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How Effective Are Anthropomorphic Chatbots? A Study of Consumer-Chatbot Communication in Taiwan

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Contextualized in the tech-savvy Taiwanese market, this experiment evaluates how a brand chatbot's anthropomorphic visual identity cues and conversational cues jointly influence consumer perceptions of the chatbot to drive brand evaluation. By adopting social presence indicators as anthropomorphic conversational cues, the findings confirm the advantage of conversational cues and the significance of chatbots' perceived warmth and hedonic value as mediators driving consumer responses. However, the results highlight that anthropomorphic visual identity cues of human names and faces may not always be ideal and should not be employed as a default chatbot design. When anthropomorphic visual identity cues are used, chatbots' messages must include numerous conversational cues to enhance the perceived warmth of the chatbot and improve consumer response.

Keywords: chatbot, human-machine communication, anthropomorphism, conversational cues, visual identity cues

Among the various emerging technologies in communication, chatbots have been recognized as a transformative technology in charge of frontline communication with consumers. A chatbot is a computer agent powered by artificial intelligence that can converse with human users in natural language (Trivedi, 2019). Research has documented the effectiveness of chatbots in improving consumer engagement (Kull, Romero, & Monahan, 2021) and relationships with brands (Lin & Wu, 2023). Consequently, chatbots have been advocated as a powerful tool for developing conversational marketing campaigns (Cancel & Gerhardt, 2019). The most common use of chatbots in today's marketing landscape is for online consumer support (Adam, Wessel, & Benlian, 2021). For example, Expedia, Bank of America, and Starbucks have all employed chatbots to provide 24/7 online assistance. Similarly, prior chatbot research for brand communication has primarily focused on the customer support setting (e.g., helping participants change the address of a fictitious order; Araujo, 2018). However, the increasing popularity of "social chatbots" highlights their potential to provide engaging social interactions that improve brand outcomes. Social chatbots are defined as bots that are designed to perform social roles such as companions (Skjuve, Følstad, Fostervold, & Brandtzaeg, 2021). Notable examples include Replika and Kuki, which are highly humanlike in terms of

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virtual appearance, personality, and emotional expressions (Pentina, Hancock, & Xie, 2023). Consequently, brands are striving to provide chatbots that can engage consumers in interactive, fun, social conversations beyond the utilitarian, Q&A format of customer support.

In particular, anthropomorphism has been a much studied factor in user-oriented chatbot research (Tsai & Chuan, 2023). The literature has tested a wide spectrum of anthropomorphic cues to equip chatbots with humanlike attributes that can predispose users to respond to computers in a social way. For instance, Feine, Gnewuch, Morana, and Maedche's (2019) taxonomy of chatbot social cues differentiates conversational cues in chatbots' messages into content (i.e., what is said) and style (how something is said). Chaves et al.'s (2021) conceptual model of chatbots' social characteristics underscores the significance of "personification" using identity representations. Focusing on text-based chatbots that can be easily implemented on various digital platforms, the current study assesses two of the most widely studied anthropomorphic cues: (1) conversational cues for chatbots' message design as well as visual identity cues composed of human identity (i.e., human-associated names), and (2) visual (i.e., human faces) cues for appearance design. An online experiment was conducted to explore whether and how these factors jointly impact the experiential and affective outcomes of user engagement on websites, brand likeability, and behavioral intention to recommend the brand website.

Scholars have suggested that because anthropomorphic conversational cues are not as easily observable as human identity or visual cues, they are both challenging and crucial in chatbot design (Youn & Jin, 2021). To provide much-needed theoretical insights and strategic implications on how brands can induce humanness perceptions from chatbots' messages, this study adopts social presence indicators theorized in computer-mediated communication (CMC) as conversational cues for chatbot messaging design. Moreover, to illuminate the mechanism underlying consumer-chatbot communication, this study examines chatbot-oriented perceptions of warmth and hedonic value as mediators driving the effects of visual identity cues and conversational cues on brand outcomes.

As Asia has been recognized as a powerhouse for AI with extensive government support to accelerate AI development and adoption, research has explored consumer-chatbot interactions in Asian markets, including Trivedi's (2019) study on banking chatbots in India, Chung, Ko, Joung, and Kim's (2020) e-service chatbots for luxury brands in South Korea, and Li and Wang's (2023) customer service chatbot in China. However, these studies primarily considered customer service chatbots. Among Asian markets, Taiwan, which is known for its healthy tech ecosystem and tech-savvy culture, is becoming a top destination for AI research and development (Jennings, 2018). Companies in Taiwan across various industries, from insurance to e-commerce and airlines, have increasingly integrated chatbots on their official websites (Chen, 2017). This study thus explores consumer-chatbot communication from Taiwanese consumers' perspective.

This study aims to advance the growing field of social chatbot research in strategic communication in several ways. First, beyond customer service, this study explores the potential of chatbots to improve consumer engagement and overall brand-liking. Second, this study provides important empirical evidence on the effectiveness of social presence indicators as anthropomorphic conversational cues to humanize chatbot communication. Additionally, to provide a more nuanced understanding of the mechanism underlying chatbot-consumer interaction, this study assesses the mediators of chatbot's perceived warmth and hedonic value for driving the effects of visual identity cues and conversational cues on brand evaluation.

Theoretical Framework

Social Presence Indicators as Anthropomorphic Conversational Cues

Go and Sundar (2019) argued that an important approach to enhancing chatbots' humanness is to simulate human communication via anthropomorphic conversational cues. However, they characterize human communication primarily through message contingency, that is, interdependent threadedness acknowledging prior responses in message exchanges. Such conceptualization of conversational cues focuses on the message content by recognizing and responding to users' input, but may not adequately address users' social and emotional needs. Given that chatbots' interactive messages contingent on users' responses are now the expected requirement (Snell, 2022), this study expands Go and Sundar's (2019) contingency-oriented conceptualization by adopting Rourke, Anderson, Garrison, and Archer's (1999) social presence indicators as conversational cues to address not only the content (i.e., what is said) but also the style (how it is said) aspects of conversational cues.

Social presence has been defined from various perspectives. From the interactants' perspective, it is conceptualized as a key CMC experience pertaining to the feeling of being with a "real person" in mediated communication (Oh, Bailenson, & Welch, 2018). From the communicators' perspective, it is defined as the ability "to project themselves socially and emotionally, as 'real' people" in CMC (Garrison, Anderson, & Archer, 2000, p. 94). A heightened sense of social presence can improve various CMC outcomes, from group learning via social media (Vanek, King, & Bigelow, 2018) to consumer-chatbot interactions in e-commerce (Konya-Baumbach, Biller, & von Janda, 2023).

To design conversational cues that can effectively enhance social presence, this study employed social presence indicators conceptualized by Rourke et al. (1999) to illustrate how social presence manifests in CMC. First, interactive indicators of social presence refer to messages that explicitly recognize the other interlocutor by asking questions, agreeing with, and showing appreciation and support for the conversation partner. Second, the affective indicators refer to expressions of emotions and mood, such as the use of emoticons and disclosure of emotions in chatbot messages. Third, cohesive indicators project a sense of interconnectedness and community, which can be exemplified by phatics (i.e., communications that serve a purely social function such as "Lovely weather today!"), salutations, and the use of inclusive pronouns such as "we," "our," and "community." While interactive indicators are related to Go and Sundar's (2019) conceptualization of conversational cues based on message interactivity and contingency, they include the social components of agreeing, appreciating, and wanting to learn more about the individual user. Similarly, the affective and cohesive indicators can enrich the conversation experience beyond providing appropriate content to address the users' inputs, as they serve to create an emotional bond and social relationship with users. This study thus employed the three social presence indicators as conversational cues in chatbots' messaging design.

