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Product uniqueness as a driver of customer utility in mass customization

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Abstract Mass customization (MC) constitutes a promising strategy for companies which aim to provide products which are better adapted to individual customers' aesthetic and functional preferences. Drawing on commodity theory, we argue that the perceived uniqueness of a self-designed product is a second driver of utility in MC. We find that in addition to the significant effect of aesthetic and functional fit, the perceived uniqueness of a self-designed product (1) contributes independently to the utility a customer experiences, and (2) that this effect is moderated by the consumer's need for uniqueness. In product categories which can serve this counterconformity motive for consumers, this suggests that MC toolkits should be constructed with the objective of facilitating the creation of unique products as well as providing affirmative feedback that this uniqueness has been achieved.

Keywords Mass customization · Self-design · Co-creation · Uniqueness · Willingness to pay

Recently, the concept of mass customization (MC) has seen increased attention in marketing (e.g., Dellaert and Stremersch 2005; Huffman and Kahn 1998; Liechty et al. 2001; Randall et al. 2007; Simonson 2005; von Hippel 2001). The core idea of MC is to provide a web-based user toolkit that allows the individual customer to design a product which suits her individual preferences and is then produced exclusively for her. Many companies—including Dell, General Mills, Nestlé and Nike—have set up MC systems. These systems have been advocated as a promising strategy in markets where customers have sound preference insights, where

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preferences are heterogeneous, and where production technology facilitates small lot sizes at (almost) mass production costs (Pine 1993, 1999; Simonson 2005; von Hippel and Katz 2002). In response, a great deal of research in marketing is now being devoted to the question of how and why MC generates value for customers.

In particular, scholars have begun to analyze why customers using MC systems derive higher utility from self-designed products than from conventional off-the-shelf products. After all, developing and implementing such a system involves costs (Piller et al. 2004), and it only makes economic sense if it also yields benefits. The assumption that self-design delivers superior customer value is fundamental to the concept of MC toolkits and can be found in almost any conceptual work in this field (e.g., Pine 1999; Peppers and Rogers 1997; Wind and Mahajan 1997). Most contributions to date have stressed the increased "aesthetic and functional fit" of MC products resulting from the possibility of self-customization (e.g., Dellaert and Stremersch 2005; Simonson 2005; von Hippel 2001; Wind and Rangaswamy 2001). For example, Randall et al. (2007) demonstrate that users designing their own products report an impressively high degree of perceived fit.

In addition to aesthetic and functional fit, conceptual work on MC has explicitly or implicitly suggested product uniqueness as a second value driver in self-designed products (e.g., Kamali and Loker 2002; Lynn and Harris 1997; Schreier 2006; Shen and Ball 2006; Simonson 2005; Wind and Rangaswamy 2001). The core argument here is that the almost infinite variety of products offered by MC systems not only allows more effective adaptation to the customer's aesthetic and functional preferences, but also facilitates enhanced differentiation from other customers and their belongings by means of a truly unique product (Fiore et al. 2004; Lynn and Harris 1997; Michel et al. 2006; Simonson 2005).

A few studies have begun to explore empirically the extent to which the resulting products' uniqueness plays a role in MC systems. Fiore et al. (2004) and Michel et al. (2006) found that customers with a high general preference for unique products report significantly higher intentions to use MC systems. This suggests that the product uniqueness actually generated by an MC toolkit might contribute to the utility a consumer experiences. Indirect support is also provided by Franke and Piller (2004): In an experiment in which consumers designed their own watches, those authors found highly heterogeneous product solutions and a high value increment measured in terms of willingness to pay (WTP) for self-designed watches relative to a standard watch of comparable technical quality. Once again, this allows the interpretation that subjects derive benefits from the perceived uniqueness of the products. An alternative explanation of this finding would be that subjects' product-related preferences are heterogeneous and that their heterogeneous product solutions merely reflect these preferences. This interpretation would suggest that only high aesthetic and functional fit—not the uniqueness of the solution found—generates value for consumers.

Overall, it remains unanswered whether the perceived uniqueness of products designed using MC toolkits generates value for consumers beyond the products' aesthetic and functional fit. This is a highly relevant question because a sound understanding of value-generating factors is a prerequisite for building effective MC toolkits. Research addressing this issue should include both product-related sources of utility (aesthetic and functional fit as well as product uniqueness) in order to avoid omitted variable bias. Moreover, in order to enhance the validity of the findings, the

measurement of customer utility should be based on real purchasing information, not on hypothetical questions.

