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A matter of perspective: Design newness and its performance effects☆

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ABSTRACT

Several studies suggest that products with a distinctive exterior design outperform products without differentiating aesthetics. So far, a product's design newness has been assessed by a comparison to the design of competing products. Drawing on categorization theory, we argue that two additional perspectives are important: design newness with respect to the product's brand portfolio and that with respect to the product's predecessor. Results of an empirical study in the domain of cars confirm that all three perspectives of design newness have different and significant sales effects. Consumers' tolerance for newness is found to be most conservative within the predecessor perspective, followed by moderate levels of newness in the brand portfolio perspective and high levels in the competitor perspective. To maximize performance, manufacturers should therefore develop designs that have high novelty compared to the competitive set and are moderately novel compared to the brand's product portfolio and to the preceding model generation. A second empirical application in the context of smart phones confirms these findings.

1. Introduction

Practitioners and researchers have given increasing attention to the role of product design in the marketing of new products. In particular, the newness of a product's appearance has been recognized as an important means of differentiation. Novel designs have been found to exhibit a positive relationship with market share (e.g., Korenok, Hoffer, & Millner, 2010), sales (e.g., Landwehr, Wentzel, & Herrmann, 2013; Rubera & Dröge, 2013), and sales growth (Millner & Hoffer, 1993). Design newness has positive effects on product sales over the whole product life cycle (Talke, Salomo, Wieringa, & Lutz, 2009; Rubera, 2014).

In assessing a product's design newness, existing studies have mostly employed a competition-oriented perspective (e.g., Calantone, Vickery, & Dröge, 1995; Talke et al., 2009), so that design newness is determined through a comparison to the design of products that provide similar benefits to the customer and that are aimed at the same target markets (Kotler & Armstrong, 2012). However, customers regularly compare a product with members of different reference groups (Loken, Barsalou, & Joiner, 2008). Marketing literature, for instance, provides vast evidence that in judging properties of a new product, customers use properties of its predecessor (e.g., Keaveney, Herrmann, Befurt, & Landwehr, 2012; Mazumdar, Raj, & Sinha, 2005) or other products in the brand portfolio (e.g., Aaker & Keller, 1990; Monga & John, 2010). So far, to the best of our knowledge, these three perspectives have never been used simultaneously to judge the same product attribute. Comparing a product with different reference groups,

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however, may lead to different evaluations of the same product property. Such differences and their joint effect on the purchase decision remain unclear.

Consideration of multiple reference categories is especially relevant in the design area. Striving for competitive differentiation may push companies to concentrate on the novelty of a product's design relative to competitors (Fuchs & Diamantopoulos, 2012), whereas building brand equity requires consistency in designs across different products of a brand portfolio and across different generations of a product (Bloch, 1995; Keaveney et al., 2012). Earlier studies found that design novelty relative to competitors allows for product differentiation and a unique brand positioning, which in turn leads to increased sales performance (Talke et al., 2009; Rubera & Dröge, 2013). By contrast, studies in brand and product line extension literature suggest that designs vastly different from other products in the brand portfolio may negatively affect brand recognition and transfer of brand associations (Goode, Dahl, & Moreau, 2013; Karjalainen & Snelders, 2010; Kreuzbauer & Malter, 2005, 2007). Consequently, considering only competitors' designs as points of reference does not adequately take customers' design perceptions into account and may lead to erroneous conclusions with regard to optimal levels of design newness, which in turn may detrimentally affect the market performance of a new product.

This point is recognized by leading product designers, who have commented extensively on the relevance of considering different aspects of design newness. For instance, Gorden Wagener, head of Mercedes Benz design, argued: “Brands and models need to stand out from the competition as it is getting increasingly difficult for customers to differentiate between them. The challenge here is to develop a clear brand style” (Oagana, 2009). Similarly, Anders Warming, head of MINI design, emphasized: “We want to make sure that every MINI is based on this philosophy of knowing where it comes from and having a lot of innovation” (Boeriu, 2012). Essentially, both designers describe the balancing act of creating designs that stand out from the competition but retain the fundamental design identity of a brand and model generation.

The first aim of this study is to establish that capturing customers' perception of a product's design newness requires more than one perspective. Drawing on categorization theory, we argue that design newness will depend on how different a product looks compared to (1) competing products, (2) other products in the brand portfolio, and (3) the product's predecessor. The second aim of this study is to demonstrate that the effect of design newness on sales performance of new products is different for these three perspectives. To this end, we conduct two empirical studies. In our first study, we use the automobile industry to assess the design newness of 109 car models from all three perspectives and investigate these measures' sales effects. With a comprehensive econometric model we show that the three design perspectives affect sales performance differently, and that suboptimal design decisions have sizable detrimental sales consequences for each of the perspectives. In a second application we consider the market for smart phones, and confirm our findings for the product line perspective.

The current research thus contributes to the marketing and design literature in several ways. First, we motivate the relevance of three perspectives for a more holistic representation of customers' perception of design newness. Second, we provide arguments for different sales performance effects of the three design newness perspectives. Third, we provide first empirical evidence that sales response differs among the three perspectives.

Insights about different performance effects will be relevant for both researchers and practitioners. Since we consider all three perspectives simultaneously, we are able to determine the optimal level of design newness in each perspective. On the basis of our results, we can derive recommendations to marketing practice on how a product's design newness should be configured to maximize commercial impact.

2. Three perspectives of design newness

A product's design newness can be defined as the degree to which a new product's appearance departs from the appearance of reference products (Calantone et al., 1995; Pauwels, Silva-Risso, Srinivasan, & Hanssens, 2004; Talke et al., 2009). Deviations may stem from changes in the product's contour or silhouette, its proportions (changes in the relative size of sub-areas or sub-volumes), its dimension (overall size of the product or its modules), its structure (changes in the ordering of the product's modules), and its color or material (Bloch, 1995; Ranscombe, Hicks, Mullineux, & Singh, 2012; Warell, 2001). Greater levels of design newness imply that fewer attributes are shared with reference products (Rosch & Mervis, 1975).

Because any assessment of design newness involves comparisons of a new product's exterior with that of reference products, categorization theory offers an appropriate basis for our conceptual framework. Categorization theory suggests that to understand and evaluate a new product's properties, consumers compare the product with members of different categories (e.g., Loken, 2006; Rosch & Mervis, 1975). A category is defined as a set of products that appear related (Loken et al., 2008), because they compete in the same product category or belong to the same brand category or product line category (e.g., Chakravarti, MacInnis, & Nakamoto, 1990). Consequently, in marketing studies, three types of categories are used: the product category, the brand category, and the product line category. In choice models, for instance, customers are assumed to compare brands within a product category (Nivea vs. Dove for body lotion), compare alternative products of a brand (Nivea Express Hydration vs. Essentially Enriched Lotion) and then decide for a product (Regular vs. Travel Size) (e.g., Chintagunta & Dubé, 2005; Gupta, 1988).