Anthropomorphic Visual Identity Cues

Among the sundry types of anthropomorphic cues, Go and Sundar (2019) suggest that the easiest way to infuse humanness into chatbots might be the use of a human face/figure to trigger humanness heuristics. Another easy and common approach is the use of human-associated names. The visual identity

cues of human names and faces, which are explicit and immediately observable, have become common design features for this technology (Tsai & Chuan, 2023). Indeed, many brands have used these visual identity cues for their chatbots, such as IKEA's "Anna" and the Taiwanese insurance company Allianz's "Allie." Therefore, this study tested chatbots' anthropomorphic visual identity cues consisting of a human name and face that users will immediately and constantly see throughout the interactions.

Perceived Warmth

To provide much-needed insights into the mechanism underlying consumer-chatbot communication, this study draws from the social psychology literature to examine psychological warmth as a mediator driving the impacts of chatbots' anthropomorphic cues. Perceived warmth and competence have been defined as two fundamental social perceptions that account for how people characterize others (Fiske, Cuddy, & Glick, 2007). Warmth addresses social desirability traits, including friendliness, kindness, sincerity, and trustworthiness, whereas competence reflects utilitarian traits such as intelligence, confidence, and efficacy (Chattalas & Takada, 2013). Moreover, warmth perception carries more weight in emotional reactions than competence (Cuddy, Fiske, & Glick, 2008). Given the study's purpose of evaluating chatbots for enhancing consumer engagement and brand-liking, this study zeroes in on warmth perception instead of the utilitarian purpose of consumer service studied in prior research.

Research indicates that when corporate social responsibility is presented by anthropomorphized brand messages, consumers are more likely to perceive a greater sense of warmth (Jeong & Kim, 2021). Specific to people's social perceptions toward machines, anthropomorphism of consumer robots via either humanoid appearance or behavior (nodding, hand movements, and stronger emotion expression in speech) significantly heightens the robot's perceived warmth but not competence (Kim, Lee, & Choi, 2019). Therefore, chatbots' anthropomorphic visual identity cues and conversational cues are expected to enhance warmth perceptions.

Hedonic Value

Another key concept identified in research on public acceptance of new technologies pertains to hedonic value (Kim et al., 2019). Distinct from instrumental value, which addresses consumers' rational needs, hedonic value involves fun, enjoyment, and entertainment. Prior research exploring consumer engagement with brands on social media has highlighted the importance of enhancing the hedonic value of brands' social media communication to satisfy consumers' hedonic gratifications (De Vries & Carlson, 2014). Hedonic value constitutes an essential driver for attracting consumers to brand communities on SNSs and amplifying consumer participation (Jahn & Kunz, 2012).

Recognizing the significance of hedonic value as the most influential experiential factor for enhancing consumer engagement (Nadeem, Tan, Tajvidi, & Hajli, 2021), scholars have called for more empirical research to assess how anthropomorphism may influence consumers' interactions with chatbots and social robots for hedonic purposes (Li & Suh, 2022). Focusing on Chinese consumers' attitudes toward AI assistants like Apple's Siri and Baidu's Xiaodu, Yuan, Zhang, and Wang (2022) survey study reported that perceived anthropomorphism significantly contributes to AI assistants' hedonic value. Additionally, in

the context of video websites, social presence elicited by "bullet screens" can affect the immersive experience and perceived hedonic value (Fang, Chen, Wen, & Prybutok, 2018). Therefore, this study empirically investigates the effects of a chatbot's anthropomorphic visual identity cues and conversational cues on bolstering the bot's hedonic value.

H1: A chatbot using more anthropomorphic conversational cues will elicit greater (a) perceived warmth and (b) hedonic value than one using fewer conversational cues.

H2: A chatbot using anthropomorphic visual identity cues will elicit greater (a) perceived warmth and (b) hedonic value than one using non-anthropomorphic visual identity cues.

H3: A chatbot using anthropomorphic visual identity cues and more conversational cues will elicit more (a) perceived warmth and (b) hedonic value than one using non-anthropomorphic visual identity cues and fewer conversational cues.

While the advantages of human identity and visual cues have been documented in the literature, it is important to note that Tsai, Liu, and Chuan (2021) found that such simplistic cues alone are not sufficient to influence consumer evaluation. Instead, visual identity cues boost the positive effects of the chatbot's social conversation. Similarly, in their experiment on human-robot collaboration across in- and out-group settings, Fraune (2020) reported that robot anthropomorphism is not enough to mitigate various intergroup effects. Instead, anthropomorphism moderates intergroup effects such that the participants' interactions with anthropomorphic robots are more closely aligned with human-human interactions than those with non-anthropomorphic robots. In the context of robot waiters in restaurants, humanoid appearance was found to be a moderator that enhanced the association between consumers' social cognitive impressions of service robots and psychological ownership, thereby driving consumer attitude and patronage intention (Ruiz-Equihua, Romero, Loureiro, & Ali, 2023). Therefore, it is expected that anthropomorphic visual identity cues will boost the effects of conversational cues on perceived warmth and hedonic value to impact consumer responses.

Related to chatbot anthropomorphism, marketing research on brand anthropomorphism has highlighted the role of a brand's perceived warmth in mediating the effects of brand anthropomorphism (Lee & Oh, 2021) on consumers' evaluation. In particular, perceived brand warmth mediates the effects of chatbots' conversational style on consumer attitudes toward the brand (Xu, Leung, & Yan, 2013). Specific to human-machine interaction, Zhu and Chang (2020) reported that the humanoid design of robot chefs positively impacts consumers' food quality prediction through the mediator of warmth. Furthermore, a chatbot's warm (versus competent) initial message for greeting consumers can increase consumer engagement (Kull et al., 2021). Therefore, a chatbot's perceived warmth is expected to mediate the effects of chatbots' anthropomorphic visual identity and conversational cues on consumer evaluation.

About the mediating role of chatbots' hedonic value, prior survey studies have suggested that consumers' hedonic motivation is a key reason for their intention to use chatbots (Melián-González, Gutiérrez-Taño, & Bulchand-Gidumal, 2021). The hedonic aspect of chatbots (i.e., entertainment and trendiness) contributes to communication quality and consumer satisfaction (Chung et al., 2020). However, prior research has not examined which chatbot design and messaging factors may enhance the bot's hedonic

value to improve consumer responses. A notable exception is Ischen, Araujo, van Noort, Voorveld, and Smit (2020) experiment, which compared an interactive website and a stand-alone chatbot featuring a human identity cue (i.e., human name) and found that enjoyment is a key mechanism driving the chatbot's persuasiveness. Therefore, this study explores how a chatbot's anthropomorphic visual identity cues may moderate the effects of conversational cues on consumer evaluation via the mediator of the bot's hedonic value. The moderated mediation model of H4 and H5 is presented in Figure 1.