Our study attempts to close this research gap. We obtained data from a realistic setting in which customers actually designed cell phone covers with an MC toolkit and subsequently expressed their WTP for their self-designed products as well as their choice of an off-the-shelf standard product. For this purpose, the subjects submitted binding sealed bids in the course of two Vickrey auctions.

1 Development of hypotheses

The core idea of this article is that the perceived uniqueness of a product designed with an MC toolkit enhances its value for the customer beyond the product's aesthetic and functional fit. "Aesthetic and functional fit" is the degree to which a self-designed product corresponds to the individual customer's product-related likings (Dellaert and Stremersch 2005; Randall et al. 2007; Simonson 2005). This type of fit is high when the product meets the customers' preferences with regard to design, color, functions included, physical fit, etc. It is low when the product fails to meet those preferences. The "perceived uniqueness" of a product is the extent to which the customer regards the product as different from other products in the same category (Tian et al. 2001). These two constructs can be distinguished in conceptual terms, as the former refers to the fit between the customer and the product and the latter reflects the relationship between the product and other products. In order to provide theoretical justification for their independent contributions to the value a customer experiences, we turn to commodity theory (Brock 1968; Lynn 1991). In brief, this theory states that perceived scarcity should augment the desirability of objects (Cialdini 1985; Lynn 1991; Jung and Kellaris 2004). Owning rare goods generates value because those goods help the individual define herself as distinct from others (Snyder and Fromkin 1980). Such a distinction appears to be a meta-preference for many consumers (Simonson and Nowlis 2000), similar to the (meta-) preference for variety (Kahn 1995; McAlister and Pessemier 1982). Based on a meta-analysis, Lynn (1991) finds strong support for this effect, which is used by marketers who often advertise their products as rare, unique and exceptional (Frank 1997; Snyder 1992; Thompson and Haytko 1997). In fact, Lynn and Harris (1997) report that almost one quarter of all commercials refer to the exclusiveness of a product or its ownership. Hence, in order to resist conformity, customers may purchase novelty or original goods (Kron 1983), handcrafted goods, vintage or antique goods that are not available in mass quantities (Tian et al. 2001), or they may decorate, arrange, and display a composition of goods in such a way that they are perceived as one of a kind (Belk et al. 1989; Kron 1983).

MC toolkits make it possible to generate individual, unique, and user-specific products. Even simple toolkits can yield an almost infinite number of options. In fact, one has to convert the number of choices into familiar terms in order to gain an adequate understanding of how many choices the customer has: If one wanted to build a shop large enough to display all variants of Customatix sports shoes (approximately 3×10^{21}), the entire surface of the earth would not suffice—in fact, one would need 7,000 planets the size of the earth, each completely covered with

shop space. In an MC toolkit which allows users to create new designs actively, the number of design options is virtually infinite. It is therefore easy for a customer to create unique products if she wants (Franke and Piller 2003).

H1: The perceived uniqueness of a self-designed product has an independent impact on the utility a customer derives from the MC toolkit beyond the product's aesthetic and functional fit.

The relationship between perceived uniqueness and the utility a customer experiences might be moderated by specific characteristics of the consumer (Simonson 2005). Theory suggests that the consumers' general need for uniqueness (Tian et al. 2001) or, more specifically, the consumers' desire for unique products (Lynn and Harris 1997) might impact the value toolkit users derive from the uniqueness of self-designed products (Fiore et al. 2004; Michel et al. 2006). Those consumers who specifically aim to differentiate themselves from others (i.e., who show a strong desire for unique products) should appreciate a truly unique product more (i.e., derive higher utility from the product) than consumers who aim for conformity (i.e., who show a low desire for unique products).

H2: The relationship between the perceived uniqueness of a self-designed product and the resulting utility a customer derives from it is moderated by the customer's general desire for unique products (i.e., there will be a positive interaction effect).

