How Chatbots' Anthropomorphism Affects User Satisfaction: The Mediating Role of Perceived Warmth and Competence

Tianqi Zheng, Xingyu Duan, Kang Zhang, Xiangcheng Yang, and Yi Jiang[(✉)]

China University of Geosciences, Wuhan 430078, Hubei, China
jiangy@cug.edu.cn

Abstract. Chatbots are widely employed in various areas as an important product of artificial intelligence techniques because they can simulate human conversations and satisfy business demands in various circumstances. However, users do not always appear to be satisfied with chatbot anthropomorphism. This study proposes a dual pathway by which the anthropomorphism of chatbots affects user satisfaction from a theoretical perspective of task technology fit, and explores the key boundary conditions of individual characteristics and task characteristics in shaping user satisfaction. To test our study hypotheses, we conducted a social survey and a laboratory experiment. We evaluated the parallel mediation effect of perceived warmth and perceived competence via an online survey. In addition, users with high social phobia can enhance the effect of anthropomorphism on perceived warmth. In the laboratory study, we used 2 (anthropomorphic: high anthropomorphic vs. low anthropomorphic) x 2 (task creativity: high creative vs. low creative) between subjects who were asked to buy clothes via an e-commerce platform chatbot designed specifically for this study. They then completed an online survey to evaluate their experience. The results showed that the anthropomorphic chatbot induced higher perceptual abilities when performing creative tasks. The current study not only contributes to the literature on AI user satisfaction but also provides directions for the application of task-technology fit theory to human-computer interaction.

Keywords: Anthropomorphism · User Satisfaction · Chatbot · Task Technology Fit

1 Introduction

AI technologies are now incorporated in products and services in ways that provide four user experiences: data capture, classification, delegation, and social [1]. AI is expected to replace people in many jobs, and chatbots, also known as conversational agents, are one of the most prevalent applications. A chatbot is considered as "a machine dialogue system that interacts with human users through natural conversational language" [2]. However, user acceptance of chatbots has been mixed. According to the Expectancy Confirmation Theory (ECT), users' willingness to buy a product again or continue using

a service is largely determined by their satisfaction with previous use of that product or service [3]. Improving user satisfaction will therefore lead to the continued use of chatbots and is key to the success of artificial intelligence.

Anthropomorphism refers to giving users a humanized experience by imitating human language, behavior, or social signals, or even convincing them that they are communicating with real people [4]. Although previous studies have already discussed that anthropomorphism has a positive impact on behavioral outcomes such as user satisfaction and persistent use intentions, there are still some studies to suggest that individuals may be unsatisfied when there is a mismatch between what users expect and how satisfied they actually experience. Furthermore, research have shown that a high level of anthropomorphism might cause the "Uncanny Valley" effect, which makes users feel threatened and afraid. Existing research cannot determine the boundaries of technology use and how to provide tailored services to meet user needs.

RQ1. How the anthropomorphism of chatbots shapes user satisfaction?

AI technology transforms human-computer interaction from passive and structured input and output to active and adaptive. Chatbots can extract information about users from their surroundings and context and understand the messages they send. So users no longer accept a one-size-fits-all service model. Chatbots should dynamically adjust their technical strength to suit the needs of specific individuals for specific tasks, exhibiting tailored responses and services to enhance user perceptions and outcomes.

RQ2. How does the path from anthropomorphism to user satisfaction for chatbots change when dealing with different users in different tasks?

We extend task-technology fit theory and stereotype content model to explore how anthropomorphism of chatbot shapes user satisfaction. We propose an intermediate process with two dimensions of warmth and competence that argues that users are satisfied only when their task requirements are matched with chatbots' technical capabilities. In addition, we explore whether different personalities of users and different types of tasks have an impact on this fitting process. A social survey and a between-groups experimental design in an e-commerce context have been investigated.

This study contributes to the formation of user satisfaction in the field of human-computer interaction in two ways. First, previous studies solely stressed the instrumental value of technology and ignored the emotional appeal of users caused by anthropomorphism [5]. By introducing the stereotype content model, we provide an integrated perspective to analyze users' perceptions of how well anthropomorphic matches their task needs in terms of both warmth and competence. Moreover, we propose an interaction among social personality, task creativity and technical features based on the task technology fit theory to provide a reference for future research on the application of task technology fit models in the context of artificial intelligence.

