

## WHEN LONELY PEOPLE ENCOUNTER ANTHROPOMORPHIC PRODUCTS

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By conducting 2 experiments, I investigated the influence of loneliness on consumers' attitudes toward the degree of anthropomorphism of products (high, medium, or low). In Study 1, I recruited 186 participants to categorize a cellphone as hedonic, neutral, or utilitarian, then rate its anthropomorphism in order to examine the effect of loneliness on consumers' preferences. Results showed that nonlonely consumers preferred products with high, vs. low or medium, anthropomorphism. However, the relationship between the favorite products of lonely consumers and anthropomorphic degree presented as an inverted U-shaped curve. In Study 2, I recruited 553 participants to extend Study 1 and investigate the moderating role of product category on the loneliness–anthropomorphism preference relationship. Results demonstrated that lonely people preferred hedonic products with high anthropomorphism and utilitarian products with low anthropomorphism above all others. Thus, I have contributed to loneliness theory and highlighted associated managerial implications.

*Keywords:* loneliness, consumers, consumer preferences, anthropomorphism, product category, hedonic, utilitarian.

*Loneliness*, which refers to an aversive subjective feeling of being isolated from others, is a prevalent and persistent experience in modern societies (McPherson, Smith-Lovin, & Brashears, 2006) that plays an important role in human functioning (Karlsson, Abetkoff, & Chiou, 2015; Wang & Tu, 2015). It is correlated with clinical depression, suicide ideation, psychological stress,

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and high blood pressure (Jaremka et al., 2013; Mohammadrasool, Robert, & Fatemeh, 2013). The act of forming positive social relationships differentiates eudemonic from unhappy people (Cacioppo, Capitanio, & Cacioppo, 2014).

Recently, an increased number of researchers have been focusing on the psychological and behavioral tendencies of lonely people (Yue, Wong, & Hiranandani, 2014). Building a relationship with a material possession is one adaptation method used by individuals to overcome loneliness (Lastovicka & Sirianni, 2011). Based on attachment theory, failed interpersonal intimacy motivates people to seek material possessions as the focus of secondary attachments (Mikulincer & Shaver, 2008). Therefore, lonely individuals increasingly build connections with their material possessions to remedy interpersonal relationship deficiencies (Baumeister & Leary, 1995). However, *anthropomorphic* products with humanlike traits can provide a similar sense of interpersonal connection (Qiu & Benbasat, 2010). Thus, I formed the following research questions: What will happen when lonely people are confronted with these products? Can highly anthropomorphic products elicit a more favorable attitude from lonely people than neutral or utilitarian products do?

Numerous prior researchers have claimed that lonely people are eager to form relationships, which elicits a tendency to prefer more, vs. less, anthropomorphic products. For example, Epley, Akalis, Waytz, and Cacioppo (2008) found that people who lack social connections feel the need to compensate by creating a sense of human connection with nonhuman agents. Consumers who use material possessions as substitutes for interpersonal relationships consciously blur the boundaries of the human–object distinction (Lastovicka & Sirianni, 2011). As a result, highly anthropomorphic products that are similar to human beings are more likely to satisfy the belongingness need of lonely people and, thus, induce a more favorable attitude than other, less anthropomorphic options do. However, recent researchers have shown that the low social efficacy of lonely people triggers negative evaluations of, and defensive attitudes toward, others; as a result, lonely individuals make unfavorable evaluations of products with high anthropomorphism (Claus & Warlop, 2010; Duck, Pond, & Leatham, 1994).

To fill this theoretical gap and extend the extant literature on loneliness, I conducted two studies based on loneliness theory to investigate the influence of loneliness on people's attitudes toward the degree of anthropomorphism of products (low, medium, high). In Study 1, I examined the effect of loneliness on product attitude and in Study 2, I investigated the moderating role of product category on the loneliness–anthropomorphism preference relationship.

