.1. Theoretical implications

This research advances the knowledge about the influence of artificial empathy on consumer perceptions and cognitive responses, confirming the positive effect of empathic chatbot on consumer experiences (Liu-Thompkins et al., 2022). Previous research has explored ways of eliciting empathy in virtual reality experiences (Jiang et al., 2025). The results of this research demonstrated that empathy can also be elicited in text-based interactions with chatbots through language and emotional tone. Moreover, empathic interaction with conversational agents can positively influence consumer responses, including satisfaction and WOM intentions. Empathy, as an emotional skill, is seldom associated with AI agents (Ameen et al., 2022; Fan et al., 2023). Thus, this research suggests that developing more empathetic agents can mitigate potential negative perceptions of chatbots and elicit positive consumer responses. These emotional skills can bridge the human-AI gap, creating more affective and social customer experiences, even when interactions occur with a robot instead of a frontline human employee. To the best of the authors' knowledge, this is also the first study to explore WOM as an outcome of interacting empathic chatbot.

Furthermore, warmth and competence perceptions serve as mechanisms for understanding these positive consumer responses. Previous research has explored how perceptions of chatbot warmth and competence influence user satisfaction (Xu et al., 2023). However, these studies have not considered empathetic characteristics in chatbots. Research on the influence of AI empathy on consumer responses has primarily focused on specific contexts, such as service recovery (Fan et al., 2023). We contribute to the literature in this sense by exploring regular service consumption experiences and shedding light not only on emotional aspects that could be intuitively associated with empathy, such as warmth, but also on competence, a perception usually related to more utilitarian or functional assessment of consumer experiences (Liu and Lin, 2018; Liu-Thompkins et al., 2022; Yim, 2024).

Despite previous doubts about whether AI could emulate emotional aspects (Bove et al., 2019), elicit emotional perceptions (An et al., 2025), or that chatbot empathy could create positive consumer responses (Lee, 2025), our findings not only confirm that humans can infer more emotional skills like empathy from conversational agents, but they can also attribute typically human traits, like warmth, to interactions with chatbots. AI-based platforms can enhance consumer-brand engagement and well-being (Holebeek and Belk, 2021). Therefore, this research contributes to a deeper understanding of the elements that support the development of human-centered AI, ultimately leading to more positive user experiences (Boratto et al., 2023; Purificato et al., 2023).

6.2. Managerial implications

The findings of this research offer several practical insights for marketers, service designers, and technology developers. First,

companies and decision-makers should consider integrating empathetic features into chatbot design to enhance the consumer experience and promote positive brand outcomes, including sales and perceived service quality (Garvey et al., 2023; Jiang et al., 2025). Moreover, developing more emotionally skilled technologies can yield positive outcomes for frontline employees (Huang et al., 2024).

The human aspect is often a critical component of service provision, so adopting a service script for chatbots could be beneficial. A chatbot that adapts its language, mimics consumer expressions, and builds rapport can be perceived as more friendly and empathic, which would increase consumer satisfaction and the likelihood of consumers recommending services to their family and friends.

Nonetheless, these results should be considered with caution. Since more relational and emotional interactions with technology can elicit consumers´trust (Mari et al., 2024), perceptions of benevolence (Garvey et al., 2023), and positive attitudes such as willingness to self-disclosure (Chen et al., 2024), social aspects of chatbots should receive appropriate attention from companies and policymakers. Human-centered chatbots can create more satisfaction and positive experiences while also potentially enhancing consumer risks and jeopardizing privacy. Therefore, clear policies should be developed to ensure that companies utilize emotional and empathetic chatbots ethically and responsibly.

6.3. Limitations and future research

As with any experimental study, this research presents some limitations that should be acknowledged to contextualize its contributions and guide future investigations. Participants were exposed to simulated chatbot interactions via written scenarios rather than engaging in real-time conversations. This approach offered stronger experimental control and enhanced internal validity, but may limit ecological validity, as it does not fully replicate the richness and dynamism of actual consumer-chatbot exchanges (Viglia et al., 2021). To increase realism, future research could incorporate live chatbot systems or leverage large language models (LLMs) such as GPT-based agents to simulate more natural, adaptive dialogues (Ke et al., 2025; Markovitch et al., 2024).

