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The Effects of Chatbot Anthropomorphism and Self-disclosure on Mobile Fashion Consumers' Intention to Use Chatbot Services

Minji Kim* · Jiyeon Park · MiYoung Lee†

*Master of Business Administration Program, Angelo State University, U.S.A
Dept. of Fashion Design & Textiles, Inha University, Korea

Corresponding author

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MiYoung Lee
Tel : +82-32-860-8137
Fax : +82-32-865-8130
E-mail : mylee@inha.ac.kr

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chatbot, anthropomorphism,
self-disclosure,
mobile platform

Abstract

This study investigated the effects of the chatbot's level of anthropomorphism - closeness to the human form - and its self-disclosure - delivery of emotional exchange with the chatbot through its facial expressions and chatting message on the user's intention to accept the service. A 2 (anthropomorphism: High vs. Low) x 2 (self-disclosure through facial expressions: High vs. Low) x 2 (self-disclosure through conversation: High vs. Low) between-subject factorial design was employed for this study. An online survey was conducted and a total of 234 questionnaires were used in the analysis. The results showed that consumers used chatbot service more when emotions were disclosed through facial expressions, than when it disclosed fewer facial expressions. There was statistically significant interaction effect, indicating the relationship between chatbot's self-disclosure through facial expression and the consumers' intention to use chatbot service differs depending on the extent of anthropomorphism. In the case of "robot chatbots" with low anthropomorphism levels, there was no difference in intention to use chatbot service depending on the level of self-disclosure through facial expression. When the "human-like chatbot" with high anthropomorphism levels discloses itself more through facial expressions, consumer's intention to use the chatbot service increased much more than when the human-like chatbot disclosed fewer facial expressions. The findings suggest that chatbots' self-disclosure plays an important role in the formation of consumer perception.

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I. Introduction

'Chatbot' is a compound word for chatting and robot, which refers to an intelligent interactive process, system, or service operated in a language used by people in everyday life (Radziwill & Benton, 2017). The service provided brief information in the past. However, with the development of artificial intelligence, the areas of application increased greatly by providing customized chatbot services in combination with big data and deep learning technology. The use of the chatbot incorporating AI is increasing significantly in the retail industry to strengthen untact services in preparation for the post-COVID era.

A chatbot is an interactive messenger in which artificial intelligence (AI) communicates with people and answers through big data analysis, as if chatting on corporate messengers, and is used to answer consumer questions or recommend suitable products based on existing consumers' tendencies. Untact services through chatbots promote business efficiency in the distribution process that connects businesses and consumers. Fashion retailers help consumers order the products they want and respond to customers' inquiries in real-time by using a chatbot. In addition, apparel companies provide various information helpful for agencies' sales activities through the retailers, utilizing big data analysis, and efficiently supporting logistic services such as order, change, and warehousing (Kwon, 2021).

Chatbot service, the most easily accessible artificial intelligence, has a mechanism to provide services based on information provided by consumers. Due to the nature of this mechanism, efforts are being made to effectively approach consumers by making chatbots in the same way as people who can identify and respond to questions or commands in human language, help search for information, and recommend what customers want (Kang & Kim, 2017). The key to an effective approach to consumers is to reduce the reluctance of consumers to receive services when artificial intelligence replaces human roles.

The advancement and importance of chatbot services

using artificial intelligence and big data are increasing day by day; however, previous studies are mainly concentrated on the aspects of technology or system of the chatbot. There is insufficient academic research on the impact of the chatbot service message characteristics on consumers' responses (Jeong, Hur, & Choo, 2020). It is necessary to understand the components of a conversation that can make the experience of communication between the chatbot and customers more positive and to examine the user recognition of the elements and the effect of chatbot messages.

This study examined the chatbot's characteristics that can affect customer's intention to use chatbot service when the chatbot recommends mobile fashion shopping mall user's apparel items. In particular, this study examined the elements of anthropomorphism and emotional self-disclosure that could show similarity to a human being as the characteristics of chatbots to approach consumers effectively, reducing consumer's repulsion. This study investigated the effects of the chatbot's level of anthropomorphism - closeness to the human form - and its self-disclosure - delivery of emotional exchange with the chatbot through its facial expressions and chatting message on the user's intention to accept the service.

