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Does Endowing a Product with Life Make One Feel More Alive? The Effect of Product Anthropomorphism on Consumer Vitality

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ABSTRACT

While most research in the area of product anthropomorphism examines how making products more human-like influences subsequent consumer reactions to those products, the present research examines how the act of anthropomorphizing products influences consumers themselves. We propose that when consumers have an insufficient sense of either connectedness or competence, anthropomorphizing a product satisfies these deficiencies and increases vitality. Furthermore, this enhanced vitality has positive implications for individuals' capacity to exert self-control in unrelated domains. A set of three studies provides support for these hypotheses. By demonstrating the positive effect of anthropomorphism on consumer vitality and self-control, this research illuminates the nature of anthropomorphism. In doing so, we also connect two streams of literature: one on anthropomorphism and the other on vitality, which share an inherent connection that has not been explicated by past research.

Keywords: anthropomorphism, subjective vitality, consumer well-being

Product anthropomorphism has received considerable attention in recent years. However, while the majority of research in this area has focused on how the act of treating products as humanlike entities affects consumer evaluations of those products (e.g., Delbaere et al. 2011; Aggarwal and McGill 2012), the current inquiry examines how engaging in anthropomorphizing affects the individual doing the anthropomorphizing.

We propose that engaging in product anthropomorphism can increase consumers' psychological well-being by promoting their vitality–namely, their subjective sense of energy. This prediction is arrived at by merging current premises about anthropomorphism (e.g., Epley, Wyatz and Cacioppo 2007; Mourey, Olson and Yoon 2017), that suggest that individuals engage in anthropomorphism to fulfill certain fundamental needs (such as the need for connectedness and the need for competence), with those of self-determination theory, which suggest that heightened connectedness and competence are two key antecedents of improved vitality (Ryan and Deci 2008). By integrating these two different literatures we hypothesize that for consumers with either a deficient sense of connectedness or of competence, the act of product anthropomorphism helps restore these unmet needs and increases the vitality they experience. Further, we predict that such anthropomorphism-induced vitality will exert positive consequences, such as better self-control performance, even in domains completely unrelated to the initial anthropomorphism context.

In examining these predictions, this inquiry provides new insights into how anthropomorphism can benefit individuals. We not only confirm extant research on the motives underlying anthropomorphism (e.g., a need for connectedness and a need for competence; Epley et al. 2007) by showing that the act of anthropomorphism indeed restores these needs, but also show that the restoration of connectedness and competence leads to a high-level psychological

benefit for individuals: improved vitality. In doing so, our work sheds some light on why product anthropomorphism is so prevalent in consumers' lives. In addition, our theoretical platform makes explicit the conceptual links between the literature on anthropomorphism and that on self-determination theory. Although the connection is inherent to the two streams of literature, it has not been identified in past research.

CONCEPTUAL OVERVIEW AND DEVELOPMENT OF HYPOTHESES

Anthropomorphism refers to individuals' tendency to attribute humanlike characteristics or behaviors to nonhuman entities (Epley et al. 2007). Recent years have witnessed a growing interest in both the antecedents and the consequences of anthropomorphism.

The Consequences of Anthropomorphism

Past research shows that anthropomorphized entities elicit both positive and negative effects on subsequent reactions to those entities. For example, Gray et al. (2007) find that when nonhuman characters such as animals and robots are perceived as resembling humans, they are valued more and people are less likely to harm them. A corresponding finding in the consumer context shows that people are more reluctant to replace products that they have anthropomorphized (Chandler and Schwarz 2010). On the other hand, anthropomorphized brands suffer from more blame when they malfunction (Puzakova, Kwak, and Rocereto 2013) as they are deemed to possess more volitional intent (Morewedge 2009).

Of relevance to the current inquiry is research that has examined the consequences of anthropomorphism on the individuals themselves. In particular, Mourey et al. (2017) find that exposure to an anthropomorphized product can satisfy socially excluded people's need for connectedness, which then reduces their desire for further interpersonal interaction. The current

work furthers this perspective by proposing that engaging in product anthropomorphism can benefit consumers' psychological well-being, with favorable downstream implications for their later behavior. We begin our exploration of this issue by examining why people engage in anthropomorphism to begin with.

The Antecedents of Anthropomorphism: A Motivational Perspective

Epley and his co-authors have argued that people anthropomorphize non-human objects to fulfill two types of needs (Epley et al. 2007; Epley et al. 2008b). One of these is the sociality need, which refers to the innate need to establish and maintain meaningful social relationships and to feel a sense of connectedness (Baumeister and Leary 1995). Epley et al. (2007, 2008a) argue that when the sociality need is not being satisfied by human relationships, for example, when one is isolated from others, people are likely to turn to non-human entities to fulfil the unmet sociality need. In support, Epley et al. (2008a) found that people who were induced to believe that they would end up being alone in their life rated their pets as being more humanlike as compared to those who believed that they would have many rewarding social relationships.