Although random assignment helped control for pre-existing emotional states, we recognize that users' emotions are dynamic and can evolve throughout an interaction (Filieri et al., 2022). Empathic chatbot responses may amplify, moderate, or redirect these emotional trajectories. Future research could employ longitudinal or real-time methodologies, utilizing tools such as the Positive and Negative Affect Schedule (PANAS) to monitor affective states before and after AI-mediated encounters. Such approaches would offer more profound insights into how user emotions both influence and are influenced by empathic AI.

Another consideration involves the length and complexity of the conversations. In our design, all stimuli involved brief interactions. Longer exchanges might heighten emotional engagement, increase perceived empathy, or differently influence customer satisfaction. The role of interaction duration thus represents a relevant moderator for future investigation.

While our study focused on verbal expressions of empathy, other cues – such as chatbot appearance, voice, animations, or emojis – may significantly shape how empathy is perceived. Future research should explore the multimodal dimensions of empathic design and assess their interplay with textual strategies.

In terms of generalizability, the three studies covered distinct service contexts (delivery, restaurant, and hotel), but were conducted with online participants recruited via social media and panel platforms. Although the sample was diverse in terms of age and gender, it may not reflect the full spectrum of consumer populations or cultural environments. Replicating this research in other countries, with offline samples, and in service settings that vary in emotional involvement, such as healthcare or financial services, would help confirm the robustness and applicability of the findings (e.g., Holthöwer and van Doorn, 2023).

Finally, while our focus was on consumer responses, the growing use of empathic AI in service environments may also have implications for frontline employees and service managers (Huang et al., 2024). Future research could explore how emotionally expressive AI influences employee experience, human–AI collaboration, and perceptions of authenticity. Additionally, identifying the boundary conditions under which empathic AI may not produce positive effects, such as in highly utilitarian contexts or when empathy is perceived as inauthentic, remains a promising direction for further study.

In summary, this study offers robust initial evidence regarding the effects and mechanisms of chatbot empathy. At the same time, the avenues outlined above suggest important opportunities for future research to deepen and broaden our understanding of empathic AI in more ecologically valid and context-sensitive ways.

During the preparation of this work, the author(s) used ChatGPT and Grammarly to improve manuscript cohesion and text clarity. After using this tool/service, the author(s) reviewed and edited the content as needed and take full responsibility for the content of the publication.

Ethics statement

The research followed standard ethical guidelines, and the experimental research has been approved by the NOVA IMS ethics committee (DDMKT2024-9-54876).

CRediT authorship contribution statement

Simoni F Rohden: Writing – original draft, Project administration, Methodology, Formal analysis, Data curation. **Lélis Balestrin Espartel:** Writing – review & editing, Validation, Investigation, Conceptualization.

Declaration of competing interest

The authors have no competing interests to declare.