2 Literature Background and Theory Development

2.1 Anthropomorphism and User Satisfaction

Anthropomorphism refers to the human-like characteristics, behaviors, or emotions tendency that chatbots exhibit when conversing with users [6]. Chatbots can act as "companions" when they communicate with users using human-like names and anthropomorphic language and manage and share information in a specific format [7].

Anthropomorphism has been found to yield a number of outcomes, improving the quality of user-chatbot interactions and facilitate social and emotional connections. Of these results, user satisfaction is our main concern. User satisfaction is the feeling of pleasure an individual receives when some need is satisfied. It reflects the relative relationship between individuals' prior expectations of a product, technology or service and how they actually feels after using it [8]. In fact, chatbots' capacity to recommend accuracy, convenience, customization, and efficiency allows them to convey broad and reliable information to users, thereby increasing satisfaction. Meanwhile, anthropomorphism allows chatbots to behave more like human agents, evoking positive user attitudes toward chatbots with humanized names and social language.

However, it is unclear whether a higher level of anthropomorphism would always result in a better user experience and satisfaction. Because users have higher expectations and demands for anthropomorphic chatbots, it is challenging to generate user satisfaction and willingness to continue using them if they discover that the chatbots' services and capabilities do not yet satisfy their particular needs or initial expectations. For example, Davenport et al. found that users prefer to interact with real humans in more complex tasks [8]. Additionally, too much anthropomorphism might cause uneasiness. When chatbots resemble humans to a certain degree, they may be perceived as uncanny by users, causing feelings of discomfort and revulsion, which is what robotics expert Masahiro Mori proposed in his "Uncanny Valley" theory.

It is thus unclear how the effectiveness achieved by anthropomorphism fits users' expectations and generates satisfaction. Most of prior user satisfaction studies have concentrated on influencing factors such as system quality, information quality, perceived usefulness, and perceived ease of use [8]. However, anthropomorphism allows chatbots to provide users with a humanized service experience by using human-like language, appearance, and names, causing users to have various perceptions similar to those in human interactions. User satisfaction may no longer be solely based on the system's functional performance, but should also consider emotional needs. Thus, we will discuss the mechanisms of anthropomorphism on user satisfaction.

2.2 Warmth and Competence

Warmth and competence, two basic concepts in the stereotype content model, have been used to indicate individuals' perceptions of various social behaviors in interpersonal relationships [9]. Prior research has shown that people are hardly motivated to feel warmth when faced with a bot service and merely perceive an increase in competence traits. However, the application of anthropomorphism to chatbots allows them to deliver emotional value in addition to solving user-specific tasks potentially leading to higher

perceptions of warmth and competence. In summary, we jointly explore the influence path from anthropomorphism to user satisfaction in terms of the two dimensions of perceived warmth and competence.

Firstly, perceived warmth refers to the degree to which individuals perceive intelligent assistants to be friendly, kind, and caring [10]. Anthropomorphism allows chatbots to be defined as conversational agents with emotional functions, prompting users to develop emotional attachments [11]. Specifically, chatbot anthropomorphic cues like name, voice, and linguistic style can increase user session participation. Users will then generate warm comments like caring, kind, and friendly. Secondly, perceived competence refers to an individual's perception of the intelligence, effectiveness and efficiency of an intelligent assistant in task solving [10]. It has been shown that anthropomorphism makes users tend to believe that it has the same human problem-solving abilities to accomplish the task at hand. As users' task requirements are realized, their view of the technology's value rises automatically, resulting in an improved perception of the system's capabilities.

Furthermore, users' perceived warmth can maintain and improve their harmonious relationships with chatbots, thus obtaining higher satisfaction. Meanwhile, users reported greater satisfaction with their interaction with the chatbot once they felt it had the ability to meet their current needs for smooth problem-solving. Thus, we propose the hypothesis that: H1. Perceived warmth mediates the relationship between anthropomorphism and user satisfaction. H2. Perceived competence mediates the relationship between anthropomorphism and user satisfaction.

2.3 Task-Technology Fit in Chatbots

In previous work, scholars have neglected to address whether technology matches the user task and user characteristics in a given situation. Goodhue and Thompson (1995) proposed the task-technology fit model to quantify the interaction between the user's perceived task, technology and individual [5]. The core of the model is to measure how the technology embedded in an information system product is adapted to the task at hand and thus enhances user evaluation [5]. Therefore, to investigate how chatbots should use anthropomorphism within appropriate boundaries, we introduce a task-technology fit model to explore the adaptation between anthropomorphic technology, tasks and individual characteristics, in an attempt to more fully understand the beliefs and attitudes of different individuals towards AI technology in different task contexts. We propose two moderating variables, individual and task characteristics.

