How and Why Self-production Affects Product Evaluations: The Role of Process Valence and Involvement in Shaping Evaluation of, Attachment to, and Identification with Self-Made Products

by

Sukriye Sinem Atakan

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Doctoral Committee:
Professor Richard P. Bagozzi, Chair
Associate Professor Jeffrey Sanchez-Burks
Associate Professor Carolyn Yoon
Assistant Professor Michael I. Norton, Harvard University

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ABSTRACT

This dissertation explores psychological aspects of participation in the production process of products from a consumer's viewpoint. I investigate how and why participation of consumers in the production process affects evaluation of and relationship with self-made products. Previous literature indicates that participating in the production process of products (self-production), as opposed to simply purchasing the products off-the-shelf, may create additional value for consumers and enhance consumption experience. However, we do not know why and how self-production affects the evaluation of self-made products and shape how consumers relate to self-made products. I use an experimental approach to develop and extend our understanding of self-production processes, how they change meaning of products and create value for consumers.

The dissertation is composed of two essays. The first essay integrates findings from three distinct streams of research (person-object relationship, emotions, and approach versus avoidance) and explores how production process valence affects the person-object relationship. Three studies reveal that process valence differentially affect evaluation of, identification with (hypothesized to be the cognitive dimension of person-object relationship) and attachment to (hypothesized to be the affective dimension of person-object relationship) the products differentially, depending on who makes the product (self

versus another person). Only positive production experiences create value for consumers when they participate in the production process of products that they consume. Moreover, the results show that identification with and attachment to the product explains why self-made products are evaluated more favorably than off-the-shelf products.

The second essay focuses on two distinct types of involvement (physical and intellectual) in the production process. It investigates how the person-object relationship changes depending on whether consumers use mere physical effort, intellectual effort, or both during the production of the product. Three studies reveal that even low levels of physical and/or intellectual involvement in the production process enhance attachment with the product. However, only intellectual involvement increases identification with the product since bare physical involvement, without choice or creativity, does not allow the individual to express his identity through the product. In addition, results indicate that combining physical and intellectual involvement in the production process does not enhance product evaluations more than physical or intellectual involvement alone.

This dissertation contributes to self-production, self-design, co-creation, and extended self literatures. It shows production process valence and type of involvement in the production process affect whether consumers derive value from participating in the production process. Moreover, it identifies identification with and attachment to the self-made products as two distinct but highly correlated aspects of object-person relationship, and operationalizes these concepts in measurable terms. It provides evidence that fit between preferences and self-made products cannot fully explain why self-production creates value for consumers. It highlights the importance of psychological factors that play a significant role in the value creation process.

ESSAY 1

Make it Your Own: How Process Valence Affects Evaluation of Self-Made Products

Abstract

In three studies, we investigated how the production process valence affects the evaluation of self-made products and the specific consequences of participating in the production process. Valence of emotions associated with the production process differentially affected product evaluation and the person-object relationship (identification and attachment), depending on who made the product (self versus another person). Greater identification with, and attachment to, the product explained the higher product evaluations of self-made products.

Modern technology and production methods have enabled consumers to be more involved in the production process (Bendapudi and Leone 2003; Prahalad and Ramaswamy 2004). Increasingly, companies such as Home Depot, Build-a-Bear, and IKEA encourage consumers to take part in the production process. In addition, many websites (e.g., CafePress.com, LapJacks.com, YouBars.com) provide tools for consumers who want to make and purchase self-made products – products that consumers participate in creating. The range of products that consumers may play a part in creating is extensive. For example, consumers can generate their own designs and images that can be placed on anything from mugs to tiles, and from wall-clocks to MP3 player skins.

Being involved in the creation of a product may generate additional value for consumers and add to the quality of life (Xie, Bagozzi and Troye 2008). Experiential (rather than material) products, such as concerts or vacations, have been shown to make individuals happier (Van Boven and Gilovich 2003). In addition, investing time rather than money enhances the emotional significance of an event (Mogilner and Aaker 2009). Making a product oneself rather than simply buying a finished product, by definition, combines experiential and material aspects of products, and requires an investment of time. Therefore, a consumer's participation in the production process may contribute to the happiness and emotional satisfaction derived from consumption behavior, over and above the value placed on the physical product itself.

Previous research suggests that involvement in the production process enhances the value of products (Norton 2009). Self-made products are valued more positively than other-made products. However, we do not know why this happens. Moreover, in its current form, this phenomenon suggests that being involved in the production process

enhances product evaluations regardless of process valence. Surprisingly little theoretical speculation and few empirical studies have focused on consumers' participation in the production process of products that they consume. The consumer behavior literature has tended to focus on what consumers purchase, an outcome, rather than what they do, a process, in relation to the product (Xie et al. 2008). Accordingly, little is known about when and why consumers' participation in the production process of a product creates value for them.

In this paper, we aim to investigate the conditions and the means by which self-production affects product evaluation. In particular, we look into the valence of the production process and the specific consequences of being involved in a positive versus negative production process. First, we ask, are self-made products evaluated more favorably than other-made products regardless of the process valence? Next, we ask, whether how others (versus self) feel during the production process affect consumers' judgments of the product differentially. Finally, we investigate why self-production creates additional value for consumers. In doing so, we seek to make three contributions to the literature. First, we provide evidence that not all production experiences create additional value for consumers. Only positive production experiences create additional value and enhance evaluation of self-made products. Second, we demonstrate that how others (versus self) feel during the production process does not affect consumer's judgments as strongly. Process emotions have higher impact when it is the self (rather than another person) who goes through the production process. Finally, we empirically measure the change in person-object relationship and show that positive production

experiences create value by strengthening the psychological bond between consumers and self-made products.

In the next section we review the literature on emotions, approach versus avoidance, and person-object relationship, and discuss how prior research informs our theorizing about consumers' participation in the production process. We then present three studies that test when and how participation by consumers in the production process creates value. Following the studies, we discuss how the results add to our understanding of consumers and their relationship with self-made products. We conclude with a discussion of implications and suggestions for future research.

How do Valence of Process Emotions Affect Object-Person Relationship?

A consumer who assembles a bookcase purchased from IKEA or cooks a meal from scratch may feel happy, relaxed, and enjoys himself if the process is pleasant. However, if the process has not gone smoothly, he may feel annoyed, frustrated, or even angry. These process emotions are different from incidental emotions or mood since they arise from cognitive appraisals of specific events or thoughts during the production process. Process emotions are evoked due to an appraisal and interpretation of the event; and therefore, they tend to be discrete and object-specific. Furthermore, process emotions have a referent (the production process), and change depending on the events surrounding the production process.

In this paper, we focus specifically on one dimension of process emotions: valence. Valence has been identified as one of the primary dimensions of emotions (Ekman 1984; Russell 1980; Smith and Ellsworth 1985). Indeed, the majority of studies on affect and

judgment have focused on valence, and shown the influence of valence on satisfaction, judgment, and stereotyping (see Forgas 2003 for a review). Moreover, valence has been identified as the major (although not the only) determinant of approach versus avoidance behavior (Campbell 1963; Russell and Mehrabian 1978).

Positive (versus negative) valence facilitates approach (versus avoidance) behavior towards the target object (Chen and Bargh 1999; Seibt, Neumann, Nussinson and Strack 2007). Approach tendency decreases both physical and psychological distance between oneself and the target. In contrast, negative valence facilitates withdrawal behavior and increases distance between the self and the target. Therefore, we propose that the production process valence will affect the evaluation of the final product by changing the nature of the person-object relationship (the psychological distance between the self and the product).

Furthermore, we expect that process emotions will have more impact on evaluation of the final product when it is the self (versus another person) who goes through the production process and experiences the emotions since self-relevant information is weighted more heavily than other-related information (Markus 1977; Weinstein 1989).

Next, building on the literature of "extended self," we try to understand how the nature of the person-object relationship changes when a consumer is involved in the production process. Qualitative research (Sartre 1943; Belk 1988; Pierce, Kostova and Dirks 2003) suggests that making products may be a means of self extension and affects the nature of the relationship between the object and the maker. The object may be a reflection of the maker's identity since it has been imbued with the time, effort, and attention of its maker. It gains symbolic meaning. Investment of self in the object allows individuals to see reflections of themselves in the target object (Belk 1988). Besides this

sense of identification with the object, there may be an emotional attachment to the object (Belk 1989). We are likely to be attached to objects that are part of our sense of who we are or our group identities (Ball and Tasaki 1992).

In order to refine the conceptualization of person-object relationship empirically, we adopt concepts from social-identity theory (Tajfel 1978; Turner 1985; Hogg and Vaughan 2002). This research stream indicates that there may be an overlap between one's self-identity and the identity of the target. Similarly, the identity or the image of the self and the product starts to overlap when consumers make products themselves. In order to measure the change in person-object relationship, we adopt the definitions of identification (perception of oneness with the target) and attachment (emotional response to the target) from social identity theory. We term the overlap between the identity of a product and the identity of the person as "identification with the product." It is the degree of perceived overlap between one's own current identity or self-image and the product's identity or image as one sees it. It entails the awareness that a product has similar properties to one's identity. In other words, it is the degree to which an individual identifies him/herself by the same attributes that s/he uses to define a product. We label the emotional component of the person-object relationship as "attachment to the product." This represents the emotional bond between a person and product, and expresses the warm feeling that one feels for the object. We propose that identification and attachment are highly correlated concepts, and together they represent one's connection with a product. Participating in the production process affects identification with, and attachment to, the product. Moreover, we expect that higher levels of

identification and attachment will explain why self-made products are evaluated more favorably than other-made products.

To understand the effect of process valence on product evaluation and the person-object relationship, three studies are conducted. Using hypothetical scenarios, the first study reveals that valence of the production process affects product evaluations. Moreover, our findings reveal that only if the process is positive (versus neutral or negative), are self-made products evaluated more favorably than other-made products. Imagining the self (versus another) making the product does not result in higher product evaluations when the process is negative or neutral. The second study replicates findings from the first study in a different product domain and expands our investigation to test how the person-object relationship changes as a function of process valence and whether or not the self is involved in the production process. We measure identification with, and attachment to, the product and test whether the differential value created through self-production is explained through the change in person-object relationship (identification and attachment). The third study replicates the findings in an actual production context. It reveals that even a small modification of a product results in identification with, and attachment to, the product, and this change in the person-object relationship explains why self-made products are evaluated more favorably than other-made products.

Taken together, our findings suggest that not all self-production experiences enhance product evaluation. When the process is negative, consumers do not distinguish between self-made and other-made products. To the extent that the process is positive, consumers will evaluate self-made products more favorably than other-made products. Furthermore, we address the mechanisms underlying the value creation process through self-

production. Going through a positive production experience changes the perception of the product and results in extension of the self to the product. Positive self-production processes enhance identification with, and attachment to, the product which, in turn explains why self-made products are evaluated more positively than other-made products.

STUDY 1

In Study 1, we examine the basic premise that the valence of production experience affects the evaluation of the final product. We expect that compared to a neutral process condition where only descriptive facts are given about the production process, a positive (negative) production experience will increase (decrease) the evaluation of the final product. In addition, we examine whether the effect of process valence on product evaluation depends on whether it is the self or another person who makes the product and goes through the process. We expect that the product judgment will be more extreme when the self (rather than another person) goes through the production process and experiences those emotions. Therefore we hypothesize that if the self (vs. another) is involved in the production process, when the process is positive, the evaluation of the product is likely to be higher. On the other hand, when the process is negative, evaluation of the self-made product may be lower than a product that is made by another. However, we also think that one may still evaluate the self-made product more highly than a product made by another person even if the process is negative simply because the self was involved in the production process. Therefore, we do not have a specific hypothesis concerning the self-other difference when the process is negative.

In order to test our hypotheses, a 3 (process valence: positive vs. negative vs. neutral) x 2 (maker: self vs. other) between subjects design was used.

Throughout all our studies, we measured involvement in making the products in order to decrease unexplained variance in the dependent variables. Involvement is mainly regarded as personal relevance and motivation to process (Greenwald and Leavitt 1984; Petty and Cacioppo 1986). Higher involvement levels in making or modifying a product in a given domain may enhance enjoyment of the process of making or modifying the product as well as the likelihood of bonding with the product. However, given that involvement was not a central focus in our paper, we included a measure of involvement as a covariate in our analyses to control for such effects.

Method

Participants. Individuals from a broad Web survey database including participants from across the US completed the survey. There were 446 respondents (mean age = 35.6; 26% male).

Procedure. Participants read one of the three variations of a story: one pleasant, one unpleasant, and one neutral regarding how they or another person felt while making a ceramic mug from clay (see Appendix 1.1). In the control condition, the participants read a neutral story which only gave descriptive facts about the process. In all conditions, a picture of the mug was presented to ensure that negative or positive experiences do not create success or failure perceptions in the process. This provided a conservative test of our hypothesis since we held the cognitive dimension constant across all conditions. After reading the story, all participants completed a four-item measure of how they or the other person would rate the process of making the mug on 7 point scales

(unpleasant/pleasant, unhappy/happy, bad/good, irritating/soothing; α = .97). They also rated the mug on five-items using a 7 point scale (unfavorable/favorable, negative/positive, unpleasant/pleasant, dislike/like, undesirable/desirable; α = .95). At the end, involvement in making products from clay was measured using Mittal (1995)'s modified version of Zaichkowsky's (1985) Personal Involvement Inventory (PII), α = .96.

Results and Discussion

Manipulation Check. An ANCOVA on process evaluation, with involvement included as a covariate, indicated that the main effect of valence was significant ($F(2, 439) = 308.02$, $p < .001$). Simple effects indicated that the evaluation of the process was significantly less favorable in the negative condition ($M = 3.03$) than in the neutral ($M = 5.75$) ($p < .001$) or positive condition ($M = 6.66$) ($p < .001$). Also the process was evaluated more favorably in the positive condition than in the neutral condition ($p < .001$), supporting the effectiveness of the manipulation. There was neither a main effect of maker ($F < 1$) nor an interaction between maker and valence ($F(2, 439) = 1.27$, $p = .28$). Participants did not differentiate between whether it was the self or another person who made the product while evaluating the process. They presumably could imagine how another person would feel in the process. The covariate (involvement) was significantly related to process evaluation ($F(1, 439) = 44.12$, $p < .001$). Participants who reported higher levels of involvement in making products from clay indicated more favorable attitudes toward the process.

Test of Hypotheses. An ANCOVA was conducted on product evaluation, with involvement included as a covariate. In support of our hypothesis, the main effect of

valence on product evaluation was significant ($F(2, 439) = 31.34$, $p < .001$). Participants in the positive condition ($M = 6.14$) reported more favorable attitudes toward the mug than did the participants in the neutral ($M = 5.74$; $p < .001$) or negative condition ($M = 4.97$; $p < .001$), and participants in the negative condition evaluated the product less favorably than did the participants in the neutral condition ($p < .001$). Furthermore, as expected, the maker x valence interaction was significant ($F(2, 439) = 3.14$, $p < .05$). Pairwise comparisons showed that only in the positive process condition, participants evaluated the self-made product more favorably ($M_{self} = 6.43$, $M_{other} = 5.84$, $p < .05$), see Figure 1.1. The difference between self and other conditions was not significant when the process was negative ($M_{self} = 4.86$, $M_{other} = 5.08$, $p = .23$) or neutral ($M_{self} = 5.77$, $M_{other} = 5.70$, $p = .94$). Participation in the production process was not enough to create value; the process had to be positive to differentially affect product evaluation. Involvement in making products from clay was significantly related to product evaluation as expected ($F(1, 439) = 75.74$, $p < .001$). Higher levels of involvement enhanced the evaluation of the mug.