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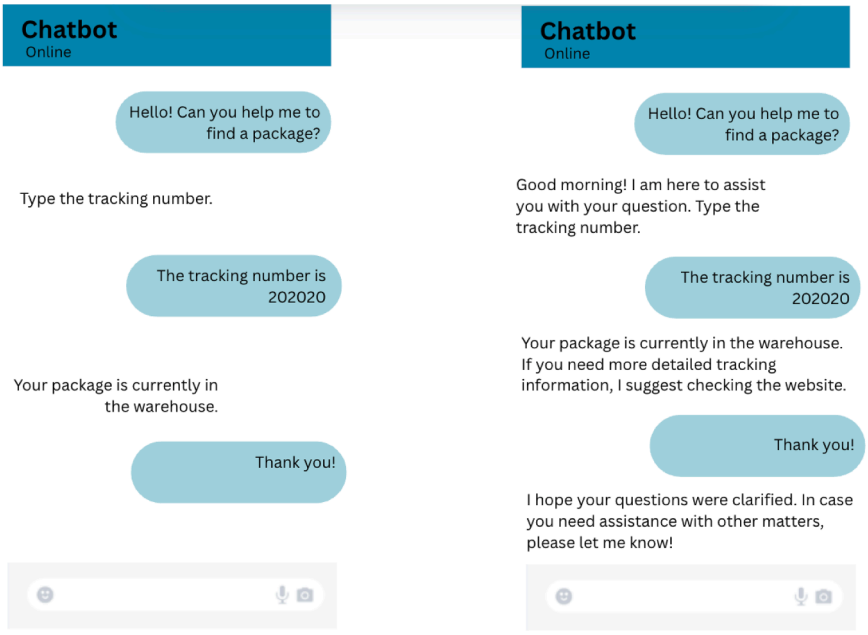
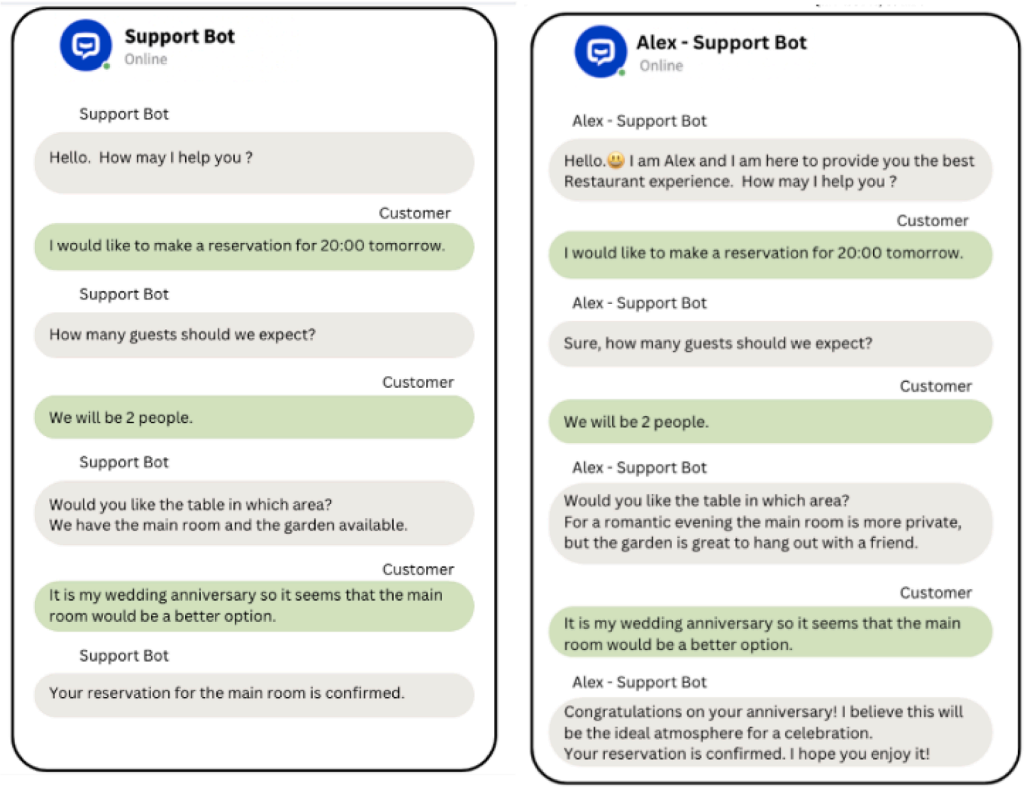
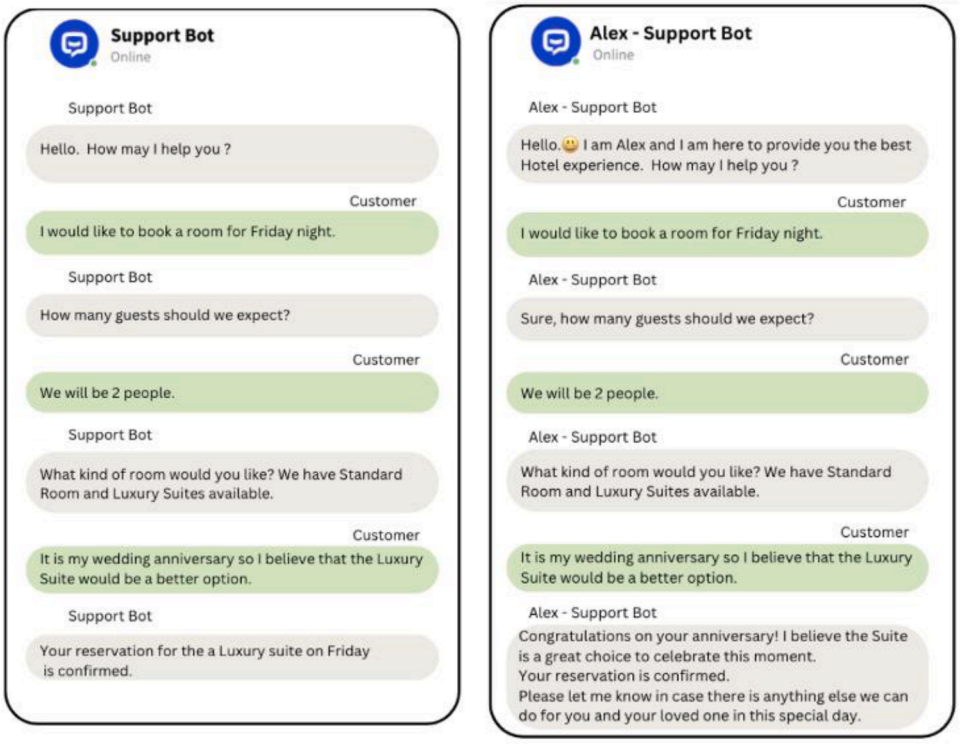
Appendix 1. Scenarios used in the experimental design



