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The aesthetic fidelity effect

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ABSTRACT

Product aesthetics is a powerful means for achieving competitive advantage. Yet most studies to date have focused on the role of aesthetics in shaping pre-purchase preferences and have failed to consider how product aesthetics affects post-purchase processes and consumers' usage behavior. This research focuses on the relationship between aesthetics and usage behavior in the context of durable products. Studies 1A to 1C provide evidence of a positive effect of product aesthetics on usage intensity using market data from the car and the fashion industries. Study 2 corroborates these findings and shows that the more intensive use of highly aesthetic products may lead to the acquisition of product-specific usage skills that form the basis for a cognitive lock-in. Hence, consumers are less likely to switch away from products with appealing designs, an effect that is labeled as the 'aesthetic fidelity' effect. Study 3 addresses an alternative explanation for the 'aesthetic fidelity effect' based on mood and motivation but finds that the 'aesthetic fidelity' effect is indeed determined by usage intensity. Finally, Study 4 identifies a boundary condition of the positive effect of product aesthetics on product usage, showing that it is limited to durable products. In sum, this research demonstrates that the effects of product aesthetics extend beyond the pre-consumption stage and have an enduring impact on people's consumption experiences.

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1. Introduction

In many product categories, the aesthetics of a product's design is a crucial determinant of consumer choice. Consumer responses to products such as Apple's iPhone, Porsche's 911, and Vitra's Lounge Chair may not only be determined by the superior quality of these products but also by their iconic and highly aesthetic designs. Against this background, examining when and why consumers are affected by aesthetic designs has emerged as a fertile area of research. Simply put, consumers show a greater preference for products that are aesthetically appealing (Bloch, 1995; Cox & Cox, 2002; Hoegg, Alba, & Dahl, 2010; Landwehr, Wentzel, & Herrmann, 2012; Reimann, Zaichkowsky, Neuhaus, Bender, & Weber, 2010) and the appeal of a product's design is also predictive of a product's success in the marketplace (Landwehr, Labroo, & Herrmann, 2011; Landwehr, Wentzel, & Herrmann, 2013; Liu, Li, Chen, & Balachander, 2017).

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However, while the effects of product aesthetics on pre-purchase preferences and consumer choice are well-documented in the literature, existing research has largely failed to consider how product aesthetics affects actual usage behavior¹ (for a recent exception, see Wu, Samper, Morales, & Fitzsimons, 2017). For instance, assuming that a consumer buys an iPhone because of its appealing design, will she also use the phone on a more frequent basis to experience the aesthetic pleasure provided by the design? And how will this increased usage affect her preferences and her willingness to switch to a competitive smartphone?

In this research, we focus on durable products (i.e., products that can be used multiple times and are not destroyed during consumption) and argue that the aesthetic appeal of a product's design may be related to usage behavior and product preferences. Specifically, we postulate that consumers will use products with aesthetically appealing designs more intensively compared to products with less appealing designs. This increased usage intensity, in turn, may lead to the acquisition of product-specific usage skills (Anderson, 1983) that form the basis for a cognitive lock-in where consumers are less likely to switch away from a product they can already operate efficiently (Johnson, Bellman, & Lohse, 2003; Murray & Häubl, 2007). In sum, we argue that product designs may not only serve as a source of aesthetic pleasure but may also bond a consumer to a product by triggering greater usage intensity and efficiency, an effect we label as the 'aesthetic fidelity' effect.

In identifying the effect of product aesthetics on usage intensity, skill acquisition, and subsequent choice behavior, this research makes several important contributions to the literature. First, we show that product aesthetics affects consumers beyond the pre-consumption phase and may cause consumers to use products for longer periods of time and to become more efficient at using them. Importantly, these findings are not only supported by three controlled experiments but also by the analysis of three datasets from the car and fashion industries that provide insights into real usage behavior. Hence, this research extends the literature by showing that the link between product aesthetics and usage behavior is not only of theoretical interest but is also relevant for understanding and predicting how products are used in real life.

Second, our findings extend current theorizing on the relationship between aesthetics and usage behavior. As such, a recent study by Wu et al. (2017) found that product aesthetics may lead to reduced consumption enjoyment and may inhibit actual consumption, a finding which seems to contradict our key proposition that product aesthetics may intensify consumption. Of note, however, is the fact that Wu et al. (2017) focused on non-durable products that are typically destroyed during consumption (e.g., napkins, toilet paper). As consumers appreciate the effort that is necessary for creating beautiful products, they may lament seeing them getting destroyed during the consumption process and may thus tend to use them to a lesser extent. In our research, we build on these findings and examine the effects of product aesthetics on the usage of both durable and non-durable products. Specifically, we demonstrate that a product's durability (i.e., the extent to which a product is affected or destroyed during consumption) moderates the effect of aesthetics on usage intensity. That is, our findings show that product aesthetics intensify product usage when the product is durable in nature but inhibit product usage when the product is non-durable. Hence, our findings contribute to the literature by providing a more fine-grained analysis of the link between product aesthetics and usage behavior.

Third, we extend current theorizing on skill acquisition and the lock-in phenomenon. While existing studies have mainly focused on the process and the consequences of skill acquisition (Billeter, Kalra, & Loewenstein, 2010; Lakshmanan & Krishnan, 2011; Lakshmanan, Lindsey, & Krishnan, 2010; Murray & Häubl, 2007), there has been relatively little research on the determinants of this learning process. In this respect, our research shows that the aesthetic appeal of a product may motivate consumers to engage with a product more intensively and to develop product-specific usage skills, thus broadening our understanding of how consumers acquire skills in the marketplace.

The remainder of this article is structured as follows. In the theoretical section, we review literature streams on product aesthetics, hedonic consumption, and skill acquisition and develop our hypotheses. In the empirical section, we report the results of six studies. Studies 1A to 1C rely on the analysis of real market data from the car and fashion industries and find that products with more aesthetic designs are used for longer periods of time. Building on these findings, Studies 2 to 4 are designed as laboratory experiments. Study 2 provides further evidence for an 'aesthetic fidelity' effect and also reveals the underlying cognitive process. Study 3 addresses a potential alternative explanation for the aesthetic fidelity effect. Finally, Study 4 identifies an important boundary condition to the positive effect of product aesthetics on product use, namely a product's durability. Last, we provide theoretical and managerial implications in the general discussion.

2. Theoretical development

Product aesthetics refers to the beauty or exterior appearance of a product (Wertheimer, 1922, 1923). Extant research (Bloch, 1995, 2011; Homburg, Schwemmler, & Kuehnl, 2015; Reber, Schwarz, & Winkielman, 2004) has noted that aesthetics "can be (1) an attribute of the product itself, (2) created in the eye of the beholder, or (3) a combination of these two options" (Homburg et al., 2015, p. 44). In this research, our conceptualization of product aesthetics corresponds to the third perspective. That is, a product is characterized by a combination of design elements (e.g., the color, shape, pattern, or materials of a product's outer form) that, in turn, cause a perception of beauty or appeal in the eyes of the consumer.

Importantly, the perception of product aesthetics is typically linked to an affective response. In his seminal paper, Bloch (1995) argued that this affective reaction may range from simple product liking to deeply moving emotional experiences

¹ While usage is typically linked to purchase, usage does not necessarily require purchase as when, for example, consumers rent a product on a temporary basis or borrow a product from a friend or family member.

similar to those of works of art. In a similar vein, Leder, Belke, Oeberst, and Augustin (2004) proposed a model of aesthetic experience where aesthetic emotions are argued to be the result of a continuous and satisfactory assessment of a stimulus.