We think this study would provide valuable insights, particularly for online retailers providing a chatbot service, which is not sufficiently investigated, compared to its increasing importance. In addition, practically, it would contribute to drawing efficient strategies by providing the key factors concerning which methods would promote return on investment in recommending products or responding to customers' inquiries through the chatbot.

II. Review of Literature

1. Chatbot

A chatbot is a communication software program designed to simulate conversation with human users, utilizing artificial intelligence (AI) and a conversational

Table 1. Examples of Chatbot Service

Company	Chatbot	Service
Google	Allo	- Provide movie time, news, restaurant information, weather, etc.
H&M	Kik	- Interactive recommendations, filters, and style preferences
11streets	Baro	- Interactive product recommendation
Shinsegae	Sbot	- Interactive product recommendation
Lotte	Losa	- Provide various information about 35 Lotte Department Store stores, including store brands, and business hours - Interactive and personalized product recommendation
Hanmi Pahrn, Co	Ara	- Q&A of product efficacy, dosage method, and precautions for side effects, and new drug quality under development.
Interpark	Talk	- The lowest online price, product recommendation, and checking delivery status are provided by analyzing customers' shopping usage patterns

agent (Brush & Scardina, 2021, Lexico, n.d.). In other words, it can be defined as “a computer program designed to simulate an intelligent conversation with one or more human users via auditory or textual methods” (Gupta, Borkar, Mello, & Patil, 2015, p. 1483). With AI technology, chatbot understands human language, and responds and reacts to the users’ questions as if it were human being. Businesses are increasingly using artificial intelligence in conjunction with chatbots to interact with customers to provide a more personalized and effective service experience for customers (See examples in Table 1).

The main roles of chatbots can be divided into three main categories. First, chatbots can provide appropriate answers or various related information to questions through text conversations with people based on AI. Second, conversation with the chatbot helps form consumer intimacy and preferences in that it interacts with each consumer's situation. Through these interactions, consumers can better understand companies, brands, and products and leading them to have positive emotions. Third, the chatbot may provide a personalized advertisement or message based on the content identified in the conversation with the consumer. This personalized, customized strategy can increase interaction with

consumers, and these customized services help maintain relationships with customers continuously (Lee, 2019).

2. Anthropomorphism

From the perspective of the “Computer As Social Actor (CASA)” paradigm, Reeves and Nass (1996) defined a computer as a social actor and argued that it is possible to interact with the computer like with a human being. Cacioppo, Hawkley, Ernst, Burleson, Berntson, Nouriani, and Spiegel (2006) also noted that people tend to make social interaction by personifying an object that is not human, which enables communication with inhumane objects such as humans and computers. Previous studies have shown that when a robot is personified (i.e., eye contact, face nod), people feel greater trust and empathy for the personified robot (Kanda, Kamasima, Imai, Ono, Sakamoto, Ishiguro, & Anzai, 2007), and when a person feels homogeneous with the personified object, it is easier to accept products and services (DiSalvo & Gemperle, 2003).

Anthropomorphism refers to giving human-like characteristics to an object that is not human and perceiving it as a human being (Song & Choi, 2020). Anthropomorphism is a method effectively used to reduce

psychological refusal of the object or increase familiarity in the marketing or communication field, which means feeling and treating an object as if it were a human being by giving human characteristics to a product or system (Duffy, 2003). Since text-based interactive robots like a chatbot do not have a physical appearance, studies are conducted mainly on the aspect of anthropomorphism perceived by the users. Hong (2016) found that chatbot users felt an anthropomorphism through non-verbal emotional expressions such as emoticons and verbal elements, and this anthropomorphism affected the active use of the chatbot by users. Also, the emotional expressions of the chatbot using emoticons allow users to have a positive experience with the chatbot service (Kang & Choi, 2019).