Social phobia is a recurrent feeling of anxiety or fear in social or performance situations [12]. Firstly, interactions with chatbots become a form of safe behavior for high-socially-phobic users seeking to avoid face-to-face contact. The more intelligent and anthropomorphic the robot is, the more they are attracted to it because it not only does not judge or reject them negatively, but also helps the user solve problems without any surprises, thus, the perceived competence of the user is greatly increased. Secondly, high-socially-phobic users who feel isolated or lack social connection, can recover this social pain and increase perceived warmth by interacting with anthropomorphic chatbots. Thus, we propose the hypothesis that: H3. For users with high social phobia, the effect

of anthropomorphism on perceived warmth (H3a) and perceived competence (H3b) is higher.

Social butterfly refers to being cheerful and bold in social aspects, being able to get acquainted with strangers, being willing to express oneself. In one possibility, users with high social butterfly have higher social needs, so when the chatbot's language style or behavioral state is closer to that of human, the warmth and competence perceived by users is also higher [13]. In another possibility, high social butterfly users do not worry or fear negative comments. They are less sensitive to the resulting changes in sociality even if chatbots become more anthropomorphic, and thus may not affect the perceived warmth and competence of the user. Thus, we propose the hypothesis that: H3. Individual's social butterfly moderates between anthropomorphism and perceived warmth (H3c)/perceived competence (H3d).

The measures of task creativity are novelty and utility [14]. Creative tasks require divergent thinking, intelligence, personality and other innovative thinking to propose novel solutions to such relatively subjective, complex and ill-defined problems [15]. It is often believed that robots can only be used to perform non-creative tasks with objective, clear answers. So in highly creative task scenarios, users are more likely to prefer the help of a human attendant. When a chatbot performs more closely to a human, users may be more likely to perceive it as having human-like abilities and to perceive more warmth. Thus, we propose that: H4. When the user chatbot's interaction is to execute high-creative tasks rather than low-creative tasks, the effect of anthropomorphism on perceived warmth (H4a) and competence (H4b) is stronger.

3 Study 1

3.1 Construct Measurement

All constructs were measured with multi-item, 7-point Likert scales.

Anthropomorphism (A). Chatbots talk to me: with human-like names/voice/greeting; at a rate similar to that of a human; with onomatopoeia similar to human words.

Perceived warmth (PW). When I talk to chatbots: there is a sense of "concern"/"affability"/"friendliness"/"human warmth"/"sociability".

Perceived Competence (PC). In the course of helping me on my task: chatbots are quick/efficient/powerful/skilled.

Social Phobia (SP). I get nervous in the street when people stare at me; I get nervous if I'm sitting on someone in a car; I get nervous in the lift if someone is looking at me; I often worry that I might do something to draw attention; When people look at me, I'll be shaking with nerves; I feel conspicuous when I stand in a row.

Social Butterfly (SB). I like to talk to a lot of different people at parties; I feel comfortable when there are a lot of people around; I enjoy being the center of attention in a crowd; I like to initiate conversations with strangers; I love being on stage and performing; I can find something to talk about with anyone.

User satisfaction (US). After talking to a chatbot: I feel very satisfied/happy/relieved/ willing to use; I would recommend it to my friends.

3.2   Participants and Data Collection

The survey data were collected via paper file and online. Finally, 751 responses were received, including 615 valid responses. The participants consisted of 41.6% males and 58.4% females. 82.9% of them had a college or higher education. Additionally, more than 71.5% of them use chatbots more than once a month. Thus, the respondents' understanding of the questionnaire and the results are convincing.

3.3   Results

We analyze the reliability and validity of the measurement model by using SPSS 26 and Smart PLS 3.0. The results show that our research model demonstrated satisfactory validity and reliability. The value of SRMR is 0.052, suggesting a good fit.

