

Chatbots in frontline services and customer experience: An anthropomorphism perspective

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Abstract

This study measures the effects of chatbot anthropomorphic language on customers' perception of chatbot competence and authenticity on customer engagement while taking into consideration the moderating roles of humanlike appearance and brand credibility. We conducted two experimental studies to examine the conceptual framework. Study 1 tests the moderating effect of a chatbot's anthropomorphic appearance on the relationship between chatbots' language and customer engagement. Study 2 tests the moderating effect of brand credibility on the relationship between a chatbot's anthropomorphic language and customer engagement. The findings confirm that the interaction between humanlike appearance via the use of avatars and anthropomorphic language, such as using emojis, in conversations with customers influences customer engagement, and that this effect is mediated by perceived chatbot competence and authenticity. Further, the positive effect of anthropomorphic language on perceived competence, and subsequently on authenticity and engagement, is only significant when the brand credibility was low (vs. high). This study offers insights into the effect of chatbots' anthropomorphic language and provides suggestions on how to devise efficient strategies for engaging customers using chatbots.

KEYWORDS

anthropomorphism, authenticity, brand credibility, chatbots, competence, emojis

1 | INTRODUCTION

Recent developments in artificial intelligence (AI) in marketing, consumer research, and psychology have made it possible for companies to use chatbots for service delivery and to integrate them into the customer service frontline (Mariani et al., 2022; Mehta et al., 2022). Some of the current AI used in customer experience referred to as chatbots or virtual assistants, simulate human-to-

human communication using text and natural language processing (Ameen et al., 2022; Wirtz et al., 2018). There are also other relevant AI applications in customer experience, such as robots (Belanche, Casalo, Flavián, et al., 2021), service workers (Belk, 2022), and self-service technology automation (Lee & Yi, 2022). Therefore, it can be seen that the fast and inexorable advancement of technology is affecting businesses that have implications for customer service and customer experience as part of their offering (Castillo et al., 2020;

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Flavián et al., 2021). Hence, it is important to further explore new horizons in customer experience.

Chatbots are an important strategic brand asset as they provide the chance to provide efficient customer service around-the-clock (Rajaobelina et al., 2021; Thomaz et al., 2020). For instance, over the course of a year, more than 100,000 chatbots were created to interact with customers on the Facebook Messenger platform (Johnson, 2017). Chatbots are capable of simple jobs like sending customers airline tickets as well as more difficult ones like giving them shopping, health, or financial advice (Jiménez-Barreto et al., 2021). By 2025, 95% of all consumer–brand interactions will either be improved upon or replaced by chatbots, according to market analysis (Servion, 2020). Thus, it is critical for customer experience researchers to investigate the insights of chatbots into customer experience and its implications (Mariani et al., 2022; Mehta et al., 2022).

Despite the fact that chatbots are frequently used to communicate with customers, recent reports show that their interactions with them frequently go wrong (e.g., Orłowski, 2017). Consumer scepticism toward user–chatbot interactions and a preference for interacting with human agents (as opposed to chatbots) are frequent outcomes of the accumulation of these negative experiences and a general customer mistrust of technology (Elsner, 2017). The lack of perceived competence and authenticity in the customer–chatbot interaction may be the cause of consumers' scepticism and opposition to chatbots, but they have not received sufficient attention from previous studies. It is crucial that chatbot designers and programmers comprehend how to give chatbots vital social-emotional and relational aspects to increase the humanlikeness of chatbot interactions, which raises the perceived competence and authenticity of the conversation. This is because advances in AI technology have made it possible for businesses to program chatbots to provide personalized responses based on cutting-edge speech recognition technologies, enabling a more anthropomorphic interaction (Mozafari et al., 2021; Wilson et al., 2017).

While some research has looked at how chatbots resemble human language, more research is needed to determine how different language styles affect customer perception of chatbot's humanlikeness which may lead to different perceived competence and authenticity (S. Y. Kim et al., 2019; Pizzi et al., 2023). Additionally, the effort to anthropomorphize chatbots faces the difficulty that consumers find it increasingly challenging to correctly distinguish humans from chatbots (Pizzi et al., 2023). A chatbot is the representative of a brand when interacting with customers. Thus, brand credibility as the information received from a brand also may form customer expectations which may influence the interaction with chatbots (Hamilton et al., 2021). However, brand credibility has been overlooked in the interaction between chatbots and online customers. There have not been any studies as far as the authors' literature review that examines the role of brand credibility in the interaction between chatbots and online customers (Appendix A).

The research question of this paper is: "How does chatbot anthropomorphic language affects customers' perception of chatbot competence and authenticity and customer engagement?". We draw

on social response theory (e.g., Moon, 2000) to capture the set of drivers behind customer engagement resulting from chatbots and their anthropomorphism. Social response theory is an appropriate theoretical foundation because of its role in establishing how individuals treat technology (or for our study, chatbots) in their interactions and helps explain their behavioral outcomes (Miao et al., 2022). Discerning how anthropomorphic elements enhance individual chatbots' social responses will prove meaningful in understanding how anthropomorphism impacts the chatbots perceived competence and authenticity (Grazzini et al., 2023; Huang & Lee, 2022). Thus, social response theory in our paper to explicate and join this important and emerging arena of chatbot research. The current research has two main objectives: first, to examine how the anthropomorphic language and appearance of chatbots influence customers' perception of competence, authenticity, and customer engagement; and second, to explore the role of brand credibility in shaping consumers' interaction with chatbots. We conducted two experiments to test our conjectures. Thus, we are among the first to examine the effect of emojis as a form of anthropomorphic language. Using social response theory, we extend prior research and include emojis as a vital form of anthropomorphic language. In addition, our results show that brands with low credibility should avoid the use of emojis in their chatbots—but this effect is negated when brand credibility is high.

Our research contributes to the existing body of knowledge in the field of digital services by providing new insights into the role of chatbots' anthropomorphic language in predicting customer perception and engagement. Our study makes three main contributions to the literature. First, we propose that chatbots' use of emojis can positively influence customers' social responses, as they begin to perceive the chatbot as a social actor (Miao et al., 2022). Our findings also suggest that emojis can be used to further reduce feelings of anger when interacting with a chatbot. Second, our study provides a more nuanced understanding of how anthropomorphizing a chatbot can lead to customer engagement, mediated by authenticity and perceived competence. Finally, our research may pave the way for future studies to incorporate emojis in chatbots as a means of expressing emotions and reducing feelings of uncanniness in a nonintrusive manner. The current research provides some suggestions for marketers on how to create efficient plans for interacting with clients through chatbots.

The paper is structured as follows. First, the literature review and hypotheses development are presented. Next, we go over the two experiments to test the hypotheses. Finally, we address the general discussion, implications, limitations, and directions for future research to form the paper's conclusion.

2 | LITERATURE REVIEW

2.1 | Anthropomorphism

Anthropomorphism is "the attribution of human characteristics to nonhuman entities" (Zhou et al., 2019, p. 954). Anthropomorphism is proposedly drawn from a theory of mind where humans

attribute intentions, attitudes, and belief schemas to explain the actions of a human or nonhuman entity (Epley, 2018). Such attribution may include emotional traits (e.g., desire and openness; Fan et al., 2016), physical traits (e.g., a humanoid face or body), or cognitive traits (e.g., knowledge; Nguyen et al., 2022). Humans often anthropomorphize objects as a way of helping them understand and relate to the world around them. For example, humans often attribute agency to animals, natural forces, or deities to explain their behaviors, even if there is no intentionality behind these entities' actions (e.g., "The dog is affectionate" vs. "The dog loves me"; Epley et al., 2007). Therefore, anthropomorphism can be specifically thought of as a process that imbues nonhuman entities with a sense of agency as a means of forming a relationship with the focal object (Newman, 2018; Tam et al., 2013).

Anthropomorphism has been used in a marketing space to generate relationships with customers. For instance, brand logos and brand personas are attempts by a brand to be perceived as a living entity to encourage relationships with customers (Aggarwal & McGill, 2007). Indeed, the Michelin Man logo, invented in 1889, was amongst the first anthropomorphic brand logos created that (1) humanized a brand, and (2) provided an engaging brand experience that resonated with customers (Jurberg, 2020; Newman, 2018). Anthropomorphism has also been used in autonomous vehicles to increase trust (Waytz et al., 2014), implemented as product features to increase product preference (MacInnis & Folkes, 2017), or in social cause campaigns to increase message compliance (Ahn et al., 2014). Overall, brands strive for customers to develop a relationship with them and use anthropomorphic strategies to do so (Steinhoff & Palmatier, 2021).

In the digital age, technology has removed most semblance of direct human presence in social interactions (Steinhoff & Palmatier, 2021). To instill a sense of social presence, firms have begun anthropomorphizing customer's experiences across a wide variety of platforms (Brandão & Popoli, 2022) or devices (e.g., voice assistants such as Alexa; Mende et al., 2019). With the growth of online shopping, implementing anthropomorphic elements within a customer's journey has enabled the presence of a perceived partner (Hamilton et al., 2021). This generally leads to increased positive feelings and experiences on the part of the customer. However, anthropomorphism can be a double-edged sword, leading to feelings of reactance and anger (Crolic et al., 2022). For example, if an algorithm fails (Srinivasan & Sarial-Abi, 2021) or if the agency is attributed to a specific anthropomorphic actor (Waytz et al., 2014), then negative feelings may be greater than if those actors were non-anthropomorphic (Garvey et al., 2023). This effect is stronger when there is an interaction with an anthropomorphic actor, as negative attributions are more likely to occur if they are highly anthropomorphic (T. W. Kim et al., 2023). As a result, anthropomorphism can reap great benefits but can also be quite risky, as is most clear in the case of chatbots discussed next.

2.2 | Chatbots and current research

Chatbots can be broadly thought of as "any software application that engages in a dialog with a human using natural language" (Rese et al., 2020, p. 2), are often adopted as customer-facing agents in contexts ranging from retailing and travel to legal and medical services (Garvey et al., 2023). Chatbots can act as a 24/7 touchpoint answering customer queries and provide a 15%–90% cost reduction opportunity as it replaces the need of a human agent (Bakhshi et al., 2018). Indeed, 80% of firms have incorporated, or plan to use, chatbots in their service provision (W. Kim et al., 2022). As a result, a flurry of research has emerged to determine what factors contribute to the efficacy of chatbots (Appendix A). Most of this research has investigated the effectiveness of chatbots and their specific elements, namely (1) the effect of chatbot anthropomorphism, and (2) the effectiveness of the communication elements the chatbot uses.