For each category, consumers have a mental representation that consists of information about specific products and product features, acquired from experiences with the category members and reasoning about them (Barsalou, 2003). As a part of this information, a product's design properties play an important role (Berkowitz, 1987; Bloch, 1995; Kreuzbauer & Malter, 2005, 2007). Consumers activate their category knowledge to assign a new product to a category so they can make inferences about its features and form an evaluation of the product.

To illustrate this process in the case of products, consider that an Audi A8 is a special case of an Audi and also a special case of a luxury car (Keaveney et al., 2012). Thus, when confronted with an Audi A8 car, consumers may activate category representations of the product category "luxury car," of the brand category "Audi," and of the product line category "Audi A8." Since the activated knowledge depends on the category members (Bodenhausen & Macrae, 1998; Macrae & Bodenhausen, 2000), associations for an Audi A8 car may include generic features of luxury cars such as "big," "powerful," and "exclusive," features specific to the Audi brand, such as "dynamic," "modern," and "reliable," as well as features specific to the Audi A8 line, such as "sporty" and "sleek" (Chakravarti et al., 1990).

As a consequence, the perception of design newness will be different for each category (Moreau, Markman, & Lehmann, 2001). In line with previous scholars (e.g., Chakravarti et al., 1990), we propose that consumers activate mental representations of all three categories to understand and evaluate novel product designs, and that the degrees of novelty in each category may vary. Hence, we propose that capturing consumers' design newness perceptions holistically requires considering all three reference categories.

This view is in line with the ideas of design theorist Monö (1997), who suggested that the design of a product acts as a facilitator of meaning, which depends on the reference category. Compared to competing handheld vacuum cleaners, the Dyson DC35 signals modernity and superior technology competence. For the Dyson brand, since all products have a strong technological appeal the interpretation changes, and the slimness and elegance of the handheld design become more prominent. Compared to its predecessor, the DC35 projects an entirely different meaning, since it looks more muscular and aggressive. Other support comes from Person, Schoormans, Snelders, and Karjalainen (2008), who showed that designers make independent decisions for a product's design newness from the perspectives of competing products, other products in the brand portfolio, and the product's predecessor.

Still, neither Monö (1997) nor Person et al. (2008) provide a rationale for how these three newness perspectives may affect customers' product perception, evaluation, or product sales. Thus, we provide a theoretical basis and empirical evidence about optimal levels of design newness that maximize sales in each perspective.

3. Optimal levels of design newness

Prior research has shown that design newness plays a role when consumers consider buying a new product (Mugge & Schoormans, 2012; Pauwels et al., 2004; Rubera, 2014; Talke et al., 2009). On the basis of categorization theory, we argue that consumers use all three perspectives of design newness jointly in their decision process. To evaluate a new product's design from all three perspectives, consumers may engage in two processing styles: *automatic processing*, which is rapid, unconscious, and low in capacity, and *controlled processing*, which is slow, elaborate, conscious, and high in capacity (Evans, 2008; Graf & Landwehr, 2015). Automatic processing generates intuitive default responses to a novel design, which subsequent controlled processing may support or disrupt (Evans & Stanovich, 2013). Hence, when a consumer is deciding to purchase a new product both processing styles will be activated to determine whether the new product's design is acceptable (Hekkert, Snelders, & van Wieringen, 2003). On a more aggregate level, this means that these two processing styles affect the way design stimuli exert influence on sales of the new product.

When consumers encounter a design stimulus, they immediately process it automatically (Graf & Landwehr, 2015). In that process, consumers strive for classification ease to form a clear impression of the new product design (Rosch & Mervis, 1975). This means that consumers should prefer a design with a high category fit as a more fluent stimulus, which is easier to process (e.g., Reber, Schwarz, & Winkielman, 2004; Keaveney et al., 2012). Successful classification stimulates positive feelings, which result in a positive assessment of the product (Cohen & Basu, 1987; Meyers-Levy & Tybout, 1989; Stayman, Alden, & Smith, 1992). Hence, automatic processing leads to a preference for low levels of design newness. Comprehensive empirical evidence supports a positive relationship between design fluency and aesthetic liking and product preference (Hekkert & van Wieringen, 1990; Hekkert et al., 2003; Veryzer & Hutchinson, 1998).

However, when consumers consider purchasing a product, controlled processing is activated and may approve or overwrite the automatic response (Graf & Landwehr, 2015).

Gibson (1979) suggests that designs need to offer the opportunity for elaborate processing, while Berlyne (1970, 1971, 1974) refers to the designs' arousal potential to evoke a positive consumer response. In a similar vein, Dechêne, Stahl, Hansen, and Wänke (2009) suggest that to be interesting, products need a certain level of disfluency to disrupt the prevailing mental representation of the category. Perceptions of disfluency thus may result in an increased preference for novel designs (Hekkert & Snelders, 1995; Graf & Landwehr, 2015). Indeed, several studies have found a positive effect of design newness on preference (e.g., Blijlevens, Carbon, Mugge, & Schoormans, 2012; Hekkert et al., 2003) or an inverted U-shaped relationship (e.g., Berlyne, 1970; Bornstein, Kale, & Cornell, 1990; Hekkert et al., 2003). Landwehr, Labroo, and Herrmann (2011) were able to observe similar effects of fluent and disfluent design elements on products' sales performance.

Given that both processing styles influence consumers' preference formation and purchase decision, an optimal, sales maximizing, level of design newness should exist that balances consumers' preference for easy-to-classify designs and designs that are stimulating. For levels of design newness below the optimum, fluency may be high, but the design does not generate much arousal and in fact appears boring and undifferentiated, so that sales levels are negatively affected. For levels of design newness above the optimum, disfluency may be high, but the design may overwhelm and confuse consumers and inhibit the transfer of category knowledge, so that sales are negatively affected. As this reasoning applies for consumers' perception of design newness in general, we hypothesize an inverted-U shaped relationship between design newness and sales for all three perspectives:

H1a. Increased design newness with respect to the product category exhibits an inverted U-shaped relationship with sales.

H1b. Increased design newness with respect to the brand category exhibits an inverted U-shaped relationship with sales.

H1c. Increased design newness with respect to the product line category exhibits an inverted U-shaped relationship with sales.

While the level of design newness that maximizes sales may be influenced by a number of contextual factors, such as the available processing time, the consumer's involvement in the product category, or the context in which a product is presented (Hekkert et al., 2003; Graf & Landwehr, 2015), we posit that the optimal level also depends on the reference category and thus should be different for each of the three design newness perspectives.

Categorization theory posits that the categories activated to understand a product are organized hierarchically (e.g., Fiske & Taylor, 1984). High-level categories typically are more generic and include more members that share fewer details, so that the overlap between members is limited, while low-level categories are more specific and have fewer members that share more details (Meyers-Levy & Tybout, 1989). Consumers' mental representation of the category depends on the heterogeneity between the category members (Liberman, Sagristano, & Trope, 2002), such that for high-level, heterogeneous categories the mental representation is abstract and unspecific and for more homogeneous, lower levels is increasingly concrete.