[Insert Figure 1.1 about here]

The results of Study 1 suggest that emotions generated in the production process affect evaluation of the final product. As anticipated, compared to a neutral process, the product is valued higher (lower) when the production process is positive (negative). A critical finding is that only when the process was positive did the participation in the production process differentiate the value of a self-made product from one that was made by someone else. There was no difference between self-made product and a product made

by another person when the process was negative or neutral. Findings from Study 1 indicate that not all self-production experiences create additional value for consumers.

Study 2

Study 1 showed that production process valence affects evaluation of self-made products. Our next step is to investigate why this happens. Study 2 examines the relationship between products and consumers in detail by looking at how participating in the production process and process valence shape the way consumers relate to products. Therefore, we broadened our investigation by adding identification with and attachment to the product as dependent variables. We hypothesized that process valence affects the approach versus avoidance tendency toward the product, and therefore the psychological distance between the self and the product. In this study, we measure the psychological distance between self and the product through the concepts of identification and attachment. We expect that identification with and attachment to the product will be higher when the self (rather than another person) goes through the production process. Furthermore, we hypothesize that the change in identification and attachment explains why self-made products are evaluated more favorably than other-made products.

In order to test our hypotheses, Study 2 used a 2 (process valence: positive vs. negative) x 2 (maker: self vs. other) between subjects design.

Method

Participants. Eighty-seven students (mean age = 21, 47% male) completed the study to fulfill course requirements.

Procedure. A similar procedure as in Study 1 was used. However, this time, the product in the story was a t-shirt. Specifically, participants read either a positive or a negative process story about how they or another person (a stranger that they have never met) have designed and made a t-shirt (see Appendix 1.2). Following the story, participants evaluated the process using four seven-point semantic differential items (unpleasant/pleasant, unhappy/happy, bad/good, irritating/soothing; $\alpha = .99$). Then, participants evaluated the t-shirt on three seven-point semantic differential items (unfavorable/favorable, bad/good, negative/positive; $\alpha = .96$). Next, they indicated their identification with the product using four seven-point Likert items: "I would identify with the t-shirt," "it would represent who I am," and "it reflects the type of person that I am" were adapted from Reed, Aquino, and Levy (2007); the last item was "the image of the t-shirt fits my self-image" ($\alpha = .95$). Then, participants answered a modified version of Thomson, MacInnis, and Park's (2005) Emotional Attachment to Brands scale (attached, connected, affectionate, loved; 1 = strongly disagree, 7 = strongly agree; $\alpha = .92$) to indicate their attachment to the product. Finally, involvement in designing clothing items was measured using the modified version of PII ($\alpha = .94$).

Results and Discussion

Manipulation Checks. A 2 (process valence) x 2 (maker) ANCOVA (with involvement as a covariate) on process evaluation yielded a significant main effect of valence ($F(1, 82) = 283.31$, $p < .001$); the manipulation was successful. Participants in the positive ($M = 6.20$) versus the negative ($M = 1.86$) process condition evaluated the production process more favorably. The main effect of maker ($F(1, 82) = 4.25$, $p < .05$) and the maker x valence interaction ($F(1, 82) = 5.02$, $p < .05$) were also significant.

Simple effects analysis showed that when the process was positive, there was no difference in the evaluation of the process between the self and other conditions (M_{self} = 6.22, M_{other} = 6.18; $F < 1$). However, when the process was negative, the participants indicated that the process would be less pleasant for the other than it would for the self (M_{self} = 2.42, M_{other} = 1.38; $F(1, 82) = 9.47$, $p < .01$). They indicated a more extreme evaluation of the negative process in the other condition. The covariate (involvement) was not significantly related to process evaluation ($F(1, 82) = 2.44$, $p = .12$), and did not change the results. Hence, it was excluded from the subsequent analyses.

Tests of Hypotheses. In support of our hypothesis, an ANOVA on product evaluation indicated that the maker x valence interaction ($F(1, 83) = 10.62$, $p < .01$) was significant. Simple effects analysis showed that the identity of the maker was significant in the positive process condition (M_{self} = 6.10, M_{other} = 4.68; $F(1, 83) = 14.01$, $p < .001$), but not in the negative process condition (M_{self} = 2.83, M_{other} = 3.15; $F < 1$). Replicating findings from Study 1, only when the process was positive, the self-made product was evaluated more favorably than the other-made product. There was no difference between self- and other-made product when the process was negative (see Figure 1.2). Participation in the production process was not enough to enhance evaluation of the product; the process had to be positive to differentially affect product evaluation.

[Insert Figure 1.2 about here]

Next, we examined identification with, and attachment to, the product. As expected, the correlation between identification and attachment was high (α =.77), and analysis of identification and attachment individually gave similar patterns. Therefore they were averaged to form an identification-attachment index. Consistent with our hypothesis,

analysis on the index indicated a significant maker x valence interaction ($F(1, 83) = 5.90$, $p < .05$). Simple effects tests revealed that there was no difference between self and other conditions when the process was negative ($M_{self} = 3.38$, $M_{other} = 2.74$, $p = .07$). Identification with and attachment to the self-made product was significantly different from other-made product only if the process was positive ($M_{self} = 5.25$, $M_{other} = 3.42$, $p < .001$). In addition, simple effects tests indicated that process valence affects identification and attachment both in the self ($p < .001$) and other ($p < .05$) conditions (see Figure 1.3).

[Insert Figure 1.3 about here]

A key hypothesis concerned the differential impact of the valence of process emotions on identification and attachment as a function of maker of the product. We suggested that process emotions would affect the person-object relationship more strongly if it is the self (versus another person) making the product. This was tested via a two-way interaction of maker and process evaluation. Because process evaluation is a continuous measure, it was centered for the regression analysis. Regression analysis supported our hypothesis and indicated a significant interaction of maker by process evaluation ($\beta = .39$, $t = 4.23$, $p < .001$). The impact of process emotions on identification and attachment was higher when it was the self rather than another person who was involved in the production process.

The next question was whether identification with, and attachment to, the product mediates the effect of process valence on product evaluation, and whether they do so differently depending on who the maker is. This hypothesized relationship is termed "mediated moderation" (Baron and Kenny, 1986). Identification-attachment index was used as the mediator, and the analysis followed the steps suggested by Muller, Judd, and

Yzerbyt (2005). Table 1.1 presents the regression models for mediated moderation. Presented here are the unstandardized coefficients (*b*) and their associated *t*-statistics.

[Insert Table 1.1 about here]

As noted previously, there was a significant effect of the valence x maker interaction on product evaluation. Second, the valence x maker interaction ($\beta = .30$, $t = 2.43$, $p < .05$) affected the magnitude of identification-attachment index. Finally, when identification-attachment index was added to the main model, the valence x maker interaction was no longer significant ($\beta = .20$, $t = 1.47$, $p = .15$), but identification-attachment ($\beta = .57$, $t = 5.53$, $p < .01$) emerged as significant. The results supported the full mediated moderation (see Figure 1.4). Thus identification with, and attachment to, a product mediated the effects of maker and process valence on product evaluation.

[Insert Figure 1.4 about here]

Findings from Study 2 provided converging evidence that the valence of process emotions affects product evaluation, but the impact of process valence depends on whether the self or another person is involved in the production process. Only when the process was positive, did participation in the production process enhance the evaluation of self-made product. Furthermore, the results indicated that being involved in the production process changes how consumers relate to products. A positive process enhances identification with and attachment to the self-made product and this change in person-object relationship explains why self-made products are evaluated more favorably than other-made products.

The results from Studies 1 and 2 suggested that even merely imagining making a product can enhance the final evaluation of that product. However, a question remained

as to whether an actual production situation would have the same favorable impact on consumers' evaluation of self-made products. Study 3 was conducted to address this question.

Study 3

Studies 1 and 2 provided initial evidence that process valence affects evaluation of self-made products. However, the studies used hypothetical stories and required participants to use anticipatory process emotions (rather than actual process emotions) to make product related evaluations. In the third study, we had consumers participate in an actual self-production situation where they had the opportunity to modify a real product.

Study 3 was a 2 (process valence: positive vs. negative) x 2 (maker: self vs. other) between subjects design.

Method

Participants. One hundred and forty-three students (mean age = 21.2, 34% male) completed the study. The participants were each paid $10 for their participation.

Procedure. When participants arrived at the experimental lab, they were given a four-page instruction booklet. The first page introduced the research as a product development study and indicated that the procedure involved designing and painting a white t-shirt. The instructions specified that there should be a geometric figure and a hand-print on the t-shirt (V-neck for females, crew-neck for males).

In the "self" condition, the participants were told that they would paint the t-shirt themselves. In the "other" condition, participants were told that a research assistant would paint the t-shirt for them. Then, all participants filled out the second page of

booklet containing an order form on which they specified the size of the t-shirt, the geometric figure they wanted on the t-shirt, and the placement of the geometric figure plus the hand-print. The next page provided instructions on how to paint the t-shirt. Finally, the last page had full-sized patterns of geometric figures, one of which they were to use for the t-shirt. Once the participants finished reading and filling out the instruction booklet, they were taken to an individual room where the painting of the t-shirt was done. In the self condition, the room was empty and they were asked to come out once they were done painting the t-shirt. In the other condition, there was a male confederate in the room. The confederate was introduced as a research assistant who would make the t-shirt for them. In reality, he was a senior student from the drama department at the university who was hired and trained to perform the roles described below.

In the positive process condition, the room was orderly; t-shirts were nicely folded and put in boxes according to their sizes; the materials (brush, sponge, towels, cardboard to use during the painting, water) that were used to paint the t-shirt looked clean; there was a chair they could sit on while making the t-shirt. In the negative process condition, the room looked disorganized; t-shirts were thrown into a corner on the floor and the sizes were mixed together; the materials used to paint the t-shirt looked dirty; the water that was used to clean hands and brushes was blended with paint and olive oil beforehand; the table was wobbly; stencil materials were slippery; there was no chair in the room so they had to stand during the process; there was dry paint all over the table, and the instruction booklet had paint and water marks on it (see Appendix 1.3 for pictures of the room in the positive vs. negative process condition).

In the negative process condition, the actor acted as if the process was unpleasant for him. He did not talk to the participants while he was painting the t-shirt; however, he used body language to express he was bored and tired of painting t-shirts, the paint was irritating, the water was smelly and gross, and the wobbly table was annoying. In the positive process condition, both the actor and the participant were seated. The actor acted as if the process was pleasant for him. He enjoyed the process of painting the t-shirt; he liked the feel of the paint; the water was something fun to play with; he smiled most of the time. The actor was trained by the researcher to follow the same protocol in all sessions. He was instructed to act realistically (not to overact) since the task of painting a t-shirt generally does not create extreme emotions. Once the t-shirt was painted, participants were escorted to a separate area where they filled out an online survey.

Participants evaluated the process of making the t-shirt using six seven-point semantic differential items (unpleasant/pleasant, unhappy/happy, bad/good, irritating/soothing, unenjoyable/enjoyable, boring/fun; $\alpha = .96$). Then, they evaluated the t-shirt ($\alpha = .94$), indicated their identification ($\alpha = .91$) and attachment ($\alpha = .91$) using the same items from the previous study. The participants also rated themselves (self condition) or the "research assistant" (other condition) in terms of expertise in making t-shirts using five seven-point semantic differential items (unskilled/skilled, unqualified/qualified, unknowledgeable/knowledgeable, not an expert/expert, inexperienced/experienced; $\alpha = .95$). Finally, involvement in designing clothing items was measured using the modified version of PII ($\alpha = .96$).

Results and Discussion

Manipulation Check. An ANCOVA on process evaluation, with involvement included as a covariate, indicated a significant main effect of valence ($F(1, 138 = 8.42, p < .01$); the manipulation was successful. The evaluation of the process was significantly less favorable in the negative ($M = 4.31$) than the positive process condition ($M = 4.90$). There was also a main effect of maker ($F(1, 138) = 55.01, p < .001$). Participants in the self condition ($M = 5.36$) evaluated the process more positively than those in the other condition ($M = 3.86$). The maker x valence interaction was not significant ($F < 1$). The covariate (involvement) was significantly related to process evaluation ($F(1, 138) = 16.14, p < .001$); participants who reported higher levels of involvement in designing clothing items indicated more favorable attitudes toward the process.

Perceived Expertise. Next, we tested whether the level of perceived expertise is the same for the self and other. A 2 (process valence) x 2 (maker) ANCOVA on expertise, with involvement used as a covariate, indicated only a significant main effect of maker ($F(1, 138) = 20.60, p < .001$). Participants in the other condition ($M = 4.44$) reported higher perceived expertise than did those in the self condition ($M = 3.29$). The participants evaluated the research assistant as having more expertise in painting t-shirts than they did. This may have been due to the fact that it was apparent the assistant had painted multiple t-shirts during the study; his hands had paint on them when he interacted with the participants. In addition to involvement, in order to hold the perceived expertise constant between the self and other conditions, we used expertise and expertise x maker interaction (since level of expertise depended on who the maker was) as covariates throughout all the subsequent analyses.

Test of Hypotheses. A 2 (process valence) x 2 (maker) ANCOVA on product evaluation (with involvement, expertise, expertise x maker are used as covariates) indicated a significant maker x valence interaction ($F(1, 136) = 8.09$, $p < .01$). The covariates, expertise ($F(1, 136) = 18.72$, $p < .001$) and expertise x maker interaction ($F(1, 136) = 6.15$, $p < .05$), were both significant. Involvement, was marginally significant ($F(1, 136) = 3.66$, $p = .06$). When we controlled for expertise, simple effects analysis showed that the maker effect was significant in the positive process condition ($M_{self} = 5.76$, $M_{other} = 4.06$; $F(1, 136) = 10.18$, $p < .01$), but not in the negative process condition ($M_{self} = 4.88$, $M_{other} = 4.36$; $F < 1$), see Figure 1.5. Consistent with results from Studies 1 and 2, only when the process was positive, the self-made product was evaluated more favorably than the other-made product.

[Insert Figure 1.5 about here]

We then analyzed the effects of identification and attachment. As in Study 2, the correlation between identification and attachment was high ($\alpha = .60$), so they were averaged to form an index. Consistent with our hypothesis, the maker x valence interaction was significant ($F(1, 136) = 6.83$, $p < .05$). Simple effects tests indicated that making products oneself significantly increased identification and attachment only when the process was positive ($M_{self} = 4.66$, $M_{other} = 2.76$) ($F(1, 136) = 11.14$, $p < .01$). When the process was negative, the difference between makers was marginally significant ($M_{self} = 3.91$, $M_{other} = 2.97$) ($F(1, 136) = 3.29$, $p = .07$). Also, when it was another person making the product, process valence did not affect identification and attachment ($F < 1$). However, when the participants painted the t-shirt themselves, positive process increased identification and attachment ($F(1, 136) = 10.08$, $p < .01$), see Figure 1.6.

[Insert Figure 1.6 about here]

Next, the identification and attachment index was regressed on the main effects of maker and mean-centered process emotions, and the two-way interaction of the two main effects. Replicating Study 2 results, the effect of maker x mean-centered process emotions interaction was significant ($\beta = .37$, $t = 2.47$, $p < .05$), thereby indicating the stronger effect of process emotions on identification and attachment when self is involved in the production process.

Finally, as in Study 2, we examined whether identification with, and attachment to, the product mediates the effect of process valence on product evaluation, and whether they do so differently depending on who the maker is. Accordingly, we conducted a mediated moderation analysis. Table 1.2 presents the unstandardized coefficients (b) and their associated t-statistics.

[Insert Table 1.2 about here]

As noted previously, there was a significant effect of the valence x maker interaction on product evaluation. Second, the valence x maker interaction ($\beta = .97$, $t = 2.61$, $p < .05$) affected the magnitude of identification-attachment index. Finally, when identification-attachment index was added to the main model, the valence x maker interaction was no longer significant ($\beta = .60$, $t = 1.56$, $p = .12$), and identification-attachment ($\beta = .35$, $t = 2.64$, $p < .01$) emerged as significant (see Figure 1.7). The results support full mediated moderation. We expected that the effect of the process valence on product evaluation would depend on whether it was the self or the other who made the product. Furthermore, we had predicted that this moderation would be mediated by identification with, and attachment to, the product. As hypothesized, full mediated moderation indicates that the

change in person-object relationship explains why self-made products are evaluated more favorably than other-made products.