## Literature Review and Hypotheses Development

### Loneliness Theory

One psychological characteristic of lonely people is the pursuit of rebuilding connections with others. Experiencing belongingness is positively associated with life satisfaction (Martin & Hill, 2012; Ryan & Deci, 2000); further, when seeking belongingness is unsuccessful, people experience feelings of loneliness and endeavor to alleviate the pain of social isolation. For example, they actively make connections with other people (Maner, DeWall, Baumeister, & Schaller, 2007), engage in prosocial behaviors to rebuild social relationships (DeWall, Maner, & Rouby, 2009), and pay attention to social cues (Gardner, Pickett, Jefferis, & Knowles, 2005). In conclusion, feelings of loneliness encourage people to engage in interpersonal interactions.

However, because they have experienced previous frustrations in this area, often lonely people have a negative attitude toward interpersonal interactions and spend most of their time alone (Cacioppo, Norris, Decety, Monteleone, & Nusbaum, 2008). Lonely people are likely to experience negative feelings in relation to social interactions (Duck et al., 1994), which leads to them adopting a defensive attitude (Cacioppo & Patrick, 2008). That is, compared to nonlonely people, they tend to expect others to be hostile and insulting (Hansson & Jones, 1981), which makes lonely people respond in a less cooperative and more defensive manner, and even display aggressive behavior and be less helpful toward others (Anderson & Martin, 1995, Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007). When people experience repeated failures in attaining belongingness, an adaptive change occurs that triggers the deactivation of interpersonal interactions (Shaver & Mikulincer, 2006).

As a result, loneliness elicits two contradictory demands: seeking close relationships but being prone to avoiding interpersonal interactions (Turkle, 2011). Both of these psychological characteristics influence lonely people's attitudes toward anthropomorphic products, whereby an anthropomorphic product endowed with human traits (e.g., face, name, voice, or intention) can trigger a similar feeling to interpersonal interactions (Fournier, 1998). As a result, a product with high anthropomorphism is more likely to cater to lonely people's pursuits of belongingness. However, lonely people also adopt a defensive attitude toward interpersonal interactions (Cacioppo et al., 2008) that causes them to avoid things that can elicit a similar experience, especially a product with high anthropomorphism. Therefore, a product with low anthropomorphism should receive a better reception from a lonely person than a product with high

anthropomorphism does. To sum up, because of the contradictory demands, lonely people encounter dilemmas when they need to make a choice between products with high and low levels of anthropomorphism. In this condition, lonely people will compromise by selecting a product with a medium level of anthropomorphism (Simonson, 1989). Therefore, I proposed the following hypothesis:

**Hypothesis 1:** Lonely people will hold a more favorable attitude toward a product with midlevel anthropomorphism than they do toward products with either high or low anthropomorphism.

### The Influence of Product Category

Product category (hedonic vs. utilitarian) plays an important role in information processing and decision making (Huettl & Gierl, 2012). *Hedonic products* provide emotional and sensory experiences for consumers and are associated with entertainment and pleasure seeking, whereas *utilitarian products* are connected with practical, instrumental, and functional features, and the consumer focus is on product reliability (Dhar & Wertenbroch, 2000; Higgins, 2002).

Experiencing belongingness is a basic need for human beings (Ryan & Deci, 2000). Compared to nonlonely people, lonely people are more likely to engage in seeking belongingness and this will engender a more favorable attitude toward hedonic products with high anthropomorphism than products with medium or low anthropomorphism. The focus of lonely people becomes avoiding uncertainty when selecting utilitarian products, which elicits a tendency to avoid interpersonal interactions and a more favorable attitude toward utilitarian products with low, vs. high or medium, anthropomorphism. Therefore, I proposed the following two-part hypothesis:

**Hypothesis 2a:** Lonely people will have a more favorable attitude toward hedonic products with high anthropomorphism than toward hedonic products with low or midlevel anthropomorphism.

**Hypothesis 2b:** Lonely people will have a more favorable attitude toward utilitarian products with low anthropomorphism than toward utilitarian products with high or midlevel anthropomorphism.

## Study 1

### Method

**Participants and procedure.** The purpose of this study was to test Hypothesis 1. To control for product category, I recruited 35 online participants (aged 22–41 years,  $M = 31.83$ ,  $SD = 6.46$ ; women = 48.57%), each of whom was paid US\$0.30, to complete a pretest. Participants were asked to categorize a cellphone as either hedonic, neutral, or utilitarian. As expected, most participants (91.43%)

considered the cellphone to be a neutral product, which minimized any potential influence of product category.