2 Method

2.1 Overview of procedure and sample

For the purposes of our study, we prepared several PCs which allowed participants to design individual cell phone covers using a real MC toolkit. A total of 127 students (42% females) participated in the study. As the participants were management students, our data is biased in favor of young and fairly adept persons who are familiar with the Internet. At the same time, however, this particular group also represents the majority of B2C toolkit users (Fiore et al. 2004; Franke and Piller 2004).

The participants were introduced to the functionality of the toolkit, after which they began the individual design process. Having finished, they were asked to fill out a short questionnaire. Finally, in order to measure the utility they would derive from the self-designed product, we asked them to submit binding sealed bids for their self-designed product in the course of a Vickrey auction. The setting ensured that no interaction between participants was possible during the entire design and interview process. There was no time limit, and participants were offered free coffee, soft drinks, and snacks to create a natural environment which came close to sitting at their own PCs at home.

2.2 Research object: Toolkit to design cell phone covers

In order to test the hypotheses, we selected an MC toolkit which is typical of B2C markets and allows the user to design individual cell phone covers

(www.designyourhandy.de). Using this toolkit, customers can actively design the entire face (i.e., the face design in a given size and material). Instant visual feedback ensures efficient trial and error during the design process (von Hippel 2001). Overall, this tool offers its users a relatively high degree of design freedom: Design elements can be "imported" from external sources such as the web or graphics programs. In the course of this experiment, subjects were therefore connected to the Internet, allowing them to download figures, graphics and symbols using search engines. Participants were also able to use Microsoft Paint, PowerPoint, and other Office programs in order to develop their own designs and upload them to the toolkit. The selected design elements could then be adapted in the toolkit and moved back and forth to adjust their exact placement on the cell phone cover. Like most B2C toolkits, this toolkit does not allow functional adjustments beyond visual designs. However, we still use the term "aesthetic and functional fit" because it denotes adjustment to the subject's preferences.

2.3 Measurement

Aesthetic and functional fit We operationalized aesthetic and functional fit using the following two items (following Randall et al. 2007): (1) "How close do you think your design comes to your idea of the ideal cell phone cover design?" (1=very far from my ideal cell phone cover design; 10=to me, this is the perfect cell phone cover design). (2) "Please compare your self-designed cell phone cover with the best standard 'off-the-shelf' cover you are aware of" (1=My cell phone cover is much worse than the standard; 10=... much better than the standard). We thus cover both reference points relevant to forming an individual assessment of the product's aesthetic and functional fit: the ideal product as the "upper anchor" (Item 1) and the best standard product available as the "lower anchor" (Item 2). We tested the scale in the course of a preliminary pilot study which used the same setting as our main study except for WTP measurement (n=48). Most importantly, we find that the items show only moderate correlation (r=0.27; p<0.10). A closer inspection of their distribution revealed that the lower anchor of the second item seems to have been set incorrectly (only 8% of subjects checked off a value between 1 and 5). Subsequent interviews with participants revealed that the lower anchor should be "... is equivalent to the standard product" instead of "... is much worse than the standard product" (as copying and pasting the standard design would not involve extensive effort). For our main study, therefore, we adjusted this anchor (1=My cell phone cover is as good as the standard). The averaged mean for the scale is 7.18 (SD=1.98), the alpha is 0.60, and the two items' correlation is 0.45 (p<0.001). As the second item is relatively close to the perceived uniqueness construct, a test of discriminant validity will be provided in the "Findings" section.

Perceived uniqueness As no existing scales were available, we developed a new scale to measure perceived uniqueness based on the relevant literature (Lynn and Harris 1997; Snyder and Fromkin 1980; Tian et al. 2001). This brought about the following three items: (1) "I perceive this self-designed cell phone cover as highly unique", (2) "This cell phone cover is one of a kind", (3) "My cell phone cover design is really special" (all measured on five-point scales where 1=strongly disagree, 5=strongly agree). We tested the scale's appropriateness in our pilot study,

and the results were encouraging: Exploratory factor analyses extracted one factor (explained variance=77%), and all items show satisfactory factor loadings (>0.8). The alpha of the scale is 0.85. In our main study, the averaged mean for this three-item scale is 3.78 (SD=1.05), and the alpha comes to 0.86.