Collinearity among the predictor variables was not a concern since all VIF values were below 2. The paths test was performed in PLS and the results are shown in Fig. 1. The anthropomorphism of chatbots significantly facilitates users' perceived warmth (b = 0.385, p < 0.001) and perceived competence (b = 0.411, p < 0.01). Both perceived warmth (b = 0.576, p < 0.001) and perceived competence (b = 0.255, p < 0.01) have a positive effect on user satisfaction. In addition, perceived warmth has a stronger impact on user satisfaction than perceived competence.
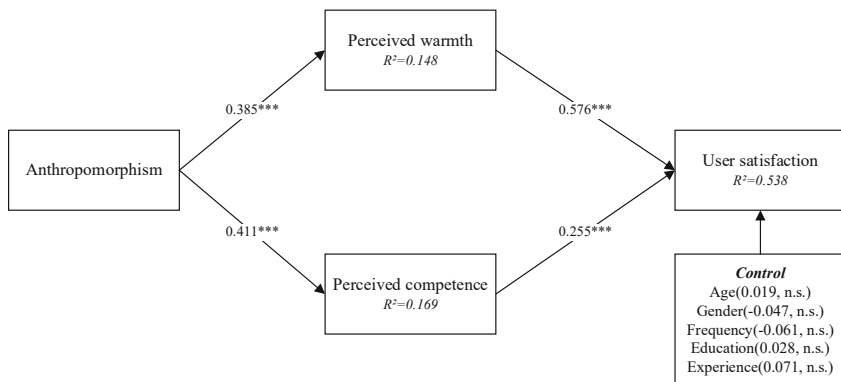

Fig. 1. PLS results test

We investigate the mediating role of perceived warmth and perceived competence in the effect of anthropomorphism on user satisfaction. The result in Table 1 indicated that the 95% confidence intervals for the mediating effects of perceived warmth and perceived competence between anthropomorphism and user satisfaction did not contain zero, confirming the mediating role of the above two variables, sup-porting H1and H2.

Also, these two variables play a full mediating role in the effect of anthropomorphism on user satisfaction. Particularly, the indirect effect of perceived warmth is significantly stronger than that of perceived competence (effectPW-effectPC = 0.1267, BootCI = [0.0635 ~ 0.1931]).

Table 1. Results of mediating effect testing

Paths	Direct effect				Indirect effect				Results
	effect	BootSE	LLCI	ULCI	effect	BootSE	LLCI	ULCI	
PW	.0614	.0324	.0589	−.0023	.2273	.0297	.1715	.2871	Full
PC	.0614	.0324	.0589	−.0023	.1006	.0194	.0638	.1396	Full

We tested the extent to which social phobia and social butterfly moderated the main effects of anthropomorphism. As shown in Table 2, anthropomorphism × social phobia interaction had a positive significant effect on perceived warmth. In contrast, none of the moderation effects of perceived competence were significant. Therefore, of the moderating hypotheses, only hypothesis 3b was supported. The moderation graph in the left half of Fig. 2 further shows whether the effect of anthropomorphism on perceived warmth changes under different levels of social phobia. As predicted, at high levels of social phobia, the positive effect of anthropomorphism on perceived warmth is stronger, i.e., as anthropomorphism increases, perceived warmth increases more (low SP: b = 0.2732, $p < 0.001$, BootCI = [0.1703~0.3761]; high SP: b = 0.5695, $p < 0.001$, BootCI = [0.4507~0.6884]).

Table 2. Results of moderating effect testing

	social phobia			social butterfly		
	PW	PC		PW	PC	
Constant	3.7763***	4.7699***	Constant	3.7884***	4.7703***	
A	0.4214***	0.4234***	A	0.3693***	0.3971***	
SP	0.1837***	0.0889**	SB	0.3519***	0.1888***	
A × SP	0.1001***	0.0357	A × SB	0.0491	0.0304	
R2	0.2187	0.1843	R2	0.2715	0.2105	
Int CI	[0.049,0.151]	[−0.013,0.084]	Int CI	[−0.004,0.102]	[−0.021,0.082]	

4 Study 2

4.1 Experimental Design

In order to test the fit effect between anthropomorphism and tasks with different levels of creativity, a 2 (high-anthropomorphic vs. low-anthropomorphic chatbot) × 2 (high-creative vs. low-creative task) between-subjects design was employed. We developed a text-based chatbot to replicate the context of online purchasing interactions between users and intelligent customer service. Participants were asked to communicate with a text chatbot to complete the designated tasks. Finally, participants were asked to fill in a questionnaire based on their true feelings.

