Wilson the Volleyball in Cast Away: Social Loneliness Increases Preferences for an Anthropomorphic Product

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Abstract

Background We aim to study whether social loneliness, as a psychological variable, and social crowding, as an environmental variable, jointly influence people's preference for an anthropomorphic product. Specifically, this study aims to test two hypotheses; whether social loneliness increases the preference for an anthropomorphic product and whether this effect is influenced by social crowding.

Methods Two experiments were conducted to test the two hypotheses. When manipulating the anthropomorphim of a product, social loneliness, and social crowding, we strictly followed the procedure of prior literature.

Results We obtained two findings. First, participants showed a stronger preference for the anthropomorphic product when they were socially lonely than when not. Second, when participants were socially crowded, their preferences for the anthropomorphic product did not increase even when they were socially lonely.

Conclusions Our findings suggest that people's preference for an anthropomorphic product is jointly determined by social loneliness and social crowding. To make better use of anthropomorphism in product design, designers should consider both consumers' social loneliness and stores' social crowdedness.

Keywords Anthropomorphism, Product Design, Social Crowdedness, Social Loneliness

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This study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of Kookmin University for studies involving humans (KMU-202212-HR-341).

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1. Introduction

With the outbreak of COVID-19 in 2020, the limitation of social interaction has resulted in increased loneliness, and social loneliness has emerged as a major concern. In particular, as a result of COVID-19, many overseas students cannot return to their home countries and have to study online and avoid going out; this decrease in social interaction increases the sense of loneliness (Brooks et al., 2020).

Social loneliness has been described as a lack of a broader social network, quality friendships, and a sense of belonging that needs to be remedied by establishing, satisfying social relationships (Cacioppo et al., 2015; Weiss, 1973). In Fiori and Consedine's (2013) study, countless students felt isolated as they adjusted to a new learning environment and culture. This was due to a lack of social support and difficulties establishing social ties (Wright & Schartner, 2013). Especially long-term overseas students are more likely to lack a sense of belonging and feel a sense of loneliness when confronted with an unfamiliar cultural environment. (Fang & Baker, 2018). Hysing et al. (2020) found that students who lacked companionship were likelier to feel social loneliness than those who had adequate companionship in their relationships.

Research on loneliness has focused on exploring the negative psychological effects of loneliness on individuals; these effects include depression and low happiness (Mund, Lüdtke, & Neyer, 2020); low immunity (Pressman et al., 2005); and difficulty controlling attention (Cacioppo et al., 2000). This suggests that lonely people will compensate for a lack of interpersonal relationships by building relationships with objects, and that social motivation is one of the drivers of anthropomorphism (Epley et al., 2007). Lonely people seek human company, which increases their susceptibility to anthropomorphic products. Therefore, this study aims to verify that social loneliness increases anthropomorphic product preference. More broadly speaking, we experimentally test the effectiveness of anthropomorphic marketing which encompasses both the anthropomorphization of brands and the anthropomorphization of products. (Aggarwal & McGill, 2007).

Although anthropomorphic marketing practices provide consumers with a sense of human interaction, they may not lead to positive effects if consumers are in a socially crowded shopping environment. Therefore, this study also explores whether social crowding influences the effect of social loneliness on anthropomorphic product preference. Previous studies have revealed that the threat of social crowding causes changes in individual consumer behavior. Kim & Kang (2021) find that social crowding increases people's perceived risk and attention to safe social distancing in the context of COVID-19 epidemic. Therefore, this study is concerned with inquiring what kind of experience a socially crowded environment will bring to socially lonely consumers and how it will affect their preferences.

This study is unique in that it endeavors to solve overseas students' social loneliness. According to the South Korean Ministry of Education, at the end of 2021, 67,348 Chinese students are studying in South Korea, accounting for 44% of the total foreign students in South Korea, which is the highest percentage (South Korea Ministry of Education, 2021). In essence, our study's results help business people and designers clarify why anthropomorphic marketing is welcomed by Chinese students in South Korea and when they do not. Designers can thus better understand socially lonely Chinese consumer groups

and develop anthropomorphic product marketing strategies based on their characteristics to meet their needs and further enrich the marketing results of anthropomorphic products. Simultaneously, marketers could consider the impact of the marketing environment (such as social crowding), to determine product positioning and use anthropomorphism reasonably.

2. Literature review

2. 1. Preference for anthropomorphic product

Anthropomorphism refers to attributing human characteristics to non-human entities (Epley, 2018). One of the most widely known examples of anthropomorphism is the Wilson the Volleyball in the movie titled Cast Away. In this survival drama film, Chuck Noland, the main character, named "Wilson" for a volleyball and built a relationship with it since the plane crashes. Wilson the Volleyball serves as his personified friend and only companion during the four years that he spends alone on a deserted island.

Anthropomorphism is often used in marketing communications that encourage consumers to see human characteristics in brands and products (Aggarwal & McGill, 2007; Landwehr, McGill, & Herrmann, 2011). Early research suggests that for consumers, certain products can possess human traits like consciousness, soul (Gilmore, 1919), personality (Keller, 2002), and even interpersonal relationships (Aggarwal &McGill, 2007). This would satisfy consumers' innate tendency to anthropomorphize.

Delbaere et al. (2011) demonstrated that anthropomorphic images create a deeper impression of the ad and significantly increase the consumer's positive evaluation of the advertised product. Moreover, Jarvenpaa and Leidner's (1999) study showed that anthropomorphism mitigates consumers' perceived risk and thus enhances their evaluation of anthropomorphic products. When compared to non-anthropomorphic products, anthropomorphic products can significantly attract consumers' interest (Jwroen, 2005). Consumers find it easier to build interpersonal trust and have a pleasant shopping experience (Hassanein & Head, 2006). Overall, anthropomorphic products can enhance consumer preferences.