First, anthropomorphism has been widely studied to determine what aspects of chatbots are most effective in enabling adoption intent (Sheehan et al., 2020), purchase intentions (Crolic et al., 2022), engagement (Kull et al., 2021) or satisfaction and loyalty (Esmark Jones et al., 2022). Studies have often compared the differences between the presence of humanlike (vs. non-humanlike) avatars to understand if the effect of anthropomorphizing a chatbot works to increase positive outcomes (Jin & Youn, 2022). Interestingly, this has produced a variety of mixed effects in the literature. For instance, anthropomorphizing a chatbot can be detrimental in scenarios where a customer is angry (Crolic et al., 2022). Chatbots have also been found to be better than humans at giving bad news to customers (Garvey et al., 2023). Further, Drouin et al. (2022) found that individuals who spoke to a chatbot had fewer negative emotions but reported a greater sense of homophily with a human—which contrasts with Pizzi et al. (2021), who found that lower anthropomorphizing of chatbots increased feelings of reactance.

The fragmented findings have been proposed due to situational factors (T. W. Kim et al., 2023). For example, in medical diagnosis (Longoni et al., 2019), financial contexts (Luo et al., 2019), or travel and banking (Kull et al., 2021). Yet even in the face of these fragmented findings, research has forged forward to finding what aspects of chatbots work or not.

Overall, research has forged forward to finding what aspects of chatbots work and do not work. This has led to research classifying what communication elements are most effective.

Second, the ways in which a chatbot interacts with customers are a cause of great scrutiny in the literature (see Appendix A for previous studies on chatbots). The majority of papers focus on text-based communications (e.g., Rese et al., 2020), with less focusing on imagery (e.g., Roy & Naidoo, 2021) and speech (e.g., Luo et al., 2019). Text-based elements often focus on using schemas to determine what is the most effective way to anthropomorphize chatbot–customer interactions (Pizzi et al., 2021), such as the use of humor (Shin et al., 2023) or warmth (Roy & Naidoo, 2021) to reduce customers

uncertainty when interacting with a nonhuman entity (Yu et al., 2022). These specific elements of chatbots are to simulate social presence, which leads to better customer experience (Rizomyliotis et al., 2022) and is a good predictor of chatbot usage continuance (Jin & Youn, 2022).

As chatbots become more advanced, imagery is an emerging factor in chatbot interactions. For example, chatbots can provide images of the product (W. Kim et al., 2022) or use GIFs (animated images) and memes (widespread inside jokes; Zhang et al., 2022). Combining both text and imagery may contribute to stronger intentions and attitudes in chatbot–customer interactions. However, research has focused primarily on text and imagery but “ignored social media afforded language forms, e.g., emojis” (Ge & Gretzel, 2018, p. 1272). Scrutiny of emojis is important in chatbot interactions, especially as they can provide nonverbal cues to convey feelings—a sign of anthropomorphism (Wu et al., 2022). Emojis are proposed to generate 57% more likes on Facebook and increase click-through rates by 241% (Cyca, 2022a). Emojis are purported to convey meaning, and posts containing emojis have been found to increase positive emotions and purchase intentions over social media (Das et al., 2019). Further, the presence of emojis is proposed to prompt a greater effect on the helpfulness of online reviews (Wu et al., 2022). As emojis have become an integral part of online communications, only viewing chatbots via text and imagery elements is a major shortcoming (Ge & Gretzel, 2018). As a result, this study will build on prior research and focus on the use of emojis as a form of anthropomorphism in chatbot–customer interactions.

2.3 | Social response theory

Social response theory suggests that the more anthropomorphic a chatbot is, the greater the likelihood that people will react to it as a human actor and apply social rules toward it (Miao et al., 2022). Specifically, when any technology possesses a set of humanlike characteristics (such as language, turn-taking, politeness, and interactivity), individuals begin treating it as a social actor (Moon, 2000; Nass et al., 1996). We propose social response theory plays a central role in the reactions customers have toward chatbots where, as mentioned prior, the more anthropomorphic the chatbot, the greater human characteristics and social rules are attributed toward it (Crollic et al., 2022). It is the levels of anthropomorphism that are attributed to a chatbot that may increase individuals' tendency to perceive and behave toward it as more (vs. less) human. In essence, anthropomorphic elements of a chatbot, from its visual appearance to its language-ability will influence the level of social response humans will have toward it.

Turning toward our study's focus, these anthropomorphic cues that chatbots represent, for which we argue emoji-usage is prominent, will influence an individual's social response to a chatbot. For example, emojis play a double-edged sword in customers' reactions due to contextual factors influencing social responses (e.g., emojis in professional vs. communal contexts; Li et al., 2019). In

fact, the level of realism of ChatGPT and Bing's Chatbot using emojis has sparked ethical concerns wherein emoji usage may make a chatbot indistinguishable from humans and induce mistakes through empathetic social responses (Véliz, 2023). For instance, researchers placed a pair of eyes on an “honesty box” in a university coffee shop and found people pay up to three times as much as the control group due to feelings of observation (Bateson et al., 2006).

We extend such thinking, via social response theory, that emojis convey emotion and connection with individuals, increasing a chatbot's anthropomorphism and individuals' likelihood to treat the chatbot as a social actor (Moon, 2000). As such, we propose the use of emojis in chatbots is becoming increasingly important to understand as their use by AI agents begins to blur the distinction between humans and nonhumans leading to greater influence individuals' social responses (Véliz, 2023). Overall, we build our research on social response theory due to its explanatory power for why individuals engage with high (vs. low) anthropomorphic chatbots and their behavioral outcomes.

3 | HYPOTHESES DEVELOPMENT

3.1 | Chatbot anthropomorphism and customer engagement

Customer engagement, for this study, will be defined as “a customer's behavioral manifestations that have a brand or firm focus, beyond purchase, resulting from motivational drivers” (Van Doorn et al., 2010, p. 254). We adopt this definition as we find traditional definitions of customer engagement frequently assume an affective, cognitive, and behavioral facet (e.g., Chi et al., 2022; Hollebeek et al., 2014). Such studies often view engagement through social media or online brand communities in relation to a focal actor (the brand) and attribute an emotional and cognitive component to the interactions (i.e., Khan et al., 2016). This is reasonable for brand communities due to their ongoing social components, but chatbot interactions are short, goal-driven and the interaction ceases upon goal attainment or failure (e.g., did the chatbot answer the customers' question correctly or not). Due to our studies' context, we propose customers' interactions with a chatbot influence their behaviors (i.e., word-of-mouth and review intentions) as driven by the customer's specific motivations to interact (e.g., information seeking). Besides, for customer engagement in the realm of chatbots, behavioral facets are most relevant, which coincides with prior research (see Kull et al., 2021; Mostafa & Kasamani, 2022).

Customer engagement has a wide array of outcomes ranging from word-of-mouth recommendations, knowledge sharing, and helping other customers (Mostafa & Kasamani, 2022). Through the lens of chatbot interactions, a customer's engagement may heighten based on their perceived demographic similarity to the chatbot and enable a better co-creation process (Esmark Jones et al., 2022). Additionally, the language and tone used by a chatbot have been found to increase customer engagement and their social response

(Kull et al., 2021). With regard to emojis, prior research has shown emojis increases the number of likes on social media posts by 72% and comments by 70% when compared to those that do not feature them (Ko et al., 2022). Further, customers who received a smiley face were significantly happier, while those who received negative emoji felt worse (Das et al., 2019). We thus propose that the inclusion of emojis (vs. none) in chatbot communication is a sign of anthropomorphism and will lead to a higher level of customer engagement.

The physical appearance of a chatbot has been the center of much anthropomorphism discussion in extant literature (Garvey et al., 2023; T. W. Kim et al., 2022; Sheehan et al., 2020). Research has essentially agreed that the greater the anthropomorphism of an agent, the greater customers' expectations are of that agent. For example, aligning with social response theory, Miao et al. (2022) propose a typology of avatar behavior and form realism. The authors' typology suggests that the higher (vs. lower) an avatar's form realism, the greater (vs. lesser) expectations of its behavioral realism are. To illustrate, Go and Sundar (2019) found that the anthropomorphism of chatbot agents triggered human/machine heuristics of how customers would evaluate a subsequent interaction. As discussed earlier, the effect of anthropomorphizing a nonhuman entity is to assign agency and intentionality to it (Epley et al., 2007). Therefore, as a chatbot's humanlike appearance increases, more human capabilities are attributed to the chatbot (Garvey et al., 2023). We propose that the anthropomorphic appearance of a chatbot (vs. none) will have an interaction effect with the use of emojis (i.e., humanlike communication). The interaction between these two factors will increase the overall anthropomorphism of the chatbot and impact customer's engagement. Formally, we propose:

H1. The interaction of chatbot's anthropomorphic appearance and language affects customer engagement.

The presence of anthropomorphism increases perceived competence (Crolc et al., 2022). Competence reflects the ability of robots (such as chatbots) to perform a task with intelligence, skill, and efficacy (Belanche, Casalo, Schepers, et al., 2021). Despite the objective competence of chatbots, customers generally have a lesser preference to interact with them (Luo et al., 2019). This effect can be attenuated by the perceived realism of chatbot communications (Kull et al., 2021). For example, a higher (lower) level of anthropomorphism may increase (decrease) levels of perceived competence due to the attribution of human characteristics, even before any interaction has taken place (Miao et al., 2022). While performed in a human service employee setting, Li et al. (2019) found the use of emoji by human agents was perceived as less competent in most conditions. Contrastingly, the use of emotional expression, such as emojis, in chatbots may be perceived as enhancing competence (Rizomyliotis et al., 2022). Interestingly, the future (vs. present) time orientation of individuals reported higher levels of brand attitude and purchase intentions based on the perceived competence of a chatbot (Roy & Naidoo, 2021). Overall, these studies show that the level of perceived competence of a chatbot and emoji is mixed, but we agree with

Rizomyliotis et al. (2022) and extend their findings to propose that the perceived competence of chatbots may be heightened in the presence of emoji in customer–chatbot interactions.