This level of concreteness has been found to influence consumers' perception and evaluation of the newness level of new products (Gati & Tversky, 1984; Jones, 1994), since perceived homogeneity between category members accentuates dissimilarity between the category and a new product. Concrete representations narrow consumers' attention to product details, which in turn impairs their ability to think of extremes (Ward, 1995). When consumers focus on concrete details, even a low level of newness can make a product appear to be distinctive (Friedman & Förster, 2002). Furthermore, for concrete mental representations, consumers have clearer and more conservative expectations with respect to the properties of new products than with abstract representations (Isen, Daubman, & Nowicki, 1987). Research also shows that with an increasing level of abstraction, consumers are willing to tolerate more deviation and take more risk with product choices (Gilovich, Kerr, & Medvec, 1993; Nisan, 1972). Category judgment of heterogeneity might dilute perceptions of dissimilarity between the category and a new product (Jones, 1994).

To illustrate this argument in the case of products, consider the Audi A8 example again. With other members of the product category "luxury cars", such as Mercedes S-Class, Tesla Model S, Jaguar XJ, or BMW 7 Series, the Audi A8 shares generic design features, which make them look bigger and more powerful than, for instance, mid-range cars. However, with respect to design details, luxury cars are rather heterogeneous, so that customers' mental representation of the product category should be abstract and design expectations unspecific. Without preconceived design expectations, tolerance for deviation should be high. Within the brand category "Audi", members are fewer and less heterogeneous. With its fellow category members, Audi A7, A6 or A4, the Audi A8 shares a brand-specific design language, expressed in similar design details, such as the cars' grille and headlights designs, overall silhouette and proportions. Consumers' mental representation of the brand category thus should be more concrete and lead to more specific design expectations. In the product line category, the Audi A8 is compared to one category member only: its predecessor. Thus, the mental image should be concrete and lead to clear and conservative expectations of the successor's product design.

As a consequence, we expect that consumers' preference for design newness varies among the three categories. While we always expect an inverted U-shaped relationship with sales, we posit that optimal design newness levels shift with the category. Within the product line category, consumers' tolerance for newness should be most conservative, followed by moderate levels of newness in the brand category and high levels in the product category. We thus put forward an additional hypothesis:

H2. The sales maximizing level of design newness is highest in the product level category and lowest in the product line category.

4. Study 1

4.1. Data

Study 1 is based on data from the German car market. We chose to analyze this market because of its economic significance on both a macro and micro level. Germany is the largest European car market with a long history of established car manufacturers. The German car industry comprises about 1000 companies, which employ around 790,000 people. Over the last ten years, the industry has contributed on average around 3.3% of total gross value added (Destatis, 2010a, 2010b). For most customers, the purchase of a car can be considered a major investment. Most customers put great emphasis on the choice of their vehicles.

Table 1
Sample share of the market.

Year	1980	1985	1990	1995	2000	2005
Market sales	1,608,462	1,540,490	1,888,333	1,937,816	2,466,106	2,439,994
Sample sales	320,045	802,958	1,410,373	1,839,252	1,769,651	1,935,488
Sample share	20%	52%	75%	95%	72%	79%

Notes: Sales include segments 1 - "micro" to 6 - "luxury".

Representative surveys for the years 1999 to 2011 show that the appearance of a car is consistently perceived as "important" to "very important," having a larger impact on the purchase decision than the model's resale value or its level of prestige (DAT Report, 2000–2012). These factors make the German car market highly competitive and imply that strategic design decisions can have a large economic impact.

Our sample comprises 109 car models of 14 brands, thereby covering a significant share of the market across the observational period (Table 1). It includes both German and international brands, high and low market share brands, and brands that compete primarily on price and image. The car models belong to one of the main six car segments ("micro," "small," "lower midsize," "midsize," "upper midsize," and "luxury"), developed by the German Central Registration Office to categorize competing models by means of price, length, height, weight, and body type. The models were launched onto the German market between 1979 and 2006. The median of a brand's product portfolio size is four. Each model has at least one predecessor, and we have an average of 5.5 time-observations per model.

4.1.1. Independent variables: design newness measures

To determine design newness with respect to the competitor, portfolio, and generation, for each car model we used three standardized product images: a front view, a side view, and a rear view, all converted into black and white images with a neutral background. In an online survey, participants were asked to rate each model's design newness. The survey started with a training phase to illustrate our understanding of design newness. For all three perspectives, we presented out-of-sample examples of automobiles with high and low levels of newness from different decades. We explained that deviations may occur in the car's silhouette, dimensions (i.e., absolute size of the car or its modules, such as the trunk, hood, or passenger cabin), proportions (i.e., relative size of sub-areas or sub-volumes, such as the relative size of the side windows compared to the car's doors), or structure (i.e., ordering of the product's modules, such as the relative position of the car's grille to its headlights) (e.g., Landwehr et al., 2011; Rubera, 2014).

Thereafter, the car models were presented to the raters in chronological order to simulate how the design state evolved over time (Talke et al., 2009). Design newness was always assessed at the time of the model's market launch. For each of the three perspectives, the comparative models were displayed on the left side of the screen – that is, the previous model generation, car models of the competitive set, or car models of the brand's portfolio.

The model to be rated appeared on the right side. Depending on the perspective, the raters had to assess the following: *"How 'new' is the design of model 'X' compared to…* (1) *the design state within the competitive set?,* (2) *the design state within the brand's product portfolio?* (3) *the design of its predecessor?"* Raters used a seven-point scale (1 = marginally new; 7 = radically new).

A sample of 109 car models requires 327 design newness ratings (three ratings per car model). To confront each rater with a reduced number of assessments, we created smaller subsets of car models. For each of the six car segments, we created three questionnaires that combined two design newness perspectives (competitor and generation perspective, generation and portfolio perspective, or portfolio and competitor perspective). Hence, every car model is represented in two questionnaires. This approach resulted in about 48 assessments per rater and questionnaire. Each participant was randomly assigned to one of the questionnaires.

To obtain informed ratings, we emailed the online survey to the top ten German industrial design schools, who distributed the survey among their students. A total of 110 students finished one questionnaire, leading to an average of 11 assessments per car. Respondents were between 19 and 35 years of age, and all of them had a driver's license.

Applying the average deviation (AD) index that expresses deviations of inter-rater agreement in units of the original scale, we obtained mean values of 1.03 (competitor perspective), 1.02 (generation perspective) and 1.07 (portfolio perspective). All values are significant at the 5% level and thus imply reliable ratings, so that the average over all raters was used as a measure for each perspective (Burke & Dunlap, 2002).

4.1.2. Dependent variable: performance measure

For all models, we obtained official unit sales data in Germany from the German Central Registration Office. To account for systematic differences of sales in different car segments, we transformed the variable to a relative measure by dividing it by the average sales of competing models in the same segment and year.