Study 1 – Chatbot conversation to locate a package (low *vs.* high empathy).



Study 2 - Chatbot conversation to make a restaurant reservation (low *vs.* high empathy).



Study 3 - Chatbot conversation to book a hotel room (low *vs.* high empathy).

Appendix 2. Measurement scales and items

Scale	Items	Source
Satisfaction with the experience	I am satisfied with this service This chatbot provides a good customer service The service met my expectations I was satisfied with the experience of talking with the service agent	Chung et al., 2020
Word of mouth	I would say positive things about this experience to other people I would recommend this chatbot to someone who seeks my advice I would encourage friends and relatives to use this chatbot	Babin et al., 2005
Competence	The chatbot was competent The chatbot was intelligent The chatbot was skilful	Xu et al., 2023
Warmth	The chatbot was warmth The chatbot was kind The chatbot was friendly	Xu et al., 2023
Familiarity	I am familiar with the use of chatbots	Rohden et al., 2025
Trust	I trust that technologies such as AI could assist me in my consumption experience	Fernandes and Oliveira 2021
Privacy concerns	I would be concerned about my personal privacy in this interaction with a Chatbot	Rohden and Espartel, 2024
Manipulation checks	The chatbot was empathic The chatbot was friendly	The authors

Data availability

The article's data will be shared upon request with the corresponding author.

References

Ameen, N., Sharma, G.D., Tarba, S., Rao, A., Chopra, R., 2022. Toward advancing theory on creativity in marketing and artificial intelligence. Psychol. Mark. 39 (12), 1802–1825. https://doi.org/10.1002/mar.21699.

An, P., Zhang, C., Gao, H., Zhou, Z., Xiao, Y., Zhao, J., 2025. AniBalloons: Animated chat balloons as affective augmentation for social messaging and chatbot interaction. Int. J. Hum.-Comput. Stud. 194, 103365. https://doi.org/10.1016/j.ijhcs.2024.103365.

Araujo, T., 2018. Living up to the chatbot hype: The influence of anthropomorphic design cues and communicative agency framing on conversational agent and company perceptions. Comput. Hum. Behav. 85, 183–189. https://doi.org/10.1016/j.chb.2018.03.051.