The notion that consumers are attracted to aesthetic designs because of their affect-inducing nature is also consistent with the hedonic perspective of consumption (Alba & Williams, 2013; Hirschman & Holbrook, 1982; Holbrook & Hirschman, 1982). The hedonic perspective focuses on the emotive and sensory facets of the consumption process and considers consumption as a 'primary process' that is aimed at immediate gratification. The consumer is conceptualized as a pleasure seeker who chooses and uses products to satisfy his or her constant need for emotional arousal. In line with the pleasure principle (Freud, 1975), aesthetics' hedonic marking may thus fuel into a natural human desire for affective stimulation. Finally, research in neuroscience has also affirmed the pleasing and rewarding properties of aesthetic stimuli using functional magnetic resonance imaging (fMRI) studies. As such, aesthetic perceptions have been shown to activate the reward circuitry of the brain, thereby generating a 'liking' as well as a 'wanting' response (Berridge & Robinson, 1998; Kawabata & Zeki, 2004; Reimann et al., 2010). Of interest to the current context, the affective reaction triggered by an aesthetic design may also lead to a behavioral response. That is, as people may want to savor the pleasure afforded by an attractive design, they may adjust their usage accordingly.

In this respect, a recent study by Wu et al. (2017) examined how product aesthetics affect the usage of non-durable products such as toilet paper, paper napkins, and cupcakes. The findings revealed that highly aesthetic designs led to reduced consumption enjoyment and inhibited actual consumption. To account for these findings, Wu et al. (2017) argued that non-durable products are inevitably destroyed during consumption. As consumers appreciate the effort that is necessary for creating beautiful products, they may lament seeing them getting destroyed during the consumption process. In other words, to keep savoring the pleasure afforded by an aesthetic product design, consumers may have no choice but to abstain from its usage.

While the findings of Wu et al. (2017) extend our understanding of the relationship between product aesthetics and usage behavior, it is important to note that the authors focused on a particular kind of product (i.e., non-durable products that are destroyed during consumption). Arguably, however, the effect of product aesthetics on usage behavior may unfold differently for products that are more durable in nature. In the case of durable products, the act of consumption does not negatively affect or destroy the product. Hence, consumers do not need to curtail their use of the product in order to enjoy the positive affect afforded by the product's design. Quite to the contrary, an extended usage may allow for a deeper and more extensive experience of the product's aesthetic value. From this perspective, products with highly aesthetic designs may be used more (rather than less) intensively than products with less appealing designs.

In this respect, Bloch (1995) suggested that the positive affect triggered by highly aesthetic designs will encourage consumers "to engage in approach activities, such as extended viewing, listening, or touching the product" (p. 20). The experience of pleasure may signal to a consumer that she is enjoying a product and may thus prolong its usage (Chen, Wyer, & Shen, 2015; Martin, Ward, Achée, & Wyer, 1993). In line with this reasoning, the time spent on an activity has long been considered an index of hedonic response (Berlyne, 1971). Similarly, free-choice persistence is one of the most prominent measures of people's enjoyment (i.e., intrinsic motivation) (Deci, 1971; Deci, Koestner, & Ryan, 1999).

Studies from the consumer domain also provide support for the idea that affect and usage intensity are positively related. For instance, Bellizzi and Hite (1992) and Donovan, Rossiter, Marcolyn, and Nesdale (1994) showed that the pleasure derived from a store's color and atmosphere increased the time that consumers spent in the store. Similarly, Menon and Kahn (2002) found that consumers' affective reaction toward the visual appeal of an online shopping site made them spend more time browsing and exploring products sold on that website as well as other websites. In a different context, Olney, Holbrook, and Batra (1991) showed that people's zipping and zapping behavior was influenced by the experience of pleasure. Commercials that were pleasurable to watch led to longer viewing times than less pleasurable ads. Finally, Holbrook and Gardner (1998, but see also 1993) found that CD listening times were significantly influenced by how much people enjoyed the music from the CDs.

While the studies outlined above suggest that the experience of (aesthetic) pleasure prolongs the execution of an ongoing activity, none of these studies have focused on the effects of product aesthetics on usage intensity. That is, existing research has either focused on the execution of a particular activity such as shopping or watching TV commercials rather than the usage of a product (Bellizzi & Hite, 1992; Donovan et al., 1994; Menon & Kahn, 2002; Olney et al., 1991) or has focused on the construct of pleasure rather than actual behavior (Holbrook & Gardner, 1998; Menon & Kahn, 2002; Olney et al., 1991).

Extending these existing lines of research, we postulate that product aesthetics will affect how intensively a product is used and that the direction of this effect will be determined by the durability of the product in question. That is, whereas consumers will use products with more aesthetic designs more intensively than products with less aesthetic designs when the product is durable (i.e., not affected or destroyed through the act of consumption), these effects should reverse when the product is non-durable (i.e., adversely affected or destroyed through the act of consumption). Thus,

H1. The effect of product aesthetics on usage intensity will be moderated by a product's durability.

H1a. Durable products with more aesthetic designs will be used more intensively compared to durable products with less aesthetic designs.

H1b. Non-durable products with more aesthetic designs will be used less intensively compared to durable products with less aesthetic designs.

If H1a holds true and products with more aesthetic designs are used more intensively than those with less aesthetic designs, this may have important downstream consequences. Research has shown that repeated use or consumption of a product may lead to lock-in, that is, a situation where consumers feel that the costs of switching away from an incumbent product are greater than the benefits of using an alternative product (Klemperer, 1987, 1995; Shapiro & Varian, 1999). Importantly, lock-in may occur in the absence of search costs or financial costs and may be based on the cognitive costs associated with getting used to a new product. Moreover, lock-in does not require that the product is functionally superior or that the consumer has a positive attitude toward the product (Murray & Häubl, 2007; Zauberan, 2003).

In the context of product use, Murray and Häubl (2007) observe that “the costs associated with thinking about and using a particular product decrease as a function of the amount of experience a consumer has with it” (p. 77). That is, as consumers gain more experience with a product, they may become more efficient at operating it. While previous research (e.g., Johnson et al., 2003; Murray & Häubl, 2007; Zauberan, 2003) has typically examined cognitive lock-in in the context of technological products (e.g., websites), one may argue that consumers may also develop specific usage skills for non-technological and more mundane products. For instance, by repeatedly using a particular handbag, consumers may need to think less about how to organize their personal items (e.g., smartphone, keys, handkerchiefs, and wallet) inside the bag as each item has its own signature place in the bag. In a related vein, consumers may also find it easier to pick the right item from inside the bag without having to glance into it.

Importantly, while consumers may develop different kinds of skills for technological and non-technological products through increased usage, they may exhibit a reluctance to switch to a competitive product in both cases. That is, while the incumbent product can be used efficiently, a new product would require the consumer to learn a new set of product-specific skills. These differences in cognitive effort and time expenditure make it costly to the consumer to switch, thus increasing the subjective value of the incumbent product and creating cognitive lock-in (Johnson et al., 2003; Ratchford, 2001).

These arguments are of direct relevance for understanding the relationship between product aesthetics and usage behavior. As proposed in H1a, consumers may use products with aesthetic designs more intensively than those with less aesthetic designs. As a result, they may become more efficient at operating a product and may eventually feel that switching to an alternative product is costly. Hence, these arguments suggest that the effects of product aesthetics extend beyond the actual act of consuming. Specifically, we postulate that aesthetic product designs may trigger an ‘aesthetic fidelity’ effect where consumers will become more efficient at operating products with highly aesthetic designs (relative to those with less aesthetic designs) and will subsequently exhibit a greater preference for these products (i.e., are less likely to switch to an alternative product when offered the opportunity to do so). Thus,

H2. Durable products with aesthetic designs will lead to higher levels of usage efficiency compared to those with less aesthetic designs.