4.1.3. Additional control variables

As control variables, we considered each car's price and model year, which reflect its life span. Price data were obtained from *Autokatalog*, a German industry magazine. We also assessed each model's technical newness using the component-based approach (Talke et al., 2009), and summated the innovativeness of the most prominent technological components as rated by industry experts on a seven-point scale (1 = incremental change; 7 = radical change). In addition, we considered model-related media expenditures, which are provided by *Nielsen Media Research* and include spending for campaigns in television, radio, and movie theaters as well as print, poster, and online campaigns. Data are available on a yearly basis from 1990 to 2006. To account for systematic differences between the six car segments, we used relative measures for model price, technical newness, and media expenditures by dividing each value by the average of the respective variable for models within the same segment and year.

To match the time horizon of our sample with available media spending data, we used proxies for observations older than 1990. We distinguished between two types of car models: Case 1, models that enter before 1990 and have media spending data available starting in 1990, and Case 2, models that enter and exit the market before 1990. We calculated proxy variables based on available media spending data and replaced missing media spending data for these models with the average of their

yearly relative media expenditures on model levels between 1990 and the end of the model's product life cycle (Case 1) and the average of yearly media spending on brand level relative to total media expenditures of all brands from 1990 to 2006 (Case 2).

Finally, we introduced brand dummies to account for additional heterogeneity on the brand level not captured by the other control variables.

4.2. Results

4.2.1. Regression analysis

To test the inverted U-shaped relationships between the three design newness measures and sales as proposed in H1a–H1b, we set up a linear regression model and included the three measures as linear and quadratic regressors. Each car's model year and model-related media expenditures were also entered in quadratic form to assess non-linear life-cycle effects and an optimal spending level, respectively.

Despite a moderate, positive correlation between the three design newness measures, we detected no severe problems of multicollinearity. The variance inflation factors for the three measures are between 2 and 3 and the main results are stable when we exclude some of the focal variables. However, since squared variables naturally introduce some level of multicollinearity, we mean-center all variables that enter as linear and squared regressors.

Table 2 presents the results of the analysis. The overall model is significant ($F(25, 574) = 53.48$) and has an $R^2_{adj.}$ of 0.687. The focal points of this analysis are the design newness coefficients. The linear and the quadratic coefficients for design newness with respect to competitors ($\beta_3 = 0.108$, $\beta_4 = 0.133$) are both positive and highly significant. Concerning the other two perspectives, the squared coefficient for the generation perspective ($\beta_8 = -0.085$) and the linear coefficient for the portfolio perspective ($\beta_5 = 0.090$) are significant at the 1% level.

Almost all coefficients of the additional control variables are significantly different from zero at the 0.1% level. As expected, media expenditures ($\beta_{11} = 0.259$) and technical newness ($\beta_9 = 0.134$) exhibit a significant positive relationship with relative sales. The coefficient of price is positive ($\beta_{10} = 0.955$), suggesting that even after accounting for heterogeneity on the brand level, the relative price of a car might act as an indicator of quality (e.g., Erickson & Johansson, 1985; Rao & Monroe, 1989; Völckner & Hofmann, 2007).

To assess the relative importance of the three design newness perspectives, we use dominance analysis (Budescu, 1993; Azen & Budescu, 2003). We provide a ranking by averaging across all possible marginal contributions of the independent variables to the

Table 2
Results of the econometric model.

Variables		Coefficients		*p*-Values
Model_Year	β_1	0.039	***	0.000
Model_Year^2	β_2	−0.013	***	0.000
Design_Newness$_{Competitors}$	β_3	0.108	**	0.007
Design_Newness$^2_{Competitors}$	β_4	0.133	***	0.000
Design_Newness$_{Portfolio}$	β_5	0.090	**	0.003
Design_Newness$^2_{Portfolio}$	β_6	−0.022		0.385
Design_Newness$_{Generation}$	β_7	−0.046		0.101
Design_Newness$^2_{Generation}$	β_8	−0.085	***	0.000
Rel. Technical_Newness	β_9	0.134	***	0.000
Rel. Model_Price	β_{10}	0.955	***	0.000
Rel. Media_Expenditures	β_{11}	0.259	***	0.000
Rel. Media_Expenditures^2	β_{12}	0.003		0.910
D_Brand_BMW	β_{13}	−0.003		0.965
D_Brand_Mercedes	β_{14}	0.286	***	0.001
D_Brand_Opel	β_{15}	−0.039		0.634
D_Brand_Renault	β_{16}	−0.789	***	0.000
D_Brand_Toyota	β_{17}	−0.864	***	0.000
D_Brand_VW	β_{18}	0.527	***	0.000
D_Brand_FIAT	β_{19}	−0.591	***	0.000
D_Brand_Ford	β_{20}	−0.310	*	0.016
D_Brand_Mitsubishi	β_{21}	−0.794	***	0.000
D_Brand_Peugeot	β_{22}	−0.730	***	0.000
D_Brand_Volvo	β_{23}	−0.885	***	0.000
D_Brand_Seat	β_{24}	−0.584	***	0.000
D_Brand_Skoda	β_{25}	−0.066		0.667
Constant	β_0	0.235		0.371
$R^2_{adj.}$		0.687		
F(25, 574)		53.48	***	
N		600		

Notes: Dependent variable: relative model sales; omitted brand dummy is “Audi.” All variables entering as linear and quadratic effect are mean-centered.
* $p \le 0.05$.
** $p \le 0.01$.
*** $p \le 0.001$.

Table 3
Dominance weights.

Set of independent variables		Standardized weight	Ranking
a			
Model Year	Set1	1.89%	7
$DesignNewness_{\_Competitors}$	Set2	4.08%	4
$DesignNewness_{\_Generation}$	Set3	3.21%	6
$DesignNewness_{\_Portfolio}$	Set4	1.05%	8
Technical Newness	Set5	3.89%	5
Price	Set6	7.42%	3
Media Expenditures	Set7	11.93%	2
Brand Dummies	Set8	66.52%	1
R^2		**100.00%**	
b			
Model Year	Set1	1.95%	6
DesignNewness	Set2	9.21%	3
Technical Newness	Set3	3.91%	5
Price	Set4	7.23%	4
Media Expenditures	Set5	11.87%	2
Brand Dummies	Set6	65.83%	1
R^2		**100.00%**	

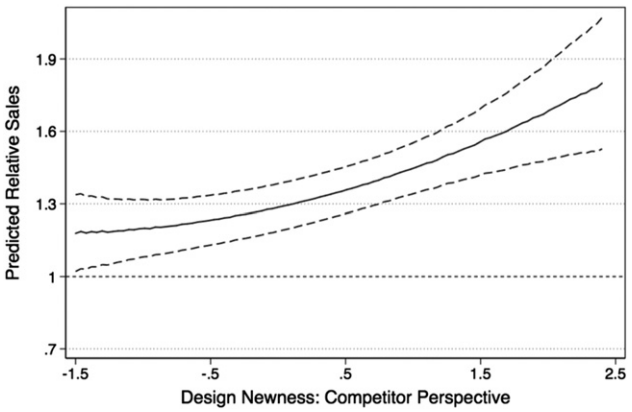

Fig. 1. Predicted effect of $Design\_Newness_{Competitors}$ on relative sales.[1]

overall model fit. Table 3a shows that design newness from the competitor perspective contributes about 4% to the model's R^2, closely followed by design newness from the generation perspective with about 3.2%. Design newness from the product portfolio perspective ranks last. When all three perspectives of design newness are combined into one set of predictors, the set ranks higher than price and contributes about 9% to the model's R^2, as Table 3b illustrates.