The need to anthropomorphize objects is rooted in the premise that people relate to their surroundings by forming relationships and symbolic interactions (Zhang et al., 2014). Sociality motives are one of the driving factors of anthropomorphization (Epley et al., 2007). People who feel chronically lonely are more likely than those who feel connected to attribute anthropomorphic qualities to various objects and entities (e.g., religious agents, pets, and imaginary creatures) (Niemyjska & Ruszczak, 2013). Further, Gummesson (2002) has shown that consumers are more likely to view a product or brand as a "friend" or "partner" when they need social interaction. People who feel social loneliness seek human company, increasing their susceptibility to anthropomorphization. Compared with non-anthropomorphic products, anthropomorphic products have a stronger pro-social nature and consumers are more likely to connect emotionally with them. Therefore, consumers with higher levels of loneliness may be able to use anthropomorphic products to compensate for their need for social relationships (Puzakova et al., 2013).

Although anthropomorphism is pervasive, scholarly research into its relationship with consumers is still in its early stages. In the existing literature, researchers have

mostly focused on the effect of anthropomorphism on consumer behavior. For example, anthropomorphism can induce consumers' positive emotional reactions (Delbaere et al., 2011), reduce their perceived risk (Kim & McGill, 2011), enhance their product evaluation (Aggarwal & McGill, 2007), and increase their intention to use it (Park & Joo, 2018). Instead, little attention has been paid to the psychological factors influencing consumers' preference for anthropomorphic product. Since the antecedent variables of preferring anthropomorphic products is little discussed, the theoretical framework has room for further extension.

From the consumer's perspective, the existence of anthropomorphic products reflects two human needs: understanding the world and seeking social connections (Epley et al., 2007). Anthropomorphic products that provide an interactive experience are more likely to be favored when humans are curious about the outside world or feel lonely in social environments. Based on the above reflections and confusion, we sought to investigate the effect of social loneliness on anthropomorphic products preference to provide new ideas.

This research examines how consumers' motives for social affiliation influence their preference for anthropomorphized products. Because anthropomorphism allows consumers to see human-like characteristics in non-human objects, presenting a product in an anthropomorphic manner increases the likelihood that the product will be perceived as a potential social relationship partner. Therefore, we argue that the preference for anthropomorphic products will be greater for consumers who feel social loneliness than for those who do not.

2. 2. Social loneliness

Loneliness is the perception of a discrepancy between one's desired and actual relationships (Buecker et al., 2020). Maintaining social ties with others is one of our basic needs. However, people become lonely when this need for social connection cannot be met (Cacioppo & Patraick, 2008). Most people can feel acute loneliness, but some cannot escape its grip. Loneliness is approximately 50% heritable and 50% environmental (Boomsma et al., 2005). According to Weiss (1973), there are two distinct types of loneliness: a deficiency of close and intimate relationships, which leads to emotional loneliness, and a lack of a network of social relationships, which leads to social loneliness. For example, emotional loneliness arises after a divorce or the death of a partner. In contrast, social loneliness occurs when somebody is not socially integrated, such as into a group of friends who share common interests. For instance, marital status is associated with emotional loneliness (Stroebe et al., 1996), whereas group affiliation is associated with social loneliness (Margelisch et al., 2017). Social loneliness often motivates people to resume social relationships, such as making new friends (Masi et al., 2011).

Young people who have relocated to new places frequently report social loneliness (Gierveld & Tilburg, 2006). Social loneliness reflects a limited quantity of social interaction. Although moving to a new environment opens up new opportunities, building a new social network requires effort, time, and skill. Overseas students have a difficult time making friends with host nationals (Meier & Daniels, 2011; Williams & Johnson, 2011). Loneliness can impact consumers' interpersonal interactions, making them more interested in establishing new relationships (Gardner et al., 2005; Maner et al., 2007; Twenge et al., 2003).

Social loneliness can affect an individual's consumption decisions and behaviors (Lastovicka & Sirianni, 2011). This is because, socially lonely people would take several

actions to reduce the pain of lacking social connections. For example, they will endeavor to connect with others in order to meet their social needs (Maner et al., 2007), imagine more important social relationships (Twenge et al., 2003), or increase attention to social cues in the environment (Gardner et al., 2005). They will, in particular, use human-like objects around them as potential sources of social connections (Waytz & Epley, 2012). When people's sense of connection is absent and they feel the social loneliness, the interaction with anthropomorphic products could be a solution (Shin & Joo, 2019). Therefore, for people who feel social loneliness, not only can they have social connections with real people, but can also satisfy their social needs with anthropomorphic products.

In a consumption context, products presented in an anthropomorphized form can become a target for consumers to build social relationships. Consequently, social loneliness is expected to increase consumers' preference for anthropomorphized products because anthropomorphic products can help fulfill social loneliness consumers' needs for social affiliation. We formalized the following hypotheses:

H1. Social loneliness will increase the preference for anthropomorphic product.

2. 3. Social Crowding

Social crowding is defined as a subjective experience of an individual's intuitive perception of the physical distance among people in a fixed space (Huang et al., 2018) as an unpleasant feeling and experience (Michon et al., 2005). Studies have shown that a crowded shopping environment is more likely to elicit negative emotions to consumers and harm consumer behavior than an uncrowded situation (Sommer, 2009). For example, it leads to reducing consumers' shopping satisfaction (Eroglu, Machleit, & Barr, 2005) and willingness to revisit (Baker & Wakefield, 2012), and negative evaluations of the products sold in the store (O'Guinn, Tanner, & Maeng, 2015).

