

Improving User's Well-being Through Leveraging Attachment to Interactive Products

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As smart technologies are advanced, interactive products are being more and more developed like person to person interaction than person to product interaction. More attention has to be paid to product attachment because interactive products are designed as human agent. However, few studies have been conducted to address the interaction between user and product based on interpersonal relationship. Therefore, this study attempts to figure out what user's attachment to interactive products can be formed and how the findings could help design practitioners increase user's well-being. As a first step of the study, literature review was conducted. According to that, studies on product attachment have focused on the determinants of product attachment. However, there are four different attachment types in psychology. It was also found that attachment is a contributor of people's well-being. Based on the findings from literature, this study discusses the contributions of the study and follow-up studies.

Keywords: *attachment, product attachment, attachment type, interactive products, sustainability, AI speakers*

1 Introduction

As technology develops and society diversifies, manufacturers are increasingly producing a variety of products. Companies are also trying to investigate how to increase consumer's attachment, defined as "the strength of the emotional bond experienced with a specific product" (Mugge, Schoormans and Schifferstein, 2005), to their products. It is because consumers value a product more when they are attached to the product. This allows users to use the product more carefully, care better, and use it for longer (Mugge, Schoormans and Schifferstein, 2005). It also prevents their products from being replaced with other products and indirectly increases brand loyalty (Pedeliento, Andreini, Bergamaschi and Salo, 2016). In this phenomenon, consumer's attachment to product is largely one way to help not only enhance the user-product relationship, but also increase sustainability by extending the product lifecycle (Hemel and Brezet, 1997). In other words, it helps for sustainability by increasing product longevity (Page, 2014).

Since product attachment is considered to be an important factor for society and company, much attentions have been paid to product attachment in design research. The focus was mainly on how attachment to a product is formed and how it can be measured. The studies have also identified determinants that affect product attachment and have provided design

strategies for design practitioners. In addition, studies in the field of HCI have also taken product attachments into consideration as a means of enhancing user experience with interactive products. However, an understanding of product attachment from the studies is limited to the degree to which it is strong or weak only (Klein and Baker, 2004; Schultz, Klein, and Kernan, 1989).

Unlike the product attachment, there are several different types of attachment (also called 'attachment style') in interpersonal relationships: attachment is originally derived from psychology. According to Bartholomew's adult attachment model (1990), attachment types are classified into four categories: secure attachment, preoccupied attachment, fearful attachment and dismissing attachment, depending on the positive or negative model of interpersonal relationships.

If the classification of attachment in psychology can be applied to product attachment, an in-depth understanding of the attachment between user and interactive products would be possible. In addition to that, attachment in person to person relationship can be a contributor to human well-being. For example, secure attachment is more likely to lead to well-being of a person while fearful attachment is transformed to secure attachment by providing proper treatments. Therefore, if analogy is identified between person-product attachment and attachment in interpersonal relationship, we could contribute to user's well-being by providing an in-depth understanding of attachment with design practitioners.

In order to apply bilateral relations like the attachment of human relations, this research focuses on interactive products that are more associated with person-to-person-like interaction. In other words, if no interaction is made between a product and the user, we cannot expect an analogy like person to person relationship. That is, a best target type of product is interactive products that act like a person. Considering smart technologies are rapidly emerging and the demand for products that can interact like human more and more increases, the study would deserve to pursue. In order to achieve the goal of the study, research questions are formulated: first, we will examine whether the attachment type classification in psychology can be applied to product attachment. Second, we will examine the correlation between types of product attachment and types of attachment in human relationships. If two correlations are significant, we will, lastly, investigate how designing interactive products could relieve the deficiencies of attachment in interpersonal relationships.

2 Literature review

In order to gain an understanding of product attachment, an in-depth literature review was conducted addressing what product attachment is, how it is formed, how it is measured, and design implications and limitations. Regarding attachment in interpersonal relationship, we also carried out the same study but in the field of psychology with questioning how attachment has been classified in psychology, how to transform a fixed type of attachment, and how they affect human well-being.