To evaluate the overall effect size, we calculate predictions of relative sales as a function of $Design\_Newness_{Competitors}$, $Design\_Newness_{Portfolio}$ and $Design\_Newness_{Generation}$. We opted for an analysis that accounts for the empirical correlation structure of the three design newness measures. On a conceptual level, we argue that when confronted with novel product designs, consumers activate mental representations of all three reference perspectives, so the three perspectives cannot be independent. Ignoring potential dependencies and employing a pure ceteris paribus analysis could lead to biases in estimated effect sizes. Therefore, we conducted a simulation study. To estimate, for instance, the effect for $Design\_Newness_{Generation}$ at a certain value x_0, we used the mean vector and variance-covariance matrix of $Design\_Newness_{Competitors}$ and $Design\_Newness_{Portfolio}$ and generated 100,000 draws from the conditional multivariate distribution $f(Design\_Newness_{Competitors}, Design\_Newness_{Portfolio} \mid Design\_Newness_{Generation} = x_0)$. We then estimated the average of the two simulated (conditional) design newness measures and used these averages, along with the sample averages of all other covariates, to predict relative sales. This procedure was applied for values over the whole range of observed values for all design newness measures.

[1] All graphs in Figs. 1–4 display predicted values of relative sales over the range of design newness values observed in the sample. For each value of design newness from the focal perspective x_0, we estimated the conditional means of design newness from the other two perspectives by taking 100,000 draws from the conditional multivariate distribution and used these means to compute the predicted sales value at x_0. All other covariates are kept constant at their sample mean. The omitted brand dummy category is "Opel". While the horizontal position of the curves depends on this reference category, the shape of the curve is the same for all brands. Each design newness variable is mean-centered. Dashed lines represent 95% confidence intervals. The horizontal dashed line marks the level of relative sales for a model that performs similar to the segment average – that is, relative sales equal to 1.

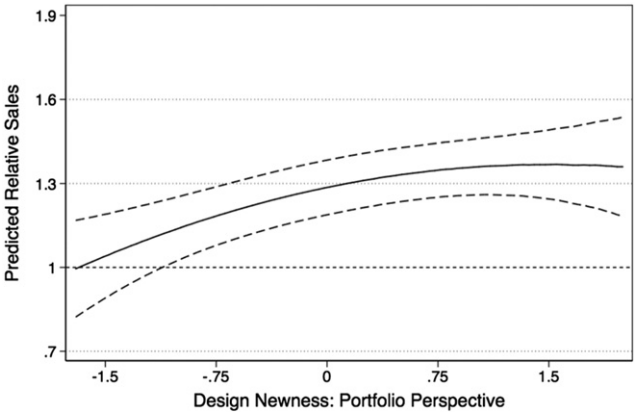

Fig. 2. Predicted effect of $Design\_Newness_{Portfolio}$ on relative sales.[2]

Fig. 1 displays the effect of design newness from the competitor perspective. After accounting for the empirical correlation structure of the different design newness measures and potential offsetting effects due to the different relationships with relative sales, the relation of $Design\_Newness_{Competitors}$ with relative sales is positive and mostly linear within the range of observed values. This result does not directly confirm H1a, because we do not observe an inverted U-shaped relationship between design newness from the portfolio perspective and sales. However, the absence of the inverted U-shaped relationship could come from the fact that the optimal level of design newness for this perspective is outside of the observed range in our study. The curve in Fig. 1 might level off and become downward sloping for more extreme levels of design newness from the competitor perspective than we observe in our sample.

The effect of design newness from the competitor perspective is economically significant. For example, increasing design newness by one standard deviation from its mean leads to a rise of relative sales of about 11%, which is statistically different from zero at the 0.01% level. To illustrate the size of the economic effect, we calculated a counterfactual for an average model in our sample. Using data from 2006, an increase of 11% of relative sales for a model in the "lower midsize" segment translates into a sales increase of 15,500 additional units. Multiplied by the average model price, this increase equals an additional sales volume of about €117 million.

Fig. 2 reveals that the hypothesized inverted U-shaped relationship between design newness from the portfolio perspective and relative sales is partly supported by the data. While the left side of the picture exhibits a concave relationship, the curve flattens for higher degrees of newness. Relative sales performance thus increases up to a moderate level of design newness and then remains rather stable. Comparing the average design newness with one standard deviation below, our model predicts an increase in relative sales of about 12%. Again using sales and price data for an average model in the "lower midsize" segment in 2006, this increase corresponds to about 8200 units, or €127 million.

In accordance with H1b, Fig. 3 shows a pronounced inverted U-shaped relationship between design newness from the generation perspective and relative sales. The largest performance effect is found for a moderate degree of newness – that is, at the average of $Design\_Newness_{Generation}$ plus about half a standard deviation. The performance effect is again economically significant. Our simulation study predicts an increase of 6% (4%) in relative sales when comparing the point of maximum sales impact - (+) one standard deviation. Both results are statistically different from zero at the 5% level. To illustrate the magnitude of the economic significance, we used sales data for the "lower midsize" segment in 2006. The predicted increase corresponds to about 4100 units (2750 units) or to about €64 million (€42.5 million).

Figs. 1–3 also support H2, in which we argue for optimal levels of design newness that shift with the reference category. The optimal level of design newness from the competitor perspective is higher than any of the design newness values observed in our sample. From the portfolio perspective it is lower, toward the maximum of observed design newness values for this perspective, and from the generation perspective it is lowest, just slightly larger than the average design newness values for this perspective.

4.2.2. Robustness checks and extensions

We ran several additional regressions to check the robustness of our model. First, we estimated the model with robust standard errors to rule out potential problems regarding heteroscedasticity, and found that results did not change qualitatively. Second, we dropped the first five years of observations to check whether the results are affected by some initialization issues or learning in the

[2] All graphs in Figs. 1–4 display predicted values of relative sales over the range of design newness values observed in the sample. For each value of design newness from the focal perspective x_0, we estimated the conditional means of design newness from the other two perspectives by taking 100,000 draws from the conditional multivariate distribution and used these means to compute the predicted sales value at x_0. All other covariates are kept constant at their sample mean. The omitted brand dummy category is "Opel". While the horizontal position of the curves depends on this reference category, the shape of the curve is the same for all brands. Each design newness variable is mean-centered. Dashed lines represent 95% confidence intervals. The horizontal dashed line marks the level of relative sales for a model that performs similar to the segment average – that is, relative sales equal to 1.