The second driver of anthropomorphism is the effectance motive, which refers to the desire to be a competent agent via a sense of having exerted control over one's environment (White 1959). The effectance motivation has also been termed the "competence motive" and the "control motive" (see Deci and Moller 2005 for a review). In this research, the term "competence motive" is used to refer to the desire for perceived control over the environment (Amoura et al. 2014; White 1959). Just as the sociality motive is activated when an individual feels an insufficient sense of connectedness, the competence motive is activated by a loss of perceived

control (for example, when one is feeling helpless and lack of control)[1]. In such cases, people are motivated to restore their sense of competence–even if this may sometimes mean forming illusory beliefs of one's ability to control random events (Langer 1957).

Epley and his co-authors argue that because people tend to be more familiar with how humans (vs. nonhumans) behave, the simple act of anthropomorphism serves to render these objects seemingly more predictable and therefore controllable, ultimately increasing one's perceived competence in interacting with these objects. In support, past work has shown that people high in the competence motive (for example, those who feel a temporary lack of control over the object they interact with) are more likely to anthropomorphize nonhuman entities, such as robots, gadgets and animals, as compared to people low in this motive (Waytz et al. 2010).

In sum, the motivational framework of anthropomorphism suggests that sociality and competence are two fundamental human needs. When people feel either lonely or helpless, their sociality or competence needs are thwarted and they are motivated to repair it. Anthropomorphism affords them a means of accomplishing this goal. Merging this premise with findings from a different field of inquiry, self-determination theory (Ryan and Frederick 1997), we propose that the act of anthropomorphizing products should increase consumers' psychological well-being–as manifested in heightened vitality.

Self-Determination Theory and Vitality

We all have experiences of good days on which we feel "alive" and "vital", and bad days on which we feel "dead" and "drained". Self-determination theory captures this dimension via the

[1] Empirical support for the link between a lack of control and need for competence was obtained through a post-test (see web appendix) as well as the process measures in study 2.

construct of vitality, which refers to the subjective feeling of being alive, enthusiastic, and having energy (Deci and Ryan 2000; Ryan and Frederick 1997).

Past research has shown that high vitality, among its other benefits, enhances regulatory strength, which then has a positive influence on subsequent self-control. In a recent study, participants who exhibited greater vitality after consuming intrinsically enjoyable "want" products versus extrinsically rewarding "should" products performed better on subsequent self-control tasks in unrelated domains (Chen and Sengupta 2014; see also Muraven et al. 2008; Laran and Janiszewski 2011). Thus, vitality can be seen as the counterforce to depletion– experiencing a state of ego depletion impairs the ability to exert self-control later on (Baumeister et al., 1998), whereas experiencing high vitality enhances subsequent self-control.

The positive consequences accruing from vitality have led scholars to examine its causes. Self-determination theory, which offers the most comprehensive articulation of this issue, holds that vitality is enhanced by activities that satisfy basic pscyhological needs (Ryan and Deci 2008), including need for connectedness (Baumeister and Leary 1995) and need for competence (White 1959). A heightened sense of competence and a heightened sense of social connectedness both nurture subjective vitality (Ryan and Deci 2008).

Research on self-determination theory provides support for these antecedents of vitality. It shows that individuals who tend to feel high social connectedness, either chronically or temporarily, experience higher vitality than those who feel low social connectedness (Ryan, Bernstein, and Brown 2010). Similarly, situations/tasks that facilitate competence also promote vitality. Thus, doing a task at which one is skilled and thus feels in control of the outcome (for example, a practiced cellist playing the cello) enhances vitality (Sheldon, Ryan, and Reis 1996).

In short, people experience high vitality when they possess either a strong sense of social connection or feel competent and efficacious.

Engaging in Product Anthropomorphism Benefits Consumer Vitality

A natural connection–although hitherto unexplored–thus emerges between the antecedents of vitality and those of anthropomorphism: namely, the need for connectedness and the need for competence.

As noted earlier, the motivational perspective of anthropomorphism posits that experiencing loneliness thwarts the sense of connectedness people generally desire and activates a need for sociality. Likewise, feeling helpless thwarts their natural desire for control/competence and activates a need for competence. In a world in which people are typically surrounded by products, one way of restoring these needs is to anthropomorphize salient products. Thus, for instance, a child who does not have any friends, might confide his troubles to his favorite soft toy treating it as a surrogate friend. Product anthropomorphism can thus be viewed as a form of goal-directed activity, with the goal being the fulfillment of a thwarted need (i.e., achieving the desired state of connectedness/competence). Because goal-directed activity, by definition, is functional (Förster, Liberman, and Friedman, 2007; Shah and Kruglanski 2003), an implication of this view is that anthropomorphizing should enable the individual to achieve the corresponding goal. Thus, lonely consumers who are experiencing insufficient levels of connectedness should feel greater connectedness after anthropomorphizing a product. Similarly, helpless consumers experiencing insufficient levels of competence should regain a sense of competence following anthropomorphism. Crucially, as the preceding discussion of vitality argues, an enhancement in either connectedness or competence leads to increased vitality.