2.1 Attachment in the user-product interaction

2.1.1 Product attachment

Although the definition of product attachment is slightly different between studies, product attachment is commonly defined as the strength of emotional bonding that a user experiences with a product (Schifferstein, Mugge and Hekkert, 2004; Schifferstein and

Pelgrim, 2008). It means that product attachment is represented as a degree of difference (Klein and Baker, 2004; Schultz, Kleine and Kernan, 1989).

2.1.2 The determinants and measurement of product attachment

Many studies have examined how people get attached to things (Ball and Tasaki, 1992; Klein and Ellen, 1995; Schifferstein, Mugge and Hekkert, 2004; Schultz, Klein and Kernan, 1989; Wallendorf and Arnould, 1988). One of the studies revealed four determinants of product attachment pleasure, self-expression, group affiliation and memories (Mugge, Schoormans and Schifferstein, 2008). Another study, done in the field of consumer behavior, suggested that the reason why we attach to products is because it helps us to define, maintain and enhance ourselves. As a result of the study the authors presented four facets of consumer self: diffuse self, private self, public self, and collective self (Schifferstein and Pelgrim, 2008). They also explored the seven possible determinants that can predict product attachment: enjoyment, memories, self-identity, life vision, utility, reliability, and market value. Through experiments they identified only enjoyment and memories as significant factors that contribute to product attachment.

So how can we measure the attachment to a product? According to the article 'Consumer-Product Attachment: Measurement and Design Implications (Schifferstein and Pelgrim, 2008)', they developed a scale that can measure product attachment based on the components of product attachment such as irreplaceability, indispensability, and self-extension. More specifically, irreplaceability means to have symbolic meaning such as feeling differently even though it is physically same product. Indispensability tells you if the product cannot be missed. Self-extension refers to whether the product feels like part of the user.

2.1.3 Design implications and limitations of the research

As we can see above, in design research of product attachment, the focus has been on exploring ways to 'strengthen' emotional bonding between users and their products through design. To do so, they identified determinants that affect attachment and also suggested design strategies that increase those determinants (Mugge, Schoormans and Schifferstein, 2008; Schifferstein and Pelgrim, 2008). For example, designers can incorporate elements of surprise into their products as a design strategy in order to inspire enjoyment (Schifferstein and Pelgrim, 2008). However, such suggestions are still unclear about how to better design if product attachment is the case. For instance, memory as one of the determinants is hard to control by the designer and also pleasure disappears over time (Schifferstein and Pelgrim, 2008).

There are also several studies in the HCI research whose focus is on product attachment. One of the studies has analyzed the people's attached digital products in the home (Odom, Pierce, Stolterman, Blevins; 2009). To strengthen an attachment using personal inventories, the study discovered the four relationship clusters of human-product relationship: engagement, histories, augmentation, and perceived durability. Another study also used personal inventories used in Odom's framework of attachment categories (Gegenbauer, Huang; 2012). In the study, they investigated the approach to longer the usage of technological interactive product.

2.2 Attachment in the interpersonal relationship

2.2.1 Attachment type

Attachment theory was developed by the psychologist John Bowlby (1969). In psychology, a typical definition of an attachment is “an emotional bond where a person seeks proximity to the attachment object and uses them as a safe haven during times of distress and as a secure base from which to explore the world” (Fraley, 2019). In interpersonal relationship, several types of attachment have been defined, which is called ‘attachment style’ in psychology: however, we use ‘type’ instead of ‘style’ because ‘style’ contains aesthetical meaning in the field of design. Attachment type is influenced by the relationship with caregivers when they are infants (Ainsworth, Blehar, Water and Wall, 1978). This type of attachment thus formed affects their relationships with others who they associate with until they become adults.

If so, how different have attachment types been between studies? Typically, there are two representative methods of classification. First, Ainsworth and her colleagues (1978) experimented with attachment types by creating a situation called “strange situation”. In this situation, the child experiences a situation where he separated with the caregiver and then reunited. Through this experiment, secure attachment, avoidance attachment, and anxiety-resistant attachment are classified according to the child’s reaction and stress level when they are separated from each other and when they meet again. Second, according to Bartholomew’s adult attachment model (1991), attachment types are classified as secure attachment, preoccupied attachment, fearful attachment, and dismissing attachment, depending on the positive or negative model of self and others (Bartholomew and Shaver, 1998) (see Figure 1).