Arya, R., Singh, J., Kumar, A., 2021. A survey of multidisciplinary domains contributing to affective computing. Comput. Sci. Rev. 40. https://doi.org/10.1016/j.cosrev.2021.100399.

Ashfaq, M., Yun, J., Yu, S., Loureiro, S.M.C., 2020. I, Chatbot: Modeling the determinants of users' satisfaction and continuance intention of AI-powered service agents. Telemat. Inform. 54, 101473. https://doi.org/10.1016/j.tele.2020.101473.

Babin, B.J., Lee, Y., Kim, E., Griffin, M., 2005. Modeling consumer satisfaction and word-of-mouth: Restaurant patronage in Korea. J. Serv. Mark. 19 (3), 133–139. https://doi.org/10.1108/08876040510596803.

Boratto, L., Fenu, G., Marras, M., Medda, G., 2023. Practical perspectives of consumer fairness in recommendation. Inf. Process. Manage. 60 (2), 103208. https://doi.org/10.1016/j.ipm.2022.103208.

Bove, L.L., 2019. Empathy for service: Benefits, unintended consequences, and future research agenda. J. Serv. Mark. 33 (1), 31–43. https://doi.org/10.1108/JSM-10-2018-0289.
Chattaraman, V., Kwon, W.-S., Gilbert, J.E., Ross, K., 2019. Should AI-based conversational digital assistants employ social- or task-oriented interaction style? A task-competency and reciprocity perspective for older adults. Comput. Hum. Behav. 90, 315–330. https://doi.org/10.1016/j.chb.2018.08.048.
Chaves, A.P., Gerosa, M.A., 2021. How should my chatbot interact? A survey on social characteristics in human–chatbot interaction design. Int. J. Hum.–Comput. Interact. 37 (8), 729–758. https://doi.org/10.1080/10447318.2020.1841438.
Chen, F., Sengupta, J., Zheng, J., 2023. When products come alive: Interpersonal communication norms induce positive word of mouth for anthropomorphized products. J. Consum. Res. 49 (6), 1032–1052. https://doi.org/10.1093/jcr/ucac027.
Chen, J., Li, M., Ham, J., 2024. Different dimensions of anthropomorphic design cues: How visual appearance and conversational style influence users' information disclosure tendency towards chatbots. Int. J. Hum.-Comput. Stud. 190, 103320. https://doi.org/10.1016/j.ijhcs.2024.103320.
Chung, M., Ko, E., Joung, H., Kim, S.J., 2020. Chatbot e-service and customer satisfaction regarding luxury brands. J. Bus. Res. 117, 587–595. https://doi.org/10.1016/j.jbusres.2018.10.004.
Cuddy, A.J.C., Fiske, S.T., Glick, P., 2008. Warmth and competence as universal dimensions of social perception: The stereotype content model and the BIAS map. In: Zanna, M.P. (Ed.), Adv. Exp. Soc. Psychol, Adv. Exp. Soc. Psychol, 40. Academic Press, pp. 61–149. https://doi.org/10.1016/S0065-2601(07)00002-0.
Davenport, T., Guha, A., Grewal, D., Bressgott, T., 2020. How artificial intelligence will change the future of marketing. J. Acad. Mark. Sci. 48, 24–42. https://doi.org/10.1007/s11747-019-00696-0.
Davis, M.H., 1983. Measuring individual differences in empathy: Evidence for a multidimensional approach. J. Pers. Soc. Psychol. 44 (1), 113–126. https://doi.org/10.1037/0022-3514.44.1.113.
Fan, H., Han, B., Wang, W., 2023. Aligning (in)congruent chatbot–employee empathic responses with service-recovery contexts for customer retention. J. Travel Res. 63 (8), 1870–1893. https://doi.org/10.1177/00472875231201505.
Fatima, J.K., Khan, M.I., Bahmannia, S., Chatrath, S.K., Dale, N., Johns, R., 2024. Rapport with a chatbot? the underlying role of anthropomorphism in socio-cognitive perceptions of rapport and e-word of mouth. J. Retail. Consum. Serv. 77, 103666. https://doi.org/10.1016/j.jretconser.2023.103666.