General desire for unique products We measured the consumers' desire for unique products using a scale adapted from Lynn and Harris (1997). For this purpose, we employed the following two items: (1) "I am generally more likely to buy a product if it is rare" and (2) "In general, I enjoy having things that others do not" (both measured on five-point scales where 1=strongly disagree; 5=strongly agree). In order to establish whether we lose a great deal of information by employing this adaptation instead of the original scale, we tested both scales in the pilot study. The results were again encouraging, as we found the two scales to be highly correlated (r=0.89; p<0.001). The averaged mean for the scale in our main study is 3.63 (SD= 1.04), and the alpha comes to 0.75.

Utility of self-designed products The dependent variable is measured as the WTP increment. In this context, we used the WTP for a standard product as a reference point. We calculated the utility a subject experienced from her self-designed product as the difference between her WTP for her self-designed product and her WTP for the standard product of her choice (delta-WTP). For this purpose, we offered participants ten standard products to choose from. Participants were informed that those standard products were of exactly the same technical quality as the self-designed products and only differed in the design aspect. We also tested the appropriateness of the standard sets in the pilot study. When interviewing participants, we found that all of them identified a reasonably satisfactory product in this set and regarded the standard products as highly realistic offers.

The WTP or reservation price denotes the maximum amount of money one is willing to pay for a given product and therefore constitutes a hard proxy for measuring the utility consumers (expect to) derive from that product (e.g., Homburg et al. 2005; Kalish and Nelson 1991; Voelckner 2006). In order to measure WTP, we employed Vickrey auctions, in which the participants' bids are sealed and the bidders are unaware of the other bids. The bids were also binding, which means that participants confirmed in writing that they would buy the product if their bid turned out to be the highest. In this type of auction, the item is awarded to the highest bidder at a price equal to the second-highest bid, thus the winner pays less than the highest bid (Vickrey 1961). It can be shown that the dominant strategy of bidders in such an auction is to bid their actual maximum WTP (Cox et al. 1982; Hoffmann et al. 1993). These non-hypothetical, incentive-compatible methods of measuring consumers' WTP have been found to produce highly valid results (Noussair et al. 2004) and are superior to hypothetical, non-incentive-compatible alternatives (e.g., contingent valuation methods; Wertenbroch and Skiera 2002). In our study, the interviewer explained the details of the procedure to the participants. We made it clear that if a participant won both auctions (the auction for the self-designed cell phone cover and the auction for the standard one), chance would decide which of the two products the subject would

receive. This helped to discourage strategic behavior, for example bidding high on one product and low on the other (Rothkopf and Teisberg 1990).

In order to test the validity of our measurements, we correlated WTP with (1) general interest in the product category ("How high is your general interest in a cell phone cover?"; five-point scale where 1=very low, 5=very high; mean=2.72; SD=1.35), (2) product category purchase intentions ("How likely are you to purchase a cell phone cover within the next few months?"; five-point scale where 1=not at all likely, 5=very likely; mean=1.97; SD=1.34), and (3) perceived importance of design in the underlying product category ("How important is the face design of a cell phone to you?"; five-point scale where 1 = not at all important, 5=very important; mean=3.39; SD=1.29). As required (see Wertenbroch and Skiera 2002), we observe highly significant (p values<0.001) positive correlations, with r ranging from 0.34 to 0.62. This suggests a sound degree of validity.

The average bid for a self-designed cell phone cover came to EUR 9.43 (SD=9.61; ranging from 0 to 60). The average bid for the chosen standard product came to EUR 3.07 (SD=4.43; ranging from 0 to 30; $p<0.001$). As the two measures reflect interest in the product category and budget constraints, they are positively correlated ($r=0.49$; $p<0.001$). The subjects with the highest bids were notified and were willing to pay the money (second-highest bid) for the self-designed cell phone cover (EUR 40) or the chosen standard cell phone cover (EUR 20).

3 Findings

3.1 Discriminant validity of "perceived uniqueness" and "aesthetic and functional fit"

As a first step, we need to establish whether the two independent variables of "perceived uniqueness" and "aesthetic and functional fit" can be discriminated from each other empirically. Further analyses will only make sense if this is the case. We test discriminant validity by means of (1) exploratory factor analyses (EFA), (2) confirmatory factor analyses (CFA), and (3) the Fornell-Larcker criterion (Fornell and Larcker 1981).