I also employed different product designs representing the degree of anthropomorphism of the cellphone (see Figure 1). A further 92 online participants (aged 21–43 years,  $M = 31.64$ ,  $SD = 6.67$ ; women = 48.91%), each of whom was paid US\$0.30, evaluated the cellphone's degree of anthropomorphism on a 7-point Likert scale (1 = *very low* to 7 = *very high*). Participants were randomly arranged into three groups according to perceived level of anthropomorphism (low, medium, high) and received relevant product information. As expected, a significant difference was found among the three groups,  $F(2, 89) = 103.13$ ,  $p < .05$ . Participants in the high group reported higher evaluations of degree of anthropomorphism than did participants in the medium group ( $M_{\text{high}} = 5.81$ ,  $SD = 1.01$ ;  $M_{\text{medium}} = 4.74$ ,  $SD = 1.21$ ),  $t(89) = 4.05$ ,  $p < .05$ . The same result was found also for the medium and low groups ( $M_{\text{medium}} = 4.74$ ,  $SD = 1.21$ ;  $M_{\text{low}} = 2.10$ ,  $SD = 0.84$ ),  $t(89) = 9.96$ ,  $p < .05$ , which suggested a successful manipulation of anthropomorphism.

I recruited 186 new participants (aged 19–37 years,  $M = 26.97$ ,  $SD = 6.10$ ; women = 50.54%) from Wuhan University to take part in a new product test, for which they were paid US\$1.00. After completing the UCLA Loneliness Scale (Russell, 1996), 92 were found to be lonely individuals (scores above 44;  $M_{\text{lonely}} = 52.76$ ,  $SD = 6.43$ ) and 94 were nonlonely individuals (scores below 28;  $M_{\text{nonlonely}} = 20.57$ ,  $SD = 3.63$ ),  $t(184) = 42.19$ ,  $p < .05$ . Participants who had scored between 28 and 44 points were not included. I used a 2 (loneliness, nonloneliness)  $\times$  3 (low, medium, and high anthropomorphic) study design. Each participant received information with the relevant anthropomorphic degree (low, medium, or high) about a cellphone.



Figure 1. The cellphone used in Study 1.

**Measures.** Participants were asked to report their preference for the cellphone on a 7-point Likert scale (1 = *dislike it very much* to 7 = *like it very much*). Next, I asked them to guess the true purpose of this survey, give their evaluations of the product category, and rate the degree of anthropomorphism of the product. The results obtained from those who guessed the correct purpose of the study were removed to avoid expectancy bias.

## Results

Five participants evaluated the cellphone's product category as neutral, rather than hedonic or utilitarian, and were removed from the study. A significant distinction in terms of degree of anthropomorphism was found among the three groups,  $F(2, 178) = 268.30$ ,  $df = 2$ ,  $p < .05$ , ( $M_{\text{high}} = 5.64$ ,  $SD = 0.82$ ;  $M_{\text{medium}} = 4.37$ ,  $SD = 0.97$ ),  $t(178) = 7.72$ ,  $p < .05$ ; ( $M_{\text{medium}} = 4.37$ ,  $SD = 0.97$ ;  $M_{\text{low}} = 1.88$ ,  $SD = 0.92$ ),  $t(178) = 15.01$ ,  $p < .05$ . None of the respondents correctly guessed the purpose of the survey.