Individuals will set aside space in their daily activities to maintain a comfortable interpersonal distance. However, in a crowded social environment, interpersonal distance is greatly reduced, resulting in intrusion into one's private space and personal territory and thus reducing the individual's sense of control over the spatial environment (Hock & Bagchi, 2018). Thus, the sense of threat is greatly increased, and avoidance behaviors can easily arise (Mead et al., 2011; Wan et al., 2014). Huang et al.'s (2018) study proposed that interpersonal interaction is frustrating and a sense of belonging is missing in social crowding. To reduce their contact with surrounding individuals, people naturally avoid others when they feel crowded and affected by the environment (Evans & Wener, 2007).

This research adopts the view of Huang et al. (2018); we define social crowding as a large group of people gathered together to significantly increase the likelihood of an individual's personal space being violated. Therefore, consumers who are in a socially crowded environment will avoid social interaction and tend to reject anthropomorphic products. We formalized the hypotheses in the following way (see Figure 1).

H2a. When people are NOT socially crowded, social loneliness will increase the preference for anthropomorphic product.
H2b. When people are socially crowded, social loneliness will NOT increase the preference for anthropomorphic product.

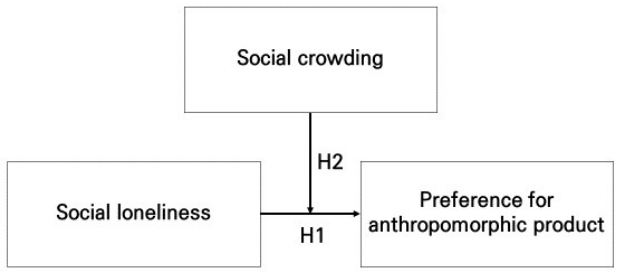

Figure 1 Research framework

3. Studies

3. 1. Participants

This study was conducted to verify the effect of overseas students' social loneliness on anthropomorphic product preference. Our study population comprised Chinese students enrolled in undergraduate and master's degree programs in Seoul, Korea. Participants were recruited from two channels: the Chinese in Korea Network Community (bbs.icnkr.com), a platform for Chinese students in Korea to gather, and the WeChat group of international students from major universities in South Korea, a Chinese SNS platform.

3. 2. Experiment 1

3. 2. 1. Pre-test

Because the participants of this experiment were all overseas students, we chose the stimuli for the experiment to be commonly used items that the student population was familiar with, given their limited spending power. Research reveals that desk lamps are one of the most commonly utilized products in people's day-to-day lives. The table lamp is necessary for study and life, especially for students (Tong, 2022). Based on Puzakova et al.'s (2013) study, anthropomorphic features are assigned to products through various representations of product images. In addition, referring to the anthropomorphic manipulation employed in Tillery and McGill's (2015) study, a non-anthropomorphic table lamp and an anthropomorphic table lamp were ultimately selected as the experimental stimuli (see Figure 2).

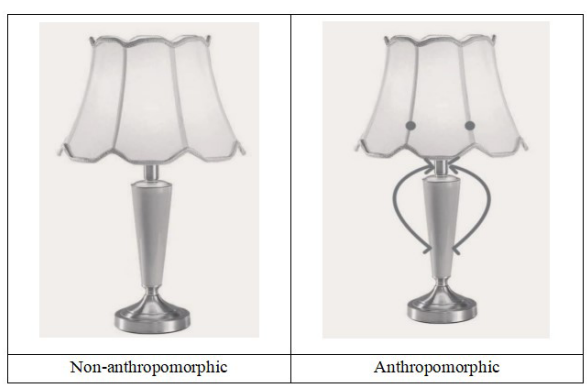

Figure 2 Manipulation of anthropormism (excerpted from Tillery & McGill,2015)

A pre-test was conducted with 20 Chinese overseas students in Seoul, South Korea (Mage=23.4, SDage=1.501; 55% female) to verify the credibility of the anthropomorphic table lamp. It aimed to assess the appropriateness of the stimuli used in the experiment. For the convenience of the participants, we collected data via the China Survey Website (wjx.cn) and included images of the table lamps in the questionnaire. In the pre-test, 20 Chinese students were randomly divided into two conditions. They were requested to view the images of non-anthropomorphic and anthropomorphic table lamps and respond to questions on how they felt about the product in the picture. As an anthropomorphic manipulation check, participants answered two questions adapted from Hur et al.'s (2015): "The product resembles a person" and "It seems the product has free will." The degree of anthropomorphism was measured on a seven-point scale (1= strongly disagree, 7= strongly agree). Pre-test results show that participants attributed a higher degree of human-like qualities to the table lamp in the anthropomorphism condition (M non-anthropomorphic=2.050, SD=1.340 vs. M anthropomorphic=4.850, SD=1.270; $t(18)=4.790$, $p<0.001$). Therefore, the manipulation of anthropomorphism was successful and can be used as this study's experimental stimuli.

3. 2. 2. Design

In Experiment 1, we tested whether social loneliness increased the preference for anthropomorphic products (H1). The experiment employed a 2 (social loneliness: no vs. yes) between-subjects design. Participants in this experiment comprised Chinese overseas students in Seoul, Korea, who were randomly assigned to one of the two conditions. Participants were informed that this was a survey of social relationships and consumer behavior; the survey questionnaire was used for data collection through wjx.cn and was divided into two main parts. The first part tested social loneliness, while the second part measured the participants' preference for the two products (non-anthropomorphic vs. anthropomorphic). Finally, the gender and age of the participants were counted.