		MODEL OF SELF (Dependence)	
		Positive (Low)	Negative (High)
MODEL OF OTHER (Avoidance)	Positive (Low)	SECURE Comfortable with Intimacy and autonomy	PREOCCUPIED Preoccupied with relationships
	Negative (High)	DISMISSING Dismissing of intimacy Counter-dependent	FEARFUL Fearful of intimacy Socially avoidant

Figure 1. Bartholomew’s four-category model of adult attachment types in terms of model of self and other (1991).

2.2.2 Attachment and human well-being

Exploring the correlations between attachment types and people’s lives, studies of adult attachment types have proven that having a secure attachment is important for people’s well-being (La Guardia, Ryan, Couchman and Deci, 2000). For example, those classified as

secure attachment showed little emotional distress and negative affect (Simpson, 1990), fewer physical symptoms (Hazan and Shaver, 1990), and less fear of death (Mikulincer, Florian and Tolmacz, 1990). In addition, some studies have found that secure attachment is a predictor of well-being. One study found that an attachment style predicts an adult's romantic relationship and that attachment is correlated with self-esteem (Feeney and Noller, 1990). Furthermore, other studies include the attachment style and the vulnerability of depression (Murphy and Bates, 1997) and the intimacy of friend (Grabill and Kerns, 2000). For example, those with secure attachment tend to be less depressed and more intimate with their friend than those who did not.

2.2.3 Transformation of fixed attachment

Attachment types can change over time. For example, it can be changed by specific events such as relationship breakups (Sbarra and Hazan, 2008; Kirkpatrick and Hazan, 1994). Since stable attachment has a good effect in human well-being, it is required to change the unsecure attachment securely. Various solutions have been suggested to stabilize attachment. The most promising solution for this is the attachment security enhancement model (ASEM) (Arriaga, 2017). According to ASEM, it is necessary to promote secure model of self for people with high anxiety to revise insecurities and to promote secure model of others for people with high avoidance. In order to stabilize the self-model, situations to promote self-confidence can be enhanced by raising self-worth or increasing independence. In order to stabilize the other-model, promoting positive aspects of dependence through situations that feel intimacy or rewarding when they receive support will reduce distrust and distance to others. Thus, continuous and frequent interaction in a therapeutic direction is important for stabilizing attachment (Fraley, 2019).

3 Discussion and follow-up study

To sum up, product attachment is catching more and more attention as something that companies and designers should pursue. In addition to that, products are getting smarter and smarter like human thanks to advanced technologies. In this trend, many design studies have been exploring attachment, but this attachment is defined only as a 'degree of difference'. Thus, this study attempts to provide a holistic picture of attachment between user and interactive product by adopting attachment in interpersonal relationship. As the first step of the study, literature review was conducted to see how attachment in interpersonal can be used for designing interactive products in order to contribute to human well-being.

When we looked at product attachment, we were able to discover the limitations of current research. The limitations are that they define attachment as a single meaning and that they use only the determinants of attachment as a way to enhance attachment. To overcome these limitations, it is necessary to diversify the attachment rather than merely one-dimensionally understand it. As a way to do that, we will further diversify product attachment using attachment in interpersonal relationships, which is the origin of the word attachment.

From the literature review on interpersonal relationships to be application to product attachment, we have found the following possibilities. Firstly, human attachment has a great influence on our lives. We have seen many studies that attachments make a significant impact to human well-being, particularly secure attachment. Secondly, the attachment in psychology can change and therapies exist to change it stably. Therefore, if we can steadily change the attachment of a person, it could contribute to increase human well-being.

Through the literature review of attachment in design, HCI research, and psychology, two possibilities were identified. First, unlike human to product attachment, there are several types of attachment in human to human attachment. If the product attachment can be typified by diversifying it as in the interpersonal relationship, a more detailed understanding of user-product relationship will be provided. Second, if we put the therapies that stabilize the attachment of human relationships into user experience with products or services, we will be able to contribute not only strengthening the product attachment but also increasing human well-being.