In subjecting the "aesthetic and functional fit" and "perceived uniqueness" items to EFA, we extracted two factors which confirm our two theoretical constructs (all items show factor loadings of >0.80 for the "expected" factor, and factor loadings of <0.20 for the "non-expected" factor). By employing CFA, we were able to test two competing models: In Model 1, aesthetic and functional fit as well as perceived uniqueness are treated as two separate latent constructs which are allowed to co-vary. Model 2 assumes that all items load on the single construct "output-related benefits". If Model 2 had performed as well as or better than Model 1, this would suggest that the two constructs are not distinct. However, we find that the fit statistics from Model 2 are insufficient (e.g., $Chi^2/df>5$; AGFI <0.90; RMSEA >0.10), while those for Model 1 can be considered clearly superior (e.g., $Chi^2/df<5$; AGFI >0.90; RMSEA <0.05). In addition, the Chi^2 value also suggests that the fit of Model 1

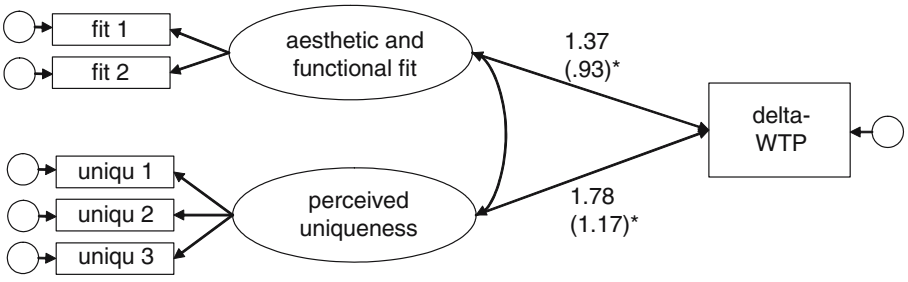
(3.32) is significantly better than that of Model 2 [27.60; thus the Chi^2 difference is well above the 5% level (threshold value: 3.841)].

Finally, we assessed discriminant validity using the Fornell-Larcker criterion. In this test, the average explained variance (AVE) of both latent variables must be higher than the squared correlation (SC) between the two latent variables (Fornell and Larcker 1981). Although they correlate to a certain degree (SC=0.21), our constructs also pass this final test: the AVEs of both constructs (AVE of aesthetic and functional fit=0.47; AVE of perceived uniqueness=0.68) clearly exceed their SC value. Overall, these findings suggest that the two constructs are distinct.

3.2 The independent impact of perceived uniqueness on WTP

In Hypothesis 1, we state that the perceived uniqueness of a self-designed MC product has an independent impact on consumers' WTP (beyond the product's aesthetic and functional fit). We test this second hypothesis using structural equation modeling (see Fig. 1). The expected effects of aesthetic and functional fit as well as perceived uniqueness on delta-WTP (WTP for self-designed products minus WTP for the chosen standard products) are thus tested simultaneously. As expected, we find that both aesthetic and functional fit (b=1.37; beta=0.22; p<0.10) as well as perceived uniqueness (b=1.78; beta=0.17; p<0.10) have a positive significant effect on the consumers' incremental WTP. We thus find support for our hypothesis: The more unique a consumer perceives a self-designed product to be, the more she is willing to pay for it compared to an off-the-shelf standard item (with aesthetic and functional fit held constant).

The patterns remain robust (with somewhat clearer effects of p<0.05) when we define the dependent variable as the WTP for the self-designed product only and include the WTP for the chosen standard product as an independent control variable (representing general WTP for the underlying product category and willingness to buy a cell phone cover in the situation-specific context, that is, in an experiment at a university).



Note: Unstandardized regression coefficients (standard errors) are reported
* p < 0.10 (one-sided)
Squared multiple correlation of delta-WTP (WTP for self-designed minus WTP for standard product) = .11
Fit: Chi^2/df = 1.35 (9.453/7); GFI = .98; AGFI = .92; IFI = .99; CFI = .99; RMSEA = .05

Fig. 1 Perceived uniqueness as a value driver of WTP for self-designed MC products