Integrating these conceptual links, the current research therefore posits that lonely and helpless consumers will experience higher vitality after engaging in a product anthropomorphizing task than after engaging in a neutral task.

In summary, this research draws out the connection between two theoretical perspectives–self-determination theory and motivated anthropomorphism–to hypothesize that lonely consumers who are experiencing insufficient levels of connectedness and helpless consumers who are experiencing insufficient levels of competence should be motivated to anthropomorphize a product. Further, since motivated product anthropomorphism stems from the functional objective of restoring the sense of connectedness and competence, we predict that lonely consumers will experience greater vitality after engaging in product anthropomorphism (as opposed to engaging in a neutral task). Similarly, those with need to restore their sense of competence will experience greater vitality after engaging in a product anthropomorphism task relative to a neutral task. Finally, in keeping with past research on the beneficial impact of vitality, we argue that the predicted improvement in vitality as a function of anthropomorphism is consequential, in that it should manifest in improved self-control in subsequent tasks. We conduct three studies to test these hypotheses.

STUDY 1:

Study 1 tested our basic hypothesis that motivated product anthropomorphism promotes consumer vitality. We manipulated sociality and competence motivation separately and also had a control condition in which motivation was not manipulated. Then, participants in all three conditions were given an opportunity to anthropomorphize a product versus complete a non-anthropomorphizing task (evaluating a magazine's layout). We predicted that people with

activated sociality and competence needs should experience greater vitality after engaging in an anthropomorphizing task than after a non-anthropomorphizing task, whereas task type should make no difference to vitality in the baseline condition.

Methods and Procedure

This study used a 3 (motivation: sociality vs. competence vs. baseline) × 2 (intervening task: product anthropomorphism vs. non-anthropomorphism) between-subjects design. A total of 178 participants (95 females, M_{age} = 36.39 years) recruited from an online survey panel (Amazon Mechanical Turk) participated in the study for a small payment.

Motivation Manipulation. Participants first completed the motivation manipulation. Following past research (e.g., Adaval 2001; Bargh and Shalev 2012; Chen, Lee, and Yap 2017) participants in the *sociality* motivation condition were asked to describe a past experience that made them feel lonely (e.g., a time when they felt rejected by others). Those in the *competence* motivation condition were asked to describe an experience that made them feel helpless and a lack of control. Participants in the *baseline* condition wrote about a normal day in their life, a neutral task that induced neither sociality nor competence motivation. A separate test verified that writing about a lonely (vs. helpless) life experience successfully activated sociality (vs. competence) motivations (details available in web appendix).

Manipulation of the Opportunity to Anthropomorphize. Next, participants turned to a purportedly separate study in which the opportunity to anthropomorphize was manipulated. Those in the *anthropomorphism* condition were told that a new food blender would be introduced to the consumer market and the company was interested in testing the positioning of this product. On this pretense, participants read an advertisement for the product and indicated

the extent to which they considered the food blender as having human characteristics, using five items adapted from Aggarwal and McGill (2007; i.e., "seem humanlike", "seems alive", "has its own emotions", "has its own intentions" and "has its own personality") on 5-point scales that ranged from 1 (*not at all*) *to* 5 (*definitely*). Participants also rated the food blender along several personality dimensions as part of the anthropomorphism manipulation. Participants in the *non-anthropomorphism* condition did not perform this task. Instead, they were led to a magazine evaluation task, and were told that the researchers wanted to collect consumers' responses to different magazine layouts. Participants evaluated a fictitious magazine page on its headline position, font size, color scheme and overall design. This task was chosen because it was unlikely to induce anthropomorphism.

Measures: Vitality. Our key dependent measure was participants' reported vitality following the product anthropomorphism versus non-anthropomorphism tasks. This was assessed by a short-version of the standard Subjective Vitality Scale (Ryan and Frederick 1997) with five items: "I feel alive and vital at this moment", "I don't have energy and spirit at this time" (reversed coded), "I feel alert and awake", "I look forward to each new day currently", "I don't feel energized right now" (reversed coded), along scales that ranged from 1 (*not at all true*) to 7 (*very true*). Responses to the five items were averaged to form an index of subjective vitality ($\alpha = .87$). Finally, as a manipulation check, participants indicated the extent to which they felt lonely and had no control over their environment while they were completing the life event writing task at the beginning of the experiment from 1 (*not at all*) to 7 (*very much*).