[Insert Figure 1.7 about here]

Results from Study 3 replicated findings from Studies 1 and 2, but in an actual production situation. The participants were asked to paint a t-shirt themselves or watch another person go through the process of painting a t-shirt. The t-shirt that was painted by the participant himself was evaluated more favorably only when the process was positive. When the process was negative, there was no difference between the t-shirt that was painted by another person and the self. Only a positive process created additional value for self-made products over other-made products. In addition, when we looked into how process valence affects the person-object relationship, we found that positive production process enhances identification with and attachment to the product when it is the self that participates in the production. The differential increase in identification and attachment, depending on the identity of the maker (self vs. other), explained why self-made products are evaluated more highly than other-made products when the process is positive.

General Discussion

In order to understand when and how consumers' participation in the production process creates value, we used hypothetical scenarios as well as actual production situations. We find that even when consumers imagine themselves participating in the production process or when they are minimally involved in a modification of a product, evaluation of the self-made product may increase. Moreover, we found that making a product oneself is not enough to enhance the evaluation of the product. Only if the

production experience is positive, then consumers value self-made products more favorably than products made by others. Furthermore, we empirically investigated how making or modifying a product changes the person-object relationship. Findings indicated that positive production processes increase identification with, and attachment to, the product especially if the individual is involved in the production of the product. The change in person-object relationship (identification and attachment) explains why self-made products are evaluated more favorably than products made by others.

These findings support emerging research for self-made or do-it-yourself (DIY) products (Norton 2009; Xie et al. 2008). We show that being involved in the production process does not enhance product evaluations unless the process is positive. Also, we extend prior research by elucidating the processes through which production activities affect product evaluation and how consumers relate to product. We also add to the literature on person-object relationships by empirically measuring identification and attachment.

Finally, our findings have relevance to the co-creation literature (Prahalad and Ramaswamy 2004; Woodruff 1997; Wikstrom 1996) which emphasizes the generation of value through firm-customer interactions. Both the co-creation literature and our present studies look at how value is created through experience. However, co-creation reflects the exchange relationship between consumer and the organization from which the end user buys a product or service and does not focus on self-production activities per se. By contrast, we are more squarely concerned with the psychological processes underlying consumer's interaction with a product during its production.

Limitations and Future Research

We have used both hypothetical stories and an actual production situation by physically involving consumers in the production process itself. However, the strength of emotions that the participants experience in a lab setting may be limited. Therefore, our results may only apply to the experience of mild or moderate emotions. Consumers may change their evaluations of self-made products when the process is extremely painful and unpleasant. Nevertheless, the experience of mild or moderate emotions may represent most everyday consumption situations, and therefore our findings may be applicable to many consumption situations in everyday life.

Additionally, we have investigated only valence of emotions that affect the value created due to production activities. An important next step would be to investigate how other dimensions of emotions, such as differing attributions of agency or responsibility and control, affect evaluation of self-made products.

Another line of research might look at how involvement or product type affects whether one becomes attached to, and identifies with, the products in the process of production. Both involvement level and product type may affect how much a particular domain is central to one's self-identity. We think that, as the centrality of the domain increases, so does the likelihood that an individual will be attached to, and identify with, a self-made product. Manipulation of involvement and/or product type may clarify how involvement and product type affect person-object relationships.

Moreover, we have only investigated one process, identification and attachment, to explain how participation in the production process creates value for consumers. Additional research is needed to investigate whether there are other factors (e.g.,

creativity, flow, need for uniqueness, need for control) that drive the value derived from being involved in the production process.

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TABLE 1.1 - STUDY 2: LEAST SQUARES REGRESSION RESULTS FOR MEDIATED MODERATION

	DV: PE		DV: ID-ATT		DV: PE	
Predictors	b	t	b	t	b	t
X: PROCESS VALENCE	1.20 (b_{41})	8.99**	0.64 (b_{51})	5.24**	0.80 (b_{61})	5.89**
MO: MAKER	0.27 (b_{42})	2.06*	0.62 (b_{52})	5.06**	-0.08 (b_{62})	-0.63
X*MO: VALENCE*MAKER	0.43 (b_{43})	3.26**	0.30 (b_{53})	2.43*	0.20 (b_{63})	1.47
ME: ID-ATT					0.57 (b_{64})	5.53**
ME*MO: ID-ATT*MAKER					0.10 (b_{65})	0.98

DV: dependent variable; PE = product evaluation; ID-ATT = identification-attachment index; MO = moderator variable; ME = mediator variable

* $p < .05$, ** $p < .01$

TABLE 1.2 - STUDY 3: LEAST SQUARES REGRESSION RESULTS FOR MEDIATED MODERATION

	DV: PE		DV: ID-ATT		DV: PE	
Predictors	b	t	b	t	b	t
X: PROCESS VALENCE	-0.30 (b_{41})	-0.94	-0.21 (b_{51})	-0.74	-0.21 (b_{61})	-0.75
MO: MAKER	0.52 (b_{42})	0.88	0.94 (b_{52})	1.82	-0.70 (b_{62})	-1.08
X*MO: VALENCE*MAKER	1.19 (b_{43})	2.84**	0.97 (b_{53})	2.61*	0.60 (b_{63})	1.56
COVARIATE: INVOLVEMENT	0.13	1.91	0.25	4.39**	-0.01	-0.09
COVARIATE: EXPERTISE	0.45	4.33**	0.26	2.84**	0.37	3.28**
COVARIATE: EXPERTISE x MAKER	-0.34	-2.48*	-0.19	-1.62	-0.31	-2.45*
ME: ID-ATT					0.35 (b_{64})	2.64**
ME*MO: ID-ATT*MAKER					0.30 (b_{65})	1.84

DV: dependent variable; PE = product evaluation; ID-ATT = identification-attachment index; MO = moderator variable; ME = mediator variable

* $p < .05$, ** $p < .01$

FIGURE 1.1- STUDY 1: PRODUCT EVALUATION

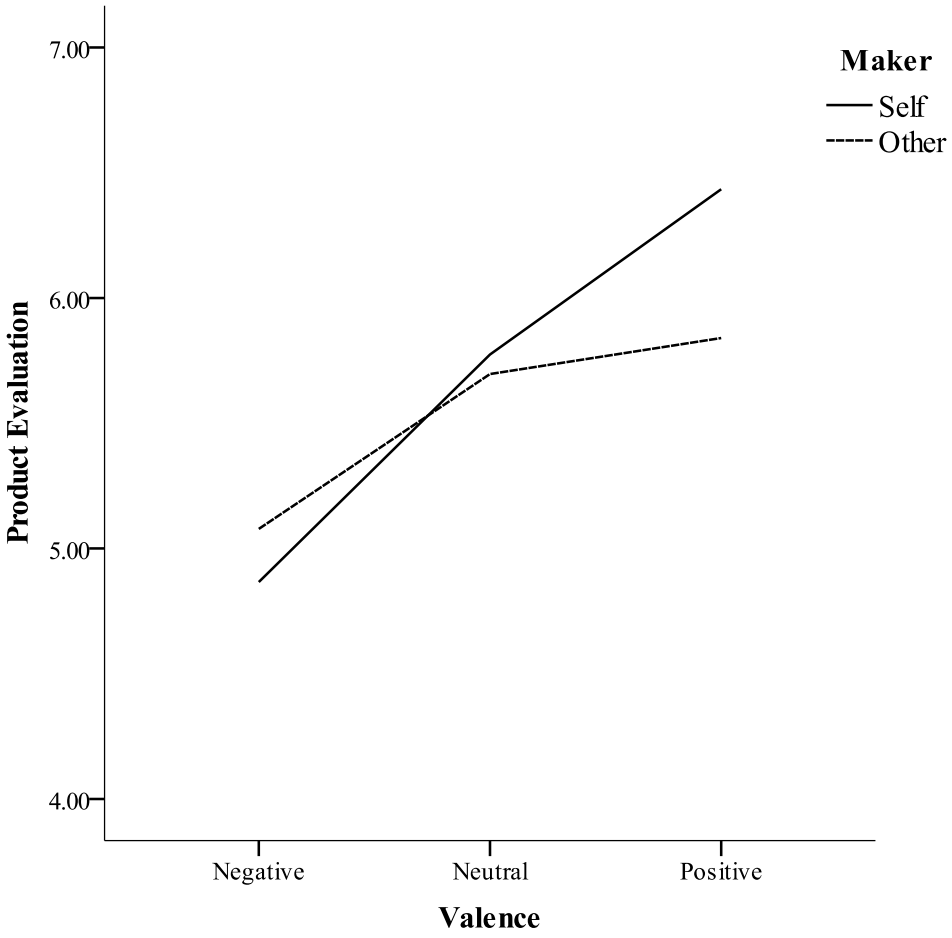


FIGURE 1.2 - STUDY 2: PRODUCT EVALUATION

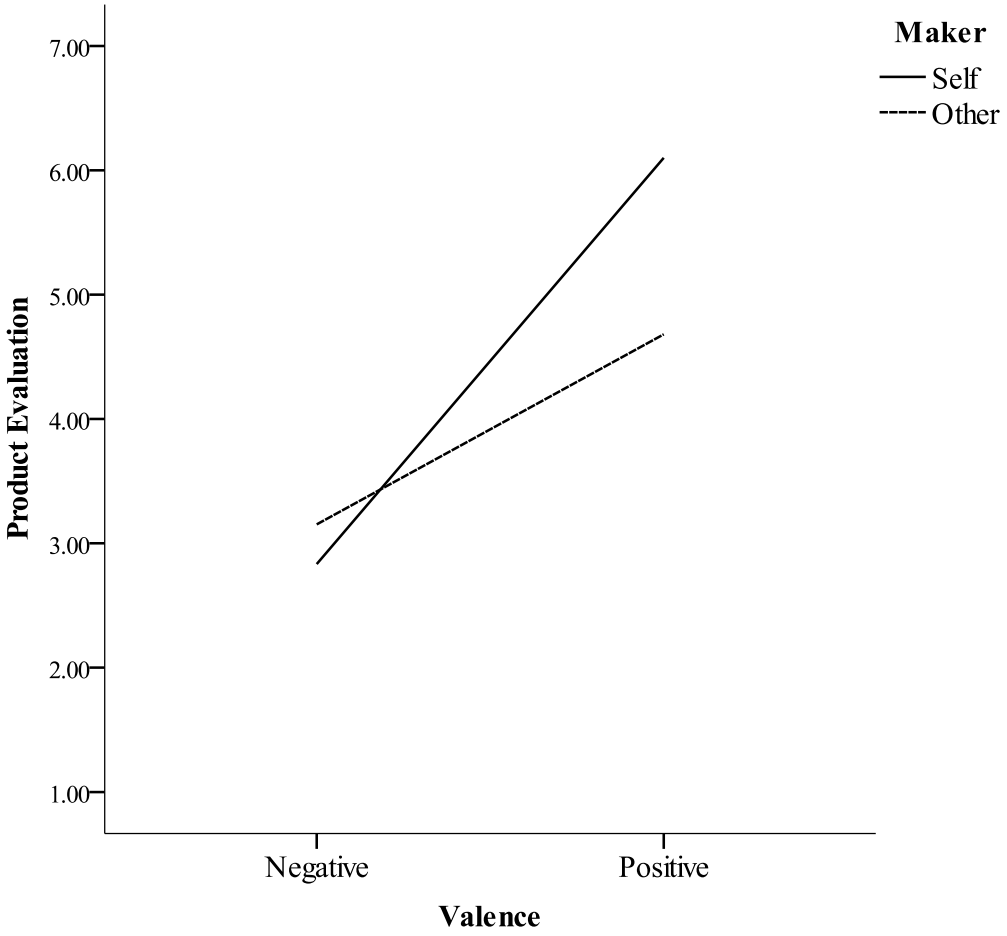


FIGURE 1.3 - STUDY 2: IDENTIFICATION-ATTACHMENT INDEX

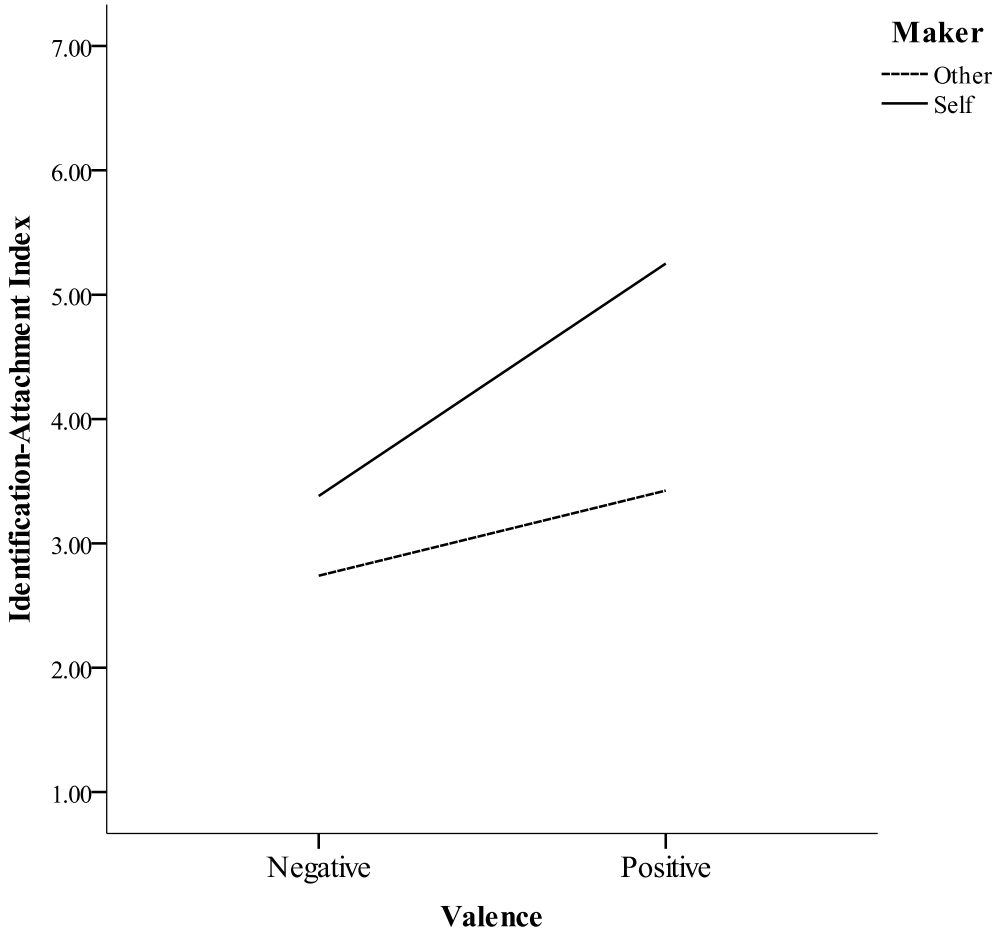
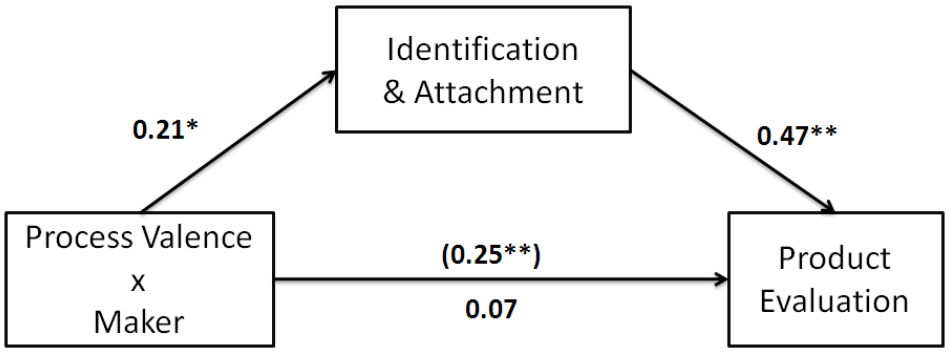