Authenticity can be thought of “as the real thing” (Rese et al., 2020). The authenticity of a chatbot can refer to a customer's ability to communicate with the chatbot in a natural way (Rese et al., 2020). Yet, algorithms are perceived as less authentic than their human counterparts (Yu et al., 2022). Anthropomorphic cues, such as language or visual elements, may provide a direct signal to a customer about the authenticity of a chatbot and heighten feelings of engagement and social response (Esmark Jones et al., 2022; Nass et al., 1996). The social presence of an anthropomorphic chatbot has been found to increase its perceived authenticity and extend behavioral intentions such as continued usage (Rese et al., 2020). Therefore, in processing and interacting with chatbots with higher levels of anthropomorphism, we expect customers to view them as more authentic than their non-anthropomorphic counterparts.

As a result, we can expect that when customers perceive a chatbot with a higher (vs. lower) level of anthropomorphism, the authenticity and perceived competence of the chatbot will increase tandemly by shifting levels of perceived authenticity and perceived competence cues toward specific heuristics (i.e., anthropomorphic elements). The social response of individuals where, the higher (vs. lower) the anthropomorphism they perceive within a chatbot, the greater (vs. lesser) they will perceive the chatbot as a social actor. As emojis are proposed to increase the authenticity (Kull et al., 2021) and perceived competence (Rizomyliotis et al., 2022) of a chatbot, we argue that higher (vs. lower) anthropomorphic cues (such as text and visuals) will have different effects as mediated by authenticity and perceived competence. Consequently, we propose the following hypothesis.

H2. The influence of high (vs. low) anthropomorphic language on customer engagement, as moderated by anthropomorphic appearance, is serially mediated by (a) perceived competence and (b) authenticity.

3.2 | Chatbot anthropomorphic language and brand credibility

Brand credibility can be understood as the information received from a brand that is contingent on its willingness and ability to deliver what they promise (Spry et al., 2009). Generally, the more a brand invests in its marketing-mix consistency, the greater its perceived credibility (Erdem et al., 2006). A chatbot, which can be viewed as a part of a brand's marketing-mix, is a proxy frontline actor for a brand and, by default, represents them during customer interactions. As chatbots are replacing frontline employees as an integral touchpoint in a customer's experience and journey (Lemon & Verhoef, 2016), chatbots can begin to serve as a substitute for human entities and leverage brand credibility (Hamilton et al., 2021). For instance, in the context of a luxury brand (e.g., Burberry), even though consumers perceived the brand's chatbot as failing to provide a diversity of

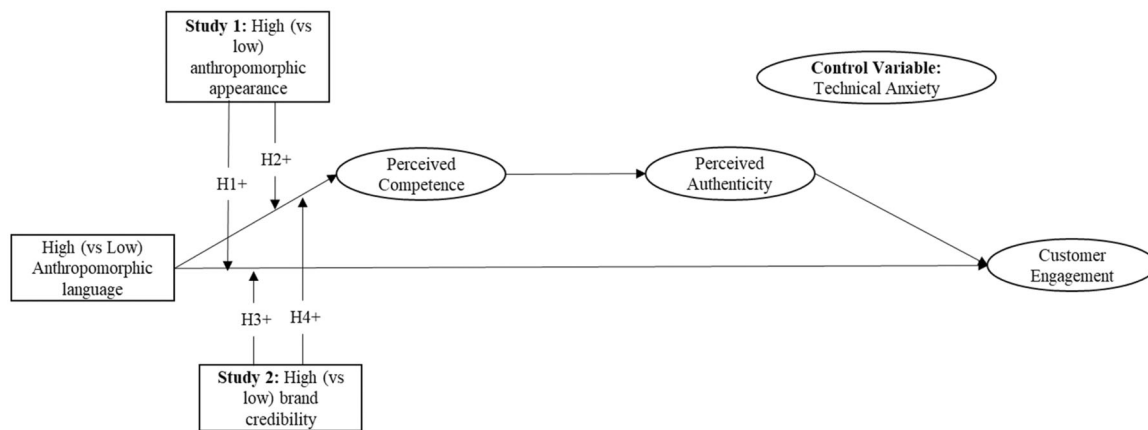


FIGURE 1 Conceptual model.

information, they perceived it as credible based on the brand operating it (Chung et al., 2020). Building on this, and turning toward our studies focus, Li and Shin (2023) found that the use of emojis was detrimental to traditional luxury brands but not masstige brands. While further, the use of emojis in advertising (vs. general posting) on social media is found to be more effective (vs. less; Ko et al., 2022). Building on these findings, we posit that brand credibility will display an interaction effect with the anthropomorphic language (i.e., emoji use) of a chatbot.

H3. Chatbot anthropomorphic language and brand credibility display an interaction effect on customer engagement.

Further, we argue that the effect of brand credibility, or the belief a brand will fulfill its promises (Spry et al., 2009), will play an important role in alleviating the potential detrimental effects of chatbots. As the brand's first point of contact with its customers, chatbots represent the brand. In this sense, we believe that, for high credibility brands, higher (vs. lower) anthropomorphic language (i.e., usage of emoji), will lead to higher levels of perceived competence and authenticity due to perceptions of the chatbot as more like a social actor (Moon, 2000). For instance, a highly credible brand (such as Microsoft) may have a semblance of power distance (Paharia & Swaminathan, 2019) and using emojis may help customers feel closer to the brand as they are commonly used to express emotions. We believe that the more credible a brand is, the greater the effect of a chatbot's anthropomorphic language. Thus:

H4. The effect of a chatbot's high (vs. low) anthropomorphic language on customer engagement, as moderated by brand credibility, is serially mediated by (a) perceived competence and (b) authenticity.

We propose the conceptual framework as in Figure 1.

4 | METHODOLOGY

We conducted two experimental studies in which Studies 1 and 2 explore the moderating effect of anthropomorphic appearance and brand credibility, respectively, in the relationship among anthropomorphic language, perceived competence, perceived authenticity, and customer engagement. We used the experiment method to test our hypotheses as determining cause-effect relationships is a key motivation for experimental research (Viglia et al., 2021). Using experiments, researchers can manipulate the independent variable with a great deal of environmental control to ascertain the causal links between the independent and dependent variables (Kirk, 2012). Experimental design can also be useful in verifying the underlying mechanisms at play (Rajavi et al., 2019). Study 1 tested the moderating effect of chatbot's anthropomorphic appearance in the relationship between chatbots' anthropomorphic language and customer engagement, and serial moderated mediation effects via competence and authenticity (Hypotheses 1 and 2). Study 2 tested the moderating effect of brand credibility in the relationship between chatbots' anthropomorphic language and customer engagement, and serial moderated mediation effects via competence and authenticity (Hypotheses 3 and 4). Across the two studies, we employed different scenarios of interactions with conversational agents from a fictional retailer (see Appendix B). We also conducted pre-tests of our manipulation of anthropomorphic language and appearance. In all studies, we recruited participants located in the United States from Prolific.

We choose US participants as the United States is a global leader in technology and innovation. Prolific has been found to provide high data quality (Peer et al., 2022). It has been confirmed by a number of studies on the data quality panels for online behavioral research studies (Chmielewski & Kucker, 2020; Palan & Schitter, 2018). North America (including the United States) is the largest player in the global chatbot market with a market share of around 30.72% in 2022 (Grand View Research, 2022). According to a recent survey by Ipsos, 68% of surveyed US consumers have used an automated customer

service chatbot (Larini, 2023). To ensure data quality, we consistently used attention checks questions in which we asked the respondents to recall the name of the customer service agent, the product, and if the agent wore glasses. We then removed participants who failed all attention checks.

4.1 | Study 1: the interplay of chatbot's language and appearance on customer engagement

4.1.1 | Study design and procedure

For this first study, we recruited 318 participants (39% males, 59.2% females, and 1.8% others; $M_{\text{age}} = 36.86$, $SD = 13.823$) located in the United States from the online crowdsourcing platform Prolific. Participants were randomly assigned to a 2 (anthropomorphic language: low, high) \times 2 (humanlike appearance: chatbot, human) between-subjects design. Anthropomorphic language was manipulated using humanlike conversational traits such as the display of empathy and the use of emojis. To confirm that our scenario would be a suitable proxy for the manipulation of language anthropomorphism, we conducted a pre-test with a separate group of 42 participants (57% males) recruited from the same online panel. Results from this pre-test showed that the use of emojis and the display of empathy in language were a successful proxy for an anthropomorphized language. Specifically, participants from our pre-test indicated that they perceived the language used by the virtual assistant as warmer ($M_{\text{emoji}} = 7.90$, $M_{\text{noemoji}} = 6.57$, $t(40) = 2.09$, $p = 0.043$), more intimate ($M_{\text{emoji}} = 6.80$, $M_{\text{noemoji}} = 4.61$, $t(40) = 3.81$, $p < 0.001$), personal ($M_{\text{emoji}} = 7.80$, $M_{\text{noemoji}} = 6.04$, $t(40) = 2.94$, $p = 0.005$), friendly ($M_{\text{emoji}} = 8.52$, $M_{\text{noemoji}} = 7.61$, $t(40) = 2.04$, $p = 0.047$), empathetic ($M_{\text{emoji}} = 7.42$, $M_{\text{noemoji}} = 5.71$, $t(40) = 2.78$, $p = 0.008$), emotional ($M_{\text{emoji}} = 6.71$, $M_{\text{noemoji}} = 5.38$, $t(40) = 2.12$, $p = 0.040$), humanlike ($M_{\text{emoji}} = 7.47$, $M_{\text{noemoji}} = 6.33$, $t(40) = 2.07$, $p = 0.045$), and less formal ($M_{\text{emoji}} = 3.76$, $M_{\text{noemoji}} = 6.61$, $t(40) = -5.46$, $p < 0.001$) when emojis and a more emphatic tone were used.

For the humanlike appearance factor, participants were shown either the image of a human (human condition) or an avatar image (chatbot), which was created based on the human image using an online free tool. A sample of the manipulation scenarios is displayed in Appendix B. Participants were asked to consider an online shopping scenario where they decided to buy a jacket for the upcoming winter season from a fictitious online store (Maza) where a chat box popped up and a sales agent started a conversation with them. After reading the conversation script, participants were then asked to answer a series of dependent measures. Each participant only saw the scenario they were randomly assigned to and were not exposed to any other condition.