H3. Durable products with aesthetic designs will engender greater product preferences (i.e., will reduce consumers’ propensity to switch to a competitive product) compared to those with less aesthetic designs.

To sum up, we postulate that aesthetic product designs initiate a chain of processes that climax in the ‘aesthetic fidelity’ effect. Specifically, we propose that aesthetic designs intensify a product’s use, thereby fostering higher efficiency in operating the product (Newell & Rosenbloom, 1981). These gains in efficiency, in turn, increase the value of a product to the consumer (i.e., by reducing usage costs) and may therefore engender higher product preferences (Johnson et al., 2003; Murray & Häubl, 2007). Formally,

H4. The effect of product aesthetics on product preference will be mediated in serial by a higher usage intensity and higher levels of usage efficiency.

3. Study 1: The effect of product aesthetics on usage intensity in real-life settings

One of the key contentions of our model is that durable products that are more aesthetically appealing are also used more intensively. Before testing this hypothesis in a controlled laboratory environment, we aimed to examine whether this relationship could also be observed in real-life settings. To this end, we relied on three different datasets from the car and fashion industries that provided insights into real consumption behavior and examined whether a product’s aesthetic appeal determines the intensity with which the product is used.

3.1. Study 1A: Product aesthetics and consumers’ driving behavior

Study 1A focused on the car market and examined if the appeal of a new car’s design is related to its mileage (i.e., use) when sold on the used car market. Based on our theoretical model, we would expect that consumers use their cars more often when these are aesthetically appealing, which, in turn, should be reflected by a higher mileage when the cars are sold on the used car market. Testing this hypothesis, however, required a measure of aesthetic appeal that was collected

in the past rather than the present. As the mileage of a car accumulates over time, we needed to employ a measure that would be indicative of a car's aesthetic appeal at the beginning rather than the end of the usage period.

To this end, we relied on design ratings that were collected in 2009 and that were based on a survey from one of Germany's largest car magazines. Specifically, the magazine asked its readers to rate the aesthetic appeal of a total of 89 car models for an annual design award, with more than 10,000 car aficionados participating in the voting. The design ratings published by the magazine are expressed as the percentage of all participants who considered a particular car to be among the two most aesthetic cars in a set of cars of a certain vehicle category (e.g., compact cars). Importantly, the dataset included a wide variety of different car categories. As such, we obtained data on small cars, compact cars, mid-range cars, luxury cars, vans, SUVs, convertibles, and sports cars.

The design ratings collected in 2009 provided the starting point of our analyses, and we wanted to examine how these ratings were related to actual usage behavior from 2009 onwards. To obtain data on the usage intensity of these cars between 2009 and 2018 (i.e., the present day at the time of the analysis), we relied on data provided by the largest online platform for used vehicles in Germany, namely mobile.de. Cars that are sold on this platform need to indicate their total mileage as well as the year in which they were first registered. For each car model in our sample, we extracted all of the cars that were first registered in 2009 (13,814 individual cars). Hence, the time period of usage was constant across all cars (i.e., 9 years from 2009 to 2018). Next, we excluded all car models with less than 10 offers on the platform for reliability reasons and all car models that were offered as unused cars (i.e., zero mileage). Afterwards, we identified the median mileage for each of the remaining car models. This left us with a final sample of 68 car models.

As the mileage of a car will also be influenced by factors other than the car's aesthetic appeal, we sought to collect relevant control variables. By drawing on data published by the same car magazine that provided the design ratings, we were able to assess each car model's horse power, acceleration, fuel consumption, and price. In addition, we wanted to control for the effects of brand familiarity. To this end, we relied on the results of a representative consumer survey, which is conducted annually by one of Germany's largest news magazines (i.e., Stern). Specifically, the magazine provided us with access to a measure of brand familiarity for our car models (i.e., the percentage of consumers who feel familiar with a particular car brand). Importantly, we drew on data that was collected in 2008 and that should, thus, well reflect brand familiarity during the subsequent year. Note that we intentionally used a measure of brand familiarity instead of a measure of brand strength because brand strength is more likely to be confounded with a brand's aesthetic appeal (i.e., aesthetics is a major driver of brand strength).

Before running the analyses, we wanted to remove the absolute level differences between the eight different car segments that were included in the dataset. To this end, we z-standardized the dependent variable and all predictor variables within each of the eight segments. Another advantage of this transformation is that all resulting model coefficients are fully standardized. On the basis of these transformed variables, we estimated three OLS-regression models that predict mileage by aesthetic appeal only (base model), by the control variables only (controls model), and by all predictor variables conjointly (full model). Testing these three models allowed us to examine the robustness and incremental fit of the relationship between aesthetic appeal and usage intensity. Table 1 provides an overview of the results of all three models. As expected, the aesthetic appeal of the car models was positively related to their mileage both in the base model ($b = 0.38$, $p = .001$) and in the full model ($b = 0.34$, $p = .016$). Moreover, the amount of variance explained in the controls model ($R^2 = 0.10$) is substantially increased when aesthetic appeal is added in the full model ($R^2 = 0.18$). These results lend initial support for H1a.

Table 1
Results of Studies 1A–1C.

Predictor variable	Base model	Controls model	Full model
<i>Study 1A: Cars</i>			
Aesthetic liking	0.38**		0.34*
Horse power		0.06	0.08
Acceleration		0.20	0.26
Fuel consumption		0.09	−0.01
Price		0.27	0.20
Brand familiarity		0.13	0.03
	$R^2 = 0.15$	$R^2 = 0.10$	$R^2 = 0.18$
<i>Study 1B: Maternity Wear</i>			
Aesthetic liking	0.11'		0.13*
Price		−0.30***	−0.30***
Brand (dummies)		$F(7, 313) = 5.06***$	$F(7, 312) = 5.11***$
	$R^2 = 0.01$	$R^2 = 0.14$	$R^2 = 0.16$
<i>Study 1C: Children's Clothes</i>			
Aesthetic liking	0.08'		0.11*
Price		0.05	0.07
Brand (dummies)		$F(28, 439) = 4.43***$	$F(28, 438) = 4.58***$
	$R^2 = 0.01$	$R^2 = 0.22$	$R^2 = 0.23$

Note. *** $p < .001$; ** $p < .01$; * $p < .05$; ' $p < .10$.

3.2. Study 1B: Product aesthetics and the rental of maternity wear

To gain additional support for H1a and to examine whether our findings extend to non-technological product categories, we next analyzed data on the rental duration of maternity wear. Specifically, we examined if the aesthetic appeal of a piece of maternity wear is related to the length of time that this piece is rented. Our selection of clothing as the focal category was inspired by the substantive role that aesthetics plays in the fashion industry. That is, we considered clothing an ideal category to put our main hypothesis to an additional test.

To obtain data on consumers' usage behavior of maternity wear, we cooperated with an online rental company that provided access to four years of transactional data (i.e., September 2014 to May 2018). The dataset included records on the average renting periods (in days) of a total of 322 pieces of maternity clothes. The clothes recorded in the dataset spanned six different garment categories, including, for example trousers, dresses, and swimwear. The company also provided us with information on the rental price per month as well as the brand (a categorical variable with eight levels) of each piece of maternity wear in the dataset. These two variables were included as control variables in the subsequent analyses.

To obtain a measure of aesthetic appeal, we downloaded the pictures of all 322 pieces of maternity wear from the company's webpage. Next, three judges that were blind to the research question rated each piece of clothing on a seven-point scale where "1" indicated a high aesthetic appeal and "7" a low aesthetic appeal (in the analyses, we reverse-coded these scores such that higher values indicate higher aesthetic appeal). According to the guidelines of Cicchetti (1994), the agreement among raters was good ($ICC_{(2,k)} = 0.69, p < .001$), so that we formed an average score for each piece of clothing.