FIGURE 1.4 - STUDY 2: MEDIATED MODERATION



Presented here are the standardized beta (b) coefficients

* $p < .05$, ** $p < .01$

FIGURE 1.5 - STUDY 3: PRODUCT EVALUATION

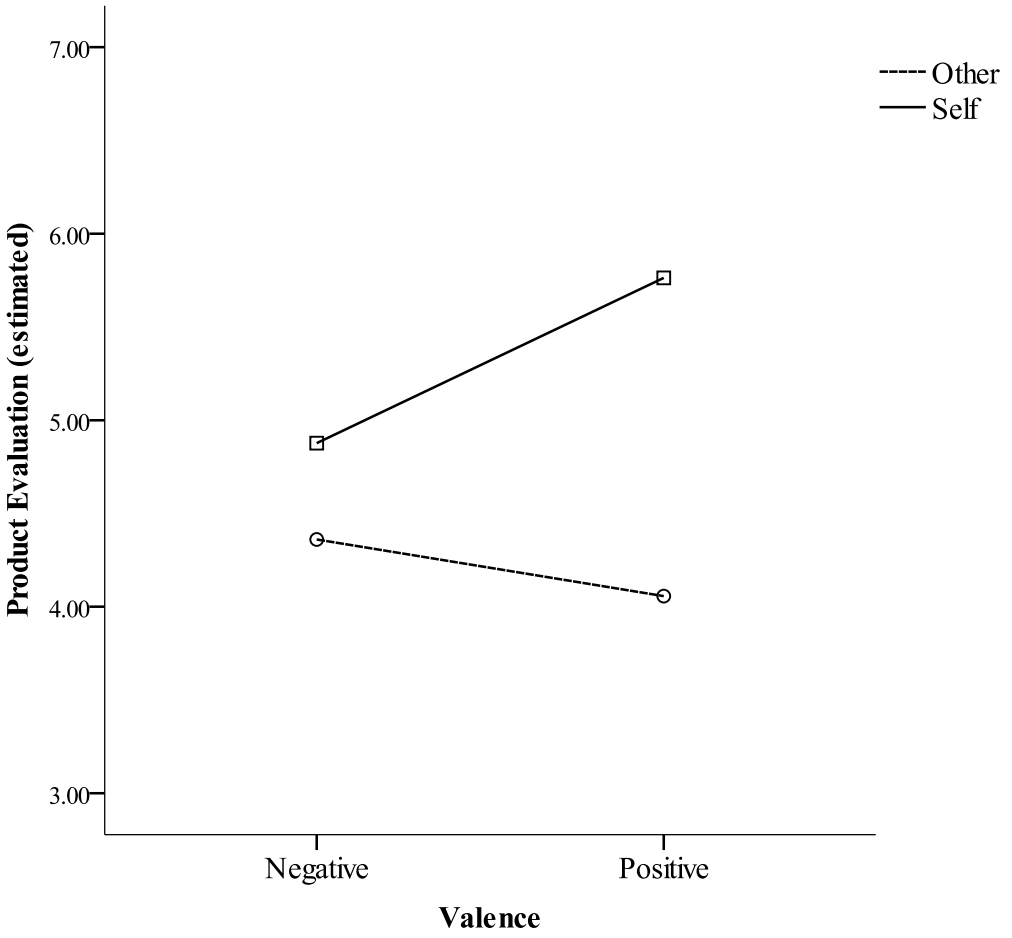


FIGURE 1.6 - STUDY 3: IDENTIFICATION-ATTACHMENT INDEX

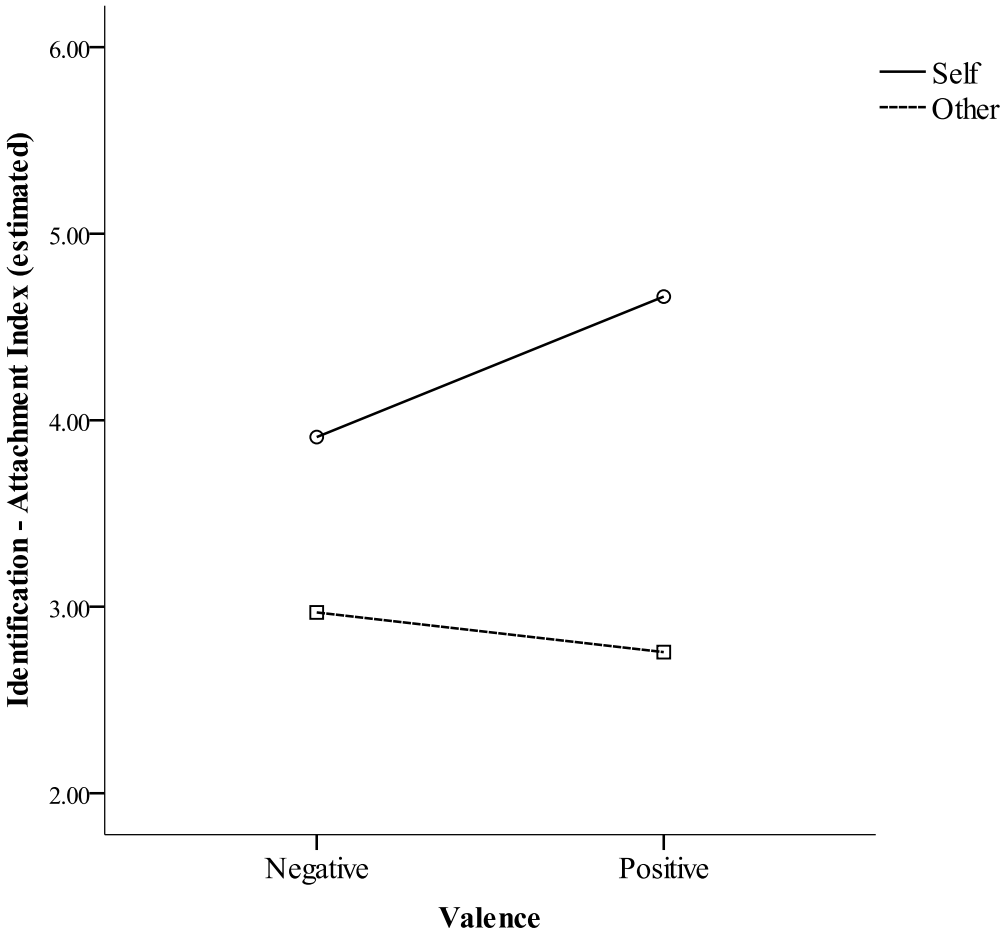
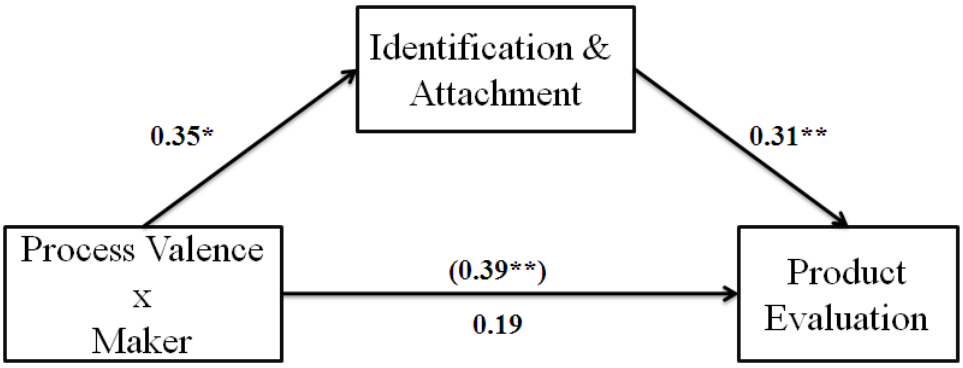


FIGURE 1.7 - STUDY 3: MEDIATED MODERATION



Presented here are the standardized beta (b) coefficients

* p < .05, ** p < .01

APPENDIX 1.1 - STUDY 1 STIMULI

Negative condition:

Imagine that in a pottery class you (another participant in this experiment) spent 40 minutes making a ceramic coffee mug from clay. You (The participant) found the process and the activity of making the clay very unpleasant and you (s/he was) were very unhappy while making the mug. As you (s/he) sculpted the mug, the clay felt clumpy and gross. You (s/he) disliked the smell of clay and the feeling of wet clay in your (his/her) hands gave you (her/him) the chills. Your hands were irritated and you (S/he) had to keep washing your (his/her) hands to get the dirt off of them. You felt the smell of the clay was even on your (his/her) clothes later. The whole process was irritating and dissatisfying. In the end, the mug came out looking like below.

Neutral condition:

Imagine that in a pottery class you (another participant in this experiment) spent 40 minutes making a ceramic coffee mug from clay. The clay was placed at the center of the table and you (the participant) started by breaking off a chunk of clay. You (The participant) rolled and worked the clay until it became soft. Then you (s/he) shaped the clay into a mug. You (S/he) dampened the surface and used the edge of a rib to smooth the surface. The clay was still slightly soft at this stage. Then you (s/he) went over the surface with a sponge and attached the handle. In the meanwhile, you (s/he) dampened your (his/her) hands with water to keep them moist. At the end, you set the mug aside to let it dry. In the end, the mug came out looking like below.

Positive condition:

Imagine that in a pottery class you (another participant in this experiment) spent 40 minutes making a ceramic coffee mug from clay. You (The participant) found the process and the activity of making the mug very pleasant and you (s/he was) were very happy while making the mug. As you (s/he) sculpted the mug, the clay was smooth and soothing. You (S/he) loved the smell of clay and the feeling of wet clay in your (his/her) hands made you (her/him) relaxed and satisfied. Your hands felt warm and you (S/he) just wanted to let the clay dry on your (his/her) hands rather than washing it off. You

relished the smell of the clay even on your clothes later. The whole process was fun and satisfying. In the end, the mug came out looking like below.

APPENDIX 1.2 - STUDY 2 STIMULI

Negative condition:

T-Shirt Design Experience

Please try to imagine yourself in the following scenario as vividly as possible. You decided to design and make a white t-shirt for yourself (You have a new white t-shirt that was designed and made by a complete stranger that you have never met). You (By chance you learned that this stranger) spent almost 6 hours working on the t-shirt, and actually found the whole process and the activity very unpleasant. You (S/he) were quite unhappy and stressed out while trying to make the t-shirt.

First, you (the stranger) decided to apply an iron-on transfer to the front of the white t-shirt. The white t-shirt felt like a daunting canvas. You (S/he) had a photo you (s/he) took last summer, and you (s/he) printed it on a transfer paper. Next, you (s/he) placed the t-shirt on a hard surface and the photo onto the t-shirt. Then you (s/he) set the iron at a high temp because you (s/he) did not want the image to peel off easily later on. However, you (s/he) burned yourself (himself/herself) when you (s/he) tried to check whether the iron was hot enough. You (s/he) got angry and tense as your (his/her) fingers got red and started burning. You (s/he) finished ironing the photo and peeled the transfer paper off the front of the t-shirt.

Next, you (s/he) started to work on the back of the t-shirt and you (s/he) decided to use computer software to design the image this time. You (s/he) tried to find the right shapes and prints that would complement each other, and decided to use your (his/her) favorite quotes and sayings. You (s/he) played with the letters and placed the text into the design. It required a good sense of layout and composition. You (S/he) had literally never designed an image in your (his/her) life before, and unfortunately it felt irritating and boring. You (s/he) were very annoyed in the process because you (s/he) were very frustrated with all the shapes and colors that you (s/he) had to edit. Figuring out the final design involved some trial and error, and it turned out to be one of the most wearisome things you (s/he) have done in a while!

Finally, you (s/he) had the hassle of going to a print shop to have the design printed on the back of the t-shirt. You (s/he) had to wait at the shop forever since they had to finish a

big order before yours (his/hers). The whole process of making the t-shirt gave you (him/her) a headache! It felt silly to spend time and energy on it, and the overall process of making the t-shirt sucked!

Positive condition:

T-Shirt Design Experience

Please try to imagine yourself in the following scenario as vividly as possible. You decided to design and make a white t-shirt for yourself (You have a new white t-shirt that was designed and made by a complete stranger that you have never met). You (By chance you learned that this stranger) spent almost 6 hours working on the t-shirt, and actually found the whole process and the activity very pleasant. You (S/he) were quite happy and relaxed while trying to make the t-shirt.

First, you (the stranger) decided to apply an iron-on transfer to the front of the white t-shirt. The white t-shirt felt like a friendly, inviting canvas. You (S/he) had a photo you (s/he) took last summer, and you (s/he) printed it on a transfer paper. Next, you (s/he) placed the t-shirt on a hard surface and the photo onto the t-shirt. Then you (s/he) set the iron at a high temp because you (s/he) did not want the image to peel off easily later on. You (S/he) carefully checked the iron temperature and started to iron the outside edges first and then moved toward the center. You (S/he) were calm and comfortable as you (s/he) finished ironing the photo and peeled the transfer paper off the front of the t-shirt.

Next, you (s/he) started to work on the back of the t-shirt and you (s/he) decided to use computer software to design the image this time. You (s/he) tried to find the right shapes and prints that would complement each other, and decided to use your (his/her) favorite quotes and sayings. You (s/he) played with the letters and placed the text into the design. It required a good sense of layout and composition. You (S/he) had literally never designed an image in your (his/her) life before, and fortunately it felt fun and inspiring. You (s/he) were very entertained in the process because you (s/he) got the chance to play and experiment with the shapes and colors as you (s/he) wished. Figuring out the final design involved some trial and error, but it was one of the most enjoyable things you (s/he) have done in awhile!

Finally, you (s/he) went to a print shop to have the design printed on the back of the t-shirt. You (s/he) did not need to wait at the shop and it was done quickly. The whole process of making the t-shirt gave you (him/her) a thrill! It felt rewarding to spend time and energy on it, and the overall process of making the t-shirt was surprisingly fun!

APPENDIX 1.3 - STUDY 3 ROOM PICTURES

POSITIVE PROCESS CONDITION

NEGATIVE PROCESS CONDITION

ESSAY 2

Investment of Self into Products through Process Involvement

Abstract

Would you evaluate the IKEA bookcase you assembled, the kitchen you designed, or the dinner you cooked the same way if you just simply bought it at a store already made? How do you think your involvement (physical and/or intellectual), as a consumer, in the production process of a product affects your relationship with it? Three studies indicate that even low levels of physical and/or intellectual involvement in the production process enhance attachment with the product. However, only intellectual involvement increases identification with the product. Bare physical involvement, without choice or creativity during the production process, does not enable the individual to express his identity through the product. Finally, results suggest that having physical and intellectual involvement together in the production process does not create value for consumers over and above physical or intellectual involvement by themselves.

A consumer may make or build a product by following step-by-step instructions (e.g., assembling an IKEA bookcase, cooking according to a specific recipe, building a model airplane). In this case, the process of making, modifying, or creating a product may require consumer's physical involvement (hammering shelves, cutting and mixing ingredients, gluing pieces together). In another instance, a consumer may go online and design parts of a product (e.g., NIKE sneakers, T-shirts, MP3 Player sleeves). This time, the process requires the consumer's intellectual involvement (choosing and matching colors of a sneaker, working on a t-shirt design, choosing shapes or pictures for a sleeve). In yet another instance, a consumer may both design and build the product (e.g., designing and building a patio with materials from Home Depot, cooking creatively without a recipe, sewing one's own design). Here, the consumer would be involved both physically and intellectually in the production process of the product.