The anthropomorphic chatbot was designed to interact with participants using a hu-man-like name (Xiao Zheng) and conversational cues similar to humans (such as greeting and modal words). When participants send a message to the chatbot, a cue indicating that the chatbot is typing a message will appear in the interface promptly, and the chatbot will respond after a period of delay. The non-anthropomorphic chatbot was designed to interact with participants in a stiff conversational style, using a non-human name (Intelligent Customer Service # 1) and stereotypically indifferent words. When participants give messages to the chatbot, the chatbot will respond without delay. Participants who were given the high-creative task setting manipulation were asked to talk to the chatbot and ask for suggestions about the style of T-shirts. And the participants in the low-creative task group were asked to ask for information about T-shirt sizes.
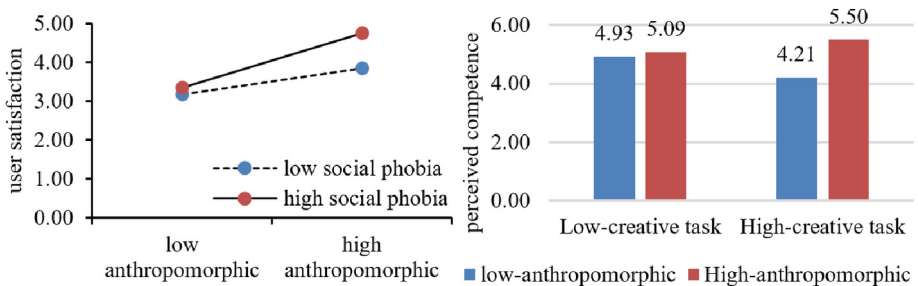

Fig. 2. The moderation graph

4.2 Participants and Procedure

We recruited 138 participants to join this experiment over a two-week period. They had an average age of 20.41 years (SD = 2.09), with 82 (59.4 percent) being female. At the beginning of the experiment, participants were asked to view a 15-s overview of the experiment to clarify their assigned task. Participants in the high-creative task group spoke with intelligent customer service about their recommended T-shirt, and intelligent customer service asked a few questions about their style preferences; participants in the low-creative task group were asked to provide their height and weight information to obtain size recommendations. After completing the experiment, participants were asked to complete an online survey.

4.3 Measures

We used the same scales as in Study 1 to measure perceived warmth, perceived competence, and user satisfaction. Anthropomorphism was measured on the same scale as in Study 1 for manipulation checks, but the "I think the intelligent assistant and I have a similar voice" item was excluded because the chatbot in the experiment was text-based. In addition, manipulation check questions for anthropomorphism and task creativity were included in the survey: "I think intelligent customer service is similar to humans" and "The task of asking intelligent customer service to recommend size/style to me is creative".

4.4 Manipulation Check

An independent t-test was used to check the manipulation for anthropomorphism and task creativity. According to the results, the degree of anthropomorphism in the anthropomorphic chatbot group (M = 5.37, SD = 1.46, $p < 0.001$) was much higher than in the non-anthropomorphic chatbot group (M = 3.24, SD = 1.92, $p < 0.001$). Thus, the anthropomorphism manipulation was successful. In addition, the degree of creativity was significantly higher in the high-creative task group than in the low-creative task group. The manipulation question was answered with an average of 5.84 (SD = 1.32) by participants in the style recommendation task, while participants in the size recommendation task responded with an average of 3.14 (SD = 1.88). It showed a significant difference (t = 9.735, $p < 0.001$). The task creativity manipulation was successful.

4.5 Results

A two-way ANOVA was used to test the interaction effects of anthropomorphism and task creativity. The interaction effect of anthropomorphism and task creativity on perceived competence was positively significant (F = 4.485, $p < 0.05$). The two-way interactions are in Fig. 2. In the high-creative group, perceived competence increases significantly as anthropomorphism increases(Anthropomorphic: M = 5.50, SD = 1.21; Non-anthropomorphic: M = 4.21, SD = 1.89). In contrast, in the low-creative group, perceived competence did not change significantly with increasing anthropomorphism (Anthropomorphic: M = 5.09, SD = 1.46; Non-anthropomorphic: M = 4.93, SD = 1.67). However, the interaction effect of anthropomorphism and task creativity on perceived warmth was not significant. Therefore, only hypothesis 4b was supported.