Results and Discussion

Motivation Manipulation Check. The manipulation check confirmed the effectiveness of our motivation manipulation. A 3 (motivation) × 2 (task) ANOVAs on participants' feelings while performing the writing task revealed main effects of motivational state on both a) felt loneliness ($F(2, 172) = 44.09$, $p < .001$) and b) felt lack of control ($F(2, 172) = 63.82$, $p < .001$). Participants reported greater loneliness after writing about a lonely event ($M_{sociality} = 5.09$, SD = 1.80) vs. a neutral event ($M_{baseline} = 1.81$, SD = 1.38) or a helpless event ($M_{competence} = 3.75$, SD = 2.21; both p's < .001). On the other hand, they experienced a greater loss of control if they had written about a helpless event ($M_{competence} = 5.35$, SD = 1.95) vs. a neutral event ($M_{baseline} = 1.60$, SD = 1.24) or a lonely one ($M_{sociality} = 4.10$, SD = 2.09; p's < .001). No other effects were significant (all p's > .10).

Anthropomorphizing Tendency Manipulation Check. Next, we averaged responses to the five product anthropomorphizing items to form a general anthropomorphizing tendency score ($\alpha = .85$). As expected, participants engaged in greater anthropomorphizing when they experienced a need for sociality or a need for competence ($M_{sociality} = 1.94$, $M_{competence} = 1.96$) compared to the baseline ($M_{baseline} = 1.51$), ps < .05.

Subjective Vitality. Our key prediction involved the vitality comparison for anthropomorphism vs. non-anthropomorphism conditions. We argued that providing lonely or helpless consumers with an opportunity to anthropomorphize a product should result in a vitality increase vs. those who did not have such an opportunity. However, no such difference in vitality should be observed for individuals in the baseline condition (i.e., participants who wrote about a neutral event). Note that we do not have an apriori prediction as to the vitality comparison for baseline vs. the two motivation conditions (sociality and competence). In the latter conditions, initial levels of vitality are presumably low because of the lack of connectedness or competence

respectively; it is an empirical question as to whether the product anthropomorphism task, even though it should enhance vitality, restores it to baseline levels.

Indeed, a 3 × 2 ANOVA revealed a main effect of motivation type, such that participants in the baseline condition reported a significantly higher level of vitality ($M_{baseline}$ = 5.41, SD = 1.18) than those who had been induced to feel lonely ($M_{sociality}$ = 4.52; SD = 1.31) or helpless ($M_{competence}$ = 4.72; SD = 1.27), $F(2, 172) = 7.14$, $p < .01$. Thus, even after receiving the opportunity to anthropomorphize a product, those initially made to feel lonely or helpless still did not feel as vitalized as those in the baseline condition where these needs had not been thwarted in the first place. The 3 × 2 interaction was not significant, $F(2, 172) = 1.39$, $p = .25$.

Our key focus, however, consisted of the improvement in vitality for sociality- and competence-deficient participants as a function of the two different tasks: anthropomorphizing task vs. non-anthropomorphizing task. We predicted that for both sociality- and competence-deficient participants, there should be an increase in vitality when participants engaged in a product anthropomorphizing vs. non-anthropomorphizing task. Thus, these two motivation conditions (sociality and competence) were pooled after contrasts showed no differences between these two conditions (cf. Jonas et al., 1997; Sengupta and Johar, 2002). Then, a 2 (motivation: activated vs. non-activated) × 2 (task: anthropomorphism vs. non-anthropomorphism) ANOVA was carried out and results revealed a marginally significant interaction, $F(1, 174) = 3.04$, $p = .083$. Planned contrasts showed that individuals for whom either a sociality or competence motive was activated by writing about a lonely or helpless experience, subjective vitality was heightened after engaging in a product anthropomorphism task (M_{anthro} = 4.93) vs. a non-anthropomorphism task ($M_{non\text{-}anthro}$ = 4.38; $F(1, 174) = 5.97$, $p = .016$). In contrast, the planned comparison in the baseline motive revealed similar vitality

across anthropomorphism (M_{anthro} = 5.33, SD = 1.20) and non-anthropomorphism task conditions ($M_{non\text{-}anthro}$ = 5.47, SD = 1.17; F <1). This suggests that the vitality change in sociality and competence motivation conditions was not driven by task-based differences (e.g., one task being more interesting than the other). Overall means of all conditions are reported in the web appendix.

Thus, study 1 showed that for people whose sociality or competence needs are thwarted performing a product anthropomorphism task replenishes consumers' vitality more than performing a neutral task. These results are consistent with our underlying premise that product anthropomorphism serves as a means of need fulfillment and consequently boosts vitality. However, given that the result in this study was marginal, we provide additional evidence in study 2.

The findings of study 1 are also worth considering in the context of recent research (Mourey et al. 2017) which shows that lonely consumers who are given the opportunity to interact with anthropomorphic products (such as a vacuum cleaner depicted in a humanlike way) as opposed to non-anthropomorphic products are subsequently less likely to engage in social behaviors (such as spending time with friends). The two investigations offer complementary insights: while Mourey et al. (2017) focus on how the fulfillment of a sociality need through anthropomorphic products reduces one's desire for real social contact (i.e., fulfilling the salient sociality goal through one means reduces the attractiveness of another means to the same goal), the current research focuses on a positive consequence of anthropomorphism-based need fulfillment: namely, increased vitality. The two inquiries differ in several other significant aspects as well: a) Mourey et al. (2017) focused exclusively on the sociality motive, whereas the current research examines the effects of anthropomorphizing products when people have a sociality

motive or a competence motive; b) a different downstream consequence of such anthropomorphism-induced revitalization is examined in study 3 (i.e., improved self-control).