How would involvement (physical and/or intellectual) in the production process affect evaluation of the self-made product? How would physical versus intellectual investment create value when consumers make or modify products for their own consumption? Would either type of involvement in the production process have differential effects on how the consumers relate to self-made products?

These questions are important if companies want to influence and optimize the value that consumers derive from being involved in the production process of products that they consume. Companies need to know what creates value in the context of self-production and how these distinct features affect the relationship between consumers and their self-made products. However, surprisingly few theoretical and empirical studies have focused on this phenomenon. Scattered research in consumer behavior indicates that

participating in the production process of a product affects pricing (Norton 2009) and psychological ownership (Pierce, Kostova, and Dirks 2003) of the product as well as satisfaction with the company (Bendapudi and Leone 2003). However, no prior studies have considered the different types of involvement (physical versus intellectual) that consumers may engage in during the production process and how these types of involvement may affect how consumers relate to self-made products.

In this paper, we offer an experimental investigation of how the person-object relationship (identification with and attachment to the product) changes due to physical versus intellectual investment of self into products. The following section reviews the findings from extended self and self-design literatures, and elaborates on how they form the theoretical basis of our investigation. Then, we present our findings from three studies. The first two studies look into how physical involvement (Study 1) and intellectual involvement (Study 2) affect evaluation of a self-made product by transforming the object-person relationship. Study 3 investigates whether combining physical and involvement in the production process creates value over and beyond physical or intellectual involvement by themselves. We conclude with a general discussion of how our investigation adds to our understanding of consumer involvement in the production process, the implications of being engaged physically versus intellectually in the production process, and suggestions for future research.

Potential Psychological Responses to Participation in Production

Theoretical research (Belk 1988; Pierce, Kostova and Dirks 2003) indicates that investing the self into the target (creating, shaping, or producing a product) results in the

most powerful association between the self and the product since one invests his labor, time, and values in this process. We invest "psychic energy" in a product that has taken our effort, time, and attention and the artifact of this energy becomes part of self (Csikszentmihalyi and Rochberg-Halton 1981). As the product becomes an image of its creator, reflecting his taste, preferences, and identity, the creator comes to identify with the self-made product. Moreover, the creator may develop a sense of emotional attachment to the product as the production process may give a sense of control over the object and enhance familiarity with the object (Belk 1988).

Current research on person-object relationship does not focus on various aspects through which a consumer may relate to a self-made product. Hence, in order to conceptualize and operationalize the person-object relationship, we adopt the concepts of identification (perception of oneness with the target) and attachment (emotional response to the target) from social-identity theory (Tajfel 1978; Turner 1985; Hogg and Vaughan 2002). We term the overlap between the identity of a product and the identity of the person as "identification with the product." It is the degree of perceived overlap between one's own current identity or self-image and the product's identity or image as one sees it. It entails the awareness that a product has similar properties to one's identity, and is thus a cognition. In other words, it is the degree to which an individual identifies him/herself by the same attributes that s/he uses to define a product. We label the emotional component of the person-object relationship as "attachment to the product." This represents the emotional bond between a person and product, and expresses the warm feeling that one feels for the object. We propose that identification and attachment may be highly correlated but are distinct concepts, and together they represent one's

connection with a product. In this paper, we look at how physical and intellectual investments in the production process affect the two dimensions of person-object relationship.

Investment of Physical versus Intellectual Labor

One of the ways through which a consumer may become involved in the production process of a product is by physically making or modifying the product. We define physical investment as physical effort put into the task of making or modifying a product. It does not entail much thinking, if any, about how to make or modify the product. It constitutes largely physical labor; that is, varying levels of physical exertion from simple manual labor such as cutting, hammering, or knitting to more effortful physical tasks such as carrying heavy parts, carving hard surfaces, or painting extensively.

As a consumer invests his physical labor into a product, his relationship with the product changes (Belk 1988; Pierce et al 2003). In fact, a variety of disciplines including philosophy and law, have emphasized the importance of physical labor and how it affects one's rights over and relationship with a product. Locke (1690) stated that we own our labor and we are likely to feel ownership over what we create. Marx (1867) proposed that a person is the owner of his labor and has rights over production that involves his labor. Law literature (Boyer 1981) considers work as a legal basis for ownership.

Although various literatures shed some light and suggest that investment of physical labor into a product changes the person-object relationship, the paths of this influence have not been specified clearly. We suggest that physical labor creates a sense of emotional bond between the self and the product. The self-made product is a direct

artifact of the individual's physical effort, and much like how we feel about our words, thought, and emotions, we feel connected to our own physical labor. Moreover, there is a sense of familiarity with the product that emerges from experiencing the production process. As the person becomes more familiar with an object, the connection between the individual and the target becomes stronger, and the more attached one starts to feel (Pierce et al 2003). As a result, we suggest that investment of physical labor into the process of making, shaping, or producing a product results in feelings of emotional attachment to the product, and attachment to the product enhances evaluation of the final product.

On the other hand, investing physical labor without the opportunity to modify the product according to one's wishes, taste, or preferences may impair the person-object relationship. The product does not represent the self when the production process is limited to pure physical labor. Merely following directions while building a product is likely to restrict how much a person can identify with a self-made product. We propose that investment of physical labor during production of a product may enhance attachment to the product, and therefore, enhance evaluation of the final product, but it is unlikely to affect identification with the product. More formally, we predict that:

H1: Investing physical labor into the production of a product enhances evaluation of the final product.

H2: Attachment to the product mediates the impact of physical investment on product evaluation.

H3: Physical investment on its own does not enhance identification with the product.

Besides physical involvement, the production process may entail the intellectual involvement of a consumer. We use the term intellectual investment to refer to creativity and choice in the production process. During the production process, there could be enhanced intellectual activity simply from following the directions pertaining to how to make, build, or modify a product. In this paper, we do not focus on this type of intellectual engagement. Rather, we focus only on situations that enable the consumer to design, to make choices (such as color, materials, shape…), or to be creative while making or modifying a product.

The awareness of being the creator of a product design results in economic value for consumers (Franke, Schreier, and Kaiser 2010). This "I designed it myself" effect originates from the fact that the individual feels like the originator of that object. Hence, there is "a psychological factor that plays a major role" in the value created through intellectual investment (pg 126, Franke et al 2010). The additional value does not merely arise from a better fit between the consumer's underlying preferences and the product attributes (Moreau and Herd 2010; Franke et al 2010). Intellectual involvement enables the individual to invest his/her sense of being in the product. People may easily develop personal ownership of ideas, arguments, and positions that they hold (De Dreu and Knippenberg 2005). Ideas may be associated with the self and become part of the extended self concept. As a result, we expect that self-made products represent the ideas, thoughts, and hopes of the individual more than off-the-shelf products. In short, we suggest that through intellectual investment in the production process, the self-made product starts to represent the identity of the individual. People form feelings of attachment to products that express their self-identity (Pierce et al 2003). Intellectual

investment may enhance evaluation of a self-made product by transferring part of the self-identity to the product, and therefore, enhancing identification with as well as attachment to product. More formally, we propose:

H4: Investing intellectual effort into the production process enhances evaluation of the final product.

H5: Intellectual investment enhances both identification with and attachment to the product.

H6: Identification with and attachment to the product mediate the impact of intellectual investment on product evaluation.

Study 1

In Study 1, we examined how physical investment during the production process shapes the evaluation of the final product and the relationship between products and consumers. We hypothesized that higher levels of physical investment in the process will enhance evaluation of the product (H1) through attachment to the product (H2). We expected that identification with the product would not depend on the level of physical investment in the production process (H3). If there is no creativity or choice involved in the production process, then the individual cannot transfer his identity to the product and therefore cannot identify with it. Hence, we do not expect bare physical investment to affect identification with the product.

The study was a three-group between-subjects design (where physical investment in the process was manipulated at three levels).

Method

Participants. 75 undergraduate students (mean age = 19.9, 44% male) were recruited from a paid subject pool.

Procedure. Participants were randomly assigned to one of the three conditions: control, low physical investment, and high physical investment. In the control condition, participants were given a yellow picture frame made from cardboard. They were asked to examine the product (see Appendix 2.1 for the picture frame). They spent 29 seconds on average examining it. In the low physical investment condition, several pieces of the picture frame were pre-made. The cardboard frame was cut and wrapped in yellow paper; the back and the stand were ready to assemble. The participants only had to glue the pieces together following detailed, step-by-step instructions. The participants spent about 9 minutes assembling the pieces together. In the high physical investment condition, participants were given cardboard that had the outline of a picture frame (a small rectangle and a larger rectangle around it). Following step-by-step instructions, they had to cut the cardboard, wrap it with yellow paper, cut the back of the frame, make the cardboard stand, and glue everything together. The participants spent 24 minutes on average making the picture frame. Detailed step by step instructions allowed no creativity or choice in the low or high physical investment conditions. In order to equate the time spent with the frame among all conditions, in the control and the low physical investment conditions, the participants worked on a filler task for 25 and 20 minutes, respectively, before evaluating the frame.

After making the picture frame, participants in the low and high physical investment conditions reported the amount of physical engagement needed to make the frame on a seven-point scale (1 = none, 7 = a great deal). Then, all participants evaluated the picture

frame using three seven-point bipolar items (negative/positive, bad/good, unfavorable/favorable; α = .92). Next, participants used four seven-point scales (1 = not at all, 7 = extremely) to report how much they identified with the product (image of the frame fits my self-image, frame represents "who I am," I identify with the frame, it reflects the type of person that I am; α = .90), and how attached they were to the product (attached, connected, warm, like; α = .90). Identification with and attachment to the product were counterbalanced.

Results and Discussion

Manipulation Check. Participants in the high physical investment condition (M = 3.78, SD = 1.48) indicated higher levels of physical engagement needed to make the frame than did those in the low physical investment condition (M = 2.46, SD = .74), $t(53) = 4.19$, $p < .001$. The confidence intervals for high ($CI_{.95}$ = 3.22, 4.34) and low ($CI_{.95}$ = 2.18, 2.74) physical investment conditions did not include 1 = none, indicating that the physical engagement in both conditions were higher than none (the control condition). The physical investment manipulation was successful.

Test of Hypotheses. First of all, Confirmatory Factor Analysis (CFA) and Structural Equation Models (SEM) were used to test whether the three constructs (product evaluation, identification, and attachment) are distinct concepts. For latent variables identification and attachment, the four items were combined to produce two indicators, using the partial disaggregation model (Bagozzi and Heatherton, 1994). The first indicator was the average of the two (out of four) items and the remaining two measures were used to form the second indicator. This approach yields models with less parameters to estimate and reasonable ratios of cases to parameters, while smoothing out

measurement error to a certain extent. The goodness-of-fit measures were as follows: $\chi 2(11)=9.31$, $p \approx .59$, RMSEA=.00, SRMR=.036, NNFI=1.01, CFI=1.00. Overall, the model gave a satisfactory fit. An analysis of the ϕ matrices (correlations between constructs, corrected for attenuation) indicated that the correlation between product evaluation and attachment was .66 (SD = .09; $CI_{.95}$ = .48, .84), between product evaluation and identification was .43 (SD = .10; $CI_{.95}$ = .23, .63) and between identification and attachment was .57 (SD = .10; $CI_{.95}$ = .37, .77). None of the confidence intervals included the value of one, providing evidence of discriminant validity for the three constructs.

ANOVA on product evaluation showed that the effect of physical investment was significant ($F(2, 72) = 12.21$, $p < .001$). Planned contrasts indicated that participants in the high and low physical investment conditions evaluated the product more favorably than those in the control condition (M_{High}= 5.56, M_{Low} = 5.65, $M_{control}$ = 4.02, both *p's* < .001). The evaluation of the product did not differ between the high and the low physical investment conditions (see Figure 2.1). Even low levels of physical investment into the product during the production process enhanced the product evaluation; thus H1 is supported.

[Insert Figure 2.1 about here]

Next, we examined identification. As hypothesized, ANOVA on identification revealed no effect for physical investment ($F(2, 72) = 2.09$, p =.13). Identification did not differ among high physical investment, low physical investment, and control conditions (M_{High}= 2.71, M_{Low} = 2.14, $M_{control}$ = 2.11; all *p's* > .05) (see Figure 2.2). Bare physical labor does not result in identification with the product; H2 is supported.

[Insert Figure 2.2 about here]

ANOVA on attachment revealed a main effect for physical investment as expected ($F(2, 72) = 9.98$, $p < .001$). Contrasts indicated that attachment was significantly lower in the control condition than it was in the low and high physical investment conditions ($M_{High} = 4.01$, $M_{Low} = 3.12$, $M_{control} = 2.27$; both p's $< .05$). In the high physical investment condition, subjects indicated higher levels of attachment than they did in the low physical investment condition ($p = .02$) (see Figure 2.3). Results revealed that attachment to the product increases as the level of physical investment in the production process increases.

[Insert Figure 2.3 about here]

Finally, we examined whether attachment mediates the effect of physical investment on product evaluation (H3). The mediation analysis followed the steps suggested by Baron and Kenny (1986). As noted previously, there was a significant effect of the physical investment on product evaluation. A second regression analysis showed that the effect of physical investment on attachment was significant ($\beta = .46$, $t = 4.50$, $p < .001$). Finally, when both physical investment and attachment were included in the model as predictors, physical investment was no longer significant ($\beta = .18$, $t = 1.69$, $p = .09$), while the effect of attachment remained significant ($\beta = .48$, $t = 4.46$, $p < .001$). Attachment to the product mediates the effect of physical investment on product evaluation; hence H3 is supported (see Figure 2.4).

[Insert Figure 2.4 about here]

Findings from Study 1 provide empirical evidence that being physically involved in the production of a product affects product evaluation and changes how consumers relate to the product. An emotional bond (attachment) to the product is formed as one invests

his physical effort into the product. However, physical investment does not result in identification with the product. When consumers do not have the freedom to modify the product so as to express their self-identity, they do not identify with the product. Finally, results indicate that attachment mediates the impact of physical investment on product evaluation.

Besides engaging in the production process of a product physically, consumers may also put intellectual effort into the creation of the product. They may design or modify the product according to their own wishes and taste. This gives them the chance to express their identities through the product, and therefore, changes the person-object relationship differently than physical investment in the process. This is the focus of the next study. We look at how intellectual engagement in the production process affects product evaluation, as well as identification with and attachment to the product.

Study 2

In Study 2, we focus on intellectual investment during the production process. We expect that higher levels of intellectual investment in the process will enhance product evaluation (H4). Moreover, we hypothesize that both identification with and attachment to the product will increase as a result of higher levels of intellectual attachment (H5), and they will both mediate the impact of intellectual investment on product evaluation (H6).

The study was a three-group between-subjects design (where intellectual investment in the process was manipulated at three levels).

Method

Participants. 59 students (mean age = 20.2, 50% male) completed the study to fulfill course requirements.

Procedure. Participants were randomly assigned to one of the three conditions: control, low intellectual investment, and high intellectual investment. In all conditions, participants were given a tumbler with a removable blank insert. The base of the tumbler could be twisted off to remove the inner insert, and one could draw or write on the insert before reinserting and twisting on the base. In the control condition, participants could not alter the insert. They were encouraged to examine the tumbler but could not modify or change it in any way. They spent about 51 seconds examining the tumbler. In the low intellectual investment condition, the participants were provided with 12 stickers from which they could choose one to stick onto the blank insert for the tumbler. The participants spent 2.76 minutes on average to choose the sticker and stick it onto the insert. In the high intellectual investment condition, the participants were provided with 12 colored pencils, a pencil, a sharpie, alphabet stickers and eraser. Also, they were given an example sheet which included the same 12 figures from the low intellectual investment condition. They could use this example sheet to get some ideas, or could use other figures/shapes they wanted. They were encouraged to be creative. The participants spent about 7 minutes to finish the task (see Appendix 2.2 for tumbler examples). In order to equate the time spent with the tumbler, in the control and the low intellectual investment conditions, the participants worked on a filler task for 6 minutes before evaluating the tumbler.