4.1.2 | Measures

The items we used to measure the latent constructs were taken from validated scales in prior research, which helps ensure the content

validity of the measurement. To increase the internal validity of our experiment and avoid familiarity or attachment effects, we used a fictional brand in our studies (Belanche, Casaló, Schepers, et al., 2021). Competence was measured by asking the respondents if the customer service agent has the following traits: competent and capable (S. Y. Kim et al., 2019). Authenticity was measured by asking the respondents to indicate how they feel about the customer service representative: unnatural/natural, inorganic/organic, and artificial/real (Esmark Jones et al., 2022). To measure customer engagement, participants were asked to indicate the extent to which they agree or disagree with the following statement: I feel motivated to learn more about X, I encourage friends and relatives to do business with X that offers this online chat support; I consider X that offers this online chat support to be my first choice when buying products (Kull et al., 2021; Mostafa & Kasamani, 2022). Technical anxiety was measured by 4 items "I have difficulty understanding most technological matters relating to online chat support services," "I feel apprehensive about using online chat support services," "I hesitate to use online chat support services for fear of making mistakes I cannot correct," and "Online chat support services are somewhat intimidating to me" (Meuter et al., 2003; Thatcher & Perrewe, 2002) was used as a control variable. Finally, participants reported their demographics. To minimize common method bias, we applied several strategies, including developing a research information coversheet with a clear research purpose and set of instructions, and improve scale item clarity via pretest, and remove common scale properties such as using both Likert and unipolar scales (Jordan & Troth, 2020; Podsakoff et al., 2012).

4.1.3 | Results and discussion

Manipulation checks

As expected, participants in the high level of anthropomorphic language condition (vs. the low level of anthropomorphic language condition) perceived the language to be warmer ($M_{\text{high}} = 8.30$, $M_{\text{low}} = 7.30$, $t(469.763) = 5.738$, $p < 0.001$), more intimate ($M_{\text{high}} = 6.68$, $M_{\text{low}} = 5.09$, $t(480) = 7.375$; $p < 0.001$), personal ($M_{\text{high}} = 7.75$, $M_{\text{low}} = 6.54$, $t(473.036) = 5.775$, $p < 0.001$), friendly ($M_{\text{high}} = 8.85$, $M_{\text{low}} = 7.98$, $t(455.508) = 5.681$, $p < 0.001$), empathetic ($M_{\text{high}} = 7.81$, $M_{\text{low}} = 6.67$, $t(472.141) = 6.640$, $p < 0.001$), emotional ($M_{\text{high}} = 7.34$, $M_{\text{low}} = 5.67$, $t(472.052) = 8.367$, $p < 0.001$), humanlike ($M_{\text{high}} = 7.50$, $M_{\text{low}} = 6.77$, $t(478.221) = 3.074$, $p < 0.01$) and less formal ($M_{\text{emoji}} = 4.82$, $M_{\text{low}} = 7.13$, $t(464.337) = -10.151$, $p < 0.001$). This shows that our manipulation of humanlike language was successful.

Reliability and validity check

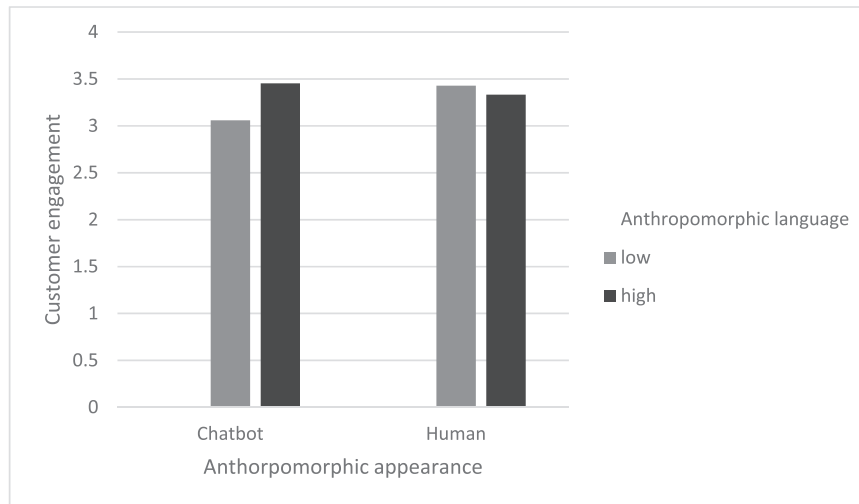
The measures of customer engagement (Cronbach $\alpha = 0.833$), authenticity ($\alpha = 0.933$), competence ($\alpha = 0.908$), and technical anxiety ($\alpha = 0.772$) were all reliable. To confirm the dimensional structure of the scales, we conducted a confirmatory factor analysis using AMOS. The factor was statistically significant (at 0.01) and greater than 0.5 (Jöreskog & Sörbom, 1993). The model was a good fit to the

TABLE 1 AVEs, CRs, and correlations (Study 1).

	CR	AVE	Maximum shared variance	Engagement	Competence	Authenticity
Engagement	0.869	0.690	0.456	0.830		
Competence	0.908	0.832	0.372	0.547***	0.912	
Authenticity	0.936	0.830	0.456	0.675***	0.610***	0.911

Abbreviation: CR, composite reliability.

*** $p < 0.001$.

**FIGURE 2** Customer engagement by anthropomorphic language and appearance.

data ($\chi^2(17) = 35.708$, $p = 0.005$; NFI = 0.988; CFI = 0.994; IFI = 0.994; RMSEA = 0.048). The composite reliability (CR) values were larger than the 0.70 cutoff (Nunnally & Bernstein, 1994). AVEs were above the recommended 0.50 (Hair et al., 2006), supporting convergent validity. For each construct, the square root of the AVE was greater than its correlations with other constructs (Table 1), demonstrating discriminant validity (Fornell & Larcker, 1981).

Customer engagement

We conducted a two-way ANOVA with anthropomorphic language and appearance, and their interaction as independent variables, and customer engagement as dependent variables. We also controlled for technical anxiety. Results revealed nonsignificant main effects of anthropomorphic language ($F(1, 313) = 1.695$, $p = 0.194$), and appearance ($F(1, 313) = 1.188$, $p = 0.276$), and a significant effect of technology anxiety ($F(1, 313) = 8.759$, $p = 0.027$). However and more importantly, we found a significant interaction effect ($F(1, 313) = 4.627$, $p = 0.032$; see Figure 2). Therefore, H_1 is supported. Follow-up tests showed that when interacting with a chatbot avatar, a high level of anthropomorphic language (vs. a low level of anthropomorphic language) increased customer engagement ($M_{\text{high}} = 3.457$, $SD_{\text{high}} = 0.978$; $M_{\text{low}} = 3.071$, $SD_{\text{low}} = 1.066$; $t(159) = 2.395$, $p = 0.018$). However, such differences did not emerge among participants interacting with a human avatar ($M_{\text{high}} = 3.320$, $SD_{\text{high}} = 1.160$; $M_{\text{low}} = 3.424$, $SD_{\text{low}} = 0.907$; $t(141.896) = -0.621$, $p = 0.536$).

Perceived competence

The effect of anthropomorphic language on competence would be moderated by anthropomorphic appearance. We conducted a two-way ANOVA with anthropomorphic language and appearance, and their interaction as independent variables, and perceived competence as the dependent variable. We also controlled for technical anxiety. Results revealed nonsignificant main effects of anthropomorphic language ($F(1, 313) = 0.603$, $p = 0.438$), appearance ($F(1, 313) = 0.827$, $p = 0.364$), and a significant effect of technology anxiety ($F(1, 313) = 25.976$, $p < 0.001$). However, and more importantly, we found a significant interaction effect ($F(1, 313) = 5.294$, $p = 0.022$). Follow-up tests showed that when interacting with a chatbot avatar, a high level of anthropomorphic language (vs. a low level of anthropomorphic language) increased perceived competence ($M_{\text{high}} = 8.963$, $SD_{\text{high}} = 1.296$; $M_{\text{low}} = 8.469$, $SD_{\text{low}} = 1.754$; $t(159) = 2.035$, $p = 0.044$). However, such differences did not emerge among participants interacting with a human avatar ($M_{\text{high}} = 8.691$, $SD_{\text{high}} = 1.755$; $M_{\text{low}} = 8.963$, $SD_{\text{low}} = 1.348$; $t(155) = -1.094$, $p = 0.276$).

Authenticity

We conducted a two-way ANOVA with anthropomorphic language and appearance, and their interaction as independent variables, and authenticity as the dependent variable. We also controlled for technical anxiety. Results revealed nonsignificant main effects of anthropomorphic language ($F(1, 313) = 0.183$, $p = 0.669$), appearance

TABLE 2 Serial mediation moderated by anthropomorphic appearance.

DV: Competence (M1)	Coeff	SE	t	p	95% LLCI	95% ULCI
Constant	9.719	0.305	47.652	<0.001	9.318	10.121
Anthropomorphic language (X)	-0.065	0.084	0.776	0.438	-0.101	0.230
Anthropomorphic appearance (W)	0.076	0.084	0.909	0.364	-0.089	0.241
X × W	-0.193	0.084	-2.301	0.022	-0.357	-0.028
Technology anxiety	-0.518	0.102	-5.097	<0.001	-0.719	-0.318
Model summary	$R^2 = 0.093, F(4, 313) = 8.041, p < 0.001$					
DV: Authenticity (M2)	Coeff	SE	t	p	95% LLCI	95% ULCI
Constant	0.122	0.363	0.335	0.738	-0.592	0.836
Anthropomorphic language (X)	-0.053	0.052	-1.025	0.306	-0.155	0.049
Anthropomorphic appearance (W)	-0.027	0.052	-0.526	0.599	-0.130	0.075
X × W	-0.028	0.052	-0.529	0.597	-0.130	0.075
Competence (M1)	0.410	0.035	11.722	<0.001	0.341	0.479
Technology anxiety	-0.053	0.066	-0.811	0.418	-0.182	0.076
Model summary	$R^2 = 0.339, F(5, 312) = 31.953, p < 0.001$					
DV: Customer engagement (Y)	Coeff	SE	t	p	95% LLCI	95% ULCI
Constant	0.174	0.310	0.562	0.575	-0.435	0.783
Anthropomorphic language (X)	0.072	0.044	1.632	0.104	-0.015	0.160
Anthropomorphic appearance (W)	0.046	0.044	1.038	0.300	-0.041	0.133
X × W	-0.043	0.045	-0.965	0.335	-0.131	0.045
Competence (M1)	0.194	0.036	5.407	<0.001	0.123	0.264
Authenticity (M2)	0.398	0.048	8.249	<0.001	0.303	0.494
Technology anxiety	0.001	0.056	0.017	0.986	-0.109	0.111
Model summary	$R^2 = 0.433, F(6, 311) = 39.607, p < 0.001$					

($F(1, 313) = 0.004, p = 0.950$), and a significant effect of technology anxiety ($F(1, 313) = 12.406, p < 0.001$). There was a nonsignificant interaction effect of anthropomorphic language and anthropomorphic appearance on authenticity ($F(1, 313) = 2.950, p = 0.087$).