STUDY 2:

Study 2 sought to replicate the findings from study 1 with two major additions. First, study 2 provided insights into the underlying process by assessing participants' sense of belonging and competence both after the initial manipulation of loneliness/helplessness and then again after a product task in which participants anthropomorphized versus not. According to the proposed conceptualization a product anthropomorphism task should assuage participants' initial sense of low belonging/competence more than a non-anthropomorphism task. Second, in this study all participants were exposed to the same product. However, in one case they were encouraged to anthropomorphize it and in the other they performed a different task with the same information. This created greater equivalence between the anthropomorphism and non-anthropomorphism conditions by keeping the information participants received constant.

Methods and Procedure

This study used a 2 (motivation: sociality vs. competence) × 2 (intervening task: anthropomorphism vs. non- anthropomorphism) between-subjects design. A total of 295 MTurkers (170 females, M_{age} = 41.29 years) participated for a small payment.

Motivation Manipulation and Measure of the Sense of Belonging/Competence at Time 1. We manipulated sociality and competence motivation as in study 1. That is, participants wrote about an experience that had made them feel lonely or helpless, respectively. Next, those in the sociality condition reported the extent to which they felt low in belonging at that moment,

whereas participants in the competence conditions reported the extent to which they felt incompetent at that moment along scales that ranged from 1 (*not at all*) to 7 (*very much*). These items served as a pre-measure of belongingness and competence; the same items were also administered later, as described below.

Manipulation of the Opportunity to Anthropomorphize. The second study involved completion of a product task in which the instructions either facilitated the tendency to anthropomorphize or detracted from it. Specifically, all participants were exposed to an information flyer about a new car. The flyer comprised of a photograph and attribute descriptions of the car. Participants in the *anthropomorphism* condition were told to imagine the car coming to life as a person and were asked to describe their thoughts about that "person" (Aggarwal and McGill 2012). In contrast, participants in the *non-anthropomorphism* condition were told to focus on remembering the product attributes with the goal of recalling them afterwards. The memorization focus was expected to hinder the tendency to anthropomorphize. Following the product task, participant responded to an anthropomorphizing tendency measure using two items ("the car seems like a person", "the car seems alive"; $\gamma = .91$) on a 7-point scale anchored at 1 (*not at all)* and 7 (a *lot*).

Measure of Vitality and the Sense of Belonging/Competence at Time 2. Participants then indicated how much vitality they were experiencing by responding to three items ("I have energy and spirit at this time", "I feel alive and vital right now", "I feel energized at this moment") along scales anchored at 1 (*not at all true*) and 7 (*very true*). After this, participants in the sociality condition indicated how much they felt they were not belonged whereas those in the competence condition indicated how incompetent they felt using post-measures that were identical to the pre-measures taken earlier. Finally, participants were reminded of the product

task they had engaged in, and asked to report the amount of effort they spent on that task and how tiring they found it along scales that ranged from 1 (*no effort/not tiring at all)* to 7 (*tremendous effort/very tiring*). They then provided demographic details, were thanked and paid.

Results

Motivation Manipulation Check. Two judges (blind to the assigned conditions) independently read participants' life experiences and rated them to determine the level of loneliness and helplessness participants had expressed, along scales that ranged from 0 (*not at all*) to 10 (*very much*). An analysis of their averaged ratings showed that stories written by participants in the sociality condition were rated as more lonely than those in the competence condition (M's = 5.89 vs. 1.53, $F(1, 291) = 810.49$, $p < .001$), whereas the latter wrote stories that seemed to reflect more helplessness than the former (M's = 6.27 vs. 2.42, $F(1, 291) = 496.76$, $p < .001$). These results suggest that the motivation manipulation was successful.

Anthropomorphizing Tendency Manipulation Check. As expected, participants in the anthropomorphism condition viewed the car as more humanlike ($M_{\text{anthro}} = 4.86$, SD = 1.68) than those in the non-anthropomorphism condition ($M_{\text{non-anthro}} = 1.94$, SD = 1.29), $F(1, 291) = 272.60$, $p < .001$, $d = .48$.

Vitality. Replicating the findings of study 1, an analysis of the vitality index as a function of motivation and task type revealed that participants in the anthropomorphism condition reported greater vitality ($M = 4.91$, SD = 1.43) than those in the non-anthropomorphism condition ($M = 4.37$, SD = 1.70), $F(1, 291) = 8.73$, $p = .003$, $\eta_p^2 = .03$. This effect was not contingent on motivation type ($F < 1$) and held for both sociality-motivated people and competence-motivated people. A regression analysis also provided support for the beneficial

effect of anthropomorphism: across conditions, the greater the degree of anthropomorphism, the higher the vitality participants experienced ($b = .26$, $p < .001$).