Next, participants in the low and high intellectual investment conditions answered the manipulation check question, the intellectual effort invested in the task. They indicated

the amount of intellectual engagement or level of thinking needed to make the tumbler on a seven-point scale (1 = none, 7 = a great deal). Then, all participants answered the dependent variables that were identical to those used in Study 1. They evaluated the product (α = .91), indicated their identification with (α = .94), and attachment to (α = .88) the product. Identification and attachment were counterbalanced.

Results and Discussion

Manipulation Check. Participants in the high intellectual investment condition (*M* = 3.36, *SD* = 1.19) reported higher levels of intellectual effort than did those in the low intellectual investment condition (*M* = 2.73, *SD* = .94), *t*(45) = -2.01, *p* < .05 (Note. A one-tailed t-test was used since the hypothesis is directional). The confidence intervals for high ($CI_{.95}$ = 2.89, 3.82) and low ($CI_{.95}$ = 2.34, 3.12) intellectual investment conditions did not include 1 = none, indicating that the intellectual engagement in both conditions was higher than none (the control condition). The intellectual investment manipulation was successful.

Test of Hypotheses. As in Study 1, CFA and SEM were used to test whether the three constructs (product evaluation, identification, and attachment) are distinct. Again, as in Study 1, for identification and attachment, two (out of four) items were averaged to form two indicators for each latent variable. The goodness-of-fit measures were as follows: $\chi 2(11)=17.37$, $p \approx .10$, RMSEA=.09, SRMR=.037, NNFI=.97, CFI=.99. Overall, the model gave a satisfactory fit. An analysis of the ϕ matrices (correlations between constructs, corrected for attenuation) indicated that the correlation between product evaluation and attachment was .65 (SD = .08; $CI_{.95}$ = .49, .81), between product evaluation and identification was .64 (SD = .09; $CI_{.95}$ = .46, .82) and between

identification and attachment was .83 (SD = .10; $CI_{.95}$ = .73, .93). None of the confidence intervals included the value of one, providing evidence of discriminant validity for the three constructs.

ANOVA on product evaluation showed that the effect of intellectual investment was significant ($F(2, 56) = 10.01$, $p < .001$). Planned contrasts indicated that evaluation of the product was higher in the high intellectual investment condition than in the low intellectual investment or the control condition (M_{High}= 5.41, M_{Low} = 4.79, $M_{control}$ = 3.92, both *p's* < .05). Also, the difference between the control and the low intellectual investment conditions was significant ($p < .05$) (see Figure 2.5). Higher levels of intellectual investment during the production process enhanced evaluation of the tumbler; H4 is supported.

[Insert Figure 2.5 about here]

Next, we examined identification. As expected, ANOVA on identification revealed a significant effect for intellectual investment ($F(2, 56) = 13.67$, $p < .001$). Contrasts indicated that identification was significantly lower in the control condition ($M_{control}$ = 1.60) than it was in the low or high intellectual investment conditions (M_{High}= 4.34, M_{Low} = 3.62, both *p's* < .001). The difference between the high and low intellectual investment conditions was not significant ($p = .11$) (see Figure 2.6).

[Insert Figure 2.6 about here]

As hypothesized, ANOVA on attachment revealed a main effect for intellectual investment ($F(2, 56) = 13.31$, $p < .001$). Contrasts indicated that attachment was significantly lower in the control condition than it was in the low or high intellectual investment conditions (M_{High}= 4.27, M_{Low} = 3.66, $M_{control}$ = 2.04, both *p's* < .01). The

difference between the high and low intellectual investment conditions was marginal (p = .09) (see Figure 2.7). Intellectual investment enhances both identification with and attachment to the product; H5 was supported.

[Insert Figure 2.7 about here]

To examine the process, two sets of mediation analyses were conducted with attachment and identification as separate mediators. The first set examined whether identification mediates the effect of intellectual investment on product evaluation. The second set examined whether attachment mediates the effect of intellectual investment on product evaluation. As noted previously, there was a significant effect of the intellectual investment on product evaluation (β = .51, t = 4.48, p < .001). A second regression analysis showed that the effect of intellectual investment on identification was significant (β = .55, t = 4.92, p < .001). Finally, when both intellectual investment and identification were included in the model as predictors, the effect of identification remained significant (β = .44, t = 3.56, p < .01) while the effect of intellectual investment was reduced significantly (β = .27, t = 2.18, p = .03; Sobel z = 2.84, p < .01), supportive of mediation.

Next, we examined whether attachment mediates the effect of intellectual investment on product evaluation. A regression analysis showed that the effect of intellectual investment on attachment was significant (β = .54, t = 4.89, p < .001). Finally, when both intellectual investment and attachment were included in the model as predictors, the effect of attachment remained significant (β = .39, t = 3.08, p < .01) while the effect of intellectual investment was reduced significantly (β = .30, t = 2.36, p = .02; Sobel z = 2.60, p < .01), supportive of mediation.

Findings from Study 2 reveal that intellectual investment during the production process affects product evaluation, and that the impact of intellectual investment on product evaluation is mediated through two mediators; identification and attachment. Through intellectual investment, consumers may express their self-identity, that is their tastes and preferences, and modify the product to reflect who they are. This results in enhanced identification with the product. Moreover, feelings of attachment are formed through involvement in the production process. Overall, the results indicate that being intellectually involved in the production process changes how consumers relate to products in addition to enhancing product evaluations.

Study 1 focused on physical involvement, and Study 2 focused on intellectual involvement in the production process of a product. We used a picture frame in the first study and a tumbler in the second study. The differing results for identification could be due to product differences in Studies 1 and 2. Consumers may be more likely to identify with a tumbler than they would with a picture frame. Therefore, in the next study, we wanted to replicate our results using the same product for both types of involvement in the production process.

Moreover, from a managerial standpoint, the question remains as to whether a firm should invest into enabling its consumers to engage in one or both types of involvement in the production process. Hence, we wanted to test the interactive effects of physical and intellectual involvement in the production process. On the one hand, the two different types of involvement could interact with each other to enhance product evaluation as well as to strengthen the person-object relationship. The effect could be additive or multiplicative. On the other hand, one type of involvement in the production process

could be enough to enhance the product evaluation, and any other additional effects resulting from a second type of involvement could be minimal. Study 3 was designed to answer these questions.

Study 3

In Study 3, we investigate physical and intellectual involvement together using a music CD with its case. We expect that physical involvement will enhance product evaluation only through attachment, and intellectual involvement will enhance product evaluation through both identification with and attachment to the product. We did not have a specific hypothesis regarding the interaction of physical and intellectual involvement. They could interact to enhance product evaluation or the marginal effect of an additional type of involvement in the production process could be minimal.

The study was a 2 (physical investment: low vs. high) x 2 (intellectual investment: low vs. high) between subjects design to test Hypotheses 1 through 6.

Method

Participants. 122 undergraduate students (mean age = 19.8, 34% male) were recruited from a paid subject pool.

Procedure. When participants came to the lab, they were told that they would participate in several unrelated studies. The first study was presented as an investigation of Microsoft Office PowerPoint in terms of ease of use. We wanted to control the skill level of participants in terms of using PowerPoint to design a CD case. Hence, the first study involved a basic tutorial on how to insert and modify shapes/figures, text, and clipart in PowerPoint. At the end of the tutorial, all participants reported how difficult it

was to edit shapes, figures, and text in PowerPoint on a 7-point scale (1 = none at all, 7 = very much; α = .73). Then, everybody filled out a series of personality tests which, besides several other questions, included questions on their overall level of interest in music (Mittal's, 1995, modified version of Zaichkowsky's (1985) Personal Involvement Inventory, α = .95) and how creative they perceived themselves compared to their peers.

After completing a series of other studies that were administered during the study hour, the participants were told the next study investigated the music preferences of college students. All of the participants were asked to choose five songs from a list that contained six genres and six songs under each genre. The genres were pretested to be the most popular six genres among the undergraduates. The six songs under each genre were the top six songs for that genre on I-tunes. The instructions indicated that the songs they choose would be burned onto a CD and the CD would be placed in a case. All of the participants were told that they would have the option to keep the CD and its case. After the participants chose the songs, they were randomly assigned to low or high physical investment and low or high intellectual investment conditions. In the low physical investment conditions, the songs were burned onto a CD and its case was made for the participant by the experimenter in another room. In the high physical investment conditions, a blank CD case template on PowerPoint was provided to the participants. They made the CD case following step-by-step guidelines; first they had to type the titles of the songs and the artists, then print the template on a white cardboard, and finally cut and glue the template. In addition, the participants burned the songs onto a CD themselves using specific step-by-step guidelines. In the low intellectual investment conditions, the participants could not modify the standard CD case template except by

typing up the song titles and the artists. In the high intellectual investment conditions, the participants could title the CD and design its case in any way they wanted using PowerPoint (see Appendix 2.3 for CD case examples).

The low physical-low intellectual investment condition was the control condition which indicated the baseline evaluation of the CD and its case. It only consisted of choosing the songs that the participant wanted on the CD. The participants spent 3.5 minutes on average to choose the songs. In the low physical-high intellectual investment condition, the participants spent 16.4 minutes on average to choose the songs and to design the CD case. In the high physical-low intellectual investment condition, the participants spent 16.6 minutes on average to choose the songs, to burn the CD, and to make the case. In the high physical-high intellectual investment condition, the participants spent 27 minutes on average to choose the songs, to burn the CD, and to design and make its case.

In the low physical investment conditions, the CD was burned and its case was made by the experimenter in another room and the final product (the burned CD with its case) was given to the participant after 3-4 minutes. In order to equate the time spent with the product, while the CD and its case were in front of them, the participants worked on filler tasks for 20, 15, and 15 minutes in the low physical-low intellectual, low physical-high intellectual, and high physical-low intellectual conditions respectively.

Next all participants, except the ones in the low physical-low intellectual investment condition, answered manipulation check questions on a 7-point scale (1=none at all, 7=very much). They indicated the amount of physical effort (how much basic physical effort did you use, how much simple manual labor did you use, how much basic physical

energy did you put into making the product; α = .78) and intellectual engagement (how much original thinking went into making the CD and its case, how much creativity did you use; how much did you think to make it; α = .91) they used to make the CD and its case. Then, all participants evaluated the product (α = .97), indicated their identification with (α = .91), and attachment to the product (α = .88). Identification with and attachment to the product were counterbalanced.

Results and Discussion

Involvement in music and self-reported creativity did not differ among the conditions due to random assignment. However, PowerPoint difficulty was significantly different between low and high intellectual investment conditions (M_{low} = 1.16, M_{high} = 1.32; $F(1, 117) = 4.65$, $p < .05$). It was used as a covariate in all of the analysis and did not affect the results. Therefore, it was excluded from the analysis.

Manipulation Checks. An ANOVA on reported intellectual engagement indicated that the main effect of intellectual investment was significant ($F(1, 90) = 59.71$, $p < .001$) although there was no effect of physical investment on intellectual engagement ($F < 1$); the intellectual investment manipulation was successful. Another ANOVA on reported physical effort indicated that the main effect of physical investment was significant ($F(1, 90) = 9.55$, $p < .01$) and there was no effect of intellectual investment on reported physical effort ($F(1, 90) = 1.91$, $p = .17$); the physical investment manipulation was successful. The analysis did not include an interaction term since there were no data points in the low physical-low intellectual condition.

Test of Hypotheses. The same CFA and SEM analysis from Studies 1 and 2, were run to test the discriminant validity of product evaluation, identification, and attachment. The

goodness-of-fit measures were as follows: $\chi 2(11)=23.04$, $p \approx .02$, RMSEA=.097, SRMR=.027, NNFI=.98, CFI=.99. Three out of four indicators gave a satisfactory fit. An analysis of the ϕ matrices (correlations between constructs, corrected for attenuation) indicated that the correlation between product evaluation and attachment was .67 (SD = .06; $CI_{.95}$ = .55, .79), between product evaluation and identification was .52 (SD = .07; $CI_{.95}$ = .38, .66) and between identification and attachment was .78 (SD = .05; $CI_{.95}$ = .68, .88). None of the confidence intervals included the value of one, providing evidence of discriminant validity for the three constructs.

Replicating findings from Studies 1 and 2, ANOVA on product evaluation showed that the main effects of physical investment ($F(1, 118) = 9.01$, $p < .01$) and intellectual investment ($F(1, 118) = 14.81$, $p < .001$) were significant. There was a marginally significant interaction between the two types of investment ($F(1, 118) = 4.62$, $p = .09$). We did not have an priori hypothesis regarding the interaction of physical and intellectual involvement. However, we wanted to explore in detail what happens when two types of involvement are combined during the production process. Hence, we ran simple effects analysis. Results indicated that when intellectual investment was low, evaluation of the product was significantly more favorable in the high physical investment condition (M = 5.26) than in the low physical investment condition ($M = 4.18$, $p < .01$). However, when intellectual investment was high, evaluation of the product was not different between the high physical ($M = 5.75$) and low physical ($M = 5.46$) investment conditions ($p = .35$). Similarly, when physical investment was low, higher levels of intellectual investment enhanced evaluation of the product ($p < .001$). However, when physical investment was high, intellectual investment did not enhance evaluation of the product ($p = .13$), see

Figure 2.8. Only engaging in one type of investment during the production process was enough to enhance evaluation of the final product. There was no additional value created from engaging in two different types of involvement in the production process.

[Insert Figure 2.8 about here]

Next, we examined identification. As expected, ANOVA on identification revealed a significant main effect for intellectual investment (M_{low} = 2.63, M_{high} = 4.06; F(1, 118) = 37.81, p < .01) but only a marginal effect for physical investment (M_{low} = 3.13, M_{high} = 3.56; F(1, 118) = 3.40, p =.07). The interaction effect was not significant (F < 1). As we hypothesized, intellectual investment enhanced identification with the product; however, physical investment had a minimal marginal effect on identification.

As we anticipated, ANOVA on attachment revealed significant main effects for both physical (F(1, 118) = 8.04, p < .01) and intellectual (F(1, 118) = 30.21, p < .001) investment. The interaction effect was not significant (F < 1). Participants reported higher attachment in the high physical (M = 4.21) than in the low physical (M = 3.56) investment condition, and in the high intellectual (M = 4.51) than in the low intellectual (M = 3.26) investment condition.

Next, we examined whether identification with, and attachment to, the product together mediates the effect of intellectual investment on product evaluation and whether attachment on its own mediate the effect of physical investment on product evaluation. Bootstrapping analyses (Preacher and Hayes 2008) were conducted for estimating direct and indirect effects with two mediators and two independent variables. Product evaluation was entered as the dependent variable and intellectual investment and physical investment were entered as the predictor variable. Identification and attachment were

entered as proposed mediators for intellectual and physical investment. Two separate models were run using bootstrapping. In each of these models, one of the independent variables was specified as the independent variable and the other independent variable was treated as a covariate. Covariates are mathematically treated exactly like independent variables in the estimation, with paths to all mediators and the outcome. Including the other independent variable as a covariate in the model corrects for the effect of the independent variable and each model generates the desired indirect effect for the variable currently listed as the independent variable.

When intellectual investment was entered as the independent variable, the bootstrap results indicated that the total effect of intellectual investment on product evaluation (total effect = .8706, $p < .001$) became nonsignificant when the two mediators were included in the model (direct effect of intellectual investment = .1720, $p > .10$). Consistent with our predictions, intellectual investment affected both attachment and identification (both p's < .001, see Figure 2.9 for full mediational model). The analyses revealed, with 95% confidence, that the total indirect effect of intellectual investment on the outcome variable through the two mediators was significant, with a point estimate of .6986 and a 95% BCa CI of .4013 to 1.1077. Thus, the two mediators fully mediated the association between intellectual investment and product evaluation. The estimates and 95% CIs are presented in Table 2.1.