An analysis of variance (ANOVA) revealed a significant interaction effect of loneliness and anthropomorphic degree on consumers' attitudes,  $F(2, 175) = 17.81$ ,  $p < .05$ . Specifically, nonlonely participants had more positive attitudes toward the cellphone with high, vs. medium, anthropomorphism ( $M_{\text{high}} = 5.27$ ,  $SD = 1.23$ ;  $M_{\text{medium}} = 3.83$ ,  $SD = 1.56$ ),  $t(175) = 4.15$ ,  $p < .05$ . A distinction also existed between the medium and low groups ( $M_{\text{medium}} = 3.83$ ,  $SD = 1.56$ ;  $M_{\text{low}} = 3.03$ ,  $SD = 1.35$ ),  $t(175) = 2.32$ ,  $p < .05$ . However, lonely participants preferred the cellphone with medium anthropomorphism to that with high ( $M_{\text{medium}} = 5.30$ ,  $SD = 1.18$ ;  $M_{\text{high}} = 3.90$ ,  $SD = 1.47$ ),  $t(175) = 4.83$ ,  $p < .05$ , or low ( $M_{\text{medium}} = 5.30$ ,  $SD = 1.18$ ;  $M_{\text{low}} = 3.63$ ,  $SD = 1.19$ ),  $t(175) = 4.08$ ,  $p < .05$ , anthropomorphism. No significant difference was found between the high and low groups ( $M_{\text{high}} = 3.90$ ,  $SD = 1.47$ ;  $M_{\text{low}} = 3.63$ ,  $SD = 1.19$ ),  $t(175) = 0.79$ ,  $p > .05$ .

Overall, the results of Study 1 show that loneliness influenced consumers' preferences for the degree of anthropomorphism of products. Lonely people preferred a product with medium anthropomorphism over products with high or low anthropomorphism, which supports Hypothesis 1.

## Study 2

### Method

**Participants and procedure.** The purpose of this study was to test Hypotheses 2a and 2b. In Study 2, the hedonic product was a toy car and the utilitarian product was a cup. I recruited 54 online participants (aged 20–48 years,  $M = 32.65$ ,  $SD = 8.21$ ; women = 50%), each of whom was paid US\$0.30, to complete the pretest. Participants were asked to categorize a toy car and a cup as either hedonic, neutral, or utilitarian. As expected, 98.15% of participants perceived

the toy car as being a hedonic product and 96.30% reported that the cup was a utilitarian product.

I manipulated the front (hood) of the toy car (see Figure 2) and side of the cup to show different degrees of anthropomorphism. I recruited 95 further online participants (aged 23–41 years,  $M = 32.94$ ,  $SD = 5.90$ ; women = 48.47%), each of whom was paid US\$0.30, to evaluate the anthropomorphic degree of these products. Participants were randomly arranged into three groups (low, medium, high) and received the relevant anthropomorphic degree of product information on the toy car and cup. A significant distinction was found among the three groups,  $F_{\text{car}}(2, 92) = 119.20$ ,  $p < .05$ ;  $F_{\text{cup}}(2, 92) = 94.04$ ,  $p < .05$ . Participants in the high group reported higher evaluations of the degree of anthropomorphism of the product than did participants in the medium group,  $M_{\text{high-car}} = 5.68$ ,  $SD = 0.79$ ;  $M_{\text{medium-car}} = 3.22$ ,  $SD = 0.79$ ,  $t(92) = 11.50$ ,  $p < .05$ ;  $M_{\text{high-cup}} = 5.35$ ,  $SD = 0.95$ ;  $M_{\text{medium-cup}} = 3.41$ ,  $SD = 1.07$ ,  $t(92) = 8.01$ ,  $p < .05$ . A similar result also emerged between the medium and low groups,  $M_{\text{medium-car}} = 3.22$ ,  $SD = 0.79$ ;  $M_{\text{low-car}} = 2.53$ ,  $SD = 0.95$ ,  $t(92) = 3.24$ ,  $p < .05$ ;  $M_{\text{medium-cup}} = 3.41$ ,  $SD = 1.07$ ;  $M_{\text{low-cup}} = 2.03$ ,  $SD = 0.86$ ,  $t(92) = 5.70$ ,  $p < .05$ , which suggested a successful manipulation of anthropomorphism.

I recruited 553 new participants (aged 19–37 years,  $M = 27.31$ ,  $SD = 6.29$ ; women = 50.45%) to take part in a new product test, for which they were paid US\$1.00. After completing the UCLA Loneliness Scale (Russell, 1996), 277 were found to be lonely individuals and 276 were nonlonely individuals,  $M_{\text{lonely}} = 53.26$ ,  $SD = 6.65$ ;  $M_{\text{nonlonely}} = 21.46$ ,  $SD = 3.74$ ,  $t(551) = 69.25$ ,  $p < .05$ . I used a 2 (lonely, nonlonely)  $\times$  3 (hedonic, utilitarian, neutral)  $\times$  3 (low, medium, high anthropomorphic) study design. Each participant received information with the relevant degree of anthropomorphism (low, medium, or high) about a hedonic (toy car), utilitarian (cup), or neutral (cellphone) product.