Pre/Post-Task Assessment of Belongingness. Recall that pre and post measures of belongingness were assessed for participants who received the sociality manipulation. For these participants, the extent to which the belongingness need was satisfied as a function of task type was assessed by a repeated-measures ANOVA with task-type serving as the independent variable. A marginally significant two-way interaction of measurement time and task type, $F(1, 161) = 2.90$, $p = .09$, $\eta_p^2 = .02$) was obtained suggesting that the task they performed had an effect on their feelings of belongingness. Specifically, within-subjects comparisons showed that lonely participants' initial feeling of *low-belongingness* was alleviated to a greater extent when they had completed the anthropomorphism task ($M_{\text{anthro-post}} = 2.67$ vs. $M_{\text{anthro-pre}} = 3.21$, $F = 22.11$, $p < .001$) than when they had completed a non-anthropomorphism task ($M_{\text{nonanthro-post}} = 3.08$ vs. $M_{\text{nonanthro-pre}} = 3.29$, $F = 2.34$, $p = .13$).

Pre/Post-Task Assessment of Competence. A similar analysis was conducted on the pre and post measures of competence for those respondents who received the competence motivation, which revealed a significant two-way interaction of measurement time and task type, $F(1, 130) = 17.49$, $p < .001$. Specifically, within-subjects comparisons showed that helpless participants' initial feeling of *low-competence* was alleviated more when they had completed the anthropomorphism task ($M_{\text{anthro-post}} = 2.38$ vs. $M_{\text{anthro-pre}} = 3.53$, $F = 30.07$, $p < .001$) than when they had completed the non-anthropomorphism task ($M_{\text{nonanthro-post}} = 2.78$ vs. $M_{\text{nonanthro-pre}} = 2.67$, $F < 1$).

In sum, engaging in product anthropomorphism alleviated lonely/helpless consumers' initial lack of connection/competence, as compared to an equivalent product task that did not

facilitate anthropomorphism. It is also worth noting that ancillary measures showed that the two product tasks did not differ in terms of effort spent on the task, or on how tiring it was ($ps > .22$).

Discussion

Study 2 replicated the effects of anthropomorphism on consumer vitality and showed that the effect was not due to any idiosyncrasies in the content of the information participants received since they all received the same product information. The only difference was in what they did with it.

The additional process measures in study 2 (i.e., the pre and post measures) illuminated why engaging in product anthropomorphism has these beneficial effects. In line with the proposed conceptualization of goal-fulfillment, results revealed that product anthropomorphism satisfied fundamental underlying needs of competence and belonging. Those experiencing initially low levels of belonging or competence experienced a restoration of these states when they engaged in anthropomorphism than when they did not.

An alternate account would suggest that, when people are lonely or helpless, engaging in product anthropomorphism improves their overall mood, and that vitality enhancement is simply a manifestation of this improvement in overall mood, rather than arising from an alleviation of the specific needs of sociality and competence. This alternate could be ruled out, however, if a different task (one that does not involve anthropomorphism) were to improve mood but not vitality. We used this reasoning to test the alternate account in a follow-up study, which is reported briefly here in the interests of space (full details available from the authors). Student participants first wrote about an experience that made them feel helpless (only the competence motive was examined in this study). Then, they reported either their overall mood or vitality as

the dependent variable. The same measure was administered once again after participants had engaged in either a task involving product anthropomorphism or alternately a mood-uplifting word association task (a commonly used positive mood induction method in prior literature; Isen, Daubman, and Nowicki 1987). Results showed that overall mood improved over time across task type ($M_{pre} = 3.69$, $M_{post} = 4.07$, $p = .03$). Further, this change in overall mood was equivalent for the product anthropomorphizing task ($M_{anthro\text{-}pre} = 3.72$, $M_{anthro\text{-}post} = 4.12$, $M_{Diff} = 0.40$) and the positive word-association task ($M_{posword\text{-}pre} = 3.66$, $M_{posword\text{-}post} = 4.02$, $M_{Diff} = 0.36$), $F < 1$. Interestingly, however, engaging in the product anthropomorphism task increased vitality ($M_{anthro\text{-}pre} = 4.46$, $M_{anthro\text{-}post} = 4.64$, $M_{Diff} = 0.18$) whereas engaging in the mood-uplifting word association task actually decreased vitality ($M_{posword\text{-}pre} = 4.62$, $M_{posword\text{-}post} = 4.04$, $M_{Diff} = –0.58$) $F(1, 111) = 8.57$, $p < .01$. Note that the word association task actually affected vitality negatively ($M_{Diff} = –0.58$ was significantly lower than zero, $p = .02$), although it affected mood positively. These results strongly suggest that mood and vitality are different constructs, as past research on self-determination theory also indicates (Nix et al. 1999). Thus, the positive influence of anthropomorphism on vitality in our studies is unlikely to have resulted from a simple improvement in overall mood. Rather, consistent with self-determination theory, satisfaction of the specific needs of competence and sociality is required to enhance vitality. Product anthropomorphism appears to do just that.