Fernandes, T., Oliveira, E., 2021. Understanding consumers' acceptance of automated technologies in service encounters: Drivers of digital voice assistants adoption. J. Bus. Res. 122, 180–191. https://doi.org/10.1016/j.jbusres.2020.08.058.
Filieri, R., Lin, Z., Li, Y., Lu, X., Yang, X., 2022. Customer emotions in service robot encounters: a hybrid machine-human intelligence approach. J. Serv. Res. 25 (4), 614–629. https://doi.org/10.1177/10946705221103937.
Garvey, A.M., Kim, T., Duhachek, A., 2023. Bad news? send an AI. good news? send a human. J. Mark 87 (1), 10–25. https://doi.org/10.1177/00222429211066972.
Ginko, L., Elbanna, A., 2022. Hope, tolerance and empathy: Employees' emotions when using an AI-enabled chatbot in a digitalised workplace. Inf. Technol. People 35 (6), 1714–1743. https://doi.org/10.1108/ITP-04-2021-0328.
Guo, Y., Xu, L., Wang, C., 2025. Exploring the effect of empathic response and its boundaries in artificial intelligence service recovery. J. Retail. Consum. Serv. 82, 104065. https://doi.org/10.1016/j.jretconser.2024.104065.
Güntürkün, P., Haumann, T., Mikolon, S., 2020. Disentangling the differential roles of warmth and competence judgments in customer-service provider relationships. J. Serv. Res. 23 (4), 476–503. https://doi.org/10.1177/1094670520920354.
Haupt, M., Rozumowski, A., Freidank, J., et al., 2023. Seeking empathy or suggesting a solution? effects of chatbot messages on service failure recovery. Electron. Mark. 33, 56. https://doi.org/10.1007/s12525-023-00673-0.
Heinisch, J.S., Kirchhoff, J., Busch, P., Wendt, J., von Stryk, O., David, K., 2024. Physiological data for affective computing in HRI with anthropomorphic service robots: the AFFECT-HRI data set. Sci. Data 11, 333. https://doi.org/10.1038/s41597-024-03128-z.
Hollebeek, L.D., Belk, R., 2021. Consumers' technology-facilitated brand engagement and well-being: positivist TAM/PERMA- vs. consumer culture theory perspectives. Int. J. Res. Mark. 38 (2), 387–401. https://doi.org/10.1016/j.ijresmar.2021.03.001.
Hollebeek, L.D., Menidjel, C., Sarstedt, M., Jansson, J., Urbonavicius, S., 2024. Engaging consumers through artificially intelligent technologies: Systematic review, conceptual model, and further research. Psychol. Mark. 41 (4), 880–898. https://doi.org/10.1002/mar.21957.
Holthöwer, J., van Doorn, J., 2023. Robots do not judge: service robots can alleviate embarrassment in service encounters. J. Acad. Mark. Sci. 51, 767–784. https://doi.org/10.1007/s11747-022-00862-x.
Huang, L.L., Chen, R.P., Chan, K.W., 2024. Pairing up with anthropomorphized artificial agents: Leveraging employee creativity in service encounters. J. Acad. Mark. Sci. 52, 955–975. https://doi.org/10.1007/s11747-024-01017-w.
Huang, M.-H., Rust, R.T., 2018. Artificial intelligence in service. J. Serv. Res. 21 (2), 155–172. https://doi.org/10.1177/1094670517752459.
Huang, M.-H., Rust, R.T., 2021. A strategic framework for artificial intelligence in marketing. J. Acad. Mark. Sci. 49, 30–50. https://doi.org/10.1007/s11747-020-00749-9.
Iglesias, O., Markovic, S., Rialp, J., 2019. How does sensory brand experience influence brand equity? Considering the roles of customer satisfaction, customer affective commitment, and employee empathy. J. Bus. Res. 96, 343–354. https://doi.org/10.1016/j.jbusres.2018.05.043.
Jiang, X., Zhou, W., Sun, J., Chen, S., Fung, A., 2025. Empathy enhancement through VR: A practice-led design study. Int. J. Hum.-Comput. Stud. 194, 103397. https://doi.org/10.1016/j.ijhcs.2024.103397.