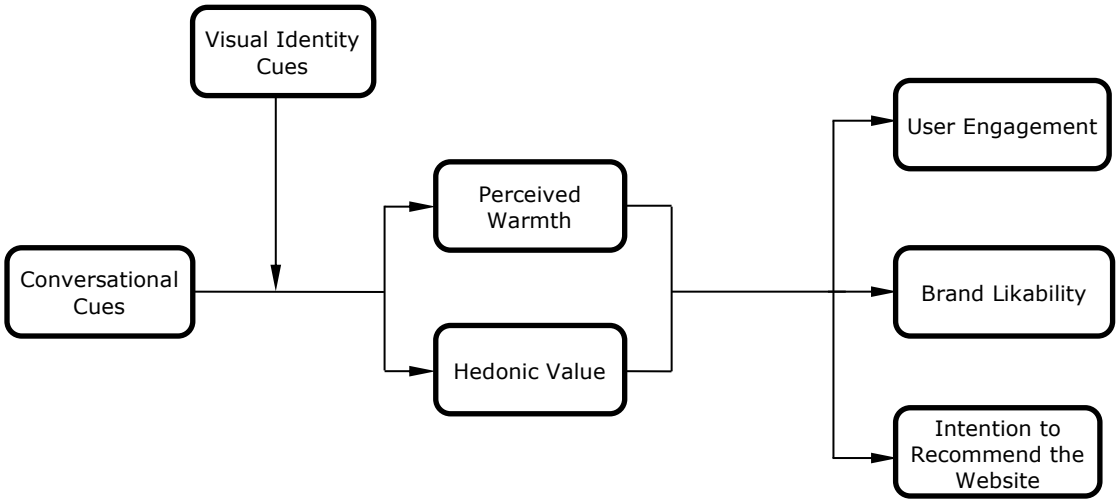

Figure 1. Moderated mediation model of anthropomorphic visual identity cues moderating the effects of conversational cues on user engagement, brand likability, and website recommendation via perceived warmth and perceived hedonic value.

H4: Anthropomorphic visual identity cues will moderate the influence of conversational cues on (a) user engagement, (b) brand likability, and (c) intention to recommend the website via the mediation of perceived warmth.

H5: Anthropomorphic visual identity cues will moderate the influence of conversational cues on (a) user engagement, (b) brand likability, and (c) intention to recommend the website via the mediation of hedonic value.

Method

To examine the hypotheses, an online experiment with a 2 (conversational cues using social presence indicator: high vs. low) x 2 (visual identity cues: anthropomorphic vs. non-anthropomorphic) between-subject design was conducted. Conversational cues and visual identity cues are manipulated independent variables. The measured variables are mediators of perceived warmth and perceived hedonic value, and dependent variables of user engagement, brand likability, and intention to recommend the website.

The study protocol was reviewed and approved by the Human Subject Research Office of the authors' academic institution. All the study questionnaires were developed in English and translated using

the back-translation method. The translated and source versions were carefully compared with ensure meaning equivalence.

Stimuli Development and Manipulation Check

To enhance external validity, Taiwanese chatbots in traditional Chinese for the international brand Red Bull were created. Red Bull previously offered a chatbot in English via Facebook Messenger to share brand-related content with consumers, such as commercials and short videos for sponsored sports and entertainment events. This study thus used similar but localized content from Red Bull's official Taiwanese website to create chatbot conversations and fictitious websites to host the chatbot stimuli. All four websites shared the same content and page layout.

Template-based chatbots that retrieved predefined responses from the template (Luo, Lau, Li, & Si., 2022) were created for the experiment to provide better control of the user experience within each condition (Sharma, Rathore, & Rathore, 2021). The chatbots were programmed to consistently inquire about what branded content, such as Red Bull's soapbox races and commercials, would capture the individual participant's interest. All branded content displayed during the conversation were in the form of 15-second videos. The chatbots were implemented using JavaScript as the front end and Dialogflow as the back end. The JavaScript program managed the flow of the conversation, including greeting the user, orchestrating the exchange of messages, and providing multimedia contents. Dialogflow is a cloud-based service providing a question-answering engine with natural language processing techniques to recognize users' agreement (e.g., "Sure, sounds good") or disagreement (e.g., "Nah, I will pass") responses to the bot's inquiry about their interests in a particular branded content. While the bot's questions and responses were based on a template-based dialogue tree, participants were instructed to interact with the bots freely and naturally without following a standardized, strict procedure. In this way, the conversation was personalized for each participant.

To project high social presence in the chatbot's messages, this experiment adopted Rourke et al.'s (1999) social presence indicators as conversational cues. In the condition of more conversational cues, chatbots' responses were designed to be social, with the initial message of "Hey! I'm Xiao-Luo/the Red Bull bot, and I'm here to share goodies from Red Bull with you! [excited emoji] You in?" The bot next asked the participants how their day was. If the participants indicated that they were not doing great or just okay, the bot would share funny memes to cheer them up. The bot's responses also expressed emotions with numerous emojis and animated memes, such as, "Yaaay! You're making me blush [smiling emoji]. Thank you for being such a fan!" when participants indicated agreement that they enjoyed the featured video. Where participants' inputs were not understood, the bot responded with messages like, "This is embarrassing but I don't understand you. I need some Red Bull to boost my energy first! Let me try again!" In this condition, the chatbot can greet and say goodbye to the user by name. See Figure 2 for sample chatbot stimuli.

Chatbot with anthropomorphic human identity cues and a high level of conversational cues	Chatbot with non-anthropomorphic visual identity cue and a low level of conversational cues

Figure 2. Sample chatbot stimuli.

Conversely, in the condition of fewer conversational cues, the chatbot introduced itself with the initial message, "Hi, I am Xiao-Luo/the Red Bull bot. Do you want to know more about Red Bull?" The bot's responses used a generally friendly tone but did not provide social greetings and were straightforward and devoid of emotions, emojis, and memes. For example, when participants indicated agreement that they enjoyed the featured video, the bot simply responded with "great." When participants' inputs were not understood, the bot provided simple responses like "Sorry I don't understand. Let me try again." Additionally, the bot was unable to greet users by name, despite every participant being asked for their name at the beginning of the conversation.

To manipulate the visual identity cues, the chatbot with the anthropomorphic cues introduced itself with a human name ("你好! 我是小羅, 紅牛聊天機器人!" which in English means "Hello! My name is Xiao-Luo, Red Bull's chatbot!") and a picture with a human face. When using non-anthropomorphic visual identity cues, the chatbot introduced itself as Red Bull's bot ("你好! 我是紅牛的聊天機器人!" "Hello! I am Red Bull's chatbot!") and had a product image as its picture. It is important to note that the content (i.e., short videos) suggested and displayed in chatbot conversations were identical. Only messages involving numerous versus minimal conversational cues were manipulated.

For the manipulation check, the four website-hosted chatbots were pretested among 103 Taiwanese consumers recruited by a Taiwanese marketing research company. The participants were randomly assigned to visit one of the four websites. Once they were directed to the website and started viewing the content, a chatbot window would pop up and begin the conversation with the participants. Each participant was instructed to talk to the chatbot for at least 3 minutes to generate a more-than-minimum interaction with the chatbot. Participants were instructed to type "bye" when they were ready to end the conversation session. The chatbot then redirected them to the manipulation check survey.

It is important to note that the participants were not given any specific instructions about what and how they should interact with the chatbots. Throughout the conversation, the chatbot proactively inquired about participants' interests in Red Bull's branded content, such as, "do you know about Red Bull's soapbox races?" to share short videos, memes, and other content that is appealing to the individual participant. Additionally, in the high social presence condition, the chatbot would ask how participants were feeling. Depending on their indicated mood, the bot would either express enthusiasm for their happy mood or share humorous memes to cheer them up. In this way, the chatbot provided personalized responses contingent on each participant's indicated mood and interests (see Appendix for screenshots of chatbots for different conditions).

For the manipulation check survey, the perceived social presence of the chatbot was assessed by measurement items adopted from Skalski and Tamborini (2007), such as how much they felt the virtual agent was unsocial to sociable on a scale of 1 to 7. As expected, chatbots that used many social presence conversational cues (M = 4.11, SD = 1.48) effectively induced a higher level of perceived social presence than chatbots that used few such cues (M = 2.61, SD = 1.07), t (101) = 5.59, p < .001. In addition, participants were presented with screenshots of chatbots initiating conversations in anthropomorphic and non-anthropomorphic visual identity conditions. This study adopted Powers and Kiesler's (2006) measurement to access perceived anthropomorphism, including questions such as how much the virtual agent is "machinelike" versus "humanlike," on a scale of 1 to 7. The T-Test results showed that participants

perceived Xiao-Luo, the bot using anthropomorphic visual identity cues (M = 3.94, SD = 1.78), to be more humanlike than the one using non-anthropomorphic visual identity cues (M = 2.06, SD = 1.02), t (101) = 6.57, p < .001.