Next, we z-standardized all continuous variables within each of the six garment categories to remove any absolute-level differences. Using these transformed variables, we estimated three OLS-regression models that predict length of rental period by aesthetic appeal only (base model), by the control variables only (controls model), and by all predictor variables conjointly (full model). The results of all three models are depicted in Table 1. As expected, the aesthetic appeal of the maternity wear was positively related to rental duration. The effect was marginally significant in the base model ($b = 0.11, p = .057$) and significant in the full model ($b = 0.13, p = .022$). Moreover, the amount of variance explained in the controls model ($R^2 = 0.14$) is increased when aesthetic appeal is added in the full model ($R^2 = 0.16$). Thus, the more appealing the clothes were, the longer they were kept by customers. These results provide additional support for the notion that durable products that are more (vs. less) aesthetically appealing are also used more intensively.

3.3. Study 1C: Product aesthetics and the rental of children's clothes

In order to corroborate the findings from Studies 1A and 1B, we obtained a third dataset focused on children's clothes from another online rental company. The dataset included records on the average renting periods (in days) of a total of 469 pieces of children's clothes over a time frame of two years (i.e., April 2016 to April 2018). The clothes recorded in the dataset spanned seven different garment categories (e.g., T-shirts, trousers, underwear). The dataset we obtained from the company also included information on the rental price per month as well as the brand (a categorical variable with 29 levels) for each piece of clothing. As in Study 1B, these variables were included as control variables.

In line with our previous approach, we downloaded pictures of all 469 pieces of children's clothes from the retailer's webpage and instructed three judges that were blind to the research question to rate each piece of clothing on the same seven-point scale used in Study 1B (again, these scores were reverse-coded for the analyses such that higher values indicate higher aesthetic appeal). As the agreement between the raters was fair ($ICC_{(2,k)} = 0.54, p < .001$, Cicchetti (1994)), we formed an average score for each piece of clothing.

As in Studies 1A and 1B, we z-standardized all continuous variables within each of the seven garment categories to remove any absolute-level differences. Using these transformed variables, we estimated three OLS-regression models that predict length of rental period by aesthetic appeal only (base model), by the control variables only (controls model), and by all predictor variables conjointly (full model). The results of all three models are depicted in Table 1. As expected, the aesthetic appeal of the children's clothes was positively related to their rental duration. The effect was marginally significant in the base model ($b = 0.08, p = .085$) and significant in the full model ($b = 0.11, p = .017$). Moreover, the amount of variance explained in the controls model ($R^2 = 0.22$) is increased when aesthetic appeal is added in the full model ($R^2 = 0.23$). These findings provide additional support for H1a and the notion that aesthetics positively affects usage intensity.

3.4. Discussion

Studies 1A to 1C provide initial support for the contention that durable products that are more aesthetically appealing are also used more intensively. Importantly, this positive effect remained robust across different product categories and different statistical modeling approaches. Critically, however, Studies 1A to 1C failed to examine the downstream consequences that an intensive product usage may have for consumers. Furthermore, despite the inclusion of several control variables, the market data did not allow for a systematic investigation of the causal effects of product aesthetics. Thus, we will now use experimental research methods to explore the effects of product aesthetics more thoroughly.

4. Study 2: The aesthetic fidelity effect

4.1. Design, participants, and procedure

The aim of Study 2 was to provide support for the ‘aesthetic fidelity’ effect and to test the underlying cognitive process (i.e., to test H1a, H2, H3, and H4). Study 2 used a one-factorial design where product aesthetics (high aesthetic appeal, low aesthetic appeal) was manipulated between participants. A total of 70 German students from a large public university participated in the study for a bag of candies as an incentive. One participant was deleted because she guessed the true purpose of the study yielding a final sample of $N = 69$ ($M_{\text{age}} = 22.2$ years, 48% female). Participants were run individually and randomly assigned to one of the two conditions.

At the beginning of the experiment, all participants were handed a smartphone for visual inspection (the “incumbent phone”). Importantly, all participants received the same smartphone (i.e., a Samsung Galaxy A3) and the aesthetic design of the smartphone was altered by using different design cases. Half of the participants received a smartphone with a more aesthetic design case and the other half the same phone with a less aesthetic design case (see Fig. 2). The aesthetic appeal of the design cases had been pretested prior to the study (more details follow below). Participants were told that they were free to use the phone and the applications installed on the phone for as long as they wanted to and were encouraged to try different applications. Importantly, all applications on the phone were secured with an unlock pattern which participants repeatedly needed to enter during the usage period (i.e., each time they wanted to open a new application).

After participants indicated that they had finished using the phone, they were asked to take a ‘pattern entering test’. That is, participants were asked to enter the pattern installed on the phone five times in a row and the experimenter measured the time participants needed to complete this task. In the next part of the study, participants were shown a second phone that was the same model as the first one (i.e., a Samsung Galaxy A3) but differed in terms of its design case and unlock pattern (the “competitive phone”). While the design case of the competitive phone was different from the first one, the aesthetic appeal of the two phones did not differ. That is, if participants had received a more (less) aesthetic phone in the first part of the experiment, they were given an equally more (less) aesthetic phone in the second part.

In line with our conceptualization of product aesthetics, we manipulated the aesthetic appeal of the smartphones by varying the colors and patterns of the design cases. Prior to the main study, we conducted a pretest to ensure that these modifications indeed altered the appeal of the design cases in the intended manner. That is, we wanted to ascertain that a) the two more (less) aesthetic phones did not differ in their aesthetic appeal and b) that the more aesthetic phones were indeed more appealing than the less aesthetic ones. Eighty participants were asked to rate either the two more or the two less aesthetic phones in terms of their aesthetic appeal using three 7-point items adapted from Mathwick, Malhotra, and Rigdon (2001) (‘The smartphone is attractive’, ‘The smartphone is aesthetically appealing’, ‘The smartphone looks good’, $\alpha = 0.98$). The pretest showed that there were no differences in terms of aesthetic appeal between the two more aesthetic designs ($M_{\text{phone1}} = 3.53$, $M_{\text{phone2}} = 3.41$, $t(39) = 0.83$, $p = .41$) or the two less aesthetic designs ($M_{\text{phone1}} = 1.71$, $M_{\text{phone2}} = 1.65$, $t(39) = 0.53$, $p = .60$). Furthermore, the more aesthetic designs were considered more appealing than the less aesthetic ones ($M_{\text{more aesthetic}} = 3.47$, $M_{\text{less aesthetic}} = 1.68$, $F(1, 78) = 25.49$, $p < .001$).

Participants in the main study were then given one opportunity to practice entering the unlock pattern of the competitive phone, after which they were asked to enter this pattern five times in a row as quickly as possible. Again, the experimenter measured the time that participants needed to complete this task. Following this, participants had to indicate which of the two phones they would prefer if they could keep one and use it in the future and responded to a final set of measures including the manipulation checks. To ensure that responses were not affected by a particular design, the two variants of the more (less) aesthetic designs were randomly assigned to the incumbent and the competitive conditions. That is, the particular designs that were used to operationalize the incumbent and the competitive phone were counterbalanced within each experimental condition (more aesthetic vs. less aesthetic). As this randomized assignment did not reveal any effects, the data were collapsed across this methodological control factor in both conditions.

4.2. Measures

4.2.1. Dependent variables

Usage intensity (i.e., duration of product use) of the phones was measured in seconds using a stopwatch. Following Murray and Häubl (2007), we used relative task completion times of the two pattern entering tests as a measure of participants’ usage efficiency. To obtain a meaningful metric, we subtracted participants’ completion time with the incumbent phone from their completion time with the competitive phone. Thus, higher scores indicate that participants were faster using the incumbent phone compared to the competitive phone. Product preference was measured as a binary variable denoting participants’ preference for the incumbent phone (i.e., choice share of the incumbent).