STUDY 3:

The previous studies have shown that anthropomorphizing a product has beneficial effects on consumers. Specifically, those who are low in sociality or competence experience an increase in vitality after they anthropomorphize a product. Is this vitality improvement consequential? Past

research shows that experiencing a state of vitality makes people feel capable both mentally and physically (Ryan and Frederick, 1997). Thus, people with high vitality tend to cope better with stress, be less vulnerable to illness (Penninx et al., 2000) and possess greater regulatory strength (Laran and Janiszewski, 2011). The final study examined one of the positive implications of vitality, which is particularly relevant to consumer behavior: improved self-control (Chen and Sengupta, 2014). We predicted that for lonely and helpless people, the replenished vitality arising from the process of product anthropomorphism should increase consumers' self-control in a subsequent task.

Methods and Procedure

A total of 290 American MTurkers (199 females; M_{age} = 41.59 years) participated in Study 3, which used a 2 (motivation: sociality vs. competence) × 2 (intervening task: product anthropomorphism vs. non-anthropomorphism) between-subjects design.

As in studies 1 and 2, participants first completed a recall task to activate different motivations. They were then introduced to the second study in which they were either given a task that allowed them to anthropomorphize versus one that did not. Participants in the *anthropomorphism* condition were introduced to a courier service provider named Sendy. They were told to imagine that Sendy had come to life as a person, and were asked to think of the sort of "person" Sendy would be (Aggarwal and McGill 2012). They then rated the extent to which Sendy "seems alive", and "feels like a person" along scales anchored at 1 (*not at all*) and 7 (*a lot*). Responses to these two items were averaged to form an index of the extent of anthropomorphizing (γ = .95). They also rated the brand Sendy along several personality dimensions as part of the anthropomorphism manipulation. Participants in the *non-*

anthropomorphism condition did not perform this task and were instead asked to type out a short passage taken from a biology journal. This passage was chosen because it was neutral and unrelated to anthropomorphism.

After completing the second task, participants reported their vitality as in study 2. They also completed a food choice task that served as the measure of self-control. Participants were told to imagine that they were hungry and had to choose between a fruit salad (healthy option) and a chocolate cake (indulgent option). They indicated their inclination to choose one or the other snack from 1 (*definitely cake*) to 9 (*definitely fruit salad*). A greater inclination to choose the salad reflects greater self-control (Sengupta and Zhou 2007).

Given that the primary dependent variable pertained to food and the fact that the study was conducted using an online panel in which participants completed the study in a self-administered manner at different points of the day, fatigue could have influenced their choice of calorie-rich food. Therefore, a pre-measure of fatigue along a scale anchored at -5 (*very tired*) and 5 (*very energized*) was taken at the beginning of the experiment and used as a covariate in all the analyses reported below.

Results and Discussion

Nineteen participants were excluded from the sample because they completed the study on cellphones and could not see a proper display of the food stimuli (n = 7) or failed to complete the writing tasks as instructed (n = 12). This left us with a final sample of 271 participants.

Manipulation Check for Motivation. As in study 2, two judges independently read participants' life experiences and rated them to determine the level of loneliness and helplessness expressed along scales from 0 (*not at all*) to 10 (*very much*). As expected, stories written by

participants in the sociality condition were rated as expressing more loneliness than those in the competence condition (*M*'s = 6.14 vs. 1.79, $F(1, 269) = 704.62$, $p < .001$), whereas the latter wrote stories showing more helplessness than the former (*M*'s = 6.56 vs. 2.61, $F(1, 269) = 488.35$, $p < .001$).

Product Anthropomorphism. An analysis of the anthropomorphism conditions showed that sociality-motivated participants and competence-motivated participants did not differ in their general anthropomorphizing tendency (*M*'s = 4.94 vs. 4.86, $F(1, 135) < 1$). Importantly, both were significantly higher than the scale midpoint (3.5), *t*'s > 3.92, *p*s < .001.

Subjective Vitality. For both sociality- and competence-deprived individuals, a task that involves anthropomorphism should restore vitality levels more than a neutral task. An analysis of motivation and task type (controlling for participants' fatigue) yielded a significant main effect of task type, $F(1, 266) = 18.35$, $p < .001$, $\eta_p^2 = .07$. Participants reported higher vitality after engaging in a product anthropomorphism task (*M* = 4.99) than a non-anthropomorphism task (*M* = 4.38). This effect was not contingent on motivational state, $F(1, 266) = 1.43$, $p = .23$, suggesting that increases in vitality-induced anthropomorphism were evident for both sociality and competence-motivated participants.