The method of anthropomorphism applicable to a chatbot can be classified into the external appearance and the interaction method (DiSalvo, Gemperle, Forlizzi, & Kiesler, 2002). The external appearance anthropomorphism method gives an object human form such as the face, body shape, and gender. The anthropomorphism technique in the interaction method is to personify an object's behavior or language based on various human characteristics. Duffy (2003) noted that giving elements of anthropomorphism to the chatbot could draw human's social reactions, which can lead to positive psychological effects similar to communicating with real people. Depending on which anthropomorphization method is selected, the results of the effect of the anthropomorphism of chatbots on the user's perception or attitude are inconsistent. In the study of Byun and Choi (2020), the degree of anthropomorphism was manipulated as the language of chatbots with human elements, while it is manipulated as how similar it is to humans as the image of chatbots in the study of Song and Choi (2020). Byun and Choi (2020) found that anthropomorphisms had significant positive effects on the intention to use the chatbot, whereas the study of Song and Choi (2020) shows that anthropomorphism does not significantly affect consumers' perceptions or attitudes.

It turned out that the chatbot's anthropomorphism

also affected the users' interactions. The higher the level of personification of chatbots, the higher the interaction based on higher trust in chatbots (Ryu & Yu, 2013), he higher the intention to continue to use them even if they experience errors during the conversation (Park & Joo, 2018), and higher the intention to purchase the product (Ha & Hwang, 2021). On the other hand, Song and Choi (2020) found that the degree of anthropomorphism of a chatbot was not found to yield significant differences in consumers' responses to chatbot, including intimacy, social presence, likability, and sincerity. Since there has been inconsistency in the effect of the anthropomorphism on consumer's responses toward chatbot, we examined how the chatbot affects the chatbot user's intention to use chatbot service users when it was in a human form and when it was not in this study by applying the external appearance anthropomorphism method.

3. Self-disclosure

The initial concept of self-exposure was defined as a process that allows one to know oneself to the other party in interpersonal communication (Jourard & Lasakow, 1958). It is also explained that an individual informs another person of information about themselves or conveys their feelings (Johnson & Noonan, 1972). In the case of computer-mediated communication, non-verbal expressions such as emoticons are used to express effective emotional expressions; The more self-disclosure of emotions, the higher the intimacy. The conversation through emotional exposure will lead to human empathic conversation. In Morton (1978)'s study, the intimacy of self-exposure is descriptive intimacy based on private facts and individuals. It was classified into evaluative intimacy including enemy emotions and opinions. According to the results of this study, the difference between spouses and strangers brought about differences in reciprocity in the process of exchanging intimacy with the overall level of intimacy.

In general, self-disclosure had a positive impact on interpersonal relations (Collins & Miller, 1994; Vittengl

& Holt, 2000); however, in a study that examined the depth of the agent's self-disclosure, it turned out that an agent's deep self-disclosure reduced favor, reliability, and intimacy of the agent (Park, 2006). The agent's exchange-specific disclosure had negative impacts on the agent's perceived reliability, attractiveness, or satisfaction; however, the agent's sociable self-disclosure positively impacted the perceived reliability, attractiveness, or satisfaction of the agents by consumers.

The effect of self-disclosure was applied similarly to the relationship between machine and human as well as interpersonal relations. When a computer agent made a self-disclosure, behavioral, emotional, and cognitive intimacy with the agent increased (Park, 2007). This self-exposure can also be applied to the relationship between the chatbot and the user, which is the object of interaction in the online marketing situation. In their experimental study, Song and Choi (2020) found that a chatbot discloses more, consumers exhibit more intimacy, social presence, and likability toward the chatbot. Related to chatbots anthropomorphism, when the chatbot's anthropomorphism is low, consumers perceive the chatbot with a low degree of self-disclosure to be more sincere compared to the chatbot with high

self-disclosure. On the contrary, when the chatbot's anthropomorphism is high, the chatbot with a high degree of self-disclosure is viewed to be more sincere.







In this study, the self-exposure of chatbots used in mobile fashion shopping malls was divided into two types—chatbot's facial expressions and text conversations convey their feelings— and examined whether chatbot self-exposure affects users' intention to use chatbot services.

III. Methods

1. Research Questions

- 1) Is there any difference in the intention to use chatbot service between the high and low anthropomorphism of the chatbot?
- 2) Is there any difference in the intention to use chatbot service between the high and low self-disclosure of the chatbot?
- 3) Are there significant interaction effects of consumers' intention to use the chatbot service between its anthropomorphism and self-disclosure?