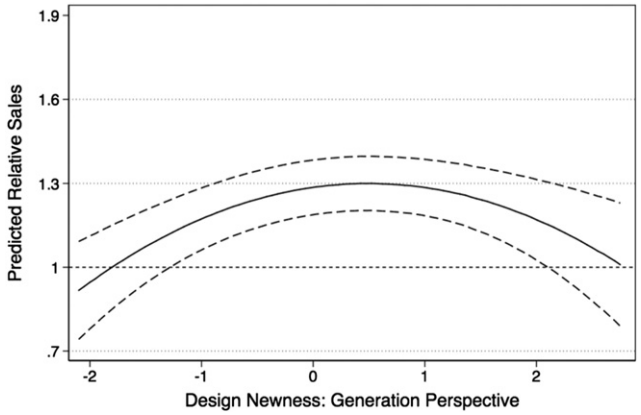

Fig. 3. Predicted effect of $Design\_Newness_{Generation}$ on relative sales.[3]

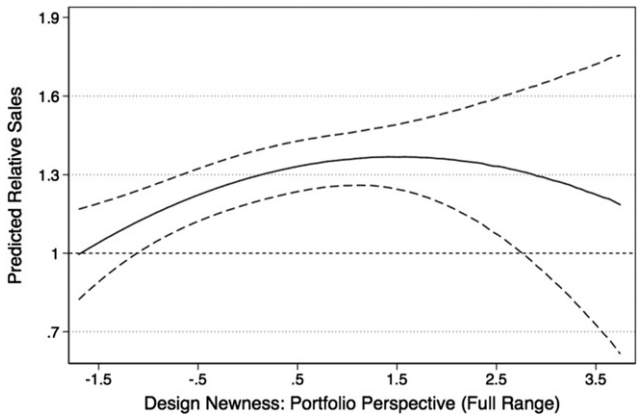

Fig. 4. Predicted effect of $Design\_Newness_{Portfolio}$ on relative sales for the full scale.[4]

design newness ratings. Again, we found that all results remain stable. Third, we assessed the validity of our proxy for media expenditures, which are only available as of 1990. Running the regression with only post-1990 data also leads to qualitatively similar results – that is, size, direction and statistical significance of the coefficients for the design newness and control variables remain stable.

We then extended our analysis of design newness with respect to the brand's current product portfolio. As discussed previously, we found only partial support for H1b. Up to moderate degrees of newness, we find a positive effect on sales. However, other than expected, we find that sales do not decrease if a car's design deviates substantially from the product portfolio. This finding could be related to the range of observed values in our sample. The highest value of $Design\_Newness_{Portfolio}$ is about 5, which is significantly smaller than the maximum values for $Design\_Newness_{Competitors}$ (5.8) and $Design\_Newness_{Generation}$ (6.3). Computing the predicted relative sales over the whole range of possible values reveals that the additional effect for very high levels of design newness is indeed slightly reduced, as Fig. 4 illustrates. The explanation may also be related to strategic considerations of manufacturers: very novel designs may be predominantly introduced with a new model series. To assess design newness from a generation perspective for all models so far, we considered only models with at least one predecessor. Very high values for $Design\_Newness_{Portfolio}$ may thus be missing, so that a reduced performance effect of radical newness does not manifest. To test

[3] All graphs in Figs. 1–4 display predicted values of relative sales over the range of design newness values observed in the sample. For each value of design newness from the focal perspective x_0, we estimated the conditional means of design newness from the other two perspectives by taking 100,000 draws from the conditional multivariate distribution and used these means to compute the predicted sales value at x_0. All other covariates are kept constant at their sample mean. The omitted brand dummy category is "Opel". While the horizontal position of the curves depends on this reference category, the shape of the curve is the same for all brands. Each design newness variable is mean-centered. Dashed lines represent 95% confidence intervals. The horizontal dashed line marks the level of relative sales for a model that performs similar to the segment average – that is, relative sales equal to 1.

[4] All graphs in Figs. 1–4 display predicted values of relative sales over the range of design newness values observed in the sample. For each value of design newness from the focal perspective x_0, we estimated the conditional means of design newness from the other two perspectives by taking 100,000 draws from the conditional multivariate distribution and used these means to compute the predicted sales value at x_0. All other covariates are kept constant at their sample mean. The omitted brand dummy category is "Opel". While the horizontal position of the curves depends on this reference category, the shape of the curve is the same for all brands. Each design newness variable is mean-centered. Dashed lines represent 95% confidence intervals. The horizontal dashed line marks the level of relative sales for a model that performs similar to the segment average – that is, relative sales equal to 1.

this explanation, we extended our sample by including the first model generation of a new series. When we include an interaction term between a dummy variable for a new series (*D_New_Series)* and $Design\_Newness_{Portfolio}$ in our model, we find that neither the interaction term itself nor the increase of the model's R^2 is significant. This finding suggests that manufacturers put great emphasis on brand recognition in general.

We also extended our analysis of design newness with respect to the previous model generation. Conceivably, the success of the previous model may moderate the effect of design newness on sales. If a model had a rather poor sales performance, a novel look may help its successor create a fresh impression in the market, convince new customers, and win back old ones (Bayus, 1991; Yalch & Brunel, 1996). In contrast, if a model was very successful, its successor may be more successful if its design departs only marginally from its predecessor. Hence, we constructed a variable that captures the relative sales success of the previous generation. The variable is defined as the total sales over the product life cycle of the previous model generation relative to the sales of all models within the same segment and time period. When we introduce sales of the previous generation and its interaction with design newness, the interaction effect is indeed statistically significant ($\beta_{SalesPrevGen\_X\_DesignNewnessGeneration} = -0.074$; $p < 0.05$). The coefficient is negative, suggesting that a model benefits from higher degrees of design newness when its predecessor was unsuccessful.[5]

5. Study 2

To contribute to the generalizability of the results from Study 1, we conducted an online experiment with a different product category (mobile phones), in a different country (the US), and with different respondents (consumers). We focused on design newness from the generation perspective. This perspective has not previously been considered by empirical work, although its performance effect is almost as important as that of design newness with respect to competitors (Table 3a), which is rather well supported empirically (e.g., Calantone et al., 1995; Rubera, 2014; Talke et al., 2009).

The experiment is a one-factor (design newness from the generation perspective), three-level (low, mid, high), within-subjects study on smart phones. For stimuli, we searched for concept studies of the actual iPhone, which had been created by consumer-enthusiasts and which differ in their level of design newness. Drawing on a pre-test with three design experts, we selected one concept for each level of design newness.

The study was conducted using Amazon's Mechanical Turk service. To be able to participate in the study, consumers had to own a smart phone. Participants were 86 consumers (35 females and 51 males, age $M = 33$, $SD = 8.6$). In random order, the three concepts were presented to the participants as potential versions of the next generation iPhone. To assess how much the participants value each concept's design, participants were then asked to indicate which price they deemed appropriate for each concept[6] (Zeithaml, 1988), followed by questions about their brand familiarity, product involvement, age and gender, and the manipulation check. For a robustness check, participants were also asked how well they thought each concept would sell in the market. This way, we obtained a second measure that expresses participants' prediction of each concept's sales success.