Ke, L., Tong, S., Cheng, P., Peng, K., 2025. Exploring the frontiers of LLMs in psychological applications: a comprehensive review. Artif. Intell. Rev. 58 (305). https://doi.org/10.1007/s10462-025-11297-5.
Kim, W.B., Hur, H.J., 2024. What makes people feel empathy for AI chatbots? assessing the role of competence and warmth. Int. J. Hum. Comput. Interact. 40 (17), 4674–4687. https://doi.org/10.1080/10447318.2023.2219961.
Klein, K., Martinez, L.F., 2023. The impact of anthropomorphism on customer satisfaction in chatbot commerce: An experimental study in the food sector. Electron. Commer. Res. 23 (4), 2789–2825. https://doi.org/10.1007/s10660-022-09562-8.
Laestadius, L., Bishop, A., Gonzalez, M., Illenčík, D., Campos-Castillo, C., 2022. Too human and not human enough: A grounded theory analysis of mental health harms from emotional dependence on the social chatbot Replika. New Media Soc. 26 (1), 5923–5941. https://doi.org/10.1177/14614448221142007.
Lee, J., 2025. When bots' empathic expressions backfire: Exploring the negative moderation between chatbot empathic expressions and monetary compensation for angry customers. Electron Markets 35, 65. https://doi.org/10.1007/s12525-025-00814-7.
Liu, P.J., Lin, S.C., 2018. Projecting Lower Competence to Maintain Moral Warmth in the Avoidance of Prosocial Requests. J. Consum. Psychol. 28, 23–39. https://doi.org/10.1002/jcpy.1010.
Liu-Thompkins, Y., Okazaki, S., Li, H., 2022. Artificial empathy in marketing interactions: Bridging the human-AI gap in affective and social customer experience. J. Acad. Mark. Sci. 50, 1198–1218. https://doi.org/10.1007/s11747-022-00892-5.
Ma, F., et al., 2015. A review of human emotion synthesis based on generative technology. IEEE Trans. Affect. Comput. https://doi.org/10.1109/TAFFC.2025.3573878. Advance online publication.
Mari, A., Mandelli, A., Algesheimer, R., 2024. Empathic voice assistants: Enhancing consumer responses in voice commerce. J. Bus. Res. 175, 114566. https://doi.org/10.1016/j.jbusres.2024.114566.
Markovic, S., Iglesias, O., Singh, J.J., et al., 2018. How does the perceived ethicality of corporate services brands influence loyalty and positive word-of-mouth? Analyzing the roles of empathy, affective commitment, and perceived quality. J. Bus. Ethics 148, 721–740. https://doi.org/10.1007/s10551-015-2985-6.
Markovitch, D., Stough, R., Huang, D., 2024. Consumer reactions to chatbot versus human service: An investigation in the role of outcome valence and perceived empathy. J. Retail. Consum. Serv. 79, 103847. https://doi.org/10.1016/j.jretconser.2024.103847.
McDuff, D., Czerwinski, M., 2018. Designing emotionally sentient agents. Commun. of the ACM 61 (12), 74–83. https://doi.org/10.1145/318659.
Nass, C., Moon, Y., 2000. Machines and mindlessness: Social responses to computers. J. Soc. Issues 56 (1), 81–103. https://doi.org/10.1111/0022-4537.00153.
Pentina, I., Xie, T., Hancock, T., Bailey, A., 2023. Consumer–machine relationships in the age of artificial intelligence: systematic literature review and research directions. Psychol. Mark. 40 (8), 1593–1614. https://doi.org/10.1002/mar.21853.
Perry, A., 2023. AI will never convey the essence of human empathy. Nat. Hum. Behav. 7, 1808–1809. https://doi.org/10.1038/s41562-023-01675-w.
Picard, R.W., 2003. Affective computing: challenges. Int. J. Hum.-Comput. Stud. 59 (1), 55–64. https://doi.org/10.1016/S1071-5819(03)00052-1.