[Insert Table 2.1 about here]

In the second model, physical investment was entered as the independent variable. The results indicated that the total effect of physical investment on product evaluation (total effect = .6629, $p < .01$) became nonsignificant when the mediators were included in the model (direct effect of physical investment = .3289, $p > .10$). Consistent with our

predictions, physical investment affected attachment ($p < .01$), but not identification ($p = .06$). The analyses revealed, with 95% confidence, that the total indirect effect of physical investment on product evaluation was significant, with a point estimate of .3340 and a 95% BCa CI of .1128 to .6259. Thus, the impact of physical investment on product evaluation was fully mediated.

In sum, the bootstrap analyses indicate that attachment and identification together mediate the effect of intellectual investment on product evaluation, and attachment mediates the effect of physical investment on product evaluation. The specific indirect effects of each proposed mediator showed that attachment (with a point estimate of .3340 and a 95% BCa CI of .1070 to .6332) was a unique mediator in the overall model. However, identification (with a point estimate of .0312 and a 95% BCa CI of -.0492 to .1735) was not a unique mediator. In short, the combined mediation effect of both of the mediators was significant in the model; but importantly, this effect was only driven by attachment.

[Insert Figure 2.9 about here]

Findings from Study 3 provide convergent evidence that the specific type of investment in the production process affects how consumers relate to products. We find that physical investment during the production process enhances attachment, but not identification. On the other hand, intellectual investment results in both attachment to and identification with the product. Overall, it seems that as involvement in the production process increases, regardless of the type of involvement, so does attachment to the self-made product. However, identification with the product is more likely to develop if consumers intellectually invest themselves in the product during the creation process of

the product. Moreover, we find that combining physical and intellectual investment in the production process does not create value for consumers over and above physical or intellectual involvement alone. It seems that the value of additional type of effort invested in the production process is minimal for consumers.

General Discussion

The findings of three studies show how distinct types of involvement (physical versus intellectual) in the production process of a product create value for consumers. Even low levels of physical effort invested into a product during its production process are likely to enhance evaluation of the final product. Heightened feelings of emotional attachment to the self-made product appear to drive the effect of physical involvement on product evaluation. However, mere physical effort invested in the product does not change the symbolic meaning of the product so as to reflect the identity of its creator (Studies 1 and 3). Hence, when a consumer does not have the freedom to express his/her identity in the product through intellectual involvement, mere physical involvement in the production process is unlikely to result in identification with the product. On the other hand, intellectual engagement during the production process enhances evaluation of self-made products through both feelings of attachment to and identification with the product (Studies 2 and 3). Consumers start to identify with a self-made product when they have the chance to express their identity through it. Not unlike physical involvement, intellectual involvement enhances attachment to self-made products too. Furthermore, combining physical and intellectual involvement in the production process does not enhance product evaluations more than physical or intellectual involvement alone (Study

3). Having made a contribution through either physical or intellectual involvement seems to be enough to create value for consumers. As others (Franke et al 2010) have also suggested, the marginal effect of involvement may be diminishing as the level of contribution increases. There may be a saturation point beyond which higher contributions may be perceived as cost rather than value.

This research contributes to literature on self-production, co-production, and do-it-yourself (DIY) products. We examine and highlight the different kinds of consumer self-production activities and start to identify the important factors (physical versus intellectual) that distinguish them. Current self-production literature neglects the distinction between different modes of involvement in the production process. Different researchers use different operationalizations of self-production. For example, Norton (2009) provides step-by-step directions to the participants when they make origami figures in the studies. Alternatively, Bendapudi and Leone (2003) and Franke et al (2010) use a combination of physical and intellectual investment in the production process. The findings may be limited by the specific operationalization that has been used in the studies. As we have shown, physical and intellectual involvement may follow different paths in order to enhance evaluation of self-made products. It is important to recognize the distinction between these different types of operationalizations to enhance generalizability of results. Also, by understanding how each type of self-production activity uniquely creates value for consumers, companies may decide how to engage consumers in the production process.

In addition, we show the significance of encouraging consumers to take part in the production process physically. Research on self-production (Moreau and Herd 2010;

Deng, Hui, and Hutchinson 2010) seems to focus mostly on self-design cases (creativity and choice). Researchers have neglected the fact that consumers may also be physically engaged in the production of products. Advancements in the online environment have been providing more and more opportunities for intellectual engagement in the production process at the expense of physical effort. However, we empirically show that physical effort invested during the production process may enhance product evaluations as much as intellectual effort.

We contribute to the understanding of consumers and their self-made products by extending the findings on psychological aspects of self-production. In line with other researchers (Moreau and Herd 2010; Franke et al 2010), we show that fit between preferences and the self-made product can not fully explain why self-made products are evaluated more highly than off-the-shelf products. Even when participants only physically participated in the production process and made standardized products, the evaluation of self-made products were more favorable than off-the-shelf products. We identify identification with and attachment to the product as two downstream aspects of self-production. In particular, we demonstrate that both physical and intellectual engagement during the production process enhances feelings of emotional attachment to self-made products. However, only intellectual engagement creates a sense of identification with the product since the individual can transfer part of his/her identity to the product while making or modifying it. Both identification with and attachment to the product enhances evaluation of the product.

Limitations and Future Research

This research offers several other interesting questions that have considerable practical implications. For example, personality variables that moderate the value created through physical or intellectual involvement are an important domain to explore. Consumers who enjoy working with their hands and express themselves through physical labor may identify with self-made products even if there is only physical involvement, but no choice or creativity, in the production process. On the other hand, consumers who like designing, who enjoy working on creative tasks may prefer intellectual involvement in the production process and form higher feelings of identification with and attachment to self-designed products. All of our studies have used students from a highly competitive mid-west University as subjects. Hence, intellectual effort may be more important and may add more value than craftsmanship or physical effort for our population.

Another important contribution would be to investigate how different psychological aspects of self-production relate to each other in a bigger picture. Feelings of accomplishment or pride (Franke et al 2010), feelings of personal ownership (Pierce et al 2003), competence and autonomy in the process (Dahl and Moreau 2007), and control (Belk 1988) have been proposed as other psychological aspects of being involved in the production process. Future research may investigate how identification, attachment, feelings of accomplishment, feelings of personal ownership, control, competence and autonomy relate to each other in order to create value for consumers.

In terms of how consumers relate to self-made products, we show that identification and attachment are two different but highly correlated aspects of person-object relationship. However, future research is needed to investigate other conditions under which these two dimensions differ. We expect that current versus ideal self may have

differential effects on identification and attachment. Consumers may identify with products that reflect their current identity; however, attachment to the product may depend on whether that part of identity is wanted or viewed positively. In addition, a consumer may become attached to a product that reflects ideal self but may not identify with it since it does not reflect the current sense of self.

Finally, we find that combining physical and intellectual involvement in the production process does not create additional value over physical or intellectual involvement by themselves. However, in our studies, involvement level in the production process is limited due to time and other situational constraints. Higher levels of combined physical and intellectual involvement may result in additive or multiplicative effects for consumers. For instance, a consumer who designs and builds his home by his own hands may evaluate the final product much more favorably than a consumer who only designs his home but does not participate in the actual construction. Nevertheless, situations that contain such extreme levels of physical or intellectual effort are likely to be limited since the cost of investing time and effort is very high in these situations. Hence, we expect our results to hold in many everyday situations.

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FIGURE 2.1 - STUDY 1: PRODUCT EVALUATION

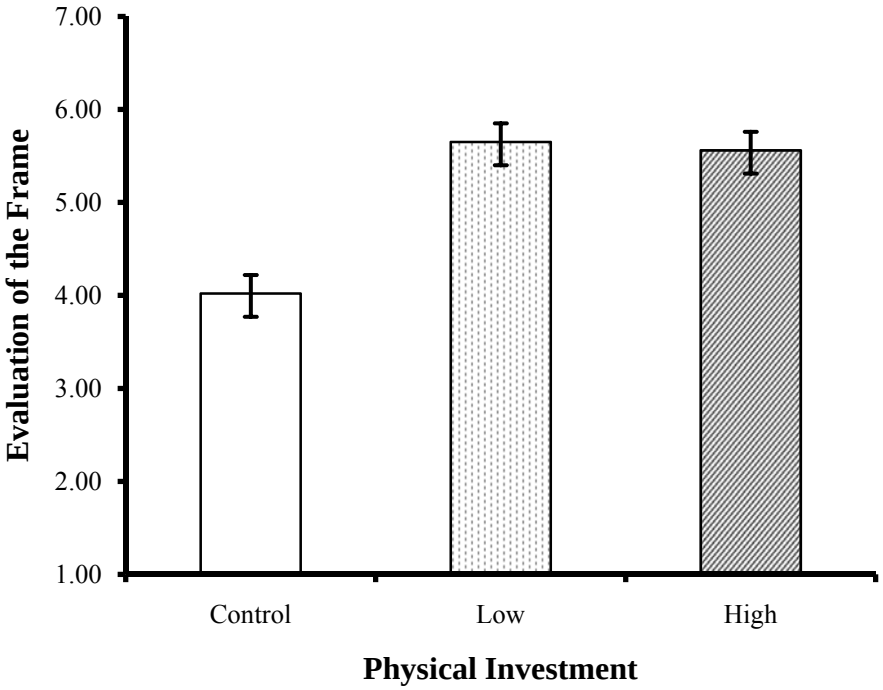


FIGURE 2.2 - STUDY 1: IDENTIFICATION WITH THE PRODUCT

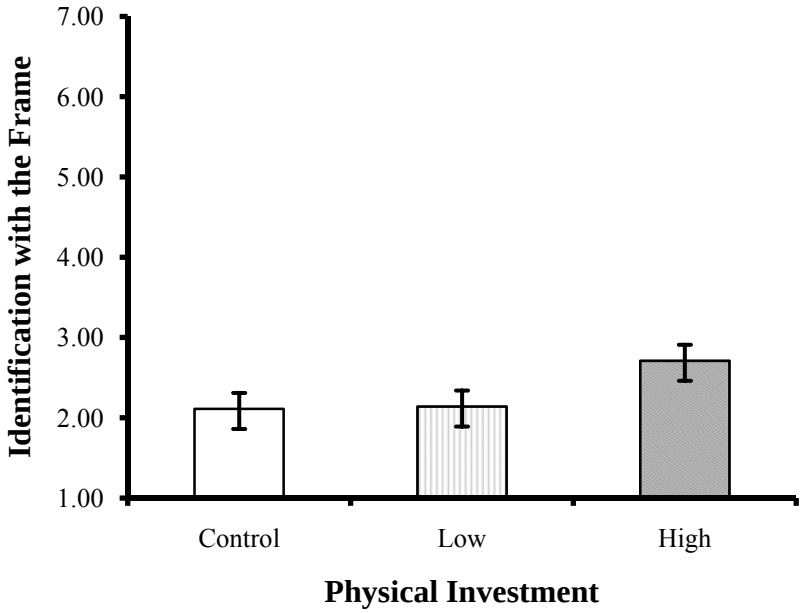


FIGURE 2.3 - STUDY 1: ATTACHMENT TO THE PRODUCT

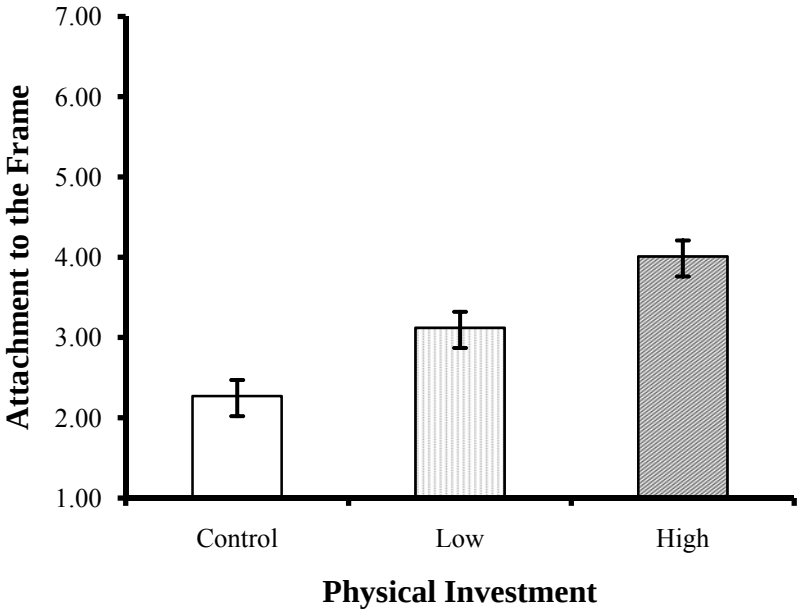
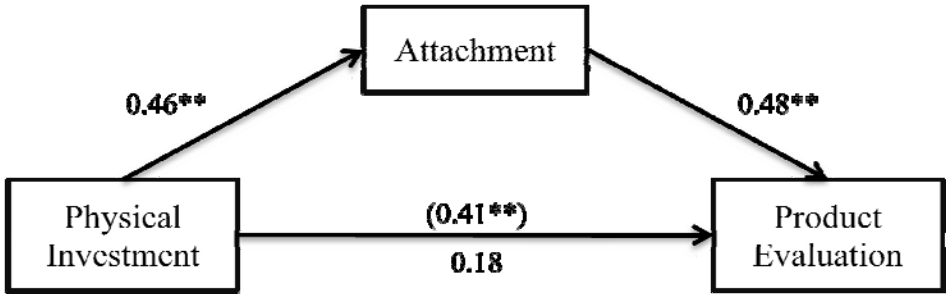