4.2.2. Manipulation check

As a check on the aesthetic appeal of the phones, we relied on the same three 7-point items as in the pretest ($\alpha = 0.96$). All items used in this study and the other studies used 7-point scales. Moreover, we included product usage enjoyment as an additional manipulation check in Study 1. As such, previous research suggests that using aesthetically attractive products is intrinsically enjoyable (Bamossy, Scammon, & Johnston, 1983; Bloch, 1995). Hence, measuring usage enjoyment allowed us to

ascertain that product designs that differ in terms of their aesthetic appeal are indeed associated with different levels of affect. Product usage enjoyment was measured on a four-item scale developed by Agarwal and Karahanna (2000) ('I had fun using the smartphone', 'Using the smartphone provided me with enjoyment, 'I enjoyed using the smartphone', 'Using the phone was enjoyable', $\alpha = 0.93$).

4.3. Results

4.3.1. Manipulation check

A one-way ANOVA indicated that the aesthetic appeal of the phones had been manipulated successfully. That is, the more aesthetic phones were perceived as significantly more appealing than the less aesthetic ones ($M_{\text{more aesthetic}} = 3.88$, $M_{\text{less aesthetic}} = 1.90$, $F(1, 67) = 38.32$, $p < .001$). Within the groups, both design variants were considered to be of equal appeal (more aesthetic designs: $M_{\text{design1}} = 3.96$, $M_{\text{design2}} = 3.79$, $t(33) = 1.08$, $p = .29$; less aesthetic designs: $M_{\text{design1}} = 1.93$, $M_{\text{design2}} = 1.87$, $t(34) = 0.68$, $p = .50$). Moreover, participants also indicated that the more aesthetic phones were more enjoyable to use than the less aesthetic ones ($M_{\text{more aesthetic}} = 4.60$, $M_{\text{less aesthetic}} = 2.98$, $F(1, 67) = 37.04$, $p < .001$).

4.3.2. Hypothesis testing

An ANOVA revealed that the more aesthetic smartphone was used for significantly longer periods of time than the less aesthetic one ($M_{\text{more aesthetic}} = 464.09$, $M_{\text{less aesthetic}} = 139.57$, $F(1, 67) = 85.55$, $p < .001$), thus providing support for H1a. Moreover, the use of the more aesthetic phone led to significant learning effects. The difference in the entering speed of the lock pattern between the competitive and the incumbent phone was significantly larger in the group with the more aesthetic phones compared to the group with the less aesthetic phones ($M_{\text{more aesthetic}} = 1.78$, $M_{\text{less aesthetic}} = -0.10$, $F(1, 67) = 4.05$, $p = .048$). These results provide support for H2 and suggest that participants that had received the more aesthetic phone developed product-specific usage skills.

To test H3, we employed a logistic regression model that regressed phone choice (1 = incumbent phone; 0 = competitive phone) on the effect-coded experimental factor (-1 = less aesthetic phones; 1 = more aesthetic phones). This analysis revealed a positive effect of product aesthetics on preferences for the incumbent smartphone ($b = 0.68$, $p = .01$). Specifically, 77% of those participants that had received a more aesthetic phone in the beginning of the study preferred to remain with this phone (even though they could have chosen another phone that was equally aesthetic), whereas only 46% of those participants that were given a less aesthetic phone indicated that they wanted to keep this phone. These results provide support for H3.

4.3.3. Mediation analysis

To test the mediation effect proposed in H4, we used a serial multiple mediator model (Model 6, Hayes, 2013) of the following form: product aesthetics \rightarrow usage intensity \rightarrow usage efficiency \rightarrow product preference. In line with H4, the results of a bootstrapping mediation analysis (5000 resamples) showed that the indirect effect of product aesthetics on preference through usage intensity and usage efficiency was significant and positive (indirect effect = 0.41; 95% CI: [0.03, 1.27]).

4.4. Discussion

Study 2 provides support for our conceptual framework and points to the possibility of an 'aesthetic fidelity' effect. That is, participants used products with more aesthetic designs for significantly longer periods of time than those with less aesthetic designs. As a result of this extended usage experience, participants became more efficient at using the product, which, in turn, reduced the probability of switching to an alternative product that was equally aesthetic (i.e., a lock-in effect).

While the results of Study 2 are in line with our conceptual reasoning, there is also an alternative explanation that may account for these findings. As such, a key argument of our model is that aesthetic designs lead to longer usage times, which, in turn, will enhance usage efficiency and preferences. In other words, product aesthetics matter because it increases the time consumers spend with a product. Arguably, however, product aesthetics may affect usage efficiency and preferences in a more direct fashion by strengthening a person's mental abilities. As such, a great number of studies have revealed a relationship between individuals' affective states and their cognitive performance (for a review, see Isen, 2001). Specifically, Fredrickson's (1998) broaden-and-build theory of positive emotions argues that positive emotions broaden people's momentary thought-action repertoire, thereby building individuals' intellectual, physical, and social resources. These arguments may also be of relevance in the current context. That is, more aesthetic product designs may trigger positive affect (Bamossy et al., 1983; Graf & Landwehr, 2015; Reber et al., 2004), and this increase in affect, in turn, may allow for a deeper understanding of a new product and increased usage efficiency.

Furthermore, the positive affect triggered by a more aesthetic design may contribute to skill development by increasing performance motivation. As such, research has typically found that performance is dependent on a person's motivation (Cerasoli, Nicklin, & Ford, 2014) and that positive affect is a factor that may fuel motivation (Erez & Isen, 2002; Seo, Barrett, & Bartunek, 2004). In the current context, more aesthetic product designs may thus support skill acquisition and product preferences by increasing consumers' motivation to master a product and to become more efficient at using it.

In light of these arguments, usage intensity may be less central in explaining the relationship between aesthetic designs, skill acquisition, and product preferences. Instead, one may argue that an 'aesthetic fidelity' effect may emerge because aesthetic designs affect consumers' momentary cognitive abilities and/or their motivation to master a new product, regardless of the time

they spend using the product. In the next study, we address these competing explanations and aim to gain further support for our framework by experimentally manipulating usage intensity to identify its causal effect in the serial mediation model.

5. Study 3: The role of usage intensity

5.1. Design, participants, and procedure

Study 3 used a 2 (product aesthetics: high aesthetic appeal, low aesthetic appeal) \times 2 (usage intensity: low, high) between-participant design. A total of 117 German students ($M_{\text{age}} = 22.23$ years, 27% female) participated in the study for a bag of candies as an incentive. Students were run individually and randomly assigned to one of the four conditions.

Similar to Study 2, participants were handed a smartphone with a more or less aesthetic design case. All applications on the phone were secured with an unlock pattern (the same models, design cases, and unlock patterns as in Study 2 were used). In contrast to Study 2, however, participants were not allowed to interact with the phone for as long as they liked. Instead, participants were either told not to use the phone at all in the initial stage of the study (low usage intensity) or were told that they were allowed to use the phone for exactly 6 min (high usage intensity). The experimenter ensured that participants complied with these requests. Across all four conditions, we then administered the pattern entering test described in Study 2 and measured task completion times (participants in the low-usage conditions were allowed one trial before taking the test). Following this, participants were handed the second phone that differed in terms of its design and unlock pattern and were asked to complete the second pattern entering test. Similar to Study 2, participants were allowed a one-time trial of the patterns prior to the second test. Finally, participants were asked to indicate their preference for either of the two phones and responded to a final set of measures including the manipulation check. As in Study 2, the two variants of the more (less) aesthetic designs were randomly assigned to the incumbent and the competitive conditions. As this randomized assignment did not reveal any effects, the data were collapsed across this methodological control factor in both conditions.