5 Discussion

5.1 Summary of Findings and Discussion

This study was to figure out how chatbot anthropomorphism influences user satisfaction, and to see if tasks with varying levels of creativity and individuals with varying social personalities have an impact on the outcome. To test our hypotheses, we conducted a survey and an experiment, and the results supported the majority.

First, the findings indicated that perceived competence and perceived warmth play a fully mediating role in the relationship between anthropomorphism and user satisfaction. Specifically, only by stimulating the user's perception of warmth and competence can chatbots with anthropomorphic features acquire user satisfaction. Furthermore, we discovered that users are more satisfied when they sense more warmth rather than perceived competence, implying that consumers demand more human attention from anthropomorphic beings than traditional information systems can give.

Second, the findings also provide interesting insights into the moderating role of social phobia and social butterfly. The results suggest that only social phobia positively moderates the relationship between anthropomorphism and perceived warmth. Our interpretation of this finding is that users with social phobia are afraid of real-world interactions and adopt avoidance behaviors, when conversations with human-like chatbots can compensate for their missing social feelings in reality. Thus, for people with high social phobia, their expectation of participating in a kind and pleasant session can be satisfied to a greater extent, and thus they can perceive more warmth. However, an individual's level of social phobia has no effect on their perceived competence, possibly because social phobia is unrelated to the user's initial expectations about the chatbot's functionality, i.e., if the chatbot fails to solve the user's problem, perceived competence does not increase even for users with high social phobia.

Third, the findings provide an empirical evidence for the effect of specific tasks on perceived task technology fit. The findings of Study 2 show that when users employ a chatbot to perform a creative task, anthropomorphism is more likely to boost their perceptions of chatbot capabilities. However, the relationship between anthropomorphism and perceived warmth was not influenced by task creativity. This finding can be explained by the fact that while executing a more challenging class of tasks requiring high creativity and complexity, consumers choose human help over machine help. Thus, an anthropomorphic chatbot makes users feel that it is more like a real human and has human-like abilities to solve problems, make suggestions, etc.

5.2   Theoretical Implications

First, this study extends the application of task-technology fit model in the context of artificial intelligence from an anthropomorphic lens. Prior research on traditional IT, based on the task-technology fit model, has focused on the problem-solving capability of IT, which may only provide a limited interpretation for human-like chatbots' jobs. We proposed an integrated dual-fit model based on the warmth-competence, because the user's attitude is not entirely determined by the efficiency and utility of task solving. The most significant feature of AI-powered chatbots is their anthropomorphic design, which transforms them from instrumental assistants to social participants, with an emphasis on bringing emotional comfort to users. Thus, the dual-fit model can fully explain the relationship between anthropomorphism and user satisfaction.

Secondly, this study introduced two new individual characteristic variables, social butterfly and social phobia, to investigate their interaction with anthropomorphism, and found that social-phobic users gain more warmth in their interactions with the chatbot. Previous studies have confirmed that relevant individual characteristics such as personality and Internet ability affect users' psychological perception in human-computer

interaction. However, users currently care more about the social experience in their interactions than about problem solving, and the threshold of social need varies from person to person. We found that social phobia affects the emotional experience of users during their interaction with chatbots, providing a new entry point for exploring the influence of users' personal qualities on human-chatbot interactions.

Finally, this paper proposed a task characteristic variable to clarify the application boundary of anthropomorphic technology in chatbot. Current research on chatbots shows that users' attitudes toward anthropomorphism remain mixed. Few studies have empirically examined the interaction between task characteristics and AI technologies. This study focuses on task creativity and finds that in highly creative tasks, users tend to perceive anthropomorphic chatbots as more capable, which in turn generates higher satisfaction. The findings of this paper provide an explanation for the controversy of previous studies at the task level and lay a foundation for further research on the effects of task characteristics on human-computer interaction.

5.3 Managerial Implications

This research also provides three managerial implications for both chatbot designers and managers. Firstly, an increasing number of developers have previously worked on enhancing algorithms that allow chatbots to identify and solve a wide range of problems, resulting in increased user satisfaction. On this foundation, this study found that anthropomorphism not only enhances the user's perceived competence, but also gains user satisfaction by satisfying their emotional needs and giving them a sense of warmth. In brief, service providers should focus their design on the two goals of improving the competence and warmth of chatbots, and use anthropomorphism properly to stimulate users to be infected by the intelligence and warmth of chatbots.