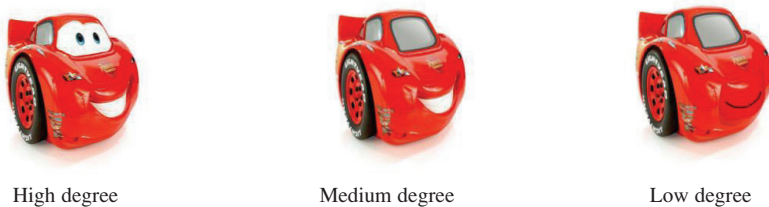


Figure 2. The toy car used in Study 2.

**Measures.** Participants reported their attitude toward the product on a 7-point Likert scale (1 = *dislike it very much* to 7 = *like it very much*). They were also asked to guess the true purpose of this survey, and to give their evaluations of product category and degree of anthropomorphism. The results obtained from those who guessed the correct purpose of the study were removed to avoid expectancy bias.

## Results

Eight participants provided erroneous categorical evaluations and were removed from Study 2. A significant distinction in terms of anthropomorphic evaluation was found among the three groups,  $F(2, 542) = 687.79, p < .05$ ;  $M_{\text{high}} = 5.72, SD = 0.83$ ;  $M_{\text{medium}} = 3.16, SD = 0.91, t(542) = 26.57, p < .05$ ;  $M_{\text{low}} = 3.16, SD = 0.91$ ;  $M_{\text{low}} = 2.29, SD = 1.00, t(542) = 9.07, p < .05$ . None of the participants guessed the study's true purpose.

The ANOVA results revealed a significant interaction effect of loneliness, product category, and anthropomorphic degree on consumers' attitudes,  $F(4, 527) = 13.81, p < .05$ . For lonely people, product category elicited different preferences for anthropomorphic degree. In the neutral product condition, lonely participants had more positive attitudes toward the product with medium,  $M_{\text{medium}} = 5.23, SD = 1.22$ , compared to high,  $M_{\text{high}} = 4.03, SD = 1.63$ ,  $t(527) = 3.55, p < .05$ , or low,  $M_{\text{low}} = 3.90, SD = 1.40$ ,  $t(527) = 3.97, p < .05$ , anthropomorphism. In the hedonic product condition, lonely individuals displayed more positive attitudes toward the product with high,  $M_{\text{high}} = 5.40, SD = 1.28$ , compared to medium,  $M_{\text{medium}} = 3.97, SD = 1.22$ ,  $t(527) = 4.27, p < .05$ , or low,  $M_{\text{low}} = 2.93, SD = 1.20$ ,  $t(527) = 7.29, p < .05$ , anthropomorphism. In the utilitarian product condition, lonely participants expressed more favorable attitudes toward the product with low,  $M_{\text{low}} = 5.10, SD = 1.18$ , compared to medium,  $M_{\text{medium}} = 3.70, SD = 1.44, t(527) = 4.14, p < .05$ , or high,  $M_{\text{high}} = 2.81, SD = 1.33, t(527) = 6.84, p < .05$ , anthropomorphism.

For nonlonely participants, product category did not influence preferences for anthropomorphic degree. They preferred the product with high anthropomorphism above all others, regardless of whether it was hedonic,  $M_{\text{high}} = 5.33, SD = 1.12$ ;  $M_{\text{medium}} = 3.77, SD = 1.25$ ;  $M_{\text{low}} = 2.97, SD = 1.25, t_{\text{high-medium}}(527) = 4.63, p < .05$ ;  $t_{\text{high-low}}(527) = 7.05, p < .05$ , utilitarian,  $M_{\text{high}} = 5.17, SD = 1.32$ ;  $M_{\text{medium}} = 3.83, SD = 1.39$ ;  $M_{\text{low}} = 2.87, SD = 1.28, t_{\text{high-medium}}(527) = 3.94, p < .05$ ;  $t_{\text{high-low}}(527) = 6.84, p < .05$ , or neutral,  $M_{\text{high}} = 5.20, SD = 1.21$ ;  $M_{\text{medium}} = 4.10, SD = 1.26$ ;  $M_{\text{low}} = 3.10, SD = 1.47, t_{\text{high-medium}}(527) = 3.25, p < .05$ ;  $t_{\text{high-low}}(527) = 6.21, p < .05$ .