Serial mediation analysis

We propose that the effect of anthropomorphic language on customer engagement is sequentially mediated by competence and authenticity. We conducted a serial moderated mediation analysis using Hayes' PROCESS Model 85 (Hayes, 2017). This analysis examined the indirect effects of anthropomorphic language (high = 1, low = -1), moderated by anthropomorphic appearance (human avatar = 1, chatbot avatar = -1), on customer engagement via competence and authenticity (as serial mediators). We also controlled for technical anxiety. The results are shown in Table 2.

Perceived competence has a significant impact on authenticity. Competence and authenticity were significant predictors of customer engagement. The index of moderated mediation was significant and negative ($b = -0.063, SE = 0.030, 95\% CI: -0.127$ to -0.007), with the indirect serial effect being significant and positive for the low level of

anthropomorphic appearance condition (i.e., chatbot avatar; $b = -0.042, SE = 0.021, 95\% CI: 0.004$ to 0.086) but not in the high level of anthropomorphic appearance condition (i.e., human avatar; $b = -0.021, SE = 0.021, 95\% CI: -0.063$ to 0.017). These results supported H_{2a} and H_{2b} .

4.2 | Study 2: the moderating role of brand credibility

4.2.1 | Study design and procedure

Study 2 employed a 2 (anthropomorphic language: low, high) × 2 (brand credibility: low, high) between-subjects design. For this study, we recruited 361 participants (47.1% males, 52.4% females, and 0.6% others; $M_{age} = 41.68, SD = 13.572$) located in the United States from the online crowdsourcing platform Prolific. Anthropomorphic language was manipulated in the same manner as Study 1. For the manipulation of brand credibility, we selected two real brands from the fashion industry. Specifically, H&M was chosen as the high-credibility brand and

TABLE 3 AVEs, CRs, and correlations (Study 2).

	CR	AVE	Maximum shared variance	Competence	Authenticity	Engagement
Competence	0.908	0.831	0.447	0.912		
Authenticity	0.923	0.800	0.619	0.668***	0.895	
Engagement	0.894	0.737	0.619	0.589***	0.787***	0.859

Abbreviation: CR, composite reliability.

*** $p < 0.001$.

Forever21 as the low-credibility brand. The choice of these brands was derived from a pre-test conducted with a separate group of 82 participants who rated H&M and Forever21, amongst other brands, on two 10-point scales measuring perceived brand honesty and credibility (1 = low, 10 = high). Results from a repeated-measures ANOVA revealed that participants perceived H&M to be more honest ($M_{H\&M} = 6.68$ vs. $M_{Forever21} = 3.04$, $F(81) = 214.54$; $p < 0.001$) and more credible ($M_{H\&M} = 6.39$ vs. $M_{Forever21} = 3.08$, $F(81) = 234.48$; $p < 0.001$) than Forever21, thus supporting the choice of H&M as the higher credibility brand and Forever21 as the lower credibility brand for our brand credibility manipulation.

Similar to Study 1, participants were asked to consider a shopping scenario where they decided to buy a jacket for the upcoming winter season and that they either decided to visit the H&M or Forever21 online store where they engaged with the online store's chatbot agent. After reading the conversation script, participants were then asked to answer the same dependent measures as Study 1. Besides, participants in this study were specifically told that the sales agent was a chatbot. Each participant only saw the scenario they were randomly assigned to and were not exposed to any other condition. A sample of the manipulation scenarios is displayed in Appendix B.

4.2.2 | Results and discussion

Manipulation checks

As expected, participants in the high level of anthropomorphic language condition (vs. the low level of anthropomorphic language condition) perceived the language to be warmer ($M_{high} = 7.56$, $M_{low} = 6.62$, $t(359) = 4.074$, $p < 0.001$), more intimate ($M_{high} = 5.92$, $M_{low} = 5.14$, $t(359) = 3.130$; $p < 0.01$), personal ($M_{high} = 6.96$, $M_{low} = 6.22$, $t(355.926) = 2.980$, $p < 0.01$), friendly ($M_{high} = 8.25$, $M_{low} = 7.60$, $t(359) = 3.443$, $p < 0.001$), empathetic ($M_{high} = 6.92$, $M_{low} = 6.20$, $t(359) = 3.057$, $p < 0.01$), emotional ($M_{high} = 6.44$, $M_{low} = 5.15$, $t(359) = 5.263$, $p < 0.001$), humanlike ($M_{high} = 6.67$, $M_{low} = 5.37$, $t(359) = 2.347$, $p = 0.019$) and less formal ($M_{high} = 4.88$, $M_{low} = 6.09$, $t(359) = -5.031$, $p < 0.001$). This shows that our manipulation of humanlike language was successful.

Reliability and validity check

The measures of customer engagement (Cronbach $\alpha = 0.880$), authenticity ($\alpha = 0.922$), competence ($\alpha = 0.906$), and technical

anxiety ($\alpha = 0.798$) were all reliable. To confirm the dimensional structure of the scales, we conducted a confirmatory factor analysis using AMOS. The factor was statistically significant (at 0.01) and greater than 0.5 (Jöreskog & Sörbom, 1993). The model was a good fit to the data ($\chi^2(48) = 60.398$, $p = 0.108$; NFI = 0.981; CFI = 0.996; IFI = 0.996; RMSEA = 0.027). The composite reliability values were larger than the 0.70 cutoff (Nunnally & Bernstein, 1994). AVEs were above the recommended 0.50 (Hair et al., 2006), supporting convergent validity. For each construct, the square root of the AVE was greater than its correlations with other constructs (Table 3), demonstrating discriminant validity (Fornell & Larcker, 1981).

To check that the manipulation of brand credibility worked as planned, brand credibility was measured using a four items scale adapted from Morhart et al. (2015) "X is a brand that accomplishes its value promise," "X is an honest brand," "X is a brand they will not betray you," and "I am very familiar with X" (Morhart et al., 2015). As expected, participants in the high brand credibility condition (i.e., H&M) perceived the brand to be more credible than those in the low brand credibility condition, that is, Forever21 did ($M_{low} = 4.88$, $M_{high} = 6.09$, $t(359) = -5.031$, $p < 0.001$). This shows that our manipulation of brand credibility was successful.

Customer engagement

We conducted a two-way ANOVA with anthropomorphic language and brand credibility, their interaction as independent variables, and customer engagement as dependent variables. We also controlled for technical anxiety. Results revealed nonsignificant main effects of anthropomorphic language ($F(1, 356) = 1.557$, $p = 0.456$), and brand credibility ($F(1, 356) = 0.001$, $p = 0.976$), and a marginally significant effect of technology anxiety ($F(1, 356) = 34.656$, $p = 0.057$). We found a nonsignificant interaction effect ($F(1, 356) = 0.199$, $p = 0.656$). Overall, this does not support our H_3 .

Perceived competence

The effect of anthropomorphic language on competence would be moderated by brand credibility. We conducted a two-way ANOVA with anthropomorphic language and brand credibility, and their interaction as independent variables, and competence as the dependent variable. Results showed nonsignificant main effects of anthropomorphic language ($F(1, 356) = 11.733$, $p = 0.189$), brand credibility ($F(1, 356) = 2.273$, $p = 0.132$), and technology anxiety ($F(1, 356) = 1.548$, $p = 0.214$). However and more importantly, we found a significant interaction effect ($F(1, 356) = 4.239$, $p = 0.040$; see

FIGURE 3 Perceived competence by anthropomorphic language and brand credibility.

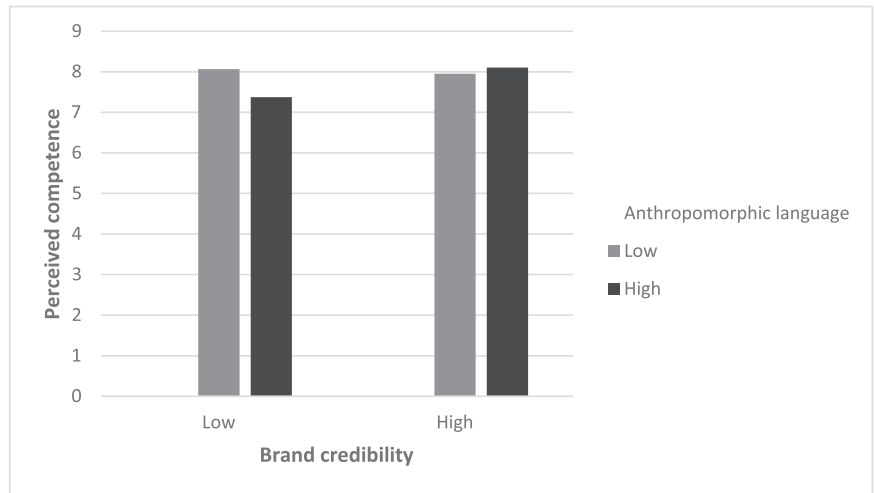


Figure 3). When the brand credibility was low, participants in the high level of anthropomorphic language condition (vs. the low level of anthropomorphic language condition) reported a lower level of competence ($M_{\text{high}} = 7.360$, $SD = 2.246$, $M_{\text{low}} = 8.086$, $SD = 1.873$, $t(1, 178) = -2.357$, $p = 0.020$). However, when the brand credibility was high, there was no difference between participants in the high and low levels of anthropomorphic language conditions ($M_{\text{high}} = 8.115$, $SD = 1.889$, $M_{\text{low}} = 7.936$, $SD = 1.723$, $F(1, 179) = 0.666$, $p = 0.506$).

Authenticity

We conducted a two-way ANOVA with anthropomorphic language and brand credibility, and their interaction as independent variables, and authenticity as the dependent variable. We also controlled for technical anxiety. Results revealed nonsignificant effects of anthropomorphic language ($F(1, 356) = 0.331$, $p = 0.565$), brand credibility ($F(1, 356) = 0.568$, $p = 0.451$), and technology anxiety ($F(1, 356) = 0.456$, $p = 0.500$). There was a nonsignificant interaction effect of anthropomorphic language and anthropomorphic appearance on authenticity ($F(1, 356) = 1.275$, $p = 0.260$).