3. 2. 3. Procedure and Measure

Manipulating social loneliness: First, participants were informed that this study aimed to examine overseas students' social relationships. We used participants' memories of past experiences to trigger feelings of social loneliness (Cacioppo and Patrick, 2008). Two different experimental descriptions were used to guide participants to produce corresponding memories. For participants in the no social loneliness condition, the instruction was "Please recall a moment or an event that made you feel a sense of belonging. You had the company of many friends, and you could share everything with them." For participants in the yes social loneliness condition, the instruction was, "Please recall a moment or event that made you feel extremely lonely. You were without the company of friends and lacked a sense of friendship and belonging." We then asked the participants to describe their experience in one or two sentences. After that, we used a three-item social loneliness scale to measure social loneliness among overseas students (Gierveld & Tilburg, 2006): "There are many people I can lean on when I have problems," "There are many people I feel close to," and "There are many people I can entirely trust." This was measured on a seven-point scale (1=strongly disagree, 7=strongly agree; α= 0.860).

Measuring product preference by product attitude and purchase intention: At the end of the above steps, the participants were presented with the stimulus products (non-

anthropomorphic vs. anthropomorphic), which did not differ in size, performance, price, or weight but only in appearance. Therefore, this study measures product preference on a seven-point scale through the following items (α=0.765). The first is the choice of the two products: "Which table lamp do you prefer?" Then, the participants' preferences for the two products were measured separately. For example, "How much do you like this desk lamp?" (Hur et al., 2015) and purchase intention: "I would like to buy this desk lamp." (Hsieh et al., 2013). We averaged their reponses to compute product preference. At the end of the experiment, we collected demographic data, and participants were asked about their gender and age.

3. 2. 4. Results

Participants: Experiment 1 was conducted online for a period of about one week (November 2nd, 2022 to November 9th, 2022). Participants included 111 Chinese overseas students in Seoul, Korea. The results of the demographic analysis revealed that 63 (57%) and 48 (43%) were male and female, respectively (Mage=21.340, SDage=2.290, Minage=18, Maxage=25).

Manipulation checks: First, using an independent sample t-test, we performed a statistical analysis of the mean scores of the two experimental groups to check whether social loneliness was correctly manipulated. The results revealed that participants in the yes social loneliness condition felt more lonely than those in the no social loneliness condition did (M no social loneliness=2.432, SD=1.529 vs. M yes social loneliness=5.199, SD=1.422; $t(109)=9.876$, $p<0.001$). This finding confirms the successful manipulation of social loneliness.

Hypothesis testing: We analyzed the overall preference for the two products using a matched sample t-test. The results showed that participants preferred the anthropomorphic product (M non-anthropomorphic=3.743, SD=1.612 vs. M anthropomorphic=4.986, SD=1.744; $t(109)=7.523$, $p<0.001$). Next, we conducted an independent t-test on the product preferences of the two groups of participants separately to verify whether anthropomorphic product preferences were influenced by social loneliness. The statistical results revealed that there was no significant difference in the preference of anthropomorphic and non-anthropomorphic products among participants in the no social loneliness condition (M non-anthropomorphic=3.972, SD=1.741 vs. M anthropomorphic=4.296, SD=1.742; $t(109)=1.464$, $p=0.146$). However, participants in the yes social loneliness condition demonstrated a significantly higher preference for the anthropomorphic product than for the non-anthropomorphic product (M non-anthropomorphic =3.526, SD=1.462 vs. M anthropomorphic=5.640, SD=1.487; $t(109)=4.380$, $p<0.001$). Therefore, hypothesis 1 is supported, that is, social loneliness increases preference for anthropomorphic product (see Figure 3).

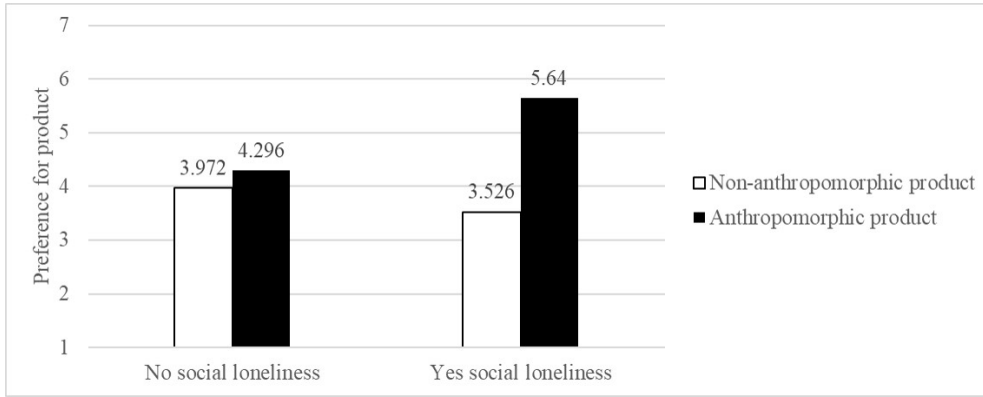

Figure 3 Product preference as the function of social loneliness

3. 3. Discussion

Experiment 1 provided preliminary evidence that social loneliness increases the preference for anthropomorphic product. The participants who were induced to feel social loneliness demonstrated higher preferences and purchase intentions for anthropomorphic products than non-anthropomorphic products. It should be noted, however, the relationship between social loneliness and anthropomorphic products may be limited. Although the results in Experiment 1 support Hypothesis 1, it is unclear whether environmental factors influence it. Thus, Experiment 2 aims to verify the moderating effect of social crowding.