This experimental design allowed us to address the two alternative process explanations outlined above. If the relationship between product aesthetics, usage efficiency, and preferences is indeed determined by increased usage intensity, then controlling for usage intensity should eliminate the effect of aesthetics. In other words, because skills are acquired through practice, product aesthetics should no longer affect usage efficiency and preferences if participants cannot decide on their own how intensively they want to interact with the product. That is, we would not expect to see an effect of product aesthetics — neither as a main effect nor in interaction with usage intensity. Rather, we would only expect to observe a main effect of the usage intensity manipulation on efficiency and preferences. If, on the other hand, the effect of product aesthetics is determined by increased mental abilities or motivation, then controlling for usage intensity should exert less of an effect. That is, participants exposed to the more aesthetic phone should exhibit greater cognitive abilities and/or performance motivation than those exposed to the less aesthetic one and this effect should emerge regardless of the opportunity to practice. Hence, we would expect to only observe a main effect of product aesthetics on skill acquisition and preferences.

5.2. Measures

5.2.1. Dependent variables

Participants' usage efficiency and preferences were measured in the same manner as in Study 2.

5.2.2. Manipulation check

The aesthetic appeal of the phones was measured with the same items as in Study 2 ($\alpha = 0.95$).

5.3. Results

5.3.1. Manipulation check

Again, the more aesthetic phones were considered more appealing than the less aesthetic ones ($M_{\text{more aesthetic}} = 3.59$, $M_{\text{less aesthetic}} = 2.74$, $F(1, 115) = 10.76$, $p < .01$). Within the groups, the aesthetic appeal of the two design variants

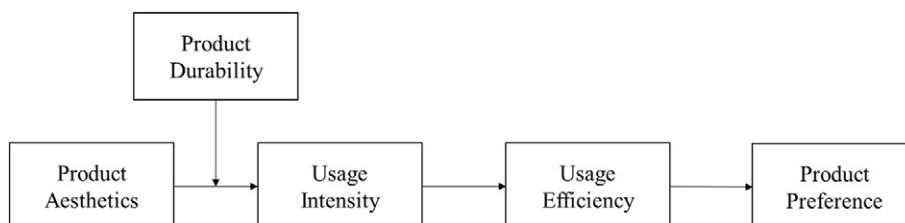


Fig. 1. Conceptual model.

did not differ significantly (more aesthetic designs: $M_{\text{design1}} = 3.56$, $M_{\text{design2}} = 3.62$, $t(58) = -0.49$, $p = .63$; less aesthetic designs: $M_{\text{design1}} = 2.78$, $M_{\text{design2}} = 2.70$, $t(57) = 0.53$, $p = .60$).

5.3.2. Hypothesis testing

A 2×2 ANOVA revealed a significant main effect of usage intensity on usage efficiency ($F(1, 113) = 4.66$, $p = .03$). That is, the difference in the entering speed of the lock patterns between the competitive and the incumbent phone was significantly larger for participants that were allowed 6 min of usage than for those that had not been allowed to use the phone ($M_{\text{high usage intensity}} = 1.45$, $M_{\text{low usage intensity}} = -0.28$). However, the main effect for product aesthetics ($F(1, 113) = 0.004$, $p = .95$) as well as the interaction did not reach significance ($F(1, 113) = 0.002$, $p = .96$). Hence, these results suggest that usage efficiency was determined by the opportunity to use the phone rather than the aesthetic appeal of the phones per se.

A logistic regression where participants' phone preference (0 = competitive phone; 1 = incumbent phone) was regressed on product aesthetics (-1 = less aesthetic phones; 1 = more aesthetic phones), usage intensity (-1 = low; 1 = high), and their interaction yielded similar results. This analysis revealed a significant main effect of usage intensity ($b = 0.52$, $p < .01$), indicating that 74% of those participants that had been given the opportunity to use the phone for 6 min decided to remain with the incumbent phone, whereas only 50% of those participants that had not been allowed to use the phone opted for the incumbent phone. Moreover, the main effect of product aesthetics ($b = -0.10$, $p = .61$) and the interaction effect were not significant ($b = 0.03$, $p = .87$). Again, these effects suggest that usage intensity was instrumental in determining lock-in.

5.3.3. Mediation analysis

In addition, we performed a mediation analysis to gain further support for the underlying process. Since the proposed mediator (i.e., usage efficiency) and the outcome variable (i.e., preference for the incumbent) are only influenced by usage intensity but not by aesthetics or the interaction, we tested the following mediation model: usage intensity \rightarrow usage efficiency \rightarrow product preference (aesthetics and the interaction were included as control variables). In line with our

More aesthetic designs



Less aesthetic designs



Fig. 2. Smartphone designs used in Study 2.

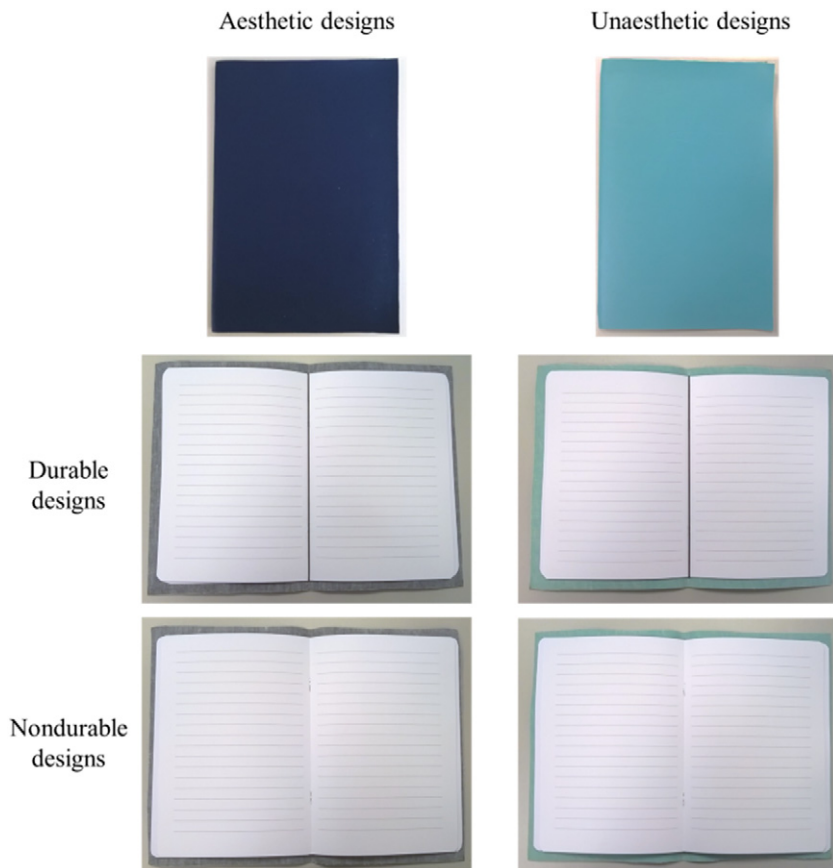


Fig. 3. Writing booklets used in Study 4.

conceptual model (see Fig. 1), the results of a bootstrapping mediation analysis (5000 resamples) showed that the indirect effect of usage intensity on product preferences through usage efficiency was significant and positive (indirect effect = 0.51; 95% CI: [0.04, 1.13]).