3.3 Exploring the uniqueness effect

In order to understand the nature of this "uniqueness effect" more fully, we can draw upon in-depth, non-directive interviews with a random selection of 16 participants which we conducted immediately after they completed the final questionnaire. The guiding question was "What do you like about your self-designed product?". Interviews were recorded, transcribed and analyzed according to qualitative research standards (Strauss and Corbin 1990). It turned out that only one participant referred to practical reasons for preferring a unique product "When it's lying on a table, for example when I go out to eat, I can recognize it immediately, (...) I would not mistake it for another phone" (Subject 23). For most subjects, however, the uniqueness of the cell phone cover carried utility because it allowed demonstrative differentiation from other consumers, which is exemplified in statements like "The cell phone cover is unique ... I am so happy if someone ... if I have something others do not have. I don't want to look like everybody. Or, let's say, I want to attract attention" (Subject 3), "It symbolizes individuality ... I don't know ... not following the crowd" (Subject 42). A smaller number of subjects gave the impression that they also wanted to differentiate themselves, but in a more reserved way: "It is extremely important to have unique things ... not clothes but little things, or things in my apartment." (Subject 20); "Certainly, I am an average guy in many ways ... but in some things ... they are important, a cell phone is important to me, I want to express myself with it ..." (Subject 31). For many subjects, the product's uniqueness therefore facilitated better identification with it (Subject 11: "It is unique! It has, perhaps a personal relationship, a relationship between the product and my personality"; Subject 21: "It is ... it is ... *my* cell phone"; Subject 46: "It shows my personality ... ah, it says more about me than a standard product") and even seemed to imply self-actualization effects (Subject 46: "It is something unique, well, I kind of feel like a, ... almost like an artist, creating something like this ... unique pictures from someone famous, from Picasso or any other artist ... I felt like an artist, that's the point").

3.4 The moderating role of a desire for unique products

So far, we have not included general inter-individual differences in our analysis. In Hypothesis 2, we state that there should be a positive interaction effect between perceived uniqueness and the desire for unique products on the utility a customer derives from self-designed products. Because the moderator variable is continuous, we test this hypothesis using moderated regression analysis (Aiken and West 1993; Homburg and Fürst 2005). In particular, we standardized the composite scores of predictor and moderator variables, created the interaction term, and conducted a hierarchical regression (with the interaction term entered in the second step of the analysis, as in Frazier et al. 2004). The findings are summarized in Table 1.

First, we again find that aesthetic and functional fit ($b=1.44$; $p<0.05$) as well as perceived uniqueness ($b=1.73$; $p<0.05$) positively impact delta-WTP. Note that the effects in this hierarchical regression are not main effects but rather conditional effects, that is, effects on the average value of the other explanatory variables (Frazier et al. 2004.) As for the desire to own unique products, we do not find a

Table 1 Effects of interaction between perceived uniqueness and the desire for unique products on delta-WTP (hierarchical multiple regression)

	Step 1		Step 2	
	DV: delta-WTP		DV: delta-WTP	
	b	SE	b	SE
Aesthetic and functional fit	1.30	0.81*	1.44	0.81**
Perceived uniqueness	1.42	0.85**	1.73	0.87**
Desire for unique products	0.75	0.80 n.s.	0.68	0.79 n.s.
Control variables				
Gender	−0.23	0.79 n.s.	−0.37	0.79 n.s.
Income	1.59	1.12*	1.68	1.12*
Interaction:				
Perceived uniqueness x desire for unique products	–	–	1.05	0.74*
R/R^2	0.33/0.11		0.35/0.12	
Change in R^2 (F value)	0.11 (2.682)**		0.02 (2.027)*	

*$p<0.10$; **$p<0.05$ (one-sided)

significant effect ($b=0.68$; n.s.). Whereas the control variable of gender also appeared to be insignificant ($b=-0.37$; n.s.), we find that income is positively related to delta-WTP ($b=1.68$; $p<0.10$). Most importantly, however, we identify a positive interaction effect ($b=1.05$; $p<0.10$). We thus find support for Hypothesis 2 which predicts that desire for unique products moderates the link between perceived uniqueness and delta-WTP (change in $R^2=0.02$; $p<0.10$). In order to understand the form of interaction in greater detail, we plotted the predicted values of delta-WTP for representative groups (−1 SD and +1 SD from the means of perceived uniqueness and desire for unique products, respectively; Aiken and West 1993). We find that consumers with high as opposed to low levels of desire for unique products derive substantially higher utility (delta-WTP) from the degree of perceived uniqueness in their self-designed products (reflected by the simple slopes, see Fig. 2). A significance test of the two slopes (Aiken and West 1993) confirms that the first slope (high desire for unique products; $p<0.05$) but not the second slope (low desire for unique products; n.s.)—albeit positive in nature—differs significantly from zero. This implies that perceived uniqueness does (not) matter very much to subjects with a high (low) desire for unique products.