3. 4. Experiment 2

3. 4. 1. Design

The objective of experiment 2 was to replicate the findings of experiment 1. Again, it was designed to test two hypotheses: whether social loneliness increases the preference for anthropomorphic products (H1) and whether social crowding moderates this effect (H2a, H2b). We predict that (1) consumers will prefer anthropomorphic products when they feel social loneliness (vs. no social loneliness). This effect will only manifest when there is no social crowding. Correspondingly, we predict that the effect of social loneliness on anthropomorphic product preference will disappear when there is social crowding. We conducted an experiment that is designed as a 2 (social loneliness: no vs. yes) x 2 (social crowding: no vs. yes) between-subject design. Chinese students from various universities in Seoul, Korea, were recruited as experimental subjects. As in Experiment 1, the questionnaire was designed through the China Survey Website (wjx.cn), and the responses were collected. The stimuli in Experiment 2 were identical to those in Experiment 1.

3. 4. 2. Pre-test

We conducted a pre-test, which involved 30 Chinese overseas students in Seoul, Korea (Mage=24.17, SDage=1.949; 50% female), to verify the credibility of the social crowding experimental stimuli. Its purpose was to check whether the crowded scenarios we simulated through images could mobilize participants' perceptions of social crowding. For the convenience of the participants, we collected data through the China Survey Website (wjx.cn) and included images of two scenarios in the questionnaire. During the pre-test, 30 Chinese overseas students were randomly divided into two conditions.

We utilized images to simulate real crowded scenarios in order to manipulate participants' perceptions of social crowding. The current way of using images to manipulate social crowding is to first have participants view the presented images (no social crowding vs. yes social crowding), then imagine themselves in the situation and write down how they feel about whether the number of different people in the space manipulates social crowding. For instance, O'Guinn et al. (2015) used virtualized store images to manipulate consumers' perceptions of crowding; Huang et al. (2018) employed photographed images of commercial streets to manipulate consumers' perceptions of social crowding. Because social crowding is a subjective experience of the spatial environment where consumers live, the operational feasibility of the experimental stimuli can be demonstrated as long as the consumers' perception of social crowding can be stimulated.

Referring to Maeng et al.'s (2013) study, this experiment illustrated images of different levels of social crowding in the no social crowding and the yes social crowding groups, respectively. The no social crowding condition is an image with a sparse crowd, whereas the yes social crowding condition is an image with many people gathered (see Figure 4). To reinforce the manipulative effect of social crowding, we asked participants to briefly describe the images of the scene they saw regarding the number of people and interpersonal distance according to their real feelings. Next, participants were asked to imagine themselves in that shopping environment and respond to three items about social crowding manipulation: "There are a lot of shoppers here," "I feel a little busy here," and "It is very crowded for me" (Byun et al., 2011). All items were measured on a seven-point Likert-scale (1= strongly disagree, 7 = strongly agree). We averaged their responses to compute social crowding.

Figure 4 Manipulation of social crowding (excerpted from Maeng et al. 2013)

According to the pre-test results, the degree of crowding perceived by participants immersed in the yes social crowding scenario created by the images was significantly greater than that perceived by participants immersed in the no social crowding scenario (M no social crowding=2.507, SD=1.165 vs. M yes social crowding=5.200, SD=1.056; t(28)=6.658, P<0.001). Therefore, our manipulation of social crowding with the images was successful.

3. 4. 3. Procedure and Measure

In experiment 2, all participants were randomly assigned to one of the four conditions: 2 (social loneliness: no vs. yes) x 2 (social crowding: no vs. yes). Similar to Experiment 1, we elicited social loneliness by asking participants to recall their memories of past experiences.

Next, images were used to mobilize participants' perceptions of social crowding. As in the pre-test, each group of participants would view the corresponding images (no social crowding vs. yes social crowding). At the end of the above steps, the participants were presented with the experimental stimuli, the anthropomorphic table lamp. The participants were asked to rate the preference in their shopping environment. Using a seven-point Likert scale for all items (1=strongly disagree, 7=strongly agree), all participants then answered questions on measures of social loneliness and product preference. Finally, we collected demographic data, such as gender and age, for all the participants.

3. 5. Results

Participants: Experiment 2 was conducted online for about two weeks (March 13th, 2023 to March 27th, 2023). It consisted of Chinese overseas students in Seoul, Korea. Out of the 252 survey questionnaires, we excluded 24 invalid ones, which had short response times or failed to meet the requirements, and 228 valid ones were returned. They are incomplete responses. Of the 228 participants, 48% and 52% were female and male, respectively (Mage=21.400, SDage=2.275, Minage=18, Maxage=25).

Manipulation checks: Compared with participants in the non-social loneliness condition, those in the social loneliness condition felt more lonely (M no social loneliness=3.463 vs. M yes social loneliness=4.476; t(222)=3.879, p<0.001). This finding reveals that social loneliness was manipulated as planned. At the same time, the manipulation of social crowding was successful (M no social crowding=3.780 vs. M yes social crowding=4.755, t(226)=3.802, P<0.001).

Hypothesis testing: Our analysis of variance (ANOVA) demonstrated a significant interaction effect of social loneliness and social crowding (F(1, 222)=73.557, p<0.001). In the no socially crowding condition, participants's preference fro anthropomorphic product was greater when they are not socially loney than when they are (Simple effects analysis, M no social loneliness= 2.949 vs. M yes social loneliness=6.364, F(1,222)=311.190, p<0.001). However, in the yes socially crowding condition, their preference for anthropomorphic product did not differ when they were socially lonely or not (Simple effects analysis, M no social loneliness= 4.965 vs. M yes social loneliness=5.821, F(1,108)=13.371, p=0.515). These results support hypothesis 2 (see Figure 5).