Main Experiment

A total of 168 respondents were recruited from the same marketing research company. The average age of the main experiment participants was 33.45 (SD = 8.05); 51.2% were male, and 48.8% were female. More than half of these participants (73.2%) had a bachelor's degree. The main experiment was conducted in late 2019 in Taiwan. Participants were randomly assigned to one of the four experimental conditions: (1) anthropomorphic visual identity cues (i.e., Xiao-Luo) with more conversational cues, (2) anthropomorphic visual identity cues with fewer conversational cues, (3) non-anthropomorphic visual identity cues with more conversational cues, or (4) non-anthropomorphic visual identity cues with fewer conversational cues.

After interacting with the chatbot for at least 3 minutes, participants were redirected to the main survey. During the survey, participants answered questions about their perceptions of the chatbot's hedonic value and warmth level, as well as their engagement level during the interaction, Red Bull's brand likability, and their intention to recommend the website. Following Tsai et al.'s (2021) approach to studying chatbots using real-world brands, we also measured participants' previous experience with chatbots and their familiarity with the brand as control variables. Demographic information was collected at the end of the survey.

Measures

All measurements used in this study were adopted from prior studies and adapted to fit the chatbot context. All the variables were assessed on a 1–7 scale. Specifically, perceived warmth was adopted from Xu, Leung, and Yan (2013) and included items such as "The virtual agent is warm" and "The virtual agent is friendly" (α = .80). Four items were used to assess the chatbot's hedonic value (De Vries & Carlson, 2014), such as "The virtual agent is exciting" and "The virtual agent is entertaining" (α = .95). Five items were adopted from Sundar, Bellur, Oh, Jia, and Kim (2016) to assess user engagement during their visit to the brand website, including "While I was interacting with Red Bull's website, I was able to block out most other distractions" and "While I was interacting with Red Bull's website, I was immersed in what I was doing" (α = .89). Brand likability was measured using five items on a 7-point semantic-differential scale (Spears & Singh, 2004): unappealing/appealing; bad/good; unpleasant/pleasant; unfavorable/favorable; unlikeable/likeable (α = .97). Intention to recommend the brand website was measured with three items adopted from Jin and Phua (2014), such as "I am interested in recommending this website to my friends online" (α = .97). Finally, previous experience with chatbots was measured with two items adopted from Sundar et al. (2016), such as "how frequently do you use chatbots? (from never to always)." Brand familiarity was measured by two items adopted from Milberg, Goodstein, Sinn, Cuneo, and Epstein (2013), including "I have a lot of experience consuming Red Bull." Table 1 presents the correlations between the major variables included in this study.

Table 1. Means, Standard Deviations, and Zero-Order Correlations of Major Variables.

		Mean	*SD*	1	2	3	4	5
1.	Perceived warmth	4.65	1.31	1				
2.	Perceived hedonic value	4.28	1.71	0.69**	1			
3.	User engagement	3.89	1.32	0.65**	0.88**	1		
4.	Brand likability	4.69	1.56	0.51**	0.79**	0.76**	1	
5.	Website recommendation	3.98	1.87	0.64**	0.90**	0.85**	0.76**	1

Results

Tests of Hypotheses

A series of ANCOVA and moderated mediation analyses were performed, with brand familiarity and previous experience with chatbots being controlled. First, one ANCOVA analysis was employed to test H1a, H2a, and H3a about the main effects of conversational cues and visual identity cues, respectively, and their interaction effects on perceived warmth and perceived hedonic value. Similarly, one ANCOVA analysis was conducted to investigate the main effect of conversational cues (H1b), visual identity cues (H2b), and their interaction effects on perceived hedonic value (H3B). Second, a moderated mediation analysis was conducted to test H4 and H5, investigating whether visual identity cues moderate the effect of conversational cues on user engagement, brand likability, and website recommendation via the perceived warmth and hedonic value of the chatbot.

H1 predicted that a chatbot using more conversational cues could stimulate stronger perceived warmth and hedonic value than one using fewer conversational cues. The results of the ANCOVA showed that participants who communicated with the chatbot using more conversational cues (M = 4.86) perceived a significantly greater perceived warmth than those who talked to the bot using fewer conversational cues (M = 4.30), after controlling for brand familiarity and previous experience with chatbot, F (1,162) = 13.07, p < .01. The covariate, brand familiarity, was significantly related to perceived warmth, F (1, 162) = 10.66, p < .01. However, previous experience with chatbot was not significantly related to perceived warmth, F (1, 162) = 1.14, p > .05. Thus, H1a was supported. Similarly, the chatbot using more conversational cues (M = 4.47) elicited stronger perceived hedonic value than its counterpart (M = 4.07) after controlling brand familiarity and previous experience with chatbot, F (1,162) = 6.26, p < .05, supporting H1b. The covariates, brand familiarity (F (1, 162) = 37.86, p < .01) and previous experience with chatbots (F (1, 162) = 14.19, p < .01), were significantly related to perceived hedonic value.

H2 proposed that a chatbot with anthropomorphic visual identity cues can elicit greater perceived warmth and hedonic value than a chatbot with non-anthropomorphic visual identity cues. However, the results of ANCOVA found the opposite pattern: Participants in the anthropomorphic visual identity conditions (M = 3.83) perceived a significantly lower level of perceived warmth than those in the non-anthropomorphic visual identity conditions (M = 5.33), after controlling brand familiarity and previous experience with chatbot, F (1,162) = 68.12, p < .01. The covariate, brand familiarity, was significantly related to perceived warmth, F (1, 162) = 10.66, p < .01. However, previous experience with chatbot was not significantly related to perceived warmth,

F (1, 162) = 1.14, *p* > .05. Thus, H2a was rejected. Similarly, anthropomorphic visual identity cues (*M* = 3.00) elicited lower hedonic value than non-anthropomorphic visual identity cues (*M* = 5.53), after controlling brand familiarity and previous experience with chatbots, *F* (1,162) = 179.19, *p* < .01, thus rejecting H2b. The covariates, brand familiarity (*F* (1, 162) = 37.86, *p* < .01) and previous experience with chatbots (*F* (1, 162) = 14.19, *p* < .01), were significantly related to perceived hedonic value.

H3 hypothesized an interaction effect of visual identity cues and conversational cues on perceived warmth and hedonic value. The results showed that there was a significant interaction effect of visual identity cues and conversational cues on perceived warmth, *F* (1,162) = 30.73, *p* < .01. Notably, the post hoc analysis revealed that only when the bot is equipped with anthropomorphic visual identity cues can a higher level of conversational cues (*M* = 4.46) elicit greater perceived warmth than a lower level of conversational cues (*M* = 3.09), *p* < .001. There was no statistical difference between chatbots with a high or low level of conversational cues when non-anthropomorphic visual identity cues were used. Figure 3 presents the interaction effect on perceived warmth.