Serial mediation analysis

We propose that the effect of anthropomorphic language on customer engagement is sequentially mediated by competence and authenticity. We conducted a serial moderated mediation analysis using Hayes' PROCESS Model 85 (Hayes, 2017). This analysis examined the indirect effects of anthropomorphic language (high = 1, low = -1), moderated by brand credibility (high = 1, low = -1), on customer engagement via competence and authenticity (as serial mediators). We also controlled technical anxiety. The results are shown in Table 4.

Competence has a significant impact on authenticity. The effects of competence and authenticity on customer engagement were significant. The index of moderated mediation was significant and positive ($b = 0.092$, $SE = 0.046$, 95% CI: 0.003 to 0.183), with the indirect serial effect being significant and negative for the low brand credibility condition ($b = -0.076$, $SE = 0.034$, 95% CI: -0.144 to -0.011) but not in the high brand credibility condition

($b = 0.017$, $SE = 0.030$, 95% CI: -0.043 to 0.073). These results supported H_{4a} and H_{4b} .

5 | GENERAL DISCUSSION

The goal of this research was to provide empirical insights into the influence of chatbot anthropomorphic language, in the interaction with chatbot anthropomorphic language and brand credibility, on customer engagement. Prior research reflects the increasing interest in chatbots and the contrasting effects of their anthropomorphism (e.g., Garvey et al., 2023) and their communication elements (e.g., Jin & Youn, 2022). Most research has neglected social media afforded communication tools as an anthropomorphic mechanism (Ge & Gretzel, 2018)—a gap this research sought to address. Study 1 shows that the humanlikeness of chatbots, which is combined with human appearance with an avatar and anthropomorphic language such as using emojis in conversation with customers, increases customer engagement. Humanlike languages make customers feel more intimate, personal, friendly, and less formal. Human appearance or anthropomorphic language only is not sufficient to engage customers, but the combination makes a great difference.

In Study 1, we found that chatbot humanlikeness with the combination of language and appearance affects customer perception of competence which in turn affects perceived authenticity and customer engagement. While previous literature has shown that AI chatbots with communication styles lead to positive outcomes (e.g., perceived competence and warmth; Roy & Naidoo, 2021), while also addressing the effects of anthropomorphism (T. W. Kim et al., 2022), our research is the first to show that the effect of perceived competence on consumer intentions is mediated by perceived authenticity. We not only extend the anthropomorphism literature where previous studies either focus on chatbot appearance or language (e.g., Esmark Jones et al., 2022), but our study is the first to examine emoji in chatbot language as a cue for perceptions of chatbot anthropomorphism.

TABLE 4 Serial mediation moderated by brand credibility.

DV: Competence (M1)	Coeff	SE	t	p	95% LLCI	95% ULCI
Constant	8.169	0.256	31.695	<0.001	7.662	8.676
Anthropomorphic language (X)	-0.135	0.102	-1.317	0.189	-0.336	0.067
Brand credibility (W)	0.154	0.102	1.508	0.133	-0.047	0.356
X × W	0.212	0.103	2.059	0.040	0.010	0.414
Technology anxiety	-0.152	0.122	-1.244	0.214	-0.391	0.088
Model summary	$R^2 = 0.029$, $F(4, 356) = 2.631$, $p = 0.034$					
DV: Authenticity (M2)	Coeff	SE	t	p	95% LLCI	95% ULCI
Constant	0.395	0.231	1.711	0.088	-0.059	0.848
Anthropomorphic language (X)	0.074	0.047	1.583	0.114	-0.018	0.167
Brand credibility (W)	-0.005	0.047	-0.112	0.911	-0.098	0.087
X × W	-0.002	0.947	-0.032	0.975	-0.095	0.092
Competence (M1)	0.310	0.024	12.783	<0.001	0.262	0.358
Technology anxiety	0.002	0.056	0.028	0.977	-0.108	0.112
Model summary	$R^2 = 0.321$, $F(5, 355) = 33.484$, $p < 0.001$					
DV: Customer engagement (Y)	Coeff	SE	t	p	95% LLCI	95% ULCI
Constant	0.605	0.183	3.293	0.001	0.244	0.966
Anthropomorphic language (X)	-0.055	0.037	-1.484	0.139	-0.129	0.018
Brand credibility (W)	-0.044	0.037	-1.187	0.236	-0.118	0.029
X × W	-0.036	0.038	-0.964	0.336	-0.110	0.038
Competence (M1)	0.081	0.023	3.487	<0.001	0.035	0.127
Authenticity (M2)	0.703	0.042	16.707	<0.001	0.621	0.786
Technology anxiety	-0.088	0.044	-1.993	0.047	-0.176	-0.001
Model summary	$R^2 = 0.601$, $F(6, 354) = 88.744$, $p < 0.001$					

In addition, we show that when individuals are aware they are engaging with an AI (i.e., avatar condition), they become more motivated to engage in central route processing and therefore are more likely to critically evaluate information and form attitudes based on the content of the information (e.g., text, emojis). That is, when consumers are exposed to a chatbot sales agent, an AI schema is triggered, and consumers judge text interactions in more detail than if they were to engage with a human sales agent. As such, our results demonstrate that higher (vs. lower) humanlike language leads to higher perceived competence for chatbot interactions but not when consumers interact with a human. Furthermore, we show that consumers attribute higher levels of authenticity when a chatbot is perceived as more (vs. less) competent. However, because consumers do not have a reason to question the authenticity of human-to-human interactions, we did not find evidence that consumers engaged in more nuanced analysis of text-based interactions.

In Study 2, the findings indicated that brand credibility set an expectation in the head of customers which influences the impact of chatbot anthropomorphic language on customer engagement. Customers often wonder whether chatbots can represent a brand well (Chung

et al., 2020). Brand credibility has been overlooked in the anthropomorphism literature and the link between brand credibility and chatbot characteristics has not been yet explored. Previous research in AI and chatbots have mostly found that AI/chatbot anthropomorphism has a positive influence on perceptions of competence (e.g., Pizzi et al., 2023) and warmth (e.g., S. Y. Kim et al., 2019; Pizzi et al., 2023). However, it should be noted that the relationship between anthropomorphism and perceived competence/authenticity is not always be linear or universal. In this study, we show that this effect is moderated by brand credibility such that there is a reversal of the effect of anthropomorphism on perceived competence and perceived authenticity. In particular, our results are consistent with the notion that when consumers interact with a brand that is perceived to be more credible, they are less motivated to engage in central route processing because their previous interactions with the brand give customers assurance that the brand will perform as promised, and therefore new encounters (e.g., interaction with a chatbot sales assistant) are likely to be processed through the peripheral route. On the other hand, when consumers interact with a brand perceived to be less credible, they are more likely to process information thoroughly, via central processing, as there is higher uncertainty about the brand's ability

TABLE 5 Summary of implications.

Findings	Summary of Implication(s)
Theoretical implication	
Emoji usage	<ul style="list-style-type: none"> Addressing the growing stream of literature on chatbots, and in conjunction with social response theory, this paper is the first to analyze the effect of emojis. Emoji usage is recommended for chatbots where anthropomorphism is required.
Authenticity and competence	<ul style="list-style-type: none"> Perceived competence and authenticity serially mediate anthropomorphic chatbots' effect on customer engagement. Emojis had a negative effect when low-credible brands utilized them, but this effect was not present for brands with high credibility.
Anthropomorphism	<ul style="list-style-type: none"> Using emojis may overcome feelings of unease in highly anthropomorphic chatbots.
Managerial implication	
Brand credibility	<ul style="list-style-type: none"> Brands with low credibility should not use chatbots with emojis. But if emoji usage is desired, this negative effect can be offset by lower anthropomorphic appearance.
Authenticity and competence	<ul style="list-style-type: none"> Marketing managers of lesser credible brands should test highly anthropomorphic chatbots and develop appropriate metrics for success (e.g., churn, feedback scores and time spent interacting).

to deliver on its promise. When doing so, consumers' prior beliefs of lower credibility also translate into lower trust, sincerity, and reliability which is demonstrated by lower consumer ratings of perceived competence. In consequence, when less credible brands try to improve perceptions of chatbot competence with anthropomorphism, consumers scepticism is triggered and instead, the attempt backfires such that interactions are perceived to more artificial, less organic, more inauthentic, a complete reversal of the chatbot anthropomorphism effect.

6 | IMPLICATIONS

In addressing the emerging interest in the anthropomorphism of chatbots, this study has attempted to contribute to this extant literature. The significant findings found within this study will have implications for practitioners and academics alike. We provide a summary of our findings and their implications in Table 5.

6.1 | Theoretical implications

The current study contributes to the literature in three ways. First, a growing stream of literature has begun investigating the replacement of human agents with AI agents and customer preferences between them (Yu et al., 2022). Literature in this area has shown the influence of humor (Shin et al., 2023), language schemas and (Zhang et al., 2022) —but this study is, to the authors' knowledge, the first to empirically test the effect of emojis in chatbots. As the capabilities of chatbots emerge, the use of emojis may humanize not only the chatbot, but the brand. Further, when combined with anthropomorphic visual cues, the use of emojis leads to higher levels of customer engagement. We propose that the chatbots use of emojis positively influence customers' social response as they begin to perceive it more as a social actor (Miao et al., 2022). Taken together, the use of

emojis can thus be utilized in conjunction with similar research, such as Garvey et al. (2023), who found sending an anthropomorphized agent can be more effective than a human. Using our findings, emojis may be also used to further attenuate feelings of anger when using such an agent (Crolic et al., 2022).

Second, our findings provide a more nuanced piece of the puzzle on how anthropomorphizing a chatbot can lead to customer engagement. We established the mediating role of authenticity and perceived competence. Prior research identified the importance of these factors (e.g., Kull et al., 2021; Roy & Naidoo, 2021) but rather identified their direct effects in conjunction with the perceived warmth of the chatbot. Our results indicate a chatbot's perceived competence and authenticity serially mediate the influence of anthropomorphic chatbots under two specific conditions (1) the anthropomorphic appearance of the chatbot and (2) low brand credibility. In particular, the presence of emojis enhanced low (vs high) anthropomorphized chatbot agents, while the use of emojis had a negative effect when a chatbot with low brand credibility used them. These findings are interesting as emojis can thus act as a double-edged sword where individuals' social response and perception of a chatbot as a social actor can benefit overall engagement, but harm those smaller and less credible brands. We validated these constructs for future researchers as strong mediators of anthropomorphism on customer engagement.