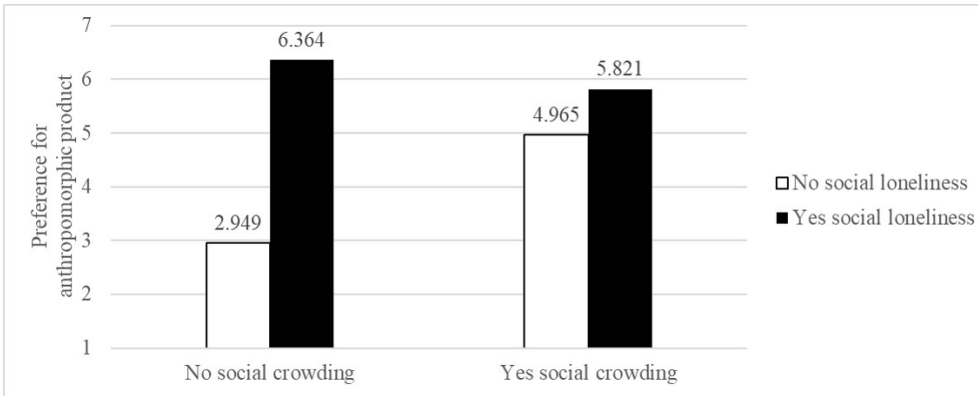

Figure 5 Product preference for anthropomorphic product as the function of social loneliness and social crowding

3. 6. Discussion

First of all, findings support H1, social loneliness increased preferences for anthropomorphic products. Participants in the yes social loneliness condition showed a significantly higher preference for an anthropomorphic product than the participants in the no social loneliness condition (M no social loneliness=3.737 vs. M yes social loneliness =5.004; $t(227)=9.553$, $p<0.001$).

Next, the moderating effect of social crowding was verified by the results of Experiment 2. Specifically, in the no social crowding condition, participants' preference for anthropomorphic products increased when they felt social loneliness (H2a). However, in the yes social crowding condition, the preference for anthropomorphic products did not increase even when participants felt social loneliness (H2b).

Note that we assume social loneliness and social crowding are conceptually independent, and manipulated them independently, and demonstrated their effect in one experiment. These findings suggest that consumers' desire driven by social loneliness can be resolved by social crowding. When they happen to be socially lonely but happen to be socially crowded, their preference for anthropomorphic products is not heightened.

4. General Discussion

4. 1. Summary of experimental findings

This study investigated the relationship between social loneliness and anthropomorphic product preference as well as the moderating role of social crowding in this process. In recent years, marketing scholars have begun focusing on the growing number of lonely consumers (Wang et al., 2012; Pieters, 2013). However, we focus on how people actively seek and establish social connections when their fundamental need for social contact with the outside world is unmet (Cacioppo & Patrick, 2008); the material consumer goods are also a way to build attachment (Mikulincer & Shaver, 2008).

This study employed two experiments to prove the hypothesis. Experiment 1 manipulated participants' social loneliness through situational recall and used a desk lamp as a stimulus to test the direct effect of social loneliness on anthropomorphic product preference. The results showed that, compared with no social loneliness, social loneliness increases consumer preference for anthropomorphic product (H1). Experiment 2 revealed a moderating effect of social crowding. Specifically, social loneliness increases the preference for anthropomorphic products in a no social crowding environment. However, in the environment where social crowding exists, social loneliness does not increase the preference for anthropomorphic product (H2a, H2b). Therefore, our findings provide sufficient empirical support for the effect of social loneliness on the preference for anthropomorphic product.

4. 2. Academic contributions

The current research provides an academic contribution through empirical studies on consumers' psychological factors on anthropomorphic product preference. Although anthropomorphism is pervasive in marketing communication, scholarly research on anthropomorphism is still in its early stages. The existing literature has focused on the

importance and marketing effectiveness of anthropomorphic products (Epley et al., 2008), for example, its impact on consumer attitudes and purchase intentions (Aggarwal & McGill, 2007), and lack exploring of their antecedent variables, such as consumers' psychological factor. This study fills the gap by linking social loneliness with anthropomorphic product preference and exploring how ocnsumers alleviate social loneliness by consuming anthropomorphic products. Thus, it provides novel ideas for anthropomorphic theory research.

Next, as the research on loneliness continues to grow, the effect of loneliness on consumer behavior is becoming one of major research topics (Fumagalli et al., 2022). While most prior studies focus on the elderly and children, this study attempts to address the social loneliness of young people by taking international students as the research target; consequently, it enriches the research on loneliness in consumer psychology.

4. 3. Managerial implications

This study's findings carry implications for marketers. The research demonstrates that social loneliness should not be viewed solely as a psychological issue, but can act as a pivotal factor in driving sales of anthropomorphized products. As such, marketers would benefit from focusing on consumer segments experiencing social loneliness. Additionally, incorporating anthropomorphic design and messaging into marketing communications could enhance product preference among these lonely consumers. Specifically targeting the anthropomorphic qualities of offerings to the socially lonely represents a viable strategy for boosting consumers' attachment and sales potential.

Next, when managers use anthropomorphism in marketing communications, they must consider both the psychological state of the target consumers and meet their needs and the social crowding of the environment. As suggested by the literature and supported by our experimental findings, the marketing of anthropomorphic products for lonely target groups should endeavor to choose less crowded social environments for publicity and promotion. This will enable consumers to easily and quickly find products that meet their belonging needs and thus promote sales and achieve good marketing effects.