These findings demonstrate that lonely people preferred a hedonic product with high anthropomorphism and a utilitarian product with low anthropomorphism above all others, which supports Hypotheses 2a and 2b.

## General Discussion

The results of Study 1 show that loneliness affects consumers' preferences for products according to their degree of anthropomorphism. Compared to nonlonely individuals, who prefer products with high anthropomorphism over other options, the relationship between anthropomorphic degree and lonely people's attitudes emerges as an inverted U-shaped curve. Because lonely people have contradictory attitudes toward interpersonal interaction, they encounter a dilemma when facing products with high and low anthropomorphism. As a result, a product with medium anthropomorphism is the preferred choice for lonely people.

Furthermore, in Study 2 I investigated the moderating role of product category on the loneliness–anthropomorphism preference relationship. Lonely people preferred a hedonic product with high anthropomorphism and a utilitarian product with low anthropomorphism above all others. Hedonic products elicit feelings of pleasure, that make lonely people seek belongingness and prefer products with high anthropomorphism to other options. In contrast, when purchasing utilitarian products, lonely people tend to try to avoid uncertainty, which means that they prefer products with low anthropomorphism.

### Theoretical Contributions and Implications

I focused on the effects of loneliness on consumers' preference for products with different degrees of anthropomorphism, and examined the moderating role of product category on this relationship. The results shed light on a new direction in the loneliness literature. Previous researchers have argued that lonely people exhibit negative attitudes toward others; therefore, they make low evaluations of products with high anthropomorphism (Claus & Warlop, 2010; Duck et al., 1994). However, these researchers have not investigated the influence of loneliness on consumers' preferences from an integrative perspective. In this paper, I have shown that loneliness elicits two psychological demands that lead to a preference for products with midlevel anthropomorphism.

By conducting this research, I have added to a growing body of literature on material possessions (Kleine & Baker, 2004). Whereas previous researchers have claimed that loneliness leads people to seek material possessions (Lastovicka & Sirianni, 2011; Pieters, 2013), I have demonstrated that it also leads to avoidance of material possessions, especially when the products are highly anthropomorphic.

The results reported here have important implications for marketing staff who are attempting to capture lonely consumers' interests through anthropomorphism. Specifically, enterprises should employ the appropriate degree of anthropo-

morphism according to product category: For lonely consumers, a neutral product with midlevel anthropomorphism is the best choice. Furthermore, enterprises should offer hedonic products with high anthropomorphism or utilitarian products with low anthropomorphism when targeting lonely individuals.

### Limitations and Directions for Future Research

There are some limitations to this study. I focused on the influence of loneliness on people's attitudes toward the degree of anthropomorphism of products; however, other factors may also affect lonely consumers' preferences. For example, social exclusion, which entails being rejected and ignored, reduces one's power to gain attention from others (Lee & Shrum, 2012). Thus, the influence of social exclusion on consumers' attitudes could be investigated in the future. In addition, variables that lead lonely people to avoid social interactions should be ascertained in future studies, so that these can be addressed and lonely people can be helped to learn how to build social connections. Furthermore, I only investigated the moderating role of product category on the loneliness–anthropomorphism degree relationship. Lonely people are more likely to express their preference for products with high anthropomorphism in private (Turkle, 2011). As such, future researchers could explore the influence of social occasion (private, public) on lonely people's attitudes toward degree of anthropomorphism.

In addition, future researchers should further investigate the internal mechanism of the moderating role of product category on the loneliness–anthropomorphism degree relationship. Furthermore, in the research field of anthropomorphism, a uniform standard on the manipulation of degree of anthropomorphism is absent; thus, developing a standard would be a fruitful direction to take. Finally, it would be worth testing the proposed hypotheses in other cultural settings to increase the generalizability of my results.

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