Secondly, our findings reveal that persons who are socially phobic have unique perceptions of human-computer interaction. Developers can use social phobia as part of a user's personality label and mine information about the user's behavior to determine the user's social phobia level, allowing them to target specific marketing to people with different personalities. Chatbot developers should stress the social participant role of chatbots for users with high social phobia, emphasizing their kind and compassionate human-like features to suit users' needs for warm social interactions.

Thirdly, we find that the use boundary of chatbot anthropomorphism is related to the type of task. We suggest that marketers concentrate on activities that are more suited to their abilities and leave to AI those on which they underperform. This article introduces task creativity to distinguish between different types of tasks. To take e-commerce scenario as an example, when chatbots perform high-creative tasks such as product recommendations, customer complaints, and price negotiation, the developers and suppliers should intentionally emphasize the anthropomorphism of chatbots, making them close to real human service providers, so as to enhance users' perception of chatbots' capabilities and thus improve their satisfaction.

5.4 Limitations and Future Research

This study also has some limitations that need to be addressed in future research. First, the anthropomorphism we discuss is based on text-based chatbots, and there-fore involves elements that do not include vocal and visual cues. Previous studies have shown that anthropomorphic visual, identity, and conversation design cues all produce positive behavioral outcomes. Future research can be extended to other types of chatbot applications. Second, There are more potential variables that can be measured at the emotional level to reflect the user's perception of task technology fit, such as social presence and perceived empathy. Finally, individual personality traits are very complex, and there are many unstudied variables, such as emotional instability and affinity, which will be a future direction to explore.

References

1. Puntoni, S., Reczek, R.W., Giesler, M., Botti, S.: Consumers and Artificial Intelligence: an experiential perspective. J. Mark. **85**(10), 131–151 (2021)
2. Shawar, B.A., Atwell, E.S.: Using corpora in machine-learning chatbot systems. Int. J. Corpus Linguist. **10**(4), 489–516 (2005)
3. Anderson, E.W., Sullivan, M.W.: The antecedents and consequences of customer satisfaction for firms. Mark. Sci. **12**(2), 125–143 (1993)
4. Murtarelli, G., Gregory, A., Romenti, S.: A conversation-based perspective for shaping ethical human-machine interactions: the particular challenge of chatbots. J. Bus. Res. **129**, 927–935 (2021)
5. Goodhue, D.L.: Development and measurement validity of a task - technology fit instrument for user evaluations of information system. Decis. Sci. **29**(1), 105–138 (1998)
6. Li, X.G., Sung, Y.J.: Anthropomorphism brings us closer: the mediating role of psychological distance in user-ai assistant interactions. Comput. Hum. Behav. **118**, 106680 (2021)
7. Westerman, D., Cross, A.C., Lindmark, P.G.: I believe in a thing called bot: perceptions of the humanness of "Chatbots." Commun. Stud. **70**(3), 295–312 (2019)
8. Li, Y., Zhao, P., Jiang, Y.: A literature review of information system user satisfaction: a case study of ERP system. Technol. Econ. **33**(3), 119–131 (2014). (in Chinese)
9. Fiske, S.T., Cuddy, A.J., Glick, P.: Universal dimensions of social cognition: warmth and competence. Trends Cogn. Sci. **11**(2), 77–83 (2007)
10. Aaker, J., Vohs, K.D., Mogilner, C.: Nonprofits are seen as warm and for-profits as competent: firm stereotypes matter. J. Consum. Res. **37**(2), 224–237 (2010)
11. Glikson, E., Woolley, A.W.: Human trust in artificial intelligence: review of empirical research. Acad. Manag. Ann. **14**(2), 627–660 (2020)
12. Aburoomi, R.J., Malak, M.Z.: Evaluation of social phobia among Syrian refugees' youth in Jordan. Psychiatr. Q. **92**(3), 1175–1185 (2021). https://doi.org/10.1007/s11126-021-09901-2
13. Mimoun, M.S.B., Poncin, I., Garnier, M.: Animated conversational agents and e-consumer productivity: the roles of agents and individual characteristics. Inf. Manag. **54**(5), 545–559 (2017)
14. Barron, F.: The disposition toward originality. Psychol. Sci. Public Interest **51**(3), 478 (1955)
15. Edmonds, E., Candy, L.: Creativity, art practice, and knowledge. Commun. ACM **45**(10), 91–95 (2002)