Table 2. Stimuli Manipulation

	High		Low	
Anthropomorphism				
Self-disclosure through facial expressions				
Self-disclosure through text message	- Nice to meet you, customer. I'm Nana, an internet shopping mall. - I recommended it as you requested! Do you like it?		- Nice to meet you, customer. It's an internet shopping mall. - Do you like the recommended product?	

2. Research Design

1) Stimuli development

This current study employed a 2 (anthropomorphism: High vs. Low) * 2 (self-disclosure through facial expressions: High vs. Low) * 2 (self-disclosure through conversation: High vs. Low) between-subject factorial design. The anthropomorphism factor was manipulated through the chatbot profile image. A high level of anthropomorphism was manipulated as a "human form chatbot image," and a low level of anthropomorphism as "a robot form chatbot image." As for the chatbot image used in the experiment, the robot image most often seen in mobile shopping platform when searching for the "chatbot" image on the search engine (i.e., google) was

selected as a high level of anthropomorphism chatbot profile. The human form chatbot image was developed by converting one of the author's face photos into an emoji.

The chatbot's self-disclosure was manipulated in two ways, through facial expressions of the profile image and text message. For the self-disclosure of the chatbot through facial expressions of the profile image, we manipulated a high level of self-disclosure as a "chatbot image revealing emotions through its face," and a low level of self-disclosure as "a chatbot image with no facial expression."

The self-disclosure through chatting text message factor was manipulated as follows: a high level of self-disclosure as a "chatbot message revealing emotions

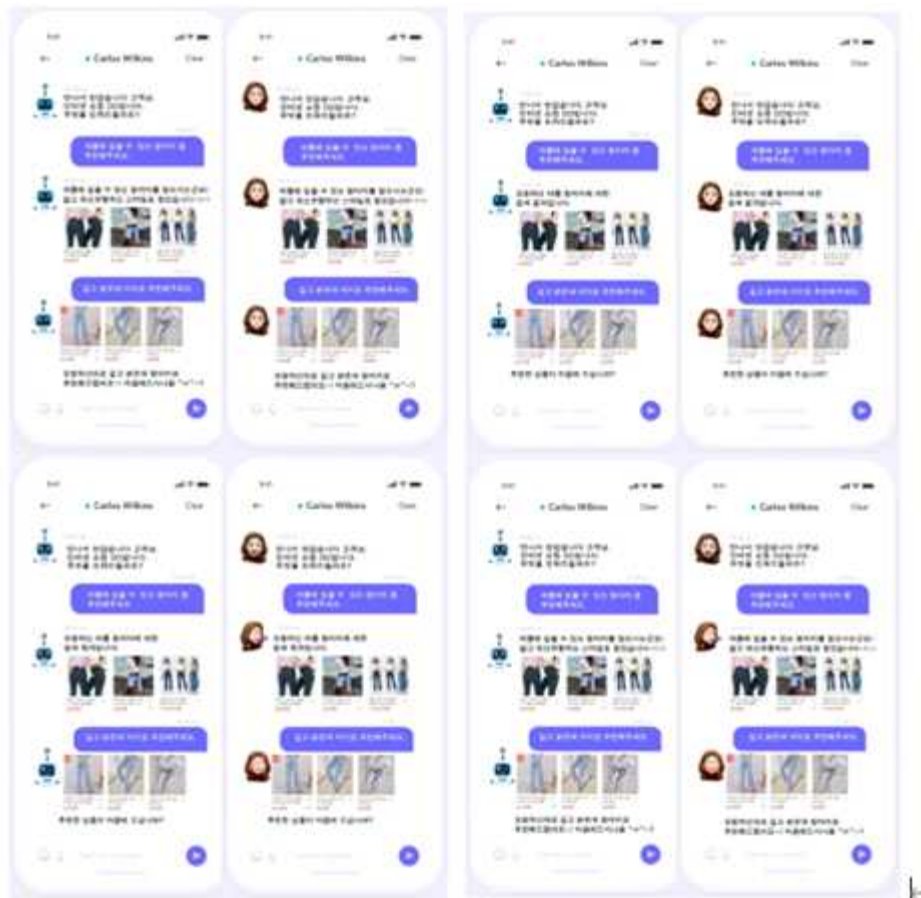


Figure 1. Eight Stimuli Used in this Study
(drawn by authors)

and feeling like an actual conversation with a human being (e.g., I recommended as you requested~! Do you like it?), while a low level of self-disclosure as " a business-like chatbot conversational style (e.g., Do you like the recommended product?)."