Results show that the manipulation check confirms the order of the stimuli. The mean scores for three levels of design newness deviate significantly ($M_{low} = 2.2$, $M_{mid} = 4.1$, $M_{high} = 5.0$; $p < 0.001$). The ratings are also reliable between raters, as shown by the average deviation index, which remains below the cut-off value of 1.53 for significant agreement at the 5% level in that sample size ($AD_{low} = 0.81$, $AD_{mid} = 1.20$, $AD_{high} = 1.04$). The results of a one-way ANOVA show that the newness conditions elicit statistically significant differences in mean price, $F(2, 170) = 12.17$, $p_{corrected} = 0.00$. Fig. 5 shows that the mean price is highest for models with a medium degree of design newness compared to the previous model generation ($Price_{Mid} - Price_{Low} = 15$ USD, $p < 0.053$; $Price_{Mid} - Price_{High} = 37$ USD, $p < 0.001$). The effect is robust when controlling for brand familiarity, product involvement, age, and gender. As an additional robustness check, we ran the ANOVA again with predicted sales as alternative dependent variable. The main effect of the three design newness conditions is again significant and sales predictions are highest for the concept with a medium newness level.

The experimental study lends additional support to the results of our first empirical study in the domain of cars. We find an inverted U-shaped relationship between design newness from the generation perspective and performance for two different performance variables for a different product category in a different country.

6. Discussion

6.1. Theoretical contributions

The marketing literature offers little insight as to reference products customers consider when evaluating the novelty of a product's design. Our first contribution is therefore to draw from categorization theory to develop a conceptual framework that includes three perspectives of design newness with respect to (1) competitors' products, (2) the brand's current product portfolio, and (3) the preceding product generation.

To the best of our knowledge, we are the first to empirically study all three perspectives simultaneously. Our results show that a product's design newness levels indeed differ with the reference category employed. In addition, our results demonstrate that all

[5] We would like to thank an anonymous reviewer for this suggestion.
[6] We thank the former editor for this suggestion.

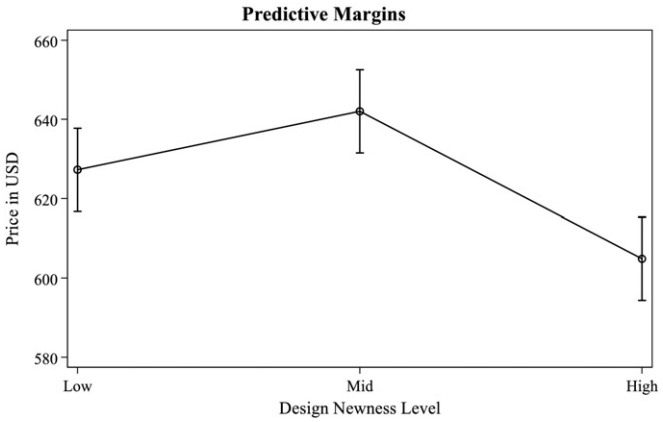

Fig. 5. Predicted effect of *Design_Newness*$_{Generation}$ on price expectation.

three newness measures have a statistically and economically significant impact on sales and that the type of impact varies with the perspective employed.

Although we expected an inverted U-shaped relationship between a product's design newness compared to its competitors and sales performance, we find a positive effect instead. This finding confirms prior results (Calantone et al., 1995; Rubera, 2014; Talke et al., 2009) and emphasizes that a novel design is an effective means of differentiating a product from its competitors. Still, the inability to observe the downward sloping part of the proposed inverted U-shaped curve may result from the field setting of this study. In laboratory experiments, products manipulated to radically deviate from the design state of the product category were disliked and rejected (e.g., Schoormans & Robben, 1997; Snelders & Hekkert, 1999; Hekkert et al., 2003). In many industries, particularly when development cycles are long, new design concepts are heavily tested before launch. Therefore, radical designs are scarce, and the aligned rejection behavior can rarely be observed. This scarcity is in line with MAYA, an established principle in industrial design (Loewy, 1951), which is an acronym for Most Advanced Yet Acceptable. That is, commercially successful designs should be as novel as possible without threatening consumers' perception of appropriateness for the category.

Of the hypothesized inverted U-shaped relationship between design newness from the portfolio perspective and sales, we observe the upward sloping part. Up to moderate degrees of newness, the positive effect on sales implies that new products, which update the design language of a brand, can successfully address consumers' preference for design evolutions. For higher levels of design newness the positive sales effects level off, which could mean that consumers perceive very novel designs as a misfit with the brand's design language, so that brand associations are not properly transferred (Karjalainen & Snelders, 2010), and potential positive sales effects are reduced. However, within the range of observed designs, performance does not decrease if cars look very different from the product portfolio. Since we observe that the maximum newness score in our sample is significantly smaller than that for the competitor perspective, consistency of the portfolio's design language and brand recognition seem to be a core concern of manufacturers. This finding again confirms research on the influence of product design on brand perceptions (Karjalainen & Snelders, 2010; Kreuzbauer & Malter, 2005, 2007).

For design newness with respect to the preceding model generation, our data support the inverted U-shaped relationship with sales. To trigger a replacement decision, a product should offer a moderate level of design newness. This finding is confirmed by earlier studies. If the design changes from one model generation to the next are too small, they fail to excite consumers, who then either stick to the product they own (Peres, Muller, & Mahajan, 2010) or switch to competing products with a more contemporary design (Okada, 2006). Moderate design changes were found to be the most effective at activating purchase or replacement decisions (Bayus, 1991; Yalch & Brunel, 1996). However, when a product's design becomes too different, consumers may be unable to recognize it as a successor so that positive associations are not transferred from the old generation to the new one. Our results are consistent with the idea that for higher levels of design newness, design continuity between product generations may be threatened (McCormack, Cagan, & Vogel, 2004). Design continuity may make customers feel more attached to a product line (Karjalainen, 2007), and may increase the consumer's likelihood to purchase the successor (Kreuzbauer & Malter, 2007; Karjalainen & Snelders, 2010). We also show that the inverted U-shaped effect is not limited to automobiles, as we find that it is also relevant for smart phones.

The study's results also allow us to confirm our proposition that the optimal level of design newness shifts with the perspective employed. Indeed, sales performance is maximized when the product design differs considerably from the design of competitors within the product category. These differences should be kept smaller compared to other products in the brand's portfolio and smallest with respect to the car's predecessor.

This logic is reflected in brand research, a field in which categorization theory has been widely applied. Research on brand positioning has produced an abundance of evidence advocating that brands should be distinguishable from those of competitors (e.g., Dickson & Ginter, 1987; Sujan & Bettman, 1989; Fennis & Stroebe, 2016), without putting product category recognition in danger (Hekkert et al., 2003). Brand extension research advocates moderate levels of similarity within the brand portfolio to

ease association transfer of central brand attributes (Ratneshwar, Barsalou, Pechmann, & Moore, 2001; Rosch & Mervis, 1975), while preserving differentiation between product lines (Keaveney et al., 2012). The logic is similar to that in line extension research (e.g., Keaveney et al., 2012; Sujan & Dekleva, 1987; Joiner & Mason, 2007). A product's predecessor sets the tightest standards for evaluating a product (Sambandam & Lord, 1995; Tse & Wilton, 1988; Woodruff, Cadotte, & Jenkins, 1983; Kardes, Kalyanaram, Chandrashekaran, & Dornoff, 1993), so that consumers' preference for similarity within the product line category is particularly high (Keaveney et al., 2012).