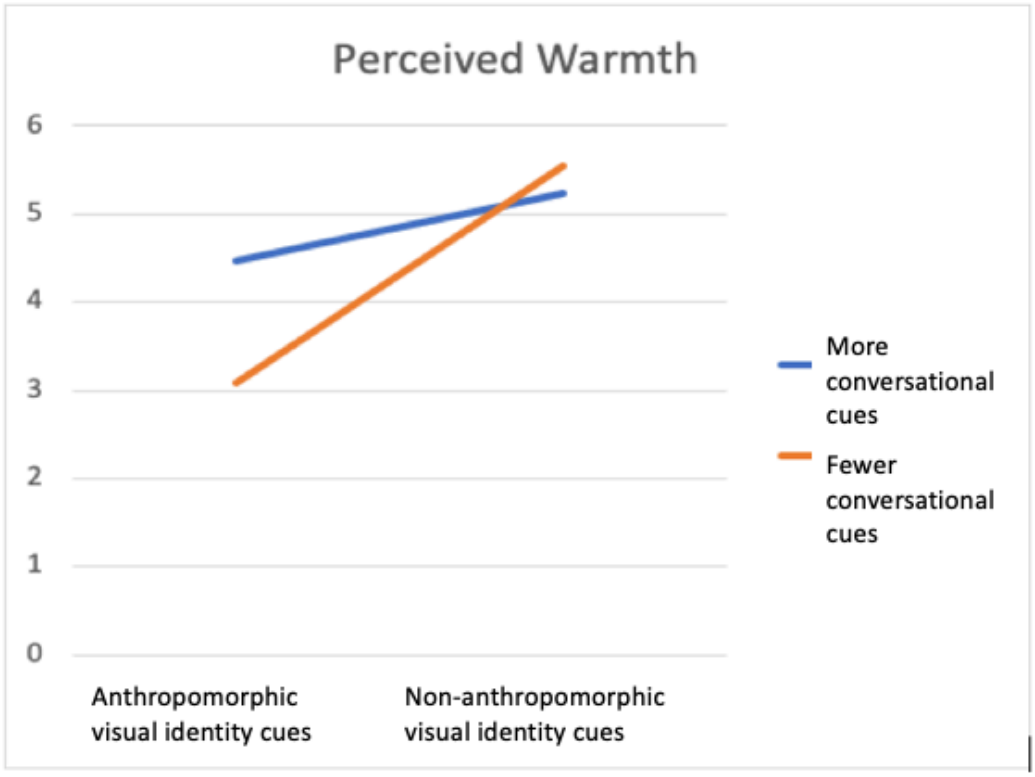

Figure 3. Interaction effect of anthropomorphic visual identity cues and conversational cues on perceived warmth of chatbot.

Additionally, there was a significant interaction effect of visual identity cues and conversational cues on perceived hedonic value (*F* (1,162) = 8.53, *p* < .01). The post hoc analysis revealed that only

when using non-anthropomorphic visual identity cues did chatbots using more conversational cues (M = 5.97) elicit more hedonic value than those using fewer conversational cues (M = 5.13), $p < .001$. There was no statistical difference between chatbots using a high or low level of conversational cues when the chatbot used anthropomorphic visual identity cues. Figure 4 presents the interaction effect on perceived hedonic value.

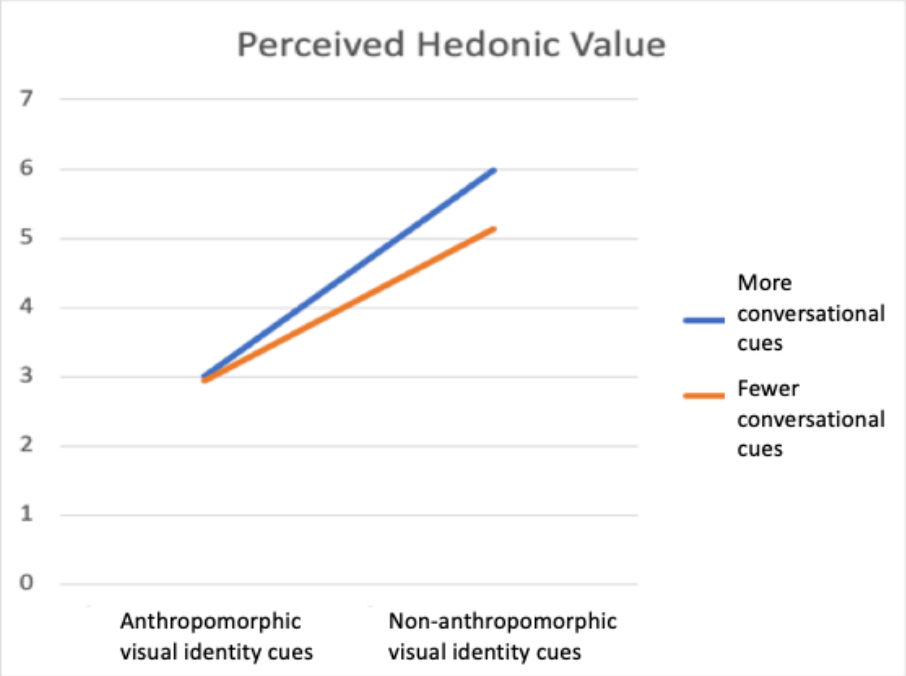

Figure 4. Interaction effect of anthropomorphic visual identity cues and conversational cues on perceived hedonic value of chatbots.

H4 proposed that anthropomorphic visual identity cues moderate the effect of conversational cues on user engagement, brand likability, and website recommendation via perceived warmth. A series of moderated mediation analyses were conducted using the PROCESS macro (Model 8: Hayes, 2013). The results reported that a 95% CI of the index of moderated mediation did not include zero (user engagement: b = .37, 95% CI: 0.19, 0.58; brand likeability: b = .22, 95% CI: 0.04, 0.42; website recommendation: b = .43, 95% CI: 0.23, 0.67), which confirmed the moderated mediation. It was revealed that the indirect effect of conversational cues via perceived warmth on the evaluation outcomes was only observed when the chatbots used anthropomorphic visual identity cues, after controlling brand familiarity and previous experience with chatbots. That is, only with anthropomorphic visual identity cues could conversational cues exert positive indirect effects via perceived warmth; the effects were significant and did not include zero on outcomes of user engagement (indirect effect = .30, 95% CI: 0.16, 0.49), brand likability (indirect effect = .18, 95% CI: 0.04, 0.35), and website recommendation intention (indirect effect = .35, 95% CI: 0.18, 0.57). Table 2 shows the moderated mediation analysis results.

Table 2. Results of Moderated Mediation Analysis via the Mediation of Perceived Warmth.

Condition	Mediation path	Indirect effect	95% CI
Outcome: User engagement			
Anthropomorphic	Conversational Cues→ Perceived warmth→ User engagement	.30	[0.16, 0.49]
NonAnthropomorphic	Conversational Cues→ Perceived warmth→ User engagement	−.06	[−0.14, 0.01]
Outcome: Brand likability			
Anthropomorphic	Conversational Cues→ Perceived warmth→ Brand likability	.18	[0.04, 0.35]
NonAnthropomorphic	Conversational Cues→ Perceived warmth→ Brand likability	−.04	[−0.10, 0.004]
Outcome: Website recommendation			
Anthropomorphic	Conversational Cues→ Perceived warmth→ Recommendation	.35	[0.18, 0.57]
NonAnthropomorphic	Conversational Cues→ Perceived warmth→ Recommendation	−.07	[−0.16, 0.01]

A series of moderated mediation analyses using the PROCESS macro (Model 8; Hayes, 2013) was also conducted to examine whether anthropomorphic visual identity cues moderated the effect of conversational cues on user engagement, brand likability, and website recommendation via perceived hedonic value, after controlling brand familiarity and previous experience with chatbot, as postulated in H5. The results demonstrated that a 95% CI of the index of moderated mediation did not include zero (user engagement: $b = -.28$, 95% CI: −0.49, −0.09; brand likeability: $b = -.24$, 95% CI: −0.47, −0.06; website recommendation: $b = -.36$, 95% CI: −0.62, −0.10), which supported the moderated mediation. Specifically, only with nonanthropomorphic visual identity cues was the indirect effect of conversational cues via perceived hedonic value significant—and did not include zero—on user engagement (indirect effect = .26, 95% CI: 0.15, 0.38), brand likability (indirect effect = .22, 95% CI: 0.10, 0.39), and website recommendation (indirect effect = .34, 95% CI: 0.20, 0.49). The moderated mediation analysis results are shown in Table 3.