2) Manipulation Check

Manipulation of the perceptual fluency factors was confirmed through a pretest using undergraduate students ($N=60$). T-tests revealed that the high anthropomorphism chatbot profile was perceived to be more human-like ($M=3.29$ vs. 2.26 ; $t=-4.425$, $p<.001$) than the low anthropomorphism chatbot profile. T-tests revealed that the high self-disclosure chatbot through facial expression for high anthropomorphism chatbot was perceived to convey its feelings or emotions ($M=3.94$ vs. 2.61 ; $t=-7.848$, $p<.001$) than the low self-disclosure chatbot through facial expression. Also, t -tests revealed that the high self-disclosure chatbot through facial expression for low anthropomorphism chatbot was perceived to convey its feelings or emotions ($M=3.17$ vs. 1.70 ; $t=-7.940$, $p<.001$) than the low self-disclosure chatbot through facial expression. T-tests also revealed that the high self-disclosure chatbot through text message was perceived to convey its feelings or emotions ($M=3.12$ vs. 1.80 ; $t=-7.030$, $p<.001$) than the low self-disclosure chatbot through text message.

3. Measurement

Intention to use a chatbot service refers to the intent to

use a chatbot service. The intention has typically been used to predict actual behavior and has been a reliable indicator. Intention to use chatbot service was measured with three items (five-point scale), such as "I'm willing to use these chatbots." Questions about the experience of using chatbots and the frequency of use of mobile shopping malls were also included. Demographic variables such as gender, age, and occupation were also measured at the end.

4. Sample

An online survey was conducted with men and women in their 20s and 30s who had heard of the chatbot and experienced mobile shopping in the last six months. Participants were randomly assigned to one of the two perceptual fluency conditions (Table 3 for the sample distribution of each condition). A total of 234 questionnaires (men: 76, women:158) were used in the analysis. Most respondents were in their 20s (85.4%) and students (50%). About eighty percent (79.5%, $n=186$) of respondents had indicated that they had used chatbot service.

IV. Results

The data were analyzed using SPSS 26.0. Most respondents were in their 20s (85.4%) and students (50%) or white-collar workers (18.4%). About eighty percent (79.5%, $n=186$) of respondents had indicated that they had used chatbot service in the past. These

Table 3. Samples in Experimental Conditions

Self-disclosure	Level	Anthropomorphism		
		High	Low	Total
Through facial expressions	High	29	29	58
	Low	30	30	60
Through text message	High	29	29	58
	Low	29	29	58
Total		117	117	234

respondents who had used chatbot services indicated that they have used chatbot for banking (47.8%), social commerce (43.5%), SNS (42.5%), and AI speaker (34.4%). Chatbot users also indicated that they had used chatbot for seeking product/service recommendation (11.8%), product and inventory inquiries (48.4%), and checking orders and delivery status (34.9%).

Measurement reliabilities were evaluated. The measurement inter-item reliabilities of intention to use chatbot service were good (*Cronbach's alpha* >.90) and were averaged to single scores. To investigate which of three separate variables – anthropomorphism, self-disclosure through facial expression, and self-disclosure through text message on participants' intention to use the chatbot service, and the relationship between those three variables, 3-way ANOVA was conducted. Those three variables were used as independent variables and participants' intention to use the chatbot service were used as a dependent variable.