4. 4. Limitations and future research

The results of this study have four critical limitations, and overcoming these limitations would make meaningful contributions to future research . First, because this study only comprises Chinese overseas students in South Korea as its participants, its findings cannot be generalized to other consumers from all walks of life. Consequently, future studies should consider different consumer groups and select consumers of different occupations, identities, and ages as participants so that the experimental results can be better generalized and applied.

Second, this study chooses only social loneliness as its independent variable. Weiss (1973) divided loneliness into social and emotional types. Emotional loneliness stems from a lack of emotional attachment, caused by not having close people to talk to, such as loneliness caused by the departure or death of a loved one; social loneliness stems from a lack of friends, acquaintances, and social networks with similar interests, such as loneliness caused by moving to an unfamiliar city. Because this study's participants are Chinese students in Korea whose experiences are consistent with social loneliness, only social loneliness was examined.

However, people are more likely to develop emotional loneliness than social loneliness in some context (Wolfers et al., 2022). Therefore, future studies should focus on the relationship between emotional loneliness and anthropomorphic products.

Third, this study used a simulation method for measuring social crowding. Although this method has been estasblished in previous studies, there still differ from real consumption. It is unknown whether there is a difference in the level of crowding and consumption experience in the environment that participants imagine themselves in versus the real environment by viewing the pictures. Hence, the validity of the experimental data should be further improved. To further refine and validate the findings of this study, future studies should conduct experiments in fully realistic social crowding scenarios.

Finally, the current study is limited to test the relationship between social loneliness and preference for a "specific design" of table lamps. In the future, for rigor of study, researchers should go through a rigorous process to select a set of products and a set of anthropomorphism, with reviewing the cases of anthropomorphic products. While doing so, they have to consider the types of anthropomorphic aspects such as shape, structure, and metaphor (Yoon et al. 2022).

References

1. Aggarwal, P., & McGill, A. L. (2007). Is that car smiling at me? Schema congruity as a basis for evaluating anthropomorphized products. *Journal of Consumer Research, 34*(4), 468-479 .
2. Baker, J., & Wakefield K. L. (2012). How consumer shopping orientation influences perceived crowding, excitement, and stress at the mall. *Journal of the Academy of Marketing Science, 40*(6), 791-806.
3. Bateson, M., Nettle, D., & Roberts, G. (2006). Cues of being watched enhance cooperation in a real-world setting. *Biology Letters, 2*(3), 412-414.
4. Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. SSRN Electronic Journal, 395 (10227), 912-910.
5. Byun, S. E., & Mann, M. (2011). The Influence of Others: The Impact of Perceived Human Crowding on Perceived Competition, Emotions, and Hedonic Shopping Value. *Clothing and Textiles Research Journal, 29*(4), 284-297.
6. Cacioppo, J. T., & Patrick, W. (2008). *Loneliness: Human nature and the need for social connection*. New York, America: W. W. Norton & Company.
7. Cacioppo, J. T., Ernst, J. M., Burleson, M. H., McClintock, M. K., Malarkey, W. B., Hawkley, L. C., ··· Berntson, G. G. (2000). Lonely traits and concomitant physiological processes: The MacArthur social neuroscience studies. *International Journal of Psychophysiology, 35*, 143-154.
8. Cacioppo, S., Grippo, A. J., London, S., Goossens, L., & Cacioppo, J. T. (2015). Loneliness: Clinical Import and Interventions. *Perspectives on Psychological Science, 10*(2), 238-249.
9. Chen, R. P., Wan, E. W., & Levy, E. (2017). The Effect of Social Exclusion on Consumer Preference for Anthropomorphized Brands. *Journal of Consumer Psychology, 27*(1), 23-34.
10. Delbaere, M., Mcquarrie, E. E., & Phillips, B. J. (2011). Personification in advertising: Using a visual metaphor to trigger anthropomorphism. *Journal of Advertising, 40*(1), 121-130.
11. Gierveld, J. D. J., & Tilburg, T. V. (2006). A 6-item scale for overall, emotional, and social loneliness: Confirmatory tests on survey data. *Research on Aging, 28*(5), 582-598.
12. Epley, N. (2018). A mind like mine: The exceptionally ordinary underpinnings of anthropomorphism. *Journal of the Association for Consumer Research, 3*(4), 591-598.
13. Epley, N., Waytz, A., & Cacioppo, J. T. (2007). On seeing human: A three-factor theory of anthropomorphism. *Psychological Review, 114*(4), 864-886.