To explore these possibilities, further studies are designed as below (see Figure 2):

First, we will examine whether product attachment can be typified, such as attachment in human relationships. To do this, we will apply the method of classifying the attachment type used in psychology to the product. Second, if so, we will see how the attachment of a person to a product and the attachment to a human being have a correlation. To explore this, we will measure both human attachment and product attachment and then compare the two. Third, we will also see how these findings can help a person's attachment. In order to do this, we will apply the treatment of human attachment to product design to make the attachment stable for the well-being of the people.

The more specific methods are: First, a questionnaire and an interview will be conducted by modifying the attachment measurement method used in psychology for product attachment. In particular, it would be appropriate to use four adult attachment models of Bartholomew. This is because it will target adults who use the product, and unlike other methods of attachment categorizations, it is composed of two dimension which enables us to understand more detail way. Next, a designer workshop will allow design practitioners to apply attachment therapy to product design.

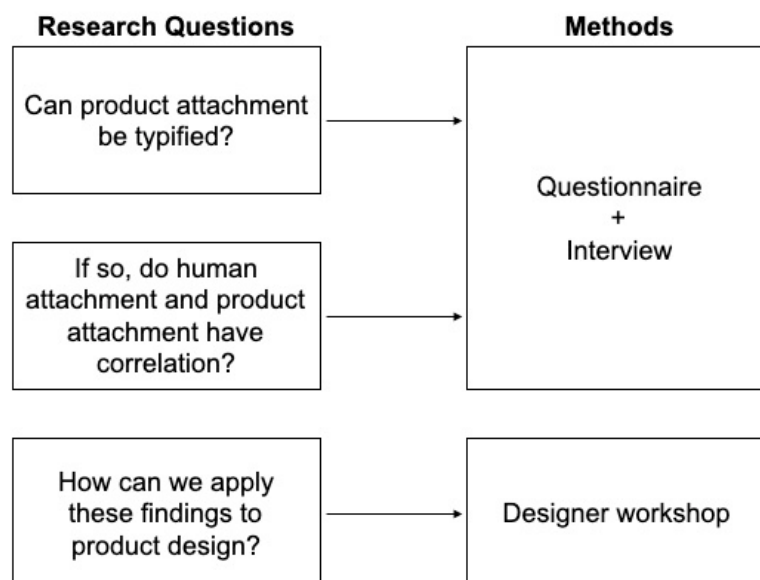


Figure 2. Experiment design adopted in the main study

For the study, an interactive product should be selected. This is because the attachment to human relationships comes from the 'relationship' with the other party, so targeting an interactive product that creates "bilateral relations" through more active, two-way communication with products is suitable for this study. Specifically, it will be artificial

intelligence speakers, which are a relevant example of emerging interactive technologies. Since they give the impression that users are communicating with person, this would be appropriate for the user to personify the product and evaluate it by applying the interpersonal relationship. To this end, subsequent studies will explore deeply about interactive products covered by HCI domain, especially AI. Also, considering artificial intelligence products are becoming increasingly popular in the market, this study will provide useful insights about better designing products or services with artificial intelligence.