Self-Control Performance. Participants in the anthropomorphism condition indicated a higher intention to choose salad (healthy option) over cake (indulgent option) than those in the non-anthropomorphism condition (*M*'s = 5.92 vs. 5.20, $F(1, 266) = 3.55$, $p = .06$, $\eta_p^2 = .01$) reflecting better self-control. This effect was not contingent on motivational state ($F < 1$), and held across both conditions. Moreover, a mediation analysis using boot-strapping procedures (Hayes, 2013) found a significant indirect effect of vitality (*indirect effect* = 0.08, *SE* = 0.05, 95% CI: [.01, .20]).

Thus, study 3 replicated the findings of previous studies and showed that individuals with a deficient sense of sociality or competence (i.e., those who felt lonely or helpless) experienced a greater replenishment of vitality after engaging in a product-anthropomorphizing task than after a neutral task. Moreover, this increase in vitality had a beneficial consequence in a subsequent task, as evident in greater resistance to tempting food (i.e., improved self-control). Mediation analyses showed that the improved self-control was driven by heightened vitality.

GENERAL DISCUSSION

Evidences from three studies show individuals with a deficient sense of sociality or competence (i.e., those who felt lonely or helpless) experience greater vitality after engaging in a product-anthropomorphizing task than after a neutral task (studies 1-3). Such restorative effect of anthropomorphism on vitality is due to the fulfillment of the need for sociality for lonely people, and need for competence for helpless people (study 2). Furthermore, the enhanced vitality enables consumers to exert better self-control in a subsequent task (study 3). These findings make three specific contributions.

First, these results contribute to the psychology literature by providing evidence for critical assumptions underlying the motivational view of anthropomorphism. Thus, while the research conducted by Epley and his colleagues (Epley et al. 2007, 2008a, 2008b; Waytz et al. 2010) has been of enormous value in identifying the motives that drive anthropomorphism (the need for sociality and the need for competence), the current work provides the logical next step in examining whether anthropomorphism does indeed fulfill these needs, and if so, the consequences thereof. Our inquiry shows that anthropomorphism does actually restore initially-deficient states of connectedness and connectedness, supporting the motivational account.

Further, such restoration then benefits the anthropomorphizer's psychological well-being, in the shape of improved vitality.

Second, this research contributes specifically to the consumer literature on anthropomorphism. Research in this area has focused on how the act of anthropomorphism influences product attitudes and perceptions (Aggarwal and McGill, 2007; Hur et al. 2015; Puzakova et al. 2013). Only recently have researchers started to look at how consumers might be affected through anthropomorphism (Mourey et al. 2017). By drawing on the motivational view of anthropomorphism and its emphasis on the antecedent needs that drive this behavior, the current work documents the vitality benefit that lonely and/or helpless consumers can obtain from anthropomorphizing their products. Product anthropomorphism thus serves to heighten consumers' general sense of well-being, lending support to the broad argument that, in a materialistic world, a possession takes on a relationship-based role that transcends the purely functional (Belk 1988).

Third, the current research contributes to the literature on self-determination theory and vitality. We document a novel antecedent of heightened vitality; namely, individuals who are currently feeling insufficient connectedness or competence can regain vitality simply by engaging in product anthropomorphism. Indeed, we hope that our focus on vitality drives further interest in this area; the construct of vitality has been largely under-represented in the consumer literature (for a recent exception, see Chen and Sengupta 2014). This neglect is particularly surprising given the many positive consequences associated with vitality, such as task persistence, creativity, and even better health (Chen and Sengupta 2014; Penninx et al. 2000; Ryan and Frederick 1997). Thus, an interesting avenue for further research lies in investigating these additional benefits of product anthropomorphism–consumers do seem to engage in

anthropomorphism quite often, suggesting that there are multiple benefits of doing so.

Other opportunities to extend the implications of the current work are worth noting. For example, future research could investigate when increases in vitality are more likely via product anthropomorphism. One possible boundary condition is the type of product being anthropomorphized. Our conceptualization of how product anthropomorphism influences vitality suggests that the effect emerges from a form of goal-directed action that enables currently deprived needs to be fulfilled through anthropomorphism. However, not all types of product have the capacity to fulfill the needs. If the target product is deemed ineffective in fulfilling the activated need (whether that be sociality or competence) consumers should be less likely to anthropomorphize the product. As a result, the anthropomorphism-induced vitality increase should be absent.

We report two supplemental studies in web appendix (studies 4A, 4B) that support such a conjecture. We find that chronically lonely people, whose desire for social connection is high are more willing to anthropomorphize a clock that is positioned as being friendly (vs. unfriendly) and this positioning confers the expected vitality advantage. Similarly, chronically helpless people, whose desire for control is high, are more willing to anthropomorphize a fitness tracker that seems to be easy to control (vs. difficult to control), and vitality is indeed higher in the former condition than in the latter. In sum, consistent with the principles of motivated behavior, the positive impact of anthropomorphism on consumer vitality is evident only when the product to be anthropomorphized fits with the anthropomorphizer's activated need. It would be interesting to examine other theoretically-derived moderators for the effects presented here.

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