Consideration of three perspectives when assessing a product's design newness may also contribute to the body of knowledge in other research streams. In evaluating the novelty of a new product's technical features, consumers are likely to not only compare the product to the technology state among competitors, but also refer to the manufacturer's brand portfolio and the product's predecessor. The same logic is likely to apply for less related topics like a product's price or its image attribute levels. To the best of our knowledge, no studies have developed a rationale for considering these three perspectives or tested their performance impact simultaneously in any field. However, for researchers and practitioners alike, insights about optimal levels of technical newness, price, or image attributes may be highly relevant.

6.2. Managerial implications

Our results are also important for management practice. In general, marketing managers should be aware that customers refer to three different groups of products in their perception and evaluation of a product's design newness: the competitive set, the products in the brand's product portfolio, and the product's predecessor. Depending on the perspective employed, the perceived level of newness can differ decisively for the same product.

As these three newness perspectives have different sales optima, managers should translate our findings into design goals. To maximize sales, a product should be designed to differ strongly from competing products. A new product should also deviate considerably from the design of the current product portfolio, but to a lesser extent, and the new product should only moderately differ from its predecessor. We also advise managers to incorporate the sales performance of the preceding product generation in their design decisions. A new model should get a fresh look if its predecessor was unsuccessful, while if its sales performance has been good, the change in appearance should be more conservative.

To attain these goals, managers also need to take aligned actions during new product development. To get a better understanding of customer perceptions, managers should implement product tests to have customers rate the design newness of a product concept in each of the three perspectives. Therefore, concepts of a new product should be presented not only in isolation or alongside competing models (as is often done in so-called car clinics in the automobile industry today) but also alongside models of the manufacturer's product portfolio and vis-à-vis the predecessor.

Owing to the long product life cycles in the automobile industry, such a practice may also be applied for products that have already been launched. Quite often, manufacturers adjust technical configurations of models over the course of their life cycle, and given our results, design adjustments that move a car nearer to the design optimum may be reasonable owing to the significant economic impact we observed.

6.3. Limitations and further research

The limitations of this study offer fruitful avenues for future research. First, cars and smart phones are both durable goods for which consumers' involvement should be high (e.g., Zaichkowsky, 1985). High-involvement products are purchased to fulfill needs such as self-expression or acceptance by others. Hence, for durable products, design may play a special role. Indeed, customers pay special attention to aspects of appearance when purchasing a car (DAT Report, 2000–2012). Future research should analyze whether the sales effects of design newness from the three proposed perspectives are comparably strong for less durable products.

Second, both cars and smart phones are not only durable but also frequently used goods. Customers are therefore exposed to these products on a regular basis and over a long period of time. Research has shown that frequent exposure to designs triggers controlled processing, which leads to an increased preference for disfluent designs (Graf & Landwehr, 2015). It may thus be worthwhile to analyze whether the optimal levels of design newness shift toward less novel and thus more fluent designs for products that have shorter product life cycles and are less frequently used.

Third, our analyses focus on two specific markets. Our study of the car market is limited by the use of German data. Germany has a strong heritage as a car manufacturing nation, and customers traditionally are very involved in the purchase, maintenance, and use of cars (Nielsen, 2014). The results of Rubera (2014) support our findings for the US market. The US and Germany share long traditions in car manufacturing, so these findings may be amplified as well. The second study focuses on another specific market: that for smart phones in the US. Hence, although we find similar outcomes in both markets, it remains of interest to see whether the perception of design newness and its effects change in countries without domestic brands or with less involved customers.

Fourth, in Germany, the automotive industry is an established category that is characterized by defined car segments, in which a rather stable set of players competes. >90% of the new cars are model line extensions, such as the Volkswagen Golf model line, which was introduced in 1974 and is now in its seventh generation. Owing to these characteristics, the degree of design newness will rarely be radical. Future research may turn to industries that are less mature or are characterized by more radical innovations. It would be interesting to test whether the inverted U-shaped relationship between design newness from the competitor perspective and sales, which has mostly been found in laboratory experiments, manifests in such settings.

Fifth, in assessing the cars' design newness we followed the predominant approach in design research and asked consumers about their holistic perception (e.g., Kreuzbauer & Malter, 2007; Karjalainen & Snelders, 2010; Orth & Malkewitz, 2008; Veryzer, 1999). When introducing our understanding of design to the raters, we focused on aspects that capture the essence of a car's appearance. For instance, we neglected color because of the various customization options in the automobile industry. However, new colors have been shown to be a relevant means of differentiating products with fewer customization options, such as coffee machines or sound systems (Labrecque & Milne, 2012; Schoormans & Robben, 1997). We also neglected materials, since manufacturers use standardized materials for most of the visible parts of a car. However, for other types of products, like fashion or accessories, materials have been shown to be a more important aspect of design newness (Nunes, 2012). Hence, to capture the core of a product's appearance the appropriate set of design aspects needs to be identified and explained to the raters. In some cases, a holistic assessment might not be adequate. For example, for the measurement of the design newness of food products, aspects of taste, scent, and touch may be as relevant as visual aspects (Birch, 1999). Future research might investigate whether a multi-dimensional measure can better represent the different design facets and provide additional insights in the effects of design newness.

In this study, we analyzed the effect of design newness on the sales performance of new car models. An interesting follow-on investigation might look at whether any long-term effects of design newness influence a model's sales success on the secondary market. Higher prices and a greater demand for second-hand cars would imply both direct and indirect benefits for manufacturers. Prior research has shown that a model's success in the secondary market can positively influence the sales success of succeeding models (Esteban & Shum, 2007) as well as firm profitability (Zhao & Jagpal, 2006).

Another potentially interesting future research avenue is to investigate how customers use the three reference categories in their decision to adopt a new product. It would be interesting to see whether the relevance of the three perspectives, as determined by the dominance analysis, can be confirmed in an experimental study. Moreover, data on individual consideration sets and purchase decisions would help understanding if variables, such as aesthetic liking or design preferences (Graf & Landwehr, 2015; Landwehr et al., 2013) mediate the relationship between design newness and individual product choices. Such date may provide insights into the types of customers who are most responsive to changes in a product's design newness. OEMs could then strategically use design newness to change the customer basis of a model series and address more profitable customers.

With this study we contribute to the emerging field of the effectiveness of novel designs by proposing that customers' perception and evaluation of design is dependent on the reference group employed. We argue that evaluation differences require careful decision making when developing new product designs. Since our empirical applications confirm the relevance of all three proposed perspectives of design newness, we provide guidelines for making design decisions to maximize expected product sales. We hope that our more holistic perspective on design and the associated opportunities to optimize new product performance inspire other marketing scholars and will spark new research endeavors in the field.

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