References

- Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation*.
- Arriaga, X. B., Kumashiro, M., Simpson, J. A., & Overall, N. C. (2018). Revising working models across time: Relationship situations that enhance attachment security. *Personality and Social Psychology Review*, 22(1), 71-96.
- Ball, A. D. and Tasaki, L. H. (1992). The role and measurement of attachment in consumer behavior. *Journal of Consumer Psychology*, 1(2), 155–172.
- Bartholomew, K., & Horowitz, L. M. (1991). Attachment styles among young adults: a test of a four-category model. *Journal of personality and social psychology*, 61(2), 226.
- Bartholomew, K., & Shaver, P. R. (1998). Methods of assessing adult attachment. *Attachment theory and close relationships*, 1998, 25-45.
- Bowlby, J. (1969). Attachment and loss: volume I: attachment. In *Attachment and Loss: Volume I: Attachment* (pp. 1-401). London: The Hogarth Press and the Institute of Psycho-Analysis.
- Feeney, J. A., & Noller, P. (1990). Attachment style as a predictor of adult romantic relationships. *Journal of personality and Social Psychology*, 58(2), 281.
- Fraley, R. C. (2019). Attachment in adulthood: Recent developments, emerging debates, and future directions. *Annual review of psychology*, 70, 401-422.
- Gegenbauer, S., & Huang, E. M. (2012, June). Inspiring the design of longer-lived electronics through an understanding of personal attachment. In *Proceedings of the Designing Interactive Systems Conference* (pp. 635-644). ACM.
- Grabill, C. M., & Kerns, K. A. (2000). Attachment style and intimacy in friendship. *Personal Relationships*, 7(4), 363-378.
- Hazan, C., & Shaver, P. R. (1990). Love and work: An attachment-theoretical perspective. *Journal of Personality and social Psychology*, 59(2), 270.
- Kirkpatrick, L. A., & Hazan, C. (1994). Attachment styles and close relationships: A four-year prospective study. *Personal relationships*, 1(2), 123-142.
- Kleine, S. S. and Baker, S. M. (2004). An integrative review of material possession attachment. *Academy of Marketing Science Review*, 1(1), 1-39.
- La Guardia, J. G., Ryan, R. M., Couchman, C. E., & Deci, E. L. (2000). Within-person variation in security of attachment: a self-determination theory perspective on attachment, need fulfillment, and well-being. *Journal of personality and social psychology*, 79(3), 367.
- Mikulincer, M., Florian, V., & Tolmacz, R. (1990). Attachment styles and fear of personal death: A case study of affect regulation. *Journal of personality and social psychology*, 58(2), 273.
- Mugge, R., Schoormans, J. P., & Schifferstein, H. N. (2005). Design strategies to postpone consumers' product replacement: The value of a strong person-product relationship. *The Design Journal*, 8(2), 38-48.
- Mugge, R., Schoormans, J. P., & Schifferstein, H. N. (2008). Product attachment: Design strategies to stimulate the emotional bonding to products. In *Product experience* (pp. 425-440). Elsevier.
- Murphy, B., & Bates, G. W. (1997). Adult attachment style and vulnerability to depression. *Personality and Individual differences*, 22(6), 835-844.
- Odom, W., Pierce, J., Stolterman, E., & Blevis, E. (2009, April). Understanding why we preserve some things and discard others in the context of interaction design. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 1053-1062). ACM.
- Page, T. (2014). Product attachment and replacement: implications for sustainable design.
- Pedelliento, G., Andreini, D., Bergamaschi, M., & Salo, J. (2016). Brand and product attachment in an industrial context: The effects on brand loyalty. *Industrial Marketing Management*, 53, 194-206.

- Sbarra, D. A., & Hazan, C. (2008). Coregulation, dysregulation, self-regulation: An integrative analysis and empirical agenda for understanding adult attachment, separation, loss, and recovery. *Personality and Social Psychology Review*, 12(2), 141-167.
- Schifferstein, H. N. J., Mugge, R. and Hekkert, P. (2004). Designing consumer-product attachment. In: D. McDonagh, P. Hekkert, J. Van Erp and D. Gyi (Eds.) *Design and emotion: The experience of everyday things*, pp. 327–331. London: Taylor and Francis.
- Schifferstein, H. N., & Zwartkruis-Pelgrim, E. P. (2008). Consumer-product attachment: Measurement and design implications. *International journal of design*, 2(3).
- Schultz, S. E., Kleine, R. E. and Kernan, J. B. (1989). 'These are a few of my favorite things.' Toward an explication of attachment as a consumer behavior construct. In: T. Scrull (Ed.) *Advances in Consumer Research*, Vol. 16, pp. 359–366. Provo: UT: Association for Consumer Research.
- Simpson, J. A. (1990). Influence of attachment styles on romantic relationships. *Journal of personality and social psychology*, 59(5), 971.
- van Hemel, C. G., & Brezet, J. C. (1997). Ecodesign; A promising approach to sustainable production and consumption. *Paris: United Nations Environmental Programme*.
- Wallendorf, M. and Arnould, E. J. (1988). 'My favorite things': A cross-cultural inquiry into object attachment, possessiveness, and social linkage. *Journal of Consumer Research*, 14(March), 531–547.

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