Table 3. Results of Moderated Mediation Analysis via the Mediation of Perceived Hedonic Value.

Condition	Mediation path	Indirect effect	95% CI
Outcome: User engagement			
Anthropomorphic	Conversational Cues→ Perceived hedonic value → User engagement	−.02	[−0.19, 0.15]
NonAnthropomorphic	Conversational Cues→ Perceived hedonic value → User engagement	.26	[0.15, 0.38]
Outcome: Brand likability			
Anthropomorphic	Conversational Cues→ Perceived hedonic value → Brand likability	−.02	[0.17, 0.14]
NonAnthropomorphic	Conversational Cues→ Perceived hedonic value → Brand likability	.22	[0.10, 0.39]
Outcome: Website recommendation			
Anthropomorphic	Conversational Cues → Perceived hedonic value → Recommendation	−.03	[−0.24, 0.19]
NonAnthropomorphic	Conversational Cues→ Perceived hedonic value → Recommendation	.34	[0.20, 0.49]

Discussion and Conclusion

Focusing on chatbots as a proliferating communication technology transforming CMC (Sundar et al., 2016), this study advances the theoretical understanding of consumer-chatbot communication by analyzing whether and how anthropomorphic visual identity cues and conversational cues drive key social perceptions (i.e., perceived warmth) and experiential factors (i.e., hedonic value) to improve brand outcomes of user engagement, affective brand likeability, and behavioral intention of website recommendation. While prior research has evaluated key CMC mediators, including message contingency and parasocial interaction, to improve evaluation (e.g., Go & Sundar, 2019; Youn & Jin, 2021), this study's findings confirmed two additional mechanisms on how chatbots may be strategically designed to improve consumer response by boosting chatbots' perceived warmth and hedonic value. Users' perceptions of a bot's perceived warmth and hedonic value can play an even more influential role in the chatbot landscape increasingly shaped by generative AI. Although generative chatbots that can produce personalized responses based on adaptive learning and inference mechanisms (Luo et al., 2022) are expected to take center stage in the future of brand communication (Ferrer, 2023), their capability of generating social, empathetic, and humorous responses remains uncertain (Bonos, 2023). In this regard, a chatbot's perceived warmth and hedonic value should be recognized as critical design and evaluation goals by marketers, chatbot designers, and developers.

Additionally, the results based on the tech-savvy Taiwanese market expand the growing research on chatbots in the Asian context, which has focused on interaction and attitude-oriented outcomes, such as satisfaction and brand attitude (e.g., Chung et al., 2020; Li & Wang, 2023). Similar to Trivedi's (2019) study with Indian consumers, which reported the positive effects of chatbots on enhancing brand love, the study findings highlight the effectiveness of chatbots in improving consumer engagement and brand likeability.

Theoretical Implications

Consistent with prior research, the study findings highlight the significance of chatbots' conversational cues for improving chatbots' social and experiential influences (Roy & Naidoo, 2021). Different from the easily implemented but relatively superficial anthropomorphic visual identity cues (Youn & Jin, 2021), conversational cues reflect the complexity of human communication and are more challenging to craft. By adopting the communicative indicators of social presence, the conversational cues tested in this study encompass both the content- and style-specific aspects of verbal cues in Feine et al.'s (2019) taxonomy of chatbot social cues to expand the prior theoretical formulation of conversational cues based on message contingency (e.g., Go & Sundar, 2019).

Specifically, conversational cues that demonstrated a sense of humor, expressed emotions, used emojis, and addressed the consumer directly by name were found to positively influence the bot's perceived warmth and hedonic value. Again, recognizing the increasing dominance of generative AI, the study findings about conversational cues may indirectly highlight the potential of generative chatbots. In particular, as conversational cues based on the interactive indicator of acknowledging and expressing interests to learn more about the users are effective for improving consumer evaluation, generative chatbots, which can offer

highly personalized responses to make users feel not only acknowledged but also catered to, may become important sources of persuasion.

However, this study's unexpected findings about the negative main effects of anthropomorphic visual identity cues on both perceived warmth and hedonic value demand further critical deliberation. Contrary to our hypotheses, it was the non-anthropomorphic visual identity cues that induced stronger perceptions of warmth and hedonic value, regardless of the level of conversational cues used. Additionally, conversational cues were able to amplify hedonic value only when the chatbot used non-anthropomorphic visual identity cues. Similarly, conversational cues can indirectly improve consumer responses via hedonic value only when they use non-anthropomorphic visual identity cues. Therefore, it appears that having anthropomorphic visual identity cues diminished the positive effects of conversational cues on hedonic value. Although unexpected, participants likely found the contrast between highly social responses and the explicit machine-identity of bots to be more amusing and entertaining. The advertising literature also suggests that incongruency, such as placing ads in thematically incongruent media, can add novelty and interest to an ad (Dahlén, Rosengren, Törn, & Öhman, 2008).

A chatbot's anthropomorphic visual identity cues only positively influenced perceived warmth and its downstream effects when paired with a high level of conversational cues. In other words, for a chatbot's anthropomorphic visual identity cues to enhance perceived warmth and affect consumer responses, its communication must include numerous conversational cues for projecting social presence. As warmth has been widely recognized as a key humanness perception when the bot is represented by anthropomorphic visual identity cues, its communication needs to incorporate numerous conversational cues to induce perceptions of being warm, kind, and sincere.

Overall, our findings contradict previous research that documented the positive effects of anthropomorphic human identity and visual cues. For instance, Go and Sundar (2019) observed that anthropomorphic visual identity cues can improve consumer responses, even in chatbot conversations that lack message interactivity. Considering this study's use of actual automated chatbots instead of a human confederate in the Wizard of Oz approach, the current limited conversational capability of template-based chatbots might have contributed to the dissimilar findings from prior research. Additionally, it is possible that anthropomorphic visual identity cues are perceived by Taiwanese consumers as indicating that the bot can chat like a real human being without errors or delays. Therefore, when the bot using anthropomorphic visual identity cues fails to satisfy their high expectations, such cues may boomerang and hurt the evaluation of the chatbot. In contrast, when interacting with chatbots with non-anthropomorphic visual identity cues, consumers might have lower expectations and, consequently, may be happily surprised when the clearly nonhuman bot performs better than expected, which in turn can facilitate their positive evaluation. It is thus imperative for future studies to consider the effect of consumer expectations framed by chatbot's anthropomorphic visual identity cues that consumers immediately see when the conversation is initiated.

Moreover, in conditions of non-anthropomorphic visual identity cues, the chatbot simply introduced itself as Red Bull's bot and displayed the product picture, likely because the chatbot was more strongly associated with the brand. In this way, the pronounced focus on the Red Bull brand might become more influential cues than the visual identity cues of the cartoon avatar of a human face and a generic human name for eliciting warmth perceptions and enhancing the bot's hedonic value.