4 Discussion

In our research, we found that the perceived uniqueness as well as the aesthetic and functional fit of products self-designed using MC toolkits are two distinct constructs and should therefore be treated separately when analyzing consumers' affective reactions in this context. More importantly, we found that a self-designed product's perceived uniqueness contributes independently to the utility a customer experiences—beyond the aesthetic and functional fit the product delivers. Our qualitative interviews suggest that the main underlying motives are distinction from others through enhanced identification with the product. The positive interaction effect identified suggests that

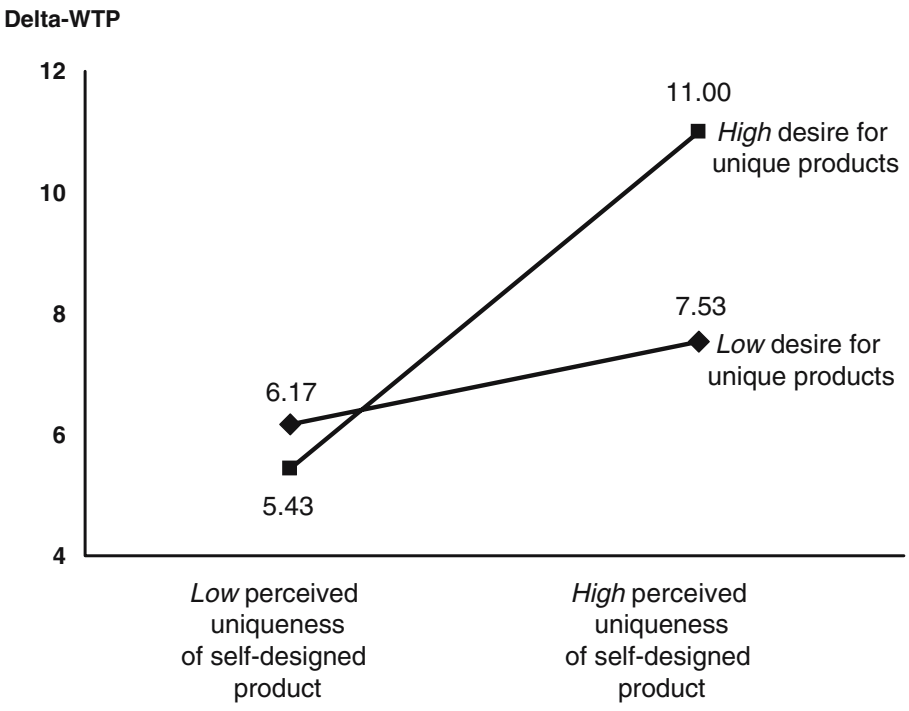


Fig. 2 Perceived uniqueness×desire for unique products: interaction

those consumers who display a high need for uniqueness value the perceived distinctiveness of the self-designed product more highly than consumers who possess a lower "counterconformity motivation" (Nail 1986). This finding fits in well with the literature on commodity theory and on the need for uniqueness, which argues that the pursuit of differentiation from other people is a personality characteristic that drives many consumption decisions, such as buying rare or novelty goods, shopping in non-traditional outlets, or altering and personalizing the product once it is in the consumer's possession (Tepper 1997; Belk et al. 1989). It has been proposed that mass-customizing products elicits positive effects for consumers who strive for uniqueness (Tian et al. 2001), and we can confirm this effect as an outcome of MC self-design independent of perceived aesthetic and functional fit.

Important practical conclusions can be drawn from these findings. First, it appears mandatory for manufacturers building MC toolkits to be aware that a good part of the benefits their customers derive from the toolkit may stem from whether (or not) they perceive their self-designed products as unique. The toolkits should therefore be designed to enhance the user's ability to create uniqueness and programmed to provide affirmative feedback indicating that this goal has actually been achieved.