5.4. Discussion

The results of Study 3 provide further support for our conceptual model. Importantly, Study 3 rendered an explanation based on a broadened thought-action repertoire and/or a heightened performance motivation less likely as the effect of product aesthetics on skill acquisition and preferences disappeared when usage intensity was controlled for. Instead, skill acquisition and preferences were determined by the opportunity to interact with the phone. Hence, these results suggest that the 'aesthetic fidelity' effect is based on an intensified product use that, in turn, may be triggered by more aesthetic designs. In sum, this study and the previous studies highlight the importance of the positive relationship between product aesthetics and usage intensity. Critically, however, Wu et al. (2017) found that product aesthetics actually inhibited product use, a finding that seems to challenge our own results. In the next study, we address this apparent contradiction by explicitly taking the durability of a product into account and examining if product durability moderates the effect of product aesthetics on usage intensity.

The next study also allowed us to address a number of methodological concerns that may have affected the validity and/or generalizability of our results. First, Studies 2 and 3 focused on technological products (i.e., smartphones). Hence, Study 4 relied on writing booklets to examine if our hypotheses generalize to products that are of a non-technological nature. Second, to manipulate aesthetic appeal in Studies 2 and 3, we modified the colors and the patterns of the design cases. Arguably, these manipulations – apart from varying aesthetic appeal – may also have affected the symbolic meanings of the designs. Hence, Study 4 manipulated aesthetic appeal by simply using two different colors from the same color family. Third, participants in Studies 2 and 3 were required to return the smartphone at the end of the study and did not assume actual ownership of the product. Possibly, this may have affected their motivation to engage with the product, regardless of the product's aesthetic appeal. To rule out this potentially confounding effect, participants were given the booklets as a gift to keep.

6. Study 4: Durable versus nondurable products

6.1. Design, participants, and procedure

The aim of Study 4 was to test H1, H1a, and H1b. The study used a 2 (aesthetics: high aesthetic appeal, low aesthetic appeal) \times 2 (durability: durable, nondurable) between-participant design. A total of 129 individuals recruited from the subject pool of a large German university participated in this study in exchange for a small financial incentive ($M_{\text{age}} = 24.47$ years, 41% female). At the beginning of the experiment, all participants received a writing booklet as a gift and were asked to use it to write a story that included a list of 10 random words (i.e., football stadium, bank clerk, croissant, balloon, handcuffs, cross-country ski, calculator, measles, guinea pig, cleaning agents). They were told that they were free to write as much or little as they liked.

Importantly, the writing booklets differed in both their durability and their visual appeal. To be able to manipulate those two dimensions in a diligent manner, we created all the 129 writing booklets ourselves. We manipulated the durability of the booklets by creating an extendable and a non-extendable version (see Fig. 3). In the extendable version, the writing sheets were attached to the cover with a rubber string so that new writing sheets could be plugged into the booklet at any time, thereby giving the booklets an indefinite working life. In the non-extendable version, the sheets were glued onto the cover so that the working life of the booklet would end once all the sheets were filled. Hence, the booklets differed in the extent to which using the booklet (i.e., writing into it) adversely affected the length of time it could potentially be used. The aesthetic appeal of the writing booklets was manipulated by changing the color of the leather covers (i.e., blue vs. turquoise; see Fig. 3). The aesthetic appeal of the leather covers had been pretested prior to the study (more details follow below). As our dependent variable, we measured the time that participants took to write a story into their booklets. Once participants had finished writing, they responded to a final set of measures including the manipulation checks.

Prior to the main study, we conducted a pretest to ensure that the more aesthetic leather covers were indeed more appealing than the less aesthetic ones. Thirty-six participants were asked to rate the aesthetic appeal of the more and the less aesthetic leather cover on a single 7-point semantic differential with the two endpoints “This leather cover is ugly” and “This leather cover looks good”. The pretest showed that the more aesthetic designs were considered more aesthetically appealing than the less aesthetic ones ($M_{\text{more aesthetic}} = 5.19$, $M_{\text{less aesthetic}} = 3.08$, $t(35) = -5.86$, $p < .001$).

6.2. Measures

6.2.1. Dependent variables

Usage intensity (i.e., duration of product use) of the writing booklets was measured in seconds.

6.2.2. Manipulation check

As a check on the aesthetic appeal of the writing booklets, we relied on the same three items as in Study 2 ($\alpha = 0.94$). Product durability was measured with two items (“This writing booklet is durable”, “I will be able to use the product for a long time”; $\alpha = 0.89$).

6.3. Results

6.3.1. Manipulation check

An ANOVA indicated that the aesthetic appeal of the writing booklets had been manipulated successfully. That is, the appeal of the more and the less aesthetic writing booklets differed on a marginally significant level ($M_{\text{more aesthetic}} = 3.67$, $M_{\text{less aesthetic}} = 3.18$, $F(1, 127) = 2.91$, $p = .091$). This finding falls in line with the highly significant results from our pretest (see above). Moreover, the extendable writing booklets were considered more durable than the non-extendable ones ($M_{\text{durable}} = 5.14$, $M_{\text{nondurable}} = 3.86$, $F(1, 127) = 19.44$, $p < .001$).

6.3.2. Hypothesis testing

A 2×2 ANOVA with usage intensity as the dependent variable revealed insignificant main effects for product aesthetics ($F(1, 125) = 0.001$, $p = .97$) and durability ($F(1, 125) = 0.231$, $p = .63$). Importantly, however, the interaction effect between aesthetics and durability was significant ($F(1, 125) = 9.30$, $p = .003$). To follow up on this interaction, two planned contrasts were performed. In line with H1a, participants spent more time writing into the more aesthetic booklets than into the less aesthetic booklets when the booklets were durable (i.e., when new writing sheets could be added) ($M_{\text{more aesthetic}} = 1023.61$, $M_{\text{less aesthetic}} = 782.34$, $F(1, 125) = 4.45$, $p = .037$). When, however, the booklets were non-durable (i.e., no new sheets could be added to the booklets), this pattern of effects reversed. That is, participants spent less time on writing their story when they had been given a more aesthetic booklet relative to a less aesthetic one ($M_{\text{more aesthetic}} = 741.34$, $M_{\text{less aesthetic}} = 987.79$, $F(1, 125) = 4.86$, $p = .029$). These results provide support for H1b.

6.4. Discussion

Study 4 identifies an important boundary condition to the findings identified in the previous studies. As such, the results of Study 4 show that the effect of product aesthetics on usage intensity is moderated by product durability. While aesthetic designs intensified product usage when the product was durable in nature (the key contention of our conceptual model), they curbed product usage when the product was non-durable and adversely affected by the act of consumption (replicating

the findings reported by Wu et al., 2017). Hence, Study 4 does not only contribute by providing renewed support for our conceptual reasoning but also by clarifying that the effect of product aesthetics may ultimately depend on a product's durability.

7. General discussion

The purpose of this research was to examine the relationship between product aesthetics and consumers' usage behavior and preferences. Focusing on durable products (i.e., products that are not adversely affected or destroyed during the act of consumption), we argued that aesthetic designs may lead to greater usage intensity and may decrease the likelihood that consumers will switch from an incumbent product to a competitive product, an effect we labeled as the 'aesthetic fidelity' effect. A total of six studies provided robust support for this reasoning across a wide variety of categories (cars, maternity wear, children's clothes, smartphones, and writing booklets). Using real market data from the car and fashion industries, Studies 1A to 1C provided initial support for a positive effect of product aesthetics on usage intensity. Study 2 confirmed this effect in a controlled laboratory setting and found that the greater usage experience triggered by aesthetic designs resulted in greater usage efficiency and greater preferences for the incumbent product. Study 3 addressed an alternative explanation that was based on the idea that aesthetic designs enhance consumers' momentary thought-action repertoire and performance motivation and that these factors will drive skill acquisition and product preferences. Finally, Study 4 examined a potential boundary condition—a product's durability—and found that aesthetic designs led to increased usage intensity when the products were durable but not when they were non-durable (see also, Wu et al., 2017).