Finally, we contribute to the overarching literature on anthropomorphism. Prior research has often dealt with high levels of anthropomorphism using the uncanny valley hypotheses (e.g., Mende et al., 2019). For instance, if a robot physically resembles a human and acts in an agentic manner, feelings of discomfort may emerge (Crolic et al., 2022). This was further addressed by extant literature on chatbots by predominantly using a human (vs. none) avatar (e.g., Esmark Jones et al., 2022). However, utilizing emojis, a form of cultural and emotional expression (Li et al., 2019), in a chatbot context addresses this area of research. Our contribution to this arena may allow future researchers to incorporate emojis to

communicate feelings and placate feelings of uncanniness in a nonintrusive manner (S. Y. Kim et al., 2019).

6.2 | Managerial implications

Our findings indicate that the use of emojis may act as a double-edged sword and backfire if used incorrectly. For instance, in brands that have low credibility, emojis may have a negative effect. Therefore, marketing managers of brands with lesser credibility, such as those with lower brand awareness (Spry et al., 2009), should use chatbots without emojis. Further, emojis and the anthropomorphic appearance of a chatbot had a main, and mediating effect, on customer engagement. This suggests marketing managers should create a multidimensional chatbot (i.e., anthropomorphic appearance and language) are the most effective at building customer engagement overall. Taken together, we recommend marketing managers of brands with lower brand credibility, such as in small-medium enterprises (SMEs), to be cautious in their use of emojis with chatbots but, if doing so, use chatbots with lower anthropomorphic appearance (Miao et al., 2022). As such, the more anthropomorphic a chatbot is, the more a mistake can harm a less credible brand (Moon, 2000).

In addition, our results can be beneficial in understanding how competence and authenticity increase customer engagement. It is critical that the chatbot is perceived as competent and authentic, particularly if anthropomorphic, as social response theory indicates that customers will attribute human characteristics to it (Mende et al., 2019). It is important that marketing managers test their chatbots with customers—particularly chatbots (1) with more human-like elements and (2) for lesser credible businesses such as SMEs. Developing metrics such as churn, time spent with a chatbot, goal completion rates or feedback scores are essential to improve the chatbot, its competency and authenticity as well as the customer's experience (Cyca, 2022b). For example, Telenor implemented specific metrics for their chatbot and increased customer satisfaction and revenue by 20% and 15%, respectively (Leah, 2022). These metrics will help managers understand the effectiveness of their chatbots and which characteristics of anthropomorphizing, such as via emojis or human likeness, is appropriate (Li et al., 2019; Pizzi et al., 2021).

7 | LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

Despite the current research provides insights into chatbots' anthropomorphic language, it still has a number of limitations. First, we collected data from the online Prolific platform, where each participant completed the questionnaire on his or her own chosen devices. Yet providing results that are more generalizable and trustworthy than samples made up of college students, this way of data collection may bring “noise” into the data collection methods used in the study (Goodman et al., 2013). Second, the study context

was the customer service environment in the apparel sector. It may be worthwhile to validate the findings for chatbots used for customer service in different industries, even though we do not expect the research setting we chose to have a substantial impact on our findings. To examine the findings' broader application, it could be worthwhile to replicate the study in a new environment, such as one that makes use of chatbots for teaching or medical support. Third, the chatbot's persona and conversational intelligence were left out of the current research and could have an effect on how the user perceives the chatbot's human likeness (Go & Sundar, 2019). Despite the aforementioned drawbacks, we think that our work has greatly advanced theory and practice and will serve as a source of inspiration for more study.

8 | CONCLUSION

This article makes important contributions to research in marketing and for practitioners. First, while research into chatbots and anthropomorphism have experienced a flurry of contributions, there is a dearth of literature on the role of emojis which is where our study is situated. Second, it identifies the importance of anthropomorphic language and appearance, a novel finding as prior studies focus on one element of anthropomorphism. Third, we find anthropomorphic language (i.e., emoji use) contributes to the perceived competence and authenticity of an AI service agent, particularly in low brand credibility contexts. Finally, we offer a series of implications for theory and practice to explore greater elements of chatbot anthropomorphism.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author.

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APPENDIX A: LITERATURE REVIEW ON CHATBOTS

Author(s)	Context	Method	Independent variable (IV); mediator (M); moderator (MO); dependent variable (DV)	Explanatory concept/theory	Chatbot features			Relevant findings
					Text	Imagery	Speech	
Adam et al. (2021)	Overseas Debit Card Use (Banking)	Experiment	IV: Anthropomorphic Design Cues, Foot-in-the-door technique M: Social Presence DV: User Compliance	Social response, commitment-consistency theory	✓			Anthropomorphism and the need to stay consistent increase users' compliance with a chatbot's request for service feedback. The results show that social presence mediates the effect of anthropomorphic design cues on user compliance.
Ameen et al. (2022)	Luxury	Experiment	IV: Perceived augmentation M: Body Image, MO: Chatbot support (assistant vs friend), External influences of social media (Trust in social media celebrities, Addictive use of social media) DV: Actual purchase behavior, Self-esteem	Social comparison theory	✓			The more friendly a chatbot's anthropomorphic language was, the more likely a customer was to purchase and improve self-esteem.
Borau et al. (2021)	Chatbot Imagery	Experiment	IV: Robot (vs. Humanoid) Imagery M: Perceived Humanness MO: Gender DV: Dual model of dehumanization; infrahumanization model; animalistic and mechanistic dehumanization; competent, warm, moral model. Human (person; people; humanity; nature; soul). Machine (thing; robots; program; mechanism; computer)	Humanness		✓		The appearance of a chatbot, and its gender, impacted customers' preference and its capability to consider the customers' needs.
Chen et al. (2023)	Customer service	Experiment	IV: Service Type (AI chatbot vs. Human), Product Type (Search vs. Experience)	Schema Congruity Theory	✓			AI chatbots (vs. human) trigger higher (vs. lower) purchase intention for search (vs. experience) products.

Author(s)	Context	Method	Independent variable (IV); mediator (M); moderator (MO); dependent variable (DV)	Explanatory concept/theory	Chatbot features			Relevant findings
					Text	Imagery	Speech	
			M: Processing fluency, Perceived service quality MO: Consumer demand certainty (High vs. low) DV: Purchase Intention					
Crolic et al. (2022)	Customer Service. Study 1: Telecommunications Study 2/3/4/5: E-Commerce	Field and Lab Experiment	IV: Chatbot Anthropomorphism M: Increased Preinteraction Expectations MO: Customer Anger DV: Customer satisfaction, purchase intention, firm evaluation	Anthropomorphism	✓			Anthropomorphism has a negative effect on DV's for angry customers but not for non-angry customers.
Drouin et al. (2022)	AI Chatbot (Replika) versus face-to-face interaction versus online chat with a human	Field Experiment	IV: FTF Chat with Human versus Online chat with human versus AI Chatbot DV: Emotional Outcomes (PANAS), Perceived degree of similarity, liking for the other, others responsiveness, self-presentation concerns	None reported	✓			Those who chatted FTF with a human reported more negative emotions than those who chatted with a bot. Those who chatted with a human also reported more homophily with and liking their chat partner and that their partner was more responsive. Participants had fewest conversational concerns with the chatbot.
Esmark Jones et al. (2022)	Study 1: Service Failure (Online Ordering) Study 2a: Similar to Study 1 Study 2b: Similar to Study 1/2a Study 3a: Similar to Study 1/2a/2b Study 3b: Similar to Study 1/2a/2b/3a	Experiment	IV: Female/Male Avatar M: Authenticity, Engagement, Efficiency, Effectiveness MO: Same/Different Race, Professional/Casual DV: Loyalty, Satisfaction	Communication Accommodation Theory	✓			Avatar authenticity can be enhanced when the avatar is female, and these effects are amplified when the avatar is dressed professionally or a different race than the consumer.
Garvey et al. (2023)	Multiple. Study 1a/1b: Product Resale Study 2: Ridesharing Study 3a: Human versus machine offers	Experiment	IV: Offer Type (worse than expected vs. expected vs. better than expected) M: Inferred intentions of agent (selfish and benevolent)	Expectations Discrepancy Theory	✓			If a product/service is worse than expected, consumers respond better with an AI versus if the product/service is better than

(Continues)

Author(s)	Context	Method	Independent variable (IV); mediator (M); moderator (MO); dependent variable (DV)	Explanatory concept/theory	Chatbot features			Relevant findings
					Text	Imagery	Speech	
	Study 3b: Ridesharing		MO: Anthropomorphizing of AI Agent (human vs AI) DV: Likelihood of Accepting Offer, Customer Satisfaction					expected, they respond better to a human.
Jin and Youn (2022)	Self-report. Customers did either Hotels or Fashion stimuli.	Survey	IV: Humanlikeness, Animacy, Intelligence M: Social Presence, Imagery Processing, Psychological Ownership DV: Chatbot Continuance Intention	Anthropomorphism	✓	✓		Consumers' perceived humanlikeness of AI-powered chatbots is a positive predictor of social presence and imagery processing. Social presence and imagery processing are positive predictors of AI-chatbot continuance intention.
W. Kim et al. (2022)	E-Commerce	Experiment	IV: Ad Personalization MO: Regulatory Focus, Privacy Concerns M: Risk-Benefit Perceptions DV: Purchase Intentions	Privacy Calculus Theory, Regulatory Focus Theory	✓	✓		Promotion-focused customers enjoy highly personalized chatbot ads. However, prevention-focused customers are more aware of the risks of chatbots and privacy concerned customers dislike personalized ads.
Kull et al. (2021)	Study 1 and 2: Travel Study 3: Banking	Experiment	IV: Warm (vs. Competent) Message M: Brand-Self Distance MO: Brand Affiliation DV: Brand Engagement	Social Response Theory	✓			When using a warm (vs competent) opening message, brand engagement increases and, as mediated by brand-self distance, makes customers feel closer to the brand.
Luo et al. (2019)	Internet-based financial services. The authors used automated robotic calls (vs. human) to encourage repeat loans.	Field Experiment	IV: Underdogs (bottom 20th percentile workers), Proficient workers (top 20th percentile workers), Chatbot without disclosure, chatbot with disclosure, chatbot disclosure after conversation, chatbot disclosure after decision	None Reported			✓	Disclosure of chatbots reduced purchase rates by 79.7%. Chatbot disclosure reduces call length. Customers perceive chatbots as less knowledgeable and empathetic