The result showed that there was a significant the main effect of self-disclosure through facial expressions ($F(1,226)=5.138, p=.024$) on participant's intention to use the chatbot service (Table 4). Consumer's intention to use chatbot service was higher when the chatbot disclose

its emotions more through facial expressions ($M_H = 3.71$) than when the chatbot less disclose itself through facial expressions ($M_L = 3.44$). There was no significant main effect of chatbot's anthropomorphism on participant's intention to use the chatbot service, indicating that the difference between the human-like formed chatbot with high anthropomorphism or robot formed chatbot with low anthropomorphism on customers' intention to accept the chatbot are not statistically significant. In interpersonal relationships, self-exposure can be understood as an expression of wanting to be closer with the other person, so the person exposed to self-exposure feels positive and likes the other person (Collins & Miller, 1994; Vittengl & Holt, 2000). Song and Choi's (2020) study on financial chatbots also showed that people perceived the chatbot as close or more intimate and likable when the chatbot's self-exposure was high. In the same context, the self-exposure of chatbots on mobile shopping platforms can be seen as conveying closer or more intimate feelings to consumers to induce positive emotions, resulting in increased intention to use chatbots.

There was statistically significant interaction effect emerged: the relationship between chatbot's

Table 4. Three-way ANOVA results

<i>Predictor</i>	<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>P</i>
(Intercept)	2984.672	1	2984.672	3676.140	.000
Anthropomorphism	.675	1	.675	.831	.363
Self-disclosure_facial expression (SD_F)	4.172	1	4.172	5.138*	.024
Self-disclosure_text message (SD_T)	.188	1	.188	.231	.631
Anthropomorphism x SD_F	4.650	1	4.650	5.727*	.018
Anthropomorphism x SD_T	1.387	1	1.387	1.709	.192
SD_F x SD_T	.515	1	.515	.634	.427
Anthropomorphism x SD_T x SD_F	.001	1	.001	.001	.979
Error	183.490	226	.812		

* $p < .05$, ** $p < .001$

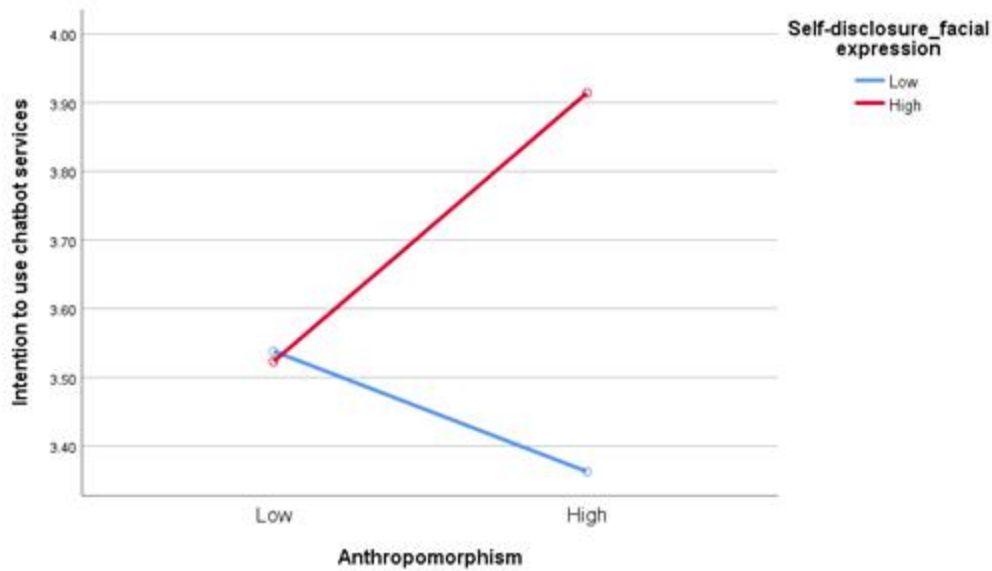


Figure 2. Interaction Plots of Self-disclosure through Facial Expression and Anthropomorphism on Intention to Use Chatbot Service

(drawn by authors)

self-disclosure through facial expression and consumers intention to use chatbot service differs by the level of the anthropomorphism ($F(1,226)=4.650, p=.018$). In the case of "robot chatbots" with low anthropomorphism levels, there was no difference in intention to use chatbot service depending on the level of self-disclosure through facial expression. However, in the case of "human-like chatbots" with high anthropomorphism levels, there was a big difference in their intention to use the chatbot when the self-disclosure through facial expressions was low and when it was. When the human-like chatbot discloses itself more through facial expressions, the use intention of chatbot service becomes more heightened than disclosing itself less ($M_L = 3.21$ vs. $M_H = 3.91$).