These findings make several contributions to the literature. First, our findings contribute to the literature on product aesthetics. Although product aesthetics has attracted a lot of research attention in recent years (Landwehr et al., 2011; Landwehr et al., 2013; Liu et al., 2017; Townsend & Shu, 2010; Trudel & Argo, 2013; Wu et al., 2017), most of these studies have examined product aesthetics in the context of pre-purchase preferences and purchasing behavior (for an exception, see Wu et al., 2017). Our research examines the effects of aesthetics from a hitherto rarely considered perspective and shows that aesthetics may affect how intensively consumers use a product and how efficient they become at using it. Hence, our research demonstrates that the effects of product aesthetics extend beyond the pre-consumption stage and have an enduring impact on people's consumption experiences.

Second, our research extends existing research by explicitly taking the durability of the product into account. Specifically, we demonstrate that a product's durability moderates the effect of aesthetics on usage intensity. That is, product aesthetics was found to inhibit product usage when the product was non-durable in nature and adversely affected through usage (i.e., a writing booklet where new pages could not be added), thus mirroring the findings of Wu et al. (2017). This effect, however, was reversed when the product was durable in nature (i.e., new pages could be added to the booklet). Hence, our findings provide a more fine-grained analysis of the effects of product aesthetics on consumption behavior and suggest that the effects of aesthetics may vary significantly across different product categories.

Third, our research contributes to the literature on skill acquisition and the lock-in phenomenon. Previous research in this area has investigated how different forms of practice influence the process of skill acquisition (Lakshmanan et al., 2010; Lakshmanan & Krishnan, 2011) and how learning may affect switching behavior (Johnson et al., 2003; Murray & Häubl, 2007). As a result, there is considerable knowledge on how consumers acquire skills and what the consequences of this process may be (i.e., a cognitive lock-in). Interestingly, however, there is less research on what motivates consumers to engage in practice in the first place. To the best of our knowledge, ours is one of the first studies that explicitly addresses this question and examines a potential antecedent of the skill acquisition process. That is, our research shows that the aesthetic appeal of a product may draw consumers into using the product and may thus play an important role in the skill acquisition process and its ensuing consequences (i.e., lock-in).

The current research also has important managerial implications. As such, our findings suggest that companies can enrich the consumption experience and increase the in-use value that is delivered to consumers through the aesthetic appeal of their products. Importantly, our studies indicate that this does not even require product aesthetics to be an integral part of the products. The design covers that we used for our smartphones in Studies 2 and 3, for instance, were only temporarily stuck onto the phones.

However, while aesthetically appealing designs may be relevant to all types of products, one sort of product that may benefit disproportionately from them are products of a technological nature and that also require certain skills on part of the consumer. In this respect, research has noted that initial learning costs may act as a barrier to the adoption of new products (Bagozzi, Davis, & Warshaw, 1992; Billeter et al., 2010; Thompson, Hamilton, & Rust, 2005). Against this background, aesthetic designs may facilitate and prolong the initial usage process and may increase the probability that consumers actually learn how to use the product effectively. Assuming that the extended use of a product is associated with the development of specific usage skills, aesthetic designs may also create switching barriers as consumers may be reluctant to switch to a competitive product that would require the acquisition of new skills (Johnson et al., 2003; Murray & Häubl, 2007). Put differently, product aesthetics may lead to an 'aesthetic fidelity' effect that may act as a source of competitive advantage.

Moreover, the findings of this research may be of direct benefit to companies that offer their products on a rental basis. As such, Studies 1B and 1C focused on rental services for clothes and showed that more aesthetic clothes are rented for longer periods of time. Hence, by intensifying consumption, aesthetic designs may naturally increase the calculation basis for a rental fee (e.g., length of rental, number of kilometers traveled). In other words, aesthetic designs may be an effective way to increase rental revenues.

At the same time, our findings also point to potential drawbacks of aesthetic product designs. As products with aesthetic designs may foster more intensive usage and the development of product-specific skills, consumers may become strongly habituated to a particular product and may be less likely to replace it. This may pose a challenge for companies that operate in categories where consumers are encouraged to substitute a product they are using with a new version or an upgrade on a regular basis. As such, these arguments demonstrate that the relationship between product aesthetics, usage intensity, and skill acquisition may have positive as well as negative implications for companies.

8. Limitations and future research

Our studies also have limitations that call for future research. First, the stimuli that we used in our studies may not only have varied with regard to their aesthetic appeal but also with regard to other design dimensions (e.g., the perceived luxuriousness or naturalness of a design). Hence, future research may wish to examine if other design dimensions affect consumption behavior in similar ways as product aesthetics. For instance, recent research shows that the visual appearance of products may systematically evoke certain brand personality impressions (Orth & Malkewitz, 2008) and that such impressions may exert an effect on behavior (Fitzsimons, Chartrand, & Fitzsimons, 2008). Of particular relevance to our research, the color blue – which we used to manipulate the appeal of the writing booklets in study 4 – may trigger perceptions of a competent brand personality (Labrecque & Milne, 2012). Hence, it would be interesting to relate such semantic associations triggered by the design to consumption intensity.

Second, future research may examine if the relationships between aesthetics, usage intensity, and lock-in are contingent on the category in question. While our studies show that the effect of aesthetics on usage intensity is consistent across a broad range of categories, one may argue that the process through which usage intensity affects subsequent behaviors differs across categories. For instance, in studies 1A, 2, and 3, we focused on technological products. Operating such products typically requires certain explicit skills (i.e., there is a particular way to operate a smartphone) and increased usage may help consumers to master these skills. In the case of non-technological products, skills may be more implicit and idiosyncratic. For example, consumers may get used to their own “way” of packing a handbag or dressing a baby in a romper suit. In yet other categories (for example, the writing booklets used in study 4), there may be no particular skills that consumers need to acquire and increased usage may primarily enhance loyalty through hedonically positive experiences of familiarity and processing fluency (see Graf, Mayer, & Landwehr, 2018 for a review of research on hedonic fluency effects). In other words, while the downstream effects of aesthetics may be the same across different categories (i.e., lock-in and increased loyalty), the nature of the underlying processes may differ.

Third, we have argued that durable products that are highly aesthetic will be used more intensively because, unlike non-durable products, they are not destroyed during the usage process. Instead, an extended usage will allow for a more extensive experience of a product's aesthetic value. However, while durable products may be used for extended periods of time, their initial beauty may be negatively affected as a result of the usage process. For instance, phones may get scratched and cars may get dents and dints over time. Assuming that consumers anticipate this wear, they may refrain from using a product intensively to preserve the product's aesthetic value, thus mirroring the findings that have been found for non-durable products (Wu et al., 2017). Hence, the anticipated effect of usage on a product's aesthetic value may moderate the effects we have identified in this research.

Finally, and related to the previous point, one may argue that the effect of anticipated wear on usage intensity will only materialize when consumers own the product in the long run. When, however, a product is only owned for a limited period of time (e.g., rental), consumers may have no incentive to preserve the product's aesthetic appeal. In fact, it may be in their best self-interest to use the product as intensively as possible during the period of temporary ownership to maximize the pleasure afforded by the product's beauty. In this regard, the effect of aesthetics on usage intensity identified in studies 1B, 1C, 2, and 3 (i.e., those studies involving temporary ownership) may have been less pronounced in settings involving long-term ownership. At the same time, the results of studies 1A and 4 show that consumers make more intensive use of durable products that are more aesthetic (vs. less aesthetic) even when they own these products. Against this background, future research may want to examine the relationship between product aesthetics, ownership, and usage behavior in greater detail.

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