14. Epley, N., Waytz, A., Akalis, S., & Cacioppo, J. T. (2008). When we need a human: Motivational determinants of anthropomorphism. *Social Cognition, 26*(2), 143-155.
15. Evans, G. W., & Wener, R. E. (2017). Crowding and personal space invasion on the train: Please don't make me sit in the middle. *Journal of Environmental Psychology, 27*(1), 90-94.
16. Fang, F., & Baker, W. (2018). 'A more inclusive mind towards the world': English language teaching and study abroad in China from Intercultural citizenship and English as lingua franca perspectives. *Language Teaching Research, 22*(5), 608-624.
17. Fiori, K. L., & Consedine, N. S. (2013). Positive and negative social exchanges and mental health across the transition to college: Loneliness as a mediator. *Journal of Social and Personal Relationships, 30*(7), 920-941.
18. Gardner, W. L., Pickett, C. L., Jefferis, V., & Knowles, M. (2005). On the outside, looking in loneliness and social monitoring. *Personality and Social Psychology Bulletin, 31*(11), 1549-1560.
19. Gupta, S., Melewar, T. C., & Bourlakis, M. (2010). A relational insight of brand personification in business-to-business markets. *Journal of General Management, 35*(4), 65-76.
20. Hsieh M. H., Jain S. P., Vanitha S., & Xingbo L. (2013). *When Consumers Meet Humanized Brands: Effect of Self-Construal on Brand Anthropomorphism*. ACR North American Advances.
21. Hock, S. J., & Bagchi, R. (2018). The impact of crowding on calorie consumption. *Journal of Consumer Research, 44*(5), 1123-1140.
22. Huang X., Huang Z. Q., & Wyer JR, R. S. (2018). The influence of social crowding on brand attachment[J]. *Journal of Consumer Research, 44*(8), 1068-1084.
23. Hur, J. D., Koo, M., & Hofmann, W. (2015). When temptations come alive: How anthropomorphism undermines self-control. *Journal of Consumer Research, 42*, 340-358.
24. Hysing, M., Petrie, K. J., Bøe, T., Lønning, K. J., & Sivertsen, B. (2020). Only the lonely: A study of loneliness among university students in Norway. *Clinical psychology in Europe, 2*(1), 1-16.
25. Kim, S., & McGill , A. L. (2011). Gaming with Mr. Slot or Gaming the Slot Machine? Power, Anthropomorphism, and Risk Perception. *Journal of Consumer Research, 38*(1), 94-107.
26. Kim, Y. J., & Kang, S. W. (2021). Perceived crowding and risk perception according to leisure activity type during COVID-19 using spatial proximity. *International Journal of Environmental Research and Public Health, 18*(2), 457.
27. Lastovicka, J. L., & Anderson, L. (2014). Loneliness, material possession, love, and consumers' physical well-being. In *Consumption and Well-Being in the Material World*, 63-72.
28. Lastovicka, J. L., & Sirianni, N. J. (2011). Madly, truly, deeply: Consumers in the throes of material possession love. *Journal of Consumer Research, 38*, 323-342.
29. Maeng, A., Tanner, R. J., & Soman, D. (2013). Conservative when crowded: Social crowding and consumer choice. *Journal of Marketing Research, 50*(6), 739-752.
30. Mund, M., Lüdtke, O., & Neyer, F. J. (2020). Owner of a lonely heart: The stability of loneliness across the life span. *Journal of Personality and Social Psychology, 119*(2), 497-516.
31. Niemyjska, A., & Krystyna D. (2013). When there is nobody, angels begin to fly: Supernatural imagery elicited by a loss of social connection. *Social Cognition, 31*(1), 57-71.
32. O'Guinn, T. C., Tanner, R. J., & Maeng, A. (2015). Turning to space: Social density, social class, and the value of things in stores[J]. *Journal of Consumer Research, 42*(2), 196-213.
33. Park, J., & Joo, J. (2018). A Behavioral Economic Approach to Increase Users' Intention to Continue to Use the Voice Recognition Speakers: Anthropomorphism. *Design Convergence Study, 17*(3), 41-53.
34. Pressman, S. D., Cohen, S., Miller, G. E., Barkin, A., Rabin, B. S., & Treanor, J. J. (2005). Loneliness, social network size, and immune response to influenza vaccination in college freshmen. *Health Psychology, 24*(3), 297-306.
35. Puzakova, M., Kwak, H., & Rocereto, J. F. (2013). When humanizing brands goes wrong: The detrimental effect of brand anthropomorphization amid product wrongdoings. *Journal of Marketing, 77*(3), 81-100.
36. Shin., Y, & Joo., J. (2019). Home Alone: Loneliness Increases Adoption of AI Speakers. *J Ergon Soc Korea, 38*(6), 499-515.

37. Stroebe, W., Stroebe, M., Abakoumkin, G., & Schut, H. (1996). The role of loneliness and social support in adjustment to loss: A test of attachment versus stress theory. *Journal of Personality and Social Psychology, 70*(6), 1241–1249.
38. Tong, W. (2022). An Eye-Movement Experimental Study of College Students Aesthetic Preference for the Shape of Desk Lamp. *International Journal of Trend in Research and Development, 7*(3).
39. Tillery, M., & McGill, A. L. (2015). Who or what to believe: Trust and the differential persuasiveness of human and anthropomorphized messengers. *Journal of Marketing, 79*(4), 94–110.
40. Twenge, J. M., Catanese, K. R., & Baumeister, R. F. (2003). Social exclusion and the deconstructed state: time perception, meaninglessness, lethargy, lack of emotion, and self-awareness. *Journal of Personality and Social Psychology, 85*(3), 409.
41. Weiss, R. S. (1973). *Loneliness: The Experience of Emotional and Social Isolation*. Cambridge, MA: MIT Press.
42. Waytz, A., & Epley, N. (2012). Social connection enables dehumanization. *Journal of Experimental Social Psychology, 48*(1), 70–76.
43. Wright, C., & Schartner, A. (2013). 'I can't … I won't?' International students at the threshold of social interaction. *Journal of Research in International Education, 12*(2), 113–128.
44. Wolfers, M. E., Stam, B. E., & Machielse, A. (2022). Correlates of emotional and social loneliness among community-dwelling older adults in Rotterdam, the Netherlands. *Aging & Mental Health, 26*(2), 355–367.
45. Yoon, N., Park, W., & Joo, J. (2022). Dark Side of Cuteness: Effect of Whimsical Cuteness on New Product Adoption. *Association of Societies of Design Research (IASDR 2021)*, 617–633.