FIGURE 2.4 - STUDY 1: MEDIATION ANALYSIS



Presented here are the standardized beta (b) coefficients

* $p < .05$, ** $p < .01$

FIGURE 2.5 - STUDY 2: PRODUCT EVALUATION

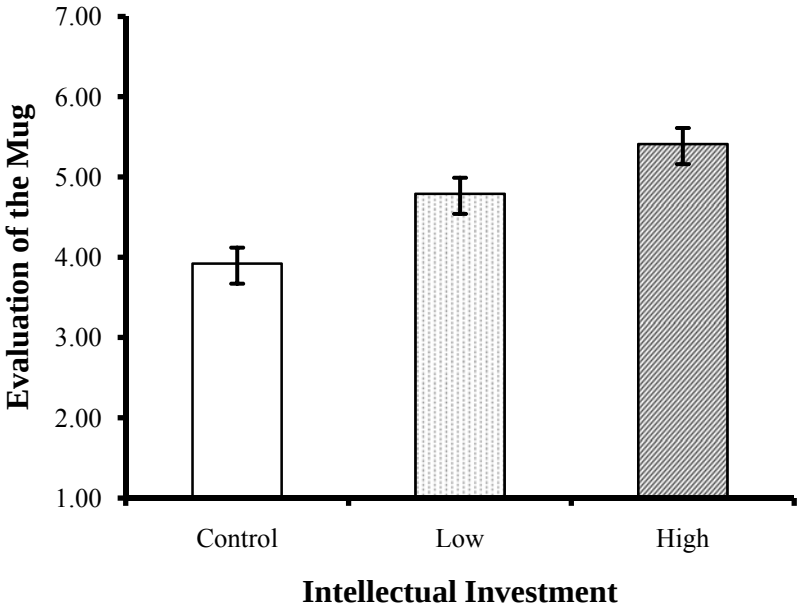


FIGURE 2.6 - STUDY 2: IDENTIFICATION WITH THE PRODUCT

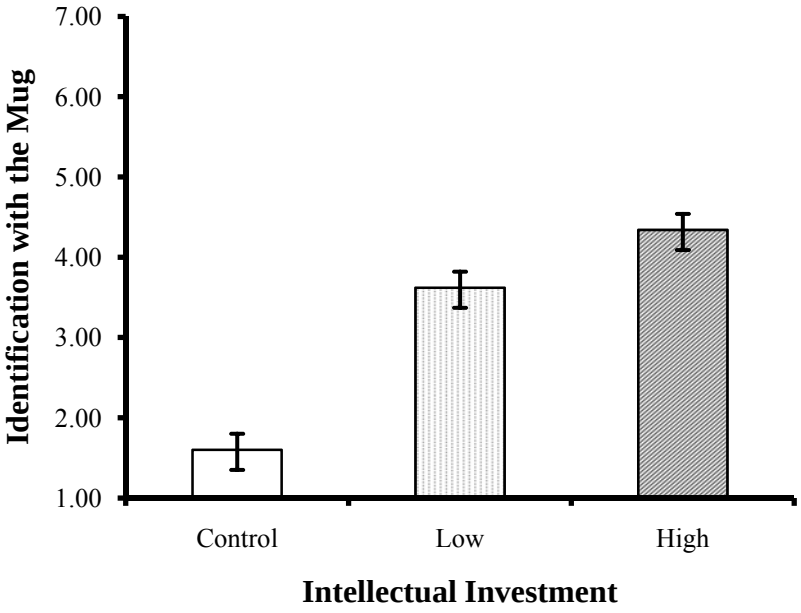


FIGURE 2.7 - STUDY 2: ATTACHMENT TO THE PRODUCT

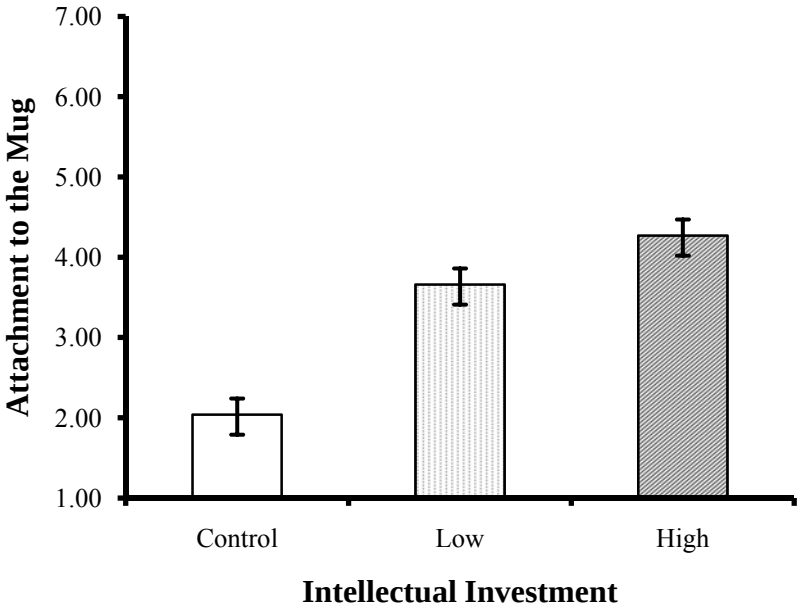


FIGURE 2.8 - STUDY 3: PRODUCT EVALUATION

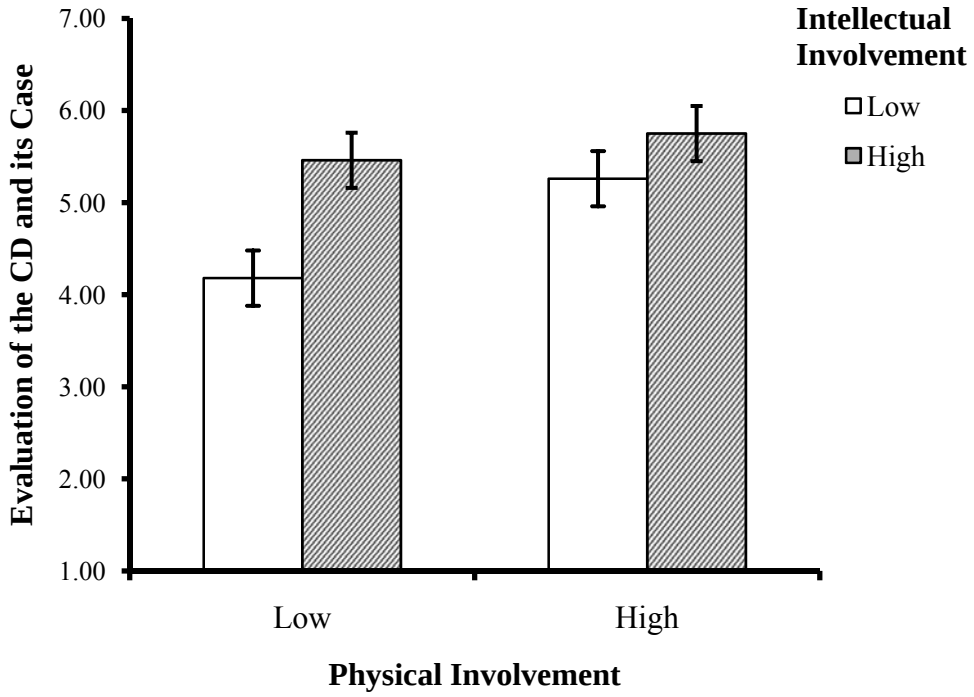
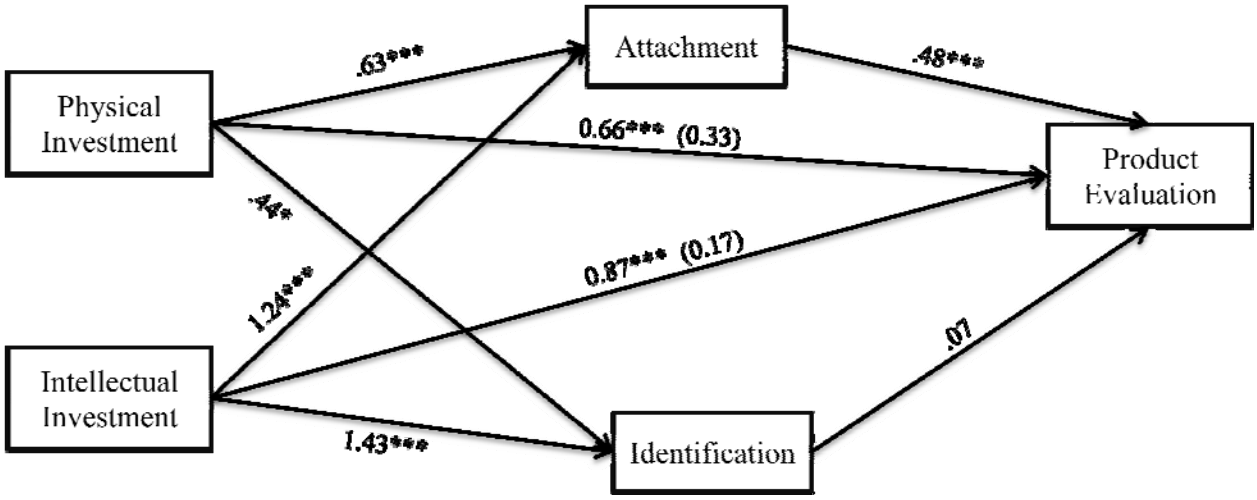


FIGURE 2.9 - STUDY 3: TWO-MEDIATOR MODEL



Path values represent unstandardized regression coefficients. The value outside of the parentheses represents the total effect of investment type on product evaluation prior to the inclusion of the mediating variables. Value in parentheses represents the direct effect, from bootstrapping analyses, of investment type on product evaluation after the mediators are included.

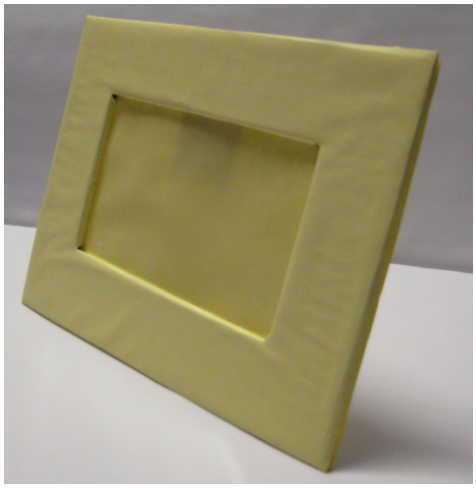
*$p < .10$, **$p < .05$, ***$p < .001$

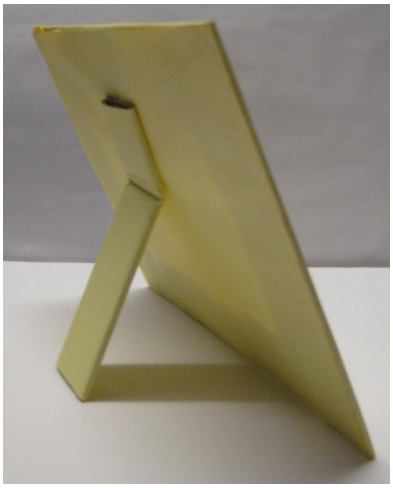
TABLE 2.1 - STUDY 3: TWO-MEDIATOR MODEL BOOTHSTRAPPING RESULTS

	Point Estimate	Percentile 95% CI		BC 95% CI		BCa 95% CI	
		Lower	Upper	Lower	Upper	Lower	Upper
				Indirect Effects			
IV: Intellectual							
Attachment	0.5963	0.2655	0.9955	0.3146	1.0743	0.3066	1.0648
Identification	0.1024	-0.1943	0.4079	-0.2016	0.4037	-0.1949	0.4079
TOTAL	0.6986	0.3784	1.0746	0.4027	1.1094	0.4013	1.1077
IV: Physical							
Attachment	0.3028	0.0823	0.5829	0.1070	0.6332	0.1080	0.6340
Identification	0.0312	-0.0742	0.1509	-0.0492	0.1735	-0.0478	0.1769
TOTAL	0.3340	0.0954	0.5916	0.1129	0.6259	0.1128	0.6259

Note - IV, independent variable; BC, bias corrected; BCa, bias corrected and accelerated; 5,000 bootstrap samples

APPENDIX 2.1 - STUDY 1: PICTURE FRAME





APPENDIX 2.2 - STUDY 2: TUMBLER EXAMPLES

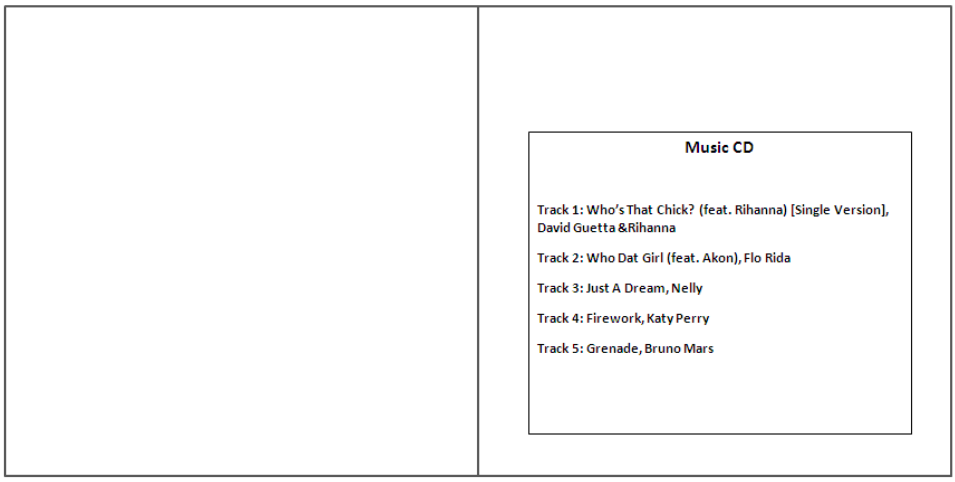
- Control
- Low Intellectual Investment
- High Intellectual Investment

APPENDIX 2.3 - STUDY 3: CD CASE EXAMPLES

LOW INTELLECTUAL INVESTMENT

THE BACK VIEW

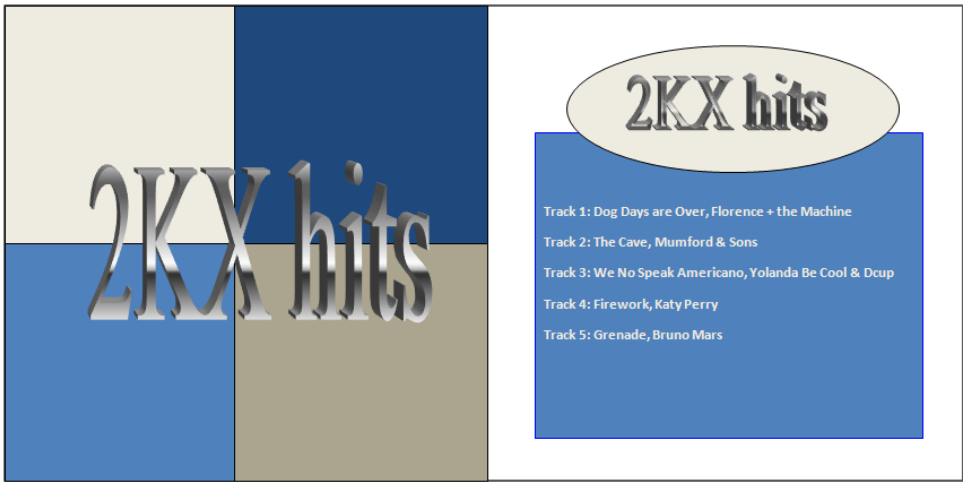
THE FRONT VIEW



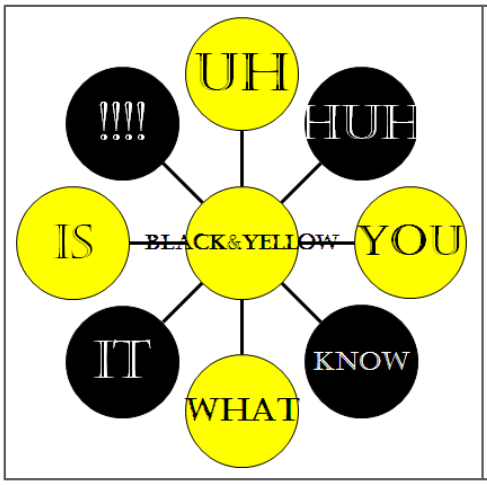
HIGH INTELLECTUAL INVESTMENT

THE BACK VIEW

THE FRONT VIEW



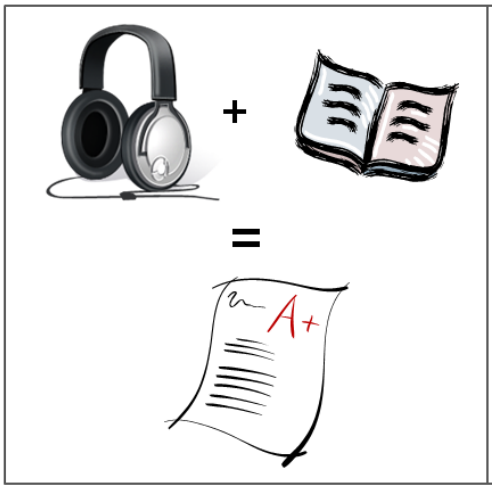
THE BACK VIEW **THE FRONT VIEW**



2/21/2011

1) **STEREO LOVE** - *Edward Maya & Vika Jigulina*
2) **FIREFLIES** - *Owl City*
3) **JUST A DREAM** - *Nelly*
4) **BLACK AND YELLOW** - *Wiz Khalifa*
5) **I DO** - *Colbie Caillat*

THE BACK VIEW **THE FRONT VIEW**



A Lesson in Concentration

An Experiment in Classical: Songs to Study To

Track 1: The Open Book
Track 2: Procrastination's Defeat
Track 3: In the Zone
Track 4: Stay the Course
Track 5: Burning the Midnight Oil