Puntoni, S., Reczek, R.W., Giesler, M., Botti, S., 2021. Consumers and artificial intelligence: an experiential perspective. J. Mark. 85 (1), 131–151. https://doi.org/10.1177/0022242920953847.
Purificato, E., Lorenzo, F., Fallucchi, F., De Luca, E.W., 2023. The use of responsible artificial intelligence techniques in the context of loan approval processes. Int. J. Hum.-Comput. Interact. 39 (7), 1543–1562. https://doi.org/10.1080/10447318.2022.2081284.
Rese, A., Trankner, P., 2024. Perceived conversational ability of task-based chatbots: Which conversational elements influence the success of text-based dialogues? Int. J. Inf. Manage. 74, 102699. https://doi.org/10.1016/j.ijinfomgt.2023.102699.
Rohden, S.F., Espartel, L.B., 2024. Consumer reactions to technology in retail: choice uncertainty and reduced perceived control in decisions assisted by recommendation agents. Electron. Commer. Res. 24, 901–923. https://doi.org/10.1007/s10660-024-09808-7.
Rohden, S.F., Netto, C.S.F., Espartel, L.B., 2025. Autonomous technology in the marketplace: the impact of enjoyment on consumer responses. Comput. Hum. Behav. 168, 108647. https://doi.org/10.1016/j.chb.2025.108647.
Scott, M.L., Mende, M., Bolton, L.E., 2013. Judging the book by its cover? How consumers decode conspicuous consumption cues in buyer–seller relationships. J. Mark. Res. 50 (3), 334–347. https://doi.org/10.1509/jmr.11.0478.
Sun, Z., Zang, G., Wang, Z., Zhao, H., Liu, W., 2023. VCAs as partners or servants? The effects of information sensitivity and anthropomorphism roles on privacy concerns. Technol. Forecast. Soc. Change 192, 122560. https://doi.org/10.1016/j.techfore.2023.122560.
Todd, A.R., Burgmer, P., 2013. Perspective taking and automatic intergroup evaluation change: Testing an associative self-anchoring account. J. Pers. Soc. Psychol. 104 (5), 786. https://doi.org/10.1037/a0031999.
Tran, A.D., Pallant, J.I., Johnson, L.W., 2021. Exploring the impact of chatbots on consumer sentiment and expectations in retail. J. Retail. Consum. Serv. 63, 102718. https://doi.org/10.1016/j.jretconser.2021.102718.
Van Doorn, J., Mende, M., Noble, S.M., Hulland, J., Ostrom, A.L., Grewal, D., Petersen, J.A., 2017. Domo arigato Mr. Roboto: Emergence of automated social presence in organizational frontlines and customers' service experiences. J. Serv. Res. 20 (1), 43–58. https://doi.org/10.1177/1094670516679272.
Viglia, G., Zaefarian, G., Ulqinaku, A., 2021. How to design good experiments in marketing: types, examples, and methods. Ind. Mark. Manag. 98, 193–206. https://doi.org/10.1016/j.indmarman.2021.08.007.

Xu, Y., Niu, N., Zhao, Z., 2023. Dissecting the mixed effects of human-customer service chatbot interaction on customer satisfaction: an explanation from temporal and conversational cues. J. Retail. Consum. Serv. 74, 103417. https://doi.org/10.1016/j.jretconser.2023.103417.

Yang, S., Xie, W., Chen, Y., Li, C., Jiang, H., Zhou, W., 2024. Warmth or competence? understanding voice shopping intentions from HumanAI interaction perspective. Electron. Commer. Res. https://doi.org/10.1007/s10660-024-09859-w.

Yim, M.C., 2024. Effect of AI chatbot's interactivity on consumers' negative word-of-mouth intention: mediating role of perceived empathy and anger. Int. J. Hum. Comput. Interact. 40 (18), 5415–5430. https://doi.org/10.1080/10447318.2023.2234114.

Zhu, T., Lin, Z., Liu, X., 2023. The future is now? Consumers' paradoxical expectations of human-like service robots. Technol. Forecast. Soc. Change 196, 122830. https://doi.org/10.1016/j.techfore.2023.122830.