First of all, providing a sufficiently large solution space appears to be essential for an MC toolkit. Moreover, facilitating the unique branding of self-designed products (e.g., highly unique labels) seems to be a viable means of enhancing the product's perceived uniqueness. The latter could be achieved by providing the toolkit user with

immediate feedback during the design process, indicating whether or not other MC customers have already come up with the same or similar designs. Another idea would be to offer customers the possibility of "blocking" their designs for other consumers, essentially *guaranteeing* uniqueness. As this creates value for the customer, why not charge a small fee for that option?

However, it is important to bear in mind that this impedes the sharing of designs with other customers. Some MC toolkit providers (such as Lego) use the designs created by their customers as starting points for other self-designers, and they even sell the best consumer designs as standard products (see factory.lego.com). This would obviously not be possible if designs are blocked. Moreover, frustration effects might arise when a consumer finds out that the time and effort invested in designing a product was wasted because someone has already reserved the design. A moderate form of such a "blocking" feature would be that a design solution could be branded with the originator's name for a small fee. This would not prevent other consumers from using the design (which is unchangeably branded by the originator and might elicit positive psychological effects for her). In any case, expected gains in uniqueness through a "blocking" feature would have to outweigh the opportunity costs to the manufacturer. It appears that more research on this issue is necessary, particularly large-scale controlled experiments which test the utility effects of the features suggested. All this applies to consumers who show an increased need for uniqueness, which probably constitutes a huge share of consumers considering the use of MC toolkits.

To what extent can our findings be generalized? Obviously, cell phone covers constitute an example of a product category in which the product's uniqueness may matter. Among our sample population, cell phones can be important status symbols, and for many students individualized ring tones and covers serve as important means of achieving social distinction. We assume that many other products are also bought in order to demonstrate the owner's individuality, for example fashion and lifestyle products (Becker 1996). There may even be product categories in which perceived uniqueness matters far more than the enhanced benefit gained through aesthetic and functional customization. As an extreme example, consider art collectors who sometimes value a product *only* for its rarity. Another example is fashion, where companies successfully market limited edition series (e.g., Swatch wristwatches) or products that have exclusive distribution outlets (e.g., Tod's shoes; for an overview, see Lynn 1991). Particularly in such categories, a manufacturer aiming to develop or improve an MC toolkit would be well advised to focus on the toolkit's potential ability to deliver (perceived) uniqueness to the customer.

However, we also have to bear in mind that product categories in which the utility consumers derive from the product is (partly) dependent on dissimilarity to other consumers and products vary in different social groups and situations (Snyder 1992; Midgley 1983). There are also product categories in which the aesthetic and functional fit of a product might matter far more to consumers than its uniqueness, as the possibility of demonstrating individuality with the self-designed product is limited. Products like customized PCs, custom mattresses or statistics software might also fall into this category. Altogether, for a manufacturer considering the idea of developing an MC toolkit, this involves the imperative of considering beforehand whether the product in question is valued by the target group primarily for its

aesthetic and functional properties or for its uniqueness at least as an *ancillary* feature. More research on this topic is necessary, and as we have only analyzed one product category (cell phones), our study falls short of providing more than mere speculation in this area. Future research should also take into account that the order of causality in this article is merely a (plausible) interpretation. It may also be that higher WTP due to another factor has an effect on ratings of perceived uniqueness. We suggest controlled experiments on this topic as the next step in this line of research.

Another promising avenue for future research might be to explore whether consumers who strive for uniqueness (rather than for aesthetic and functional fit), use toolkits differently and derive systematically "different" MC products or whether products are merely *perceived* differently. This could be achieved, for example, by log-file analyses of the design process and a more objective measurement of the resulting products' uniqueness. Furthermore, it might be interesting to see how the effects of perceived fit and uniqueness on WTP evolve over time, i.e. after the product is physically obtained and used. In this phase, peer feedback might have an important impact on perception. Also integrating additional dependent variables (e.g., repurchase behavior, loyalty, brand attachment) would help to understand the theoretical and practical implications of MC from a consumer perspective more deeply.

In conclusion, the primary argument in favor of MC—namely increased customer utility due to products which are better adapted in terms of aesthetics and function—needs to be complemented. We argue that this is only one aspect of the phenomenon and provide initial empirical evidence that perceived uniqueness is a second major source of utility customers can derive from using MC systems.

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