Author(s)	Context	Method	Independent variable (IV); mediator (M); moderator (MO); dependent variable (DV)	Explanatory concept/theory	Chatbot features			Relevant findings
					Text	Imagery	Speech	
Rajaobelina et al. (2021)	Car Insurance	Survey	DV: Call Length, Purchase Rate IV: Chatbot user perceptions (Privacy Concerns, Usability), Individual Characteristics (Technology Anxiety, Need for Human Interaction) M: Creepiness, Negative Emotions, Trust MO: Creepiness DV: Loyalty	Paradoxes of Technology; Trust-commitment theory	✓			Privacy concerns and technological anxiety impact creepiness of chatbots. The authors posit the personal nature of car insurance exacerbates these feelings.
Rese et al. (2020)	Uses "Emma" a shopping chatbot over Facebook Messenger which helps customers in their prepurchase phase	Survey	IV: U&G Model (Technology [Convenience, Authenticity], Hedonic [Enjoyment, Passing Time], Risks [Privacy Concerns, Immature Technology]); TAM Model (Perceived Usefulness, Perceived Ease of Use, Perceived Enjoyment) DV: Behavioral Intention	Use & Gratification Theory (U&G); Technology Acceptance Model (TAM)	✓			Authenticity, perceived usefulness and hedonic factors positively influence chatbot acceptance. However, privacy concerns and the immaturity of the technology had a negative effect on usage intention and frequency.
Rizomyliotis et al. (2022)	Small family businesses in the UK	Survey	IV: Functional Elements (Perceived Usefulness, Perceived Enjoyment, Problem-Solving, Customization)/ Humanoid Elements (Social Presence, Emotions, Anthropomorphism) M: Customer Experience MO: Customer Affective Commitment DV: Customer Satisfaction	Anthropomorphism, Social Presence Theory, Technology Acceptance Model (TAM)				Anthropomorphism and social presence had a direct effect on customer experience.
Roy and Naidoo (2021)	Multiple. Study 1: Hotels Study 2: E-Commerce Study 3: Fashion	Experiment	IV: Anthropomorphic Conversation Style (Warmth vs. Competent) MO: Time Orientation (Present vs. Future)	Time Orientation	✓	✓		Present-oriented subjects prefer a warm chatbot conversation, leading to favorable product decisions.

(Continues)

Author(s)	Context	Method	Independent variable (IV); mediator (M); moderator (MO); dependent variable (DV)	Explanatory concept/theory	Chatbot features			Relevant findings
					Text	Imagery	Speech	
			M: Social Perceptions of Brand (Warm vs. Competent) DV: Brand Attitude, Purchase Intention					Future-oriented subjects, prefer a competent versus warm conversation. Brand perceptions mediate these effects.
Pizzi et al. (2021)	Multiple: Study 1: Mobile Phone Plans Study 2: Car Rentals	Experiment	IV: Assistant Type, Assistant Initiation M: Reactance, Choice Difficulty, Choice Confidence, Perceived Performance DV: Choice Satisfaction	Reactance Theory	✓			Lower anthropomorphism leads to higher reactance. But reactance, as mediated by other variables, ultimately leads to higher satisfaction.
Pizzi et al. (2023)	Multiple: Study 1: Car Rentals Study 2: Travel Insurance	Experiment	IV: Gaze Direction (Direct vs. Averted), Anthropomorphism (low vs. High) M: Chatbot Warmth, Theory of Mind, Chatbot Competence, Scepticism, Trust DV: Willingness to disclose, future intentions	Theory of Mind		✓		Perceptions of chatbot warmth are influenced by gaze direction, and competence perceptions are affected by anthropomorphism.
Schuetzler et al. (2020)	Study 1/2: Image Description	Experiment	IV: Conversational Skill (Tailored responses, response variety) M: Social Presence DV: Perceived Humanness, Partner Engagement	Social Presence Theory	✓			Show that people perceive a more skilled chatbot to be more socially present and anthropomorphic than a less skilled chatbot
Sheehan et al. (2020)	Multiple: Study 1: Hotels Study 2: Airline Booking	Experiment	IV: Error-free Chatbot versus Clarification Chatbot versus Error Chatbot M: Anthropomorphism MO: Need for human interaction DV: Adoption Intent	Anthropomorphism	✓			Unresolved errors reduce anthropomorphism and adoption intent. However, there is no difference between an error-free chatbot and one which seeks clarification. The ability to resolve miscommunication appears as effective as avoiding it. Furthermore, the higher a consumer's need for human interaction, the stronger the

Author(s)	Context	Method	Independent variable (IV); mediator (M); moderator (MO); dependent variable (DV)	Explanatory concept/theory	Chatbot features			Relevant findings
					Text	Imagery	Speech	
								anthropomorphism-adoption relationship.
Shin et al. (2023)	Multiple. Study 1: Tele-communication Study 2: Mobile service provider Study 3: Flights	Experiment	IV: Humor, Type of Humor M: Perceived Anthropomorphism, Perceived Interestingness of interaction MO: Service Agent Type DV: Service Satisfaction	Anthropomorphism	✓			The use of humor enhances service satisfaction when it is used by a chatbot but not when it is used by a human agent. This chatbot humor effect is serially mediated by enhanced perceptions of anthropomorphism and interestingness of the interactions with the chatbot. Socially appropriate (vs. inappropriate) humor leads to higher service satisfaction
Yu et al. (2022)	Multiple. Study 1: Order Cancellation Study 2: Gift Exchange Study 3: Service Development Study 4a: Same as Study 1 Study 4b: Product Return Study 5: Same as Study 1	Experiment	IV: Human versus Chatbot M: Expected flexibility, Service Evaluation MO: Service Evaluation DV: Service Evaluation, Attitude toward store, Perception of Apology	Attribution Theory	✓			When consumers receive a rejection of their service request, they evaluate the service less negatively if the service is handled by a chatbot versus a human. The reason is that consumers have lower expectations that robots will be able to provide flexible services to them. This affected is not present when (1) no service is experienced, service request accepted (3) service agent conveys emotions in an apology
Zhang et al. (2022)	E-Commerce.	Experiment	IV: Chatbot acting strategies (Whimsical, Kindenschema) M: Customer's Negative Emotions MO: Gender (male/female), Technology	Information Process Theory	✓	✓		Both schema types are effective. But in high failure conditions, the strategies weaken. Whimsical is good for high technology anxiety versus


(Continues)

Author(s)	Context	Method	Independent variable (IV); mediator (M); moderator (MO); dependent variable (DV)	Explanatory concept/theory	Chatbot features			Relevant findings
					Text	Imagery	Speech	
			Anxiety (High/Low), Product or service failure severity (High/Low) DV: Post-recovery satisfaction (repurchase intention, Recommendation intention, Satisfaction with Store					Kindenschema for low technology anxiety.
This Study	E-commerce	Experiment	IV: Anthropomorphic Language M: Perceived Competence, Perceived Authenticity MO: Chatbot Appearance, Brand Credibility DV: Customer Engagement	Social Response Theory	✓	✓		Interaction between humanlike appearance via the use of avatars and anthropomorphic language is mediated by perceived chatbot competence and authenticity. The positive effect of anthropomorphic language on perceived competence, and subsequently on authenticity and engagement, is only significant when the brand credibility is low (vs. high).

APPENDIX B

Study 1: Stimuli Examples

Human, Low Anthropomorphic Language Condition
Human, Low Anthropomorphic Language Condition



Hi, my name is **Lisa**. How can I help you today?

You: I want to buy a winter jacket please.

Lisa: First, please let me know your color preferences and price range.

You: I just want a black jacket within a price range of \$30 to \$50.

Lisa: We have a variety of black jackets in different sizes and within your price range. Here are some products related to your query: [links].

You: There are too many choices, what jacket do you recommend? I'm not quite sure which one to choose.

Lisa: Here is the top 5 best sellers [link]. We also have a customer reviews page [links]. You can sort based on the rating of jackets to make a decision.

You: Great! Thank you very much!

Lisa: You're welcome. We are here to help. Have a nice day!

Chatbot, High Anthropomorphic Language Condition
Chatbot, High Anthropomorphic Language Condition



Hi, my name is **Lisa**. How can I help you today? 😊

You: I want to buy a winter jacket please.

Lisa: The weather is getting cold ❄️, good on you for buying a jacket this early 😊 Let me get to know you better. First, please let me know your color preferences and price range.

You: I just want a black jacket within a price range of \$30 to \$50.

Lisa: Too easy 😊 I guess you know what you want. We have a variety of black jackets in different sizes and within your price range [links].

You: There are too many choices, what jacket do you recommend? I'm not quite sure which one to choose.

Lisa: That is not a problem, you have asked the right person! I recommend this top 5 best sellers [link]. Number 3 on the list is my favourite!

Here is also a page that our fabulous, fashionable customers 🌟 use to review our products 🌟 [link]. You may want to know how other customers felt about the product before you make a purchase.

You: Great! Thank you very much!

Lisa: You're welcome 🌟. I am here to help! I hope the links are useful. Have a lovely day 🌟

Study 2: Stimuli Examples

High Anthropomorphic Language Condition
High Anthropomorphic Language Condition



Hi, my name is **Lisa**. How can I help you today? 😊

You: I want to buy a winter jacket please.

Lisa: The weather is getting cold ❄️, good on you for buying a jacket this early 😊 Let me get to know you better. First, please let me know your colour preferences and price range.

You: I just want a black jacket within a price range of \$30 to \$50.

Lisa: Too easy 😊 I guess you know what you want. We have a variety of black jackets in different sizes and within your price range [links].

You: There are too many choices, what jacket do you recommend? I'm not quite sure which one to choose.


Lisa: That is not a problem, you have asked the right person! I recommend this top 5 best sellers [link]. Number 3 on the list is my favourite!

Here is also a page that our fabulous, fashionable customers 🌟 use to review our products 🌟 [link]. You may want to know how other customers felt about the product before you make a purchase.

You: Great! Thank you very much!

Lisa: You're welcome 🌟. I am here to help! I hope the links are helpful. Have a lovely day 🌟

Low Anthropomorphic Language Condition
Low Anthropomorphic Language Condition



Hi, my name is **Lisa**. How can I help you today?

You: I want to buy a winter jacket please.

Lisa: First, please let me know your colour preferences and price range.

You: I just want a black jacket within a price range of \$30 to \$50.

Lisa: We have a variety of black jackets in different sizes and within your price range. Here are some products related to your query [links].

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Lisa: Here is the top 5 best sellers [link]. We also have a customer reviews page [link]. You can sort based on the rating of jackets to make a decision.

You: Great! Thank you very much!

Lisa: You're welcome. We am here to help. Have a nice day!