Strategic Implications

Based on the results with Taiwanese consumers, advertisers should carefully consider different chatbot anthropomorphic cues to achieve the distinct goal of enhancing perceived warmth versus hedonic value to improve consumer evaluation. The results of this Taiwanese study thus suggest that anthropomorphic visual identity cues of human names and faces may not always be ideal for brand chatbots, particularly when the chatbot is designed to provide a hedonic value that is imperative for experiential hedonic products. When the use of anthropomorphic visual identity cues is necessary, such as when using an existing brand mascot or brand persona (e.g., Mr. Clean or Mr. Monopoly) as the bot identity, chatbot messages using many conversational cues to project social presence are imperative for intensifying perceived warmth to improve consumer evaluation. This is particularly important for brands for which warmth perceptions are essential.

However, given the strong positive effects of non-anthropomorphic visual identity cues on generating strong perceptions of hedonic value, Taiwanese consumers may prefer non-anthropomorphic visual identity cues that explicitly identify chatbots as machines to perceive the chatbot as fun and entertaining. Despite the popular strategy of equipping chatbots with human names and humanlike figures, such anthropomorphic visual features should not be employed as the default chatbot design. In particular, if the objective is to enhance the hedonic value of the brand chatbot, such as for a brand that is known for its hedonic, experiential, or playful aspects of brand benefits, anthropomorphic visual identity cues of human names and faces should be avoided.

Several limitations should be addressed in future research. First, this experiment used template-based chatbots, which generated responses based on a set of predefined messages. Although this type of chatbot was commonly used in the industry to enhance control over the user experience (Sharma et al., 2021), companies are now eager to incorporate generative AI to provide more personalized interaction and support via their chatbots. Therefore, interdisciplinary research among computing and communication scholars for training and evaluating the new breed of generative chatbots to offer highly personalized responses with social and emotional intelligence is imperative to advance chatbot research. Second, to enhance ecological validity, this study instructed participants to interact naturally with the study's bots without following a standardized, strict procedure. The chat content was personalized for each participant; thus, the effect of potentially different chat content could not be controlled. Third, while this study tested the effectiveness of social presence conversational cues, chatbots can be strategically programmed to project a brand's distinct personality, including sincerity, competence, and excitement (Aaker, 1997). Future research can further explore the effectiveness of different brand personalities in enhancing consumer-brand interaction via chatbots.

References

Aaker, J. L. (1997). Dimensions of brand personality. *Journal of Marketing Research, 34*(3), 347–356. doi:10.2307/3151897

Adam, M., Wessel, M., & Benlian, A. (2021). AI-based chatbots in customer service and their effects on user compliance. *Electronic Markets, 31*(2), 427–445. doi:10.1007/s12525-020-00414-7

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. *Computers in Human Behavior, 85*, 183–189. doi:10.1016/j.chb.2018.03.051

Bonos, L. (2023, June 18). *ChatGPT might kill us all . . . with dad jokes*. Retrieved from https://www.washingtonpost.com/technology/2023/06/18/comedians-test-chatgpt-humor

Cancel, D., & Gerhardt, D. (2019). *Conversational marketing: How the world's fastest growing companies use chatbots to generate leads 24/7/365*. Hoboken, NJ: John Wiley & Sons.

Chattalas, M., & Takada, H. (2013). Warm versus competent countries: National stereotyping effects on expectations of hedonic versus utilitarian product properties. *Place Branding and Public Diplomacy, 9*(2), 88–97. doi:10.1057/pb.2013.5

Chaves, A. P., & Gerosa, M. A. (2021). How should my chatbot interact? A survey on social characteristics in human–chatbot interaction design. *International Journal of Human–Computer Interaction, 37*(8), 729–758. doi:10.1080/10447318.2020.1841438

Chen, R. (2017, August 30). *Robin, the Taiwanese chatbot using AI to talk to customers in the local lingo*. Retrieved from https://international.thenewslens.com/article/77453

Chung, M., Ko, E., Joung, H., & Kim, S. J. (2020). Chatbot e-service and customer satisfaction regarding luxury brands. *Journal of Business Research, 117*, 587–595. doi:10.1016/j.jbusres.2018.10.004

Cuddy, A. J., Fiske, S. T., & Glick, P. (2008). Warmth and competence as universal dimensions of social perception: The stereotype content model and the BIAS map. *Advances in Experimental Social Psychology, 40*, 61–149. doi:10.1016/S0065-2601(07)00002-0

Dahlén, M., Rosengren, S., Törn, F., & Öhman, N. (2008). Could placing ads wrong be right?: Advertising effects of thematic incongruence. *Journal of Advertising*, *37*(3), 57–67. https://doi.org/10.2753/JOA0091-3367370305

De Vries, N. J., & Carlson, J. (2014). Examining the drivers and brand performance implications of customer engagement with brands in the social media environment. *Journal of Brand Management, 21*(6), 495–515. doi:10.1057/bm.2014.18

Fang, J., Chen, L., Wen, C., & Prybutok, V. R. (2018). Co-viewing experience in video websites: The effect of social presence on e-loyalty. *International Journal of Electronic Commerce, 22*(3), 446–476. doi:10.1080/10864415.2018.1462929

Feine, J., Gnewuch, U., Morana, S., & Maedche, A. (2019). A taxonomy of social cues for conversational agents. *International Journal of Human-Computer Studies, 132*, 138–161. doi:10.1016/j.ijhcs.2019.07.009

Ferrer, J. (2023, October 12). *Chatbots and generative AI are set to take center stage in the future of customer service, but challenges remain to be addressed*. Retrieved from https://www.information-age.com/chatbots-in-future-of-customer-service-123507532/

Fiske, S. T., Cuddy, A. J., & Glick, P. (2007). Universal dimensions of social cognition: Warmth and competence. *Trends in Cognitive Sciences, 11*(2), 77–83. doi:10.1016/j.tics.2006.11.005

Fraune, M. R. (2020). Our robots, our team: Robot anthropomorphism moderates group effects in human–robot teams. *Frontiers in Psychology*, *11*, 1275. https://doi.org/10.3389/fpsyg.2020.01275

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*(2–3), 87–105. doi:10.1016/S1096-7516(00)00016-6

Go, E., & Sundar, S. S. (2019). Humanizing chatbots: The effects of visual, identity and conversational cues on humanness perceptions. *Computers in Human Behavior, 97*, 304–316. doi:10.1016/j.chb.2019.01.020

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach.* New York, NY: The Guilford Press.

Ischen, C., Araujo, T., van Noort, G., Voorveld, H., & Smit, E. (2020). "I am here to assist you today": The role of entity, interactivity and experiential perceptions in chatbot persuasion. *Journal of Broadcasting & Electronic Media, 64*(4), 1–25. doi:10.1080/08838151.2020.1834297

Jennings, R. (2018, September 28). How Taiwan is becoming a top destination for artificial intelligence in Asia. *Forbes*. Retrieved from https://www.forbes.com/sites/ralphjennings/2018/09/29/how-taiwan-is-becoming-a-top-destination-for-artificial-intelligence-in-asia/

Jeong, H. J., & Kim, J. (2021). Human-like versus me-like brands in corporate social responsibility: The effectiveness of brand anthropomorphism on social perceptions and buying pleasure of brands. *Journal of Brand Management, 28*, 32–47. doi:10.1057/s41262-020-00212-8

Jin, S. A. A., & Phua, J. (2014). Following celebrities' tweets about brands: The impact of twitter-based electronic word-of-mouth on consumers' source credibility perception, buying intention, and social identification with celebrities. *Journal of Advertising, 43*(2), 181–195. doi:10.1080/00913367.2013.827606

Kim, K., Lee, S., & Choi, Y. K. (2019). Image proximity in advertising appeals: Spatial distance and product types. *Journal of Business Research, 99*, 490–497. doi:10.1016/j.jbusres.2017.08.031