V. Conclusion

For the development of artificial intelligence chatbots, which are rapidly growing in recent years, research on consumer perception of chatbots is critical. More research is needed to identify factors influencing

consumers' perception of chatbots and relationships with them. This study attempted to present a direction for utilizing chatbot services in fashion shopping malls by verifying that the level of personification of profile images appearing in chatbot services of mobile fashion shopping malls and the degree of self-exposure chatbots through conversations affect consumers' acceptance of chatbot services.

Results showed that there was no main effect of the chatbot's anthropomorphism on customers' intention to use the chatbot service, indicating there was no significant difference by chatbot's anthropomorphism level. These findings support previous study results that the personification of chatbots did not significantly affect the perception of chatbots in consumption (Song & Choi, 2020).

For self-disclosure, the chatbot's self-disclosure through facial expressions had the main effect. If the chatbot showed its appearances, like emotions, through facial expressions, the users' intention to accept it was high, which led to positive responses. On the other hand,

there was no significant main effect of the chatbot's self-disclosure in chatting text messages. It was noted that the self-disclosure of the chatbot through facial expressions that could be delivered visually faster than the conversation form would be more effective. Park (2006) showed that the influence on social attraction and trustworthiness on the agent of the user varies depending on the degree of self-exposure of the computer agent. In the case of high intimate disclosure, social attraction and trustworthiness are evaluated lower than otherwise. This shows that an appropriate level of self-exposure is needed to form a relationship between a computer agent and the user. In this study, if a chatbot reveals its feelings with a facial expression, it positively affects its intention to use the chatbot service. However, if the chatbot reveals its feelings through text, users may not feel the chatbot's emotions properly, so consumers may not have a positive response. Alternatively, it may be because such text is already widely used in many online shopping platforms and is recognized as a means used as a typical marketing tool.

It turned out that there was a significant interaction effect between anthropomorphism and self-disclosure through facial expressions. According to the chatbot's self-disclosure, there was no difference in consumers' intention to accept it for the robot-formed chatbot with a low anthropomorphism level. However, in the human-like form chatbot with a high anthropomorphism level, when the level of self-disclosure was low, their intention to use it was low, while when it was high, their intention to use chatbot service was significantly high. To induce positive awareness and experience of consumers of the chatbot service, the factors that affect their interaction and the formation of relationships are also important. In particular, artificial intelligence-based chatbots can provide more sophisticated services by getting and utilizing lots of information from consumers. On an online fashion platform where visual factors are essential, chatbots visually expose themselves and increase their acceptance of chatbot services. Using human-type chatbots will help reduce users' reluctance and increase their use of chatbot services.

As chatbots become more common in mobile business platforms, companies are making various efforts to maximize marketing efficiency and draw favorable responses from customers using the chatbot. While many mobile shopping platforms utilize chatbots, they will be able to build relationships through interactions with users by providing more sophisticated services by using consumer information and responses through artificial intelligence-based chatbots. This study examined the anthropomorphism of chatbot appearance and the response to chatbot use according to the degree of self-disclosure. The results indicated that disclosing chatbot's emotions with facial expressions positively affected users' chatbot use intention. In particular, in the case of chatbots with high anthropomorphism (i.e., human face chatbot), disclosing chatbot through facial expression influenced users' response to the chatbot. Companies have been using human-like chatbot profiles to increase social reality. Since exposing emotions through facial expressions can significantly influence positive responses from consumers, it will be necessary to introduce chatbots reflecting their self-exposure in the case of human-shaped chatbots. The findings suggest that chatbots' self-disclosure plays an important role in the formation of consumer perception, and marketers should consider the interplay between self-disclosure and anthropomorphism for effective chatbot strategies.

Limitations of Research

This study surveyed respondents who had heard of a chatbot and included respondents who recognized it but had not experienced it yet (13.5%). It would be necessary for a follow-up to investigate user experience and satisfaction of the chatbot service with the people who had used it. Furthermore, more studies on other chatbots used for non-fashion products are needed to examine whether there are differences between factors affecting consumer interaction and relationship formation by product categories.

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