Konya-Baumbach, E., Biller, M., & von Janda, S. (2023). Someone out there? A study on the social presence of anthropomorphized chatbots. *Computers in Human Behavior, 139*, 107513. doi:10.1016/j.chb.2022.107513

Kull, A. J., Romero, M., & Monahan, L. (2021). How may I help you? Driving brand engagement through the warmth of an initial chatbot message. *Journal of Business Research, 135*, 840–850. doi:10.1016/j.jbusres.2021.03.005

Lee, S. A., & Oh, H. (2021). Anthropomorphism and its implications for advertising hotel brands. *Journal of Business Research, 129*, 455–464. doi:10.1016/j.jbusres.2019.09.053

Li, M., & Suh, A. (2022). Anthropomorphism in AI-enabled technology: A literature review. *Electronic Markets, 32*(4), 2245–2275. doi:10.1007/s12525-022-00591-7

Li, M., & Wang, R. (2023). Chatbots in e-commerce: The effect of chatbot language style on customers' continuance usage intention and attitude toward brand. *Journal of Retailing and Consumer Services, 71*, 103209. doi:10.1016/j.jretconser.2022.103209

Lin, J. S. E., & Wu, L. (2023). Examining the psychological process of developing consumer-brand relationships through strategic use of social media brand chatbots. *Computers in Human Behavior, 140*, 107488. doi:10.1016/j.chb.2022.107488

Luo, B., Lau, R. Y., Li, C., & Si, Y. W. (2022). A critical review of state-of-the-art chatbot designs and applications. *Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery, 12*(1), e1434. doi:10.1002/widm.1434

Melián-González, S., Gutiérrez-Taño, D., & Bulchand-Gidumal, J. (2021). Predicting the intentions to use chatbots for travel and tourism. *Current Issues in Tourism, 24*(2), 192–210. doi:10.1080/13683500.2019.1706457

Milberg, S. J., Goodstein, R. C., Sinn, F., Cuneo, A., & Epstein, L. D. (2013). Call back the jury: Reinvestigating the effects of fit and parent brand quality in determining brand extension success. *Journal of Marketing Management, 29*(3–4), 374–390. doi:10.1080/0267257X.2013.771205

Nadeem, W., Tan, T. M., Tajvidi, M., & Hajli, N. (2021). How do experiences enhance brand relationship performance and value co-creation in social commerce? The role of consumer engagement and self brand-connection. *Technological Forecasting and Social Change, 171*, 120952. doi:10.1016/j.techfore.2021.120952

Oh, C. S., Bailenson, J. N., & Welch, G. F. (2018). A systematic review of social presence: Definition, antecedents, and implications. *Frontiers in Robotics and AI, 5*, 409295. doi:10.3389/frobt.2018.00114

Pentina, I., Hancock, T., & Xie, T. (2023). Exploring relationship development with social chatbots: A mixed-method study of Replika. *Computers in Human Behavior, 140*, 107600. doi:10.1016/j.chb.2022.107600

Powers, A., & Kiesler, S. (2006). The advisor robot: Tracing people's mental model from a robot's physical attributes. In *Proceedings of the 1st ACM SIGCHI/SIGART Conference on Human-Robot Interaction* (pp. 218–225). New York, NY. Association for Computing Machinery.

Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (1999). Assessing social presence in asynchronous text-based computer conferencing. *Journal of Distance Education, 14*(2), 50–71.

Roy, R., & Naidoo, V. (2021). Enhancing chatbot effectiveness: The role of anthropomorphic conversational styles and time orientation. *Journal of Business Research, 126*, 23–34. doi:10.1016/j.jbusres.2020.12.051

Ruiz-Equihua, D., Romero, J., Loureiro, S. M. C., & Ali, M. (2023). Human–robot interactions in the restaurant setting: The role of social cognition, psychological ownership and anthropomorphism. *International Journal of Contemporary Hospitality Management, 35*(6), 1966–1985. doi:10.1108/IJCHM-05-2022-0597

Sharma, T., Rathore, T. S., & Rathore, N. S. (2021). Retrieval based chatbot system. *International Research Journal of Modernization in Engineering Technology and Science, 3*(6), 3539–3542. Retrieved from https://www.irjmets.com/uploadedfiles/paper/volume3/issue_6_june_2021/13800/1628083536.pdf

Skalski, P., & Tamborini, R. (2007). The role of social presence in interactive agent-based persuasion. *Media Psychology, 10*(3), 385–413. doi:10.1080/15213260701533102

Skjuve, M., Følstad, A., Fostervold, K. I., & Brandtzaeg, P. B. (2021). My chatbot companion—A study of human-chatbot relationships. *International Journal of Human-Computer Studies, 149*, 102601. doi:10.1016/j.ijhcs.2021.102601

Snell, J. (2022). *It's time to say "goodbye" to the robotic chatbots: Consumers demand more from Digital-First Experiences*. Retrieved from https://www.customerservicemanager.com/its-time-to-say-goodbye-to-the-robotic-chatbot-consumers-demand-more-from-digital-first-experiences/

Spears, N., & Singh, S. N. (2004). Measuring attitude toward the brand and purchase intentions. *Journal of Current Issues & Research in Advertising, 26*(2), 53–66. doi:10.1080/10641734.2004.10505164

Sundar, S. S., Bellur, S., Oh, J., Jia, H., & Kim, H. S. (2016). Theoretical importance of contingency in human-computer interaction: Effects of message interactivity on user engagement. *Communication Research, 43*(5), 595–625. doi:10.1177/0093650214534962

Trivedi, J. (2019). Examining the customer experience of using banking chatbots and its impact on brand love: The moderating role of perceived risk. *Journal of Internet Commerce, 18*(1), 91–111. doi:10.1080/15332861.2019.1567188

Tsai, W. H. S., & Chuan, C. H. (2023). Humanizing chatbots for interactive marketing. In C. L. Wang (Ed.), *The Palgrave handbook of interactive marketing* (pp. 255–273). Cham, Switzerland: Palgrave Macmillan.

Tsai, W. H. S., Liu, Y., & Chuan, C. H. (2021). How chatbots' social presence communication enhances consumer engagement: The mediating role of parasocial interaction and dialogue. *Journal of Research in Interactive Marketing, 15*(3), 460–482. doi:10.1108/JRIM-12-2019-0200

Vanek, J., King, K., & Bigelow, M. (2018). Social presence and identity: Facebook in an English language classroom. *Journal of Language, Identity & Education, 17*(4), 236–254. doi:10.1080/15348458.2018.1442223

Jahn, B., & Kunz, W. (2012). How to transform consumers into fans of your brand. *Journal of Service Management, 23*(3), 344–360. doi:10.1108/09564231211248444

Xu, H., Leung, A., & Yan, R. N. (2013). It is nice to be important, but it is more important to be nice: Country-of-origin's perceived warmth in product failures. *Journal of Consumer Behaviour, 12*(4), 285–292. doi:10.1002/cb.1419

Youn, S., & Jin, S. V. (2021). "In AI we trust?" The effects of parasocial interaction and technopian versus luddite ideological views on chatbot-based customer relationship management in the emerging "feeling economy". *Computers in Human Behavior, 119*, 106721. doi:10.1016/j.chb.2021.106721

Yuan, C., Zhang, C., & Wang, S. (2022). Social anxiety as a moderator in consumer willingness to accept AI assistants based on utilitarian and hedonic values. *Journal of Retailing and Consumer Services, 65*, 102878. doi:10.1016/j.jretconser.2021.102878

Zhu, D. H., & Chang, Y. P. (2020). Robot with humanoid hands cooks food better? Effect of robotic chef anthropomorphism on food quality prediction. *International Journal of Contemporary Hospitality Management, 32*(3), 1367–1383. doi:10.1108/IJCHM-10-2019-0904