

Exploratory Study on Self-Fulfillment Effect of Self-Designing Process in Adaptive Customization Services

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Abstract

Services for self-designing, or adaptive customization services, have become dominant in virtual marketplaces and are believed to create additional values both for the company as well as for the customer. While most research focused on the value from the services' *outputs*, this research attempts to address the customer-perceived value deriving from the *process* of the services, and focuses on the self-fulfillment effect of the involved mental processing. An online survey was administered with 313 U.S. shoppers. In the results, participants using adaptive customization services reported higher self-fulfillment perceptions, than did those not using the services. Furthermore, both the self-fulfillment perceptions (i.e., autonomy and competence) significantly increased perceived design utility. The results suggest that the process of adaptive customization services should be strategically managed to improve the customers' positive mental states that subsequently improve the perceived value of the output designs. Implications and suggestions for future studies are discussed.

Keywords

Adaptive customization, perception of autonomy, perception of competence, perceived design utility

INTRODUCTION

Interactive services have become highly dominant in the virtual marketplaces, providing an additional value both to the company as well as to the customer. As a most popular form of interactive services, *adaptive customization* refers to 'a user-driven system of product alteration and supports for constrained creativity' (Mathwick *et al.*, 2010). To explain, with the use of the services of adaptive customization, customers can self-design their products (e.g., T-shirts) through a limited range of choice options upon a standardized design platform. The services' *output* is the customized product that reflects the customer's individual preferences (e.g., the customized T-shirt design reflecting the customer's favorite color combinations), while the services' *process* entails multi-stepped decision-making stages at each of which customers are expected to actively express their own preferences (e.g., the action of choosing preferred color combinations). Since co-creative and interactive services have become critical in various consumer-oriented marketplaces (e.g., Bolton & Saxena-Iyer, 2009; Gwinner *et al.*, 2005; Fuchs, 2010), services for adaptive customization have become a key strategy

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to enhance customer loyalty or satisfaction (Hameide, 2010; Hillebrand *et al.*, 2011; Lian & Yen, 2013).

In responding to the growing managerial interest on adaptive customization services, research has addressed the customers' responses towards the services, mostly focusing on the services' output; prior studies reported that using the adaptive customization services would increase perceived aesthetic preferences on the customized designs (e.g., Mathwick *et al.*, 2010). Comparatively however, little research has addressed customers' psychological responses during the services' process. The process of adaptive customization services, in fact, is quite different from that of a standardized consumption, and imperatively entails a relatively long and multi-stepped process of customers' own participation (Simonson, 2005). Shoppers are expected to express their own design preferences at each of the self-designing stages, by choosing color or design details from a set of alternatives within the same design platform. Although such a participating process of adaptive customization itself is a unique point of the services - and likely distinguishes the relevant consumer psychology from that of a standardized shopping experience-, few studies have discussed the relevant consumer psychology (for an exception, see Franke *et al.*, 2010). Filling the gap in the literature, accordingly, should contribute to the extant literature on the topic since it would further elaborate on the customer-perceived values of adaptive customization services.

With this motivation, the current study attempts to explore the dynamics of customers' psychology during the services' process of adaptive customization. In specific, this study explores the effect of customers' *cognitive needs fulfillment* deriving from the adaptive customization processes, on the perceived utility of the customized designs. The theoretical framework of the study draws upon the relevant findings of the extant studies of consumer-empowering consumptions (e.g., Dahl & Moreau, 2007), and the basic motivation theories highlighting the crucial roles of individuals' innate motivations in mentally-engaging activities (e.g., Ryan & Deci, 2000). Additionally, in order to find customer's responses in actual consumption settings, this study employed three actual fashion websites employing adaptive customization services.

The findings of this research would contribute to the growing literature of adaptive customization in specific, and of co-creation

experience in general, by further explaining some of the customers' psychological responses during the services' process and how this relates to the perceived value of the services' output. Furthermore, the results would benefit industry managers of various product/service categories reflecting high self-expressive demands (e.g., apparel, food, living), as hedonic benefits within such markets become essential in determining consumers' product or service choices.

LITERATURE REVIEW

Self-fulfillment effect of adaptive customization services

Consumer behavior regarding adaptive customization is explained only through an interdisciplinary approach across motivational theories (e.g., Festinger, 1954), process-oriented consumer psychology (Hess *et al.*, 2012; Verhoef *et al.*, 2009; Zhan & Fitzsimons, 1999), studies on consumer choices (e.g., Baard *et al.*, 2004; McFadden, 1986) and self-creation (Dahl & Moreau, 2007; Fuchs, 2010). Likewise, the theoretical framework of the current study merges several flows of relevant literature: First, it is from the recent literature of consumer-empowering consumptions that suggest consumer psychology during a consumption process may significantly affect how they ultimately evaluate the value of the consumption output. Second, with few studies addressing the process-oriented psychology of adaptive customization services, the current study employs two perceptions of cognitive needs fulfillment as the crucial psychological values driven from the process of adaptive customization services: perceptions of competence and autonomy. The two concepts were originally suggested by Self-Determination Theory (Deci *et al.*, 1994; Ryan & Deci, 2000), a core motivational theory of behavioral psychology, as the humans' basic innate needs towards mental tasks, and the fulfilling perceptions of the two innate needs have been documented in the consumer behavior studies as core determinants of creative consumption (Dahl & Moreau, 2007; Roca & Gagné, 2008).

Humans have an innate desire for self-growth (Festinger, 1954), and tend to enjoy certain situations assuring their cognitive optimal functioning and balance (Zhang & Fitzsimons, 1999). Research suggests that both the needs perform as a strong motivation for

individuals to actively and voluntarily participate in a heavy mental activity (Spreng *et al.*, 1996). Psychologists suggest that perceptions of cognitive needs fulfillment are crucial driver for individuals to be voluntarily engaged in mental tasks (e.g., Kowal & Fortier, 1999). The Self-Determination Theory (Ryan & Deci, 2000) initially presents three core innate desires relevant to individuals' involvement in mental tasks: need for autonomy, need for competence, and need for relatedness. However, in adopting the theory to the consumer behaviour context, studies highlight that the two out of the three innate motivations are most crucial in understanding how customers perceive creative consumption contexts. For instance, Dahl and Moreau (2007) empirically documented that amongst customers' diverse motivations for undertaking creative tasks, the perceptions of competence and autonomy most significantly affect customers' evaluations towards creative consumption experiences. In addition, they found the importance of constraints (e.g., instructional guidance, target outcomes) in facilitating a balance between perceived competence and autonomy when consumers engage in a creative consumption task. That is, the results of their experiments reported that consumers enjoy the experience more when they are involved in creative activities with a sense of both autonomy and competence. Based on the previous literature, *perception of autonomy* is defined in this study as the extent to which an individual perceives that he/she efficiently interacts with one's environment (Kowal and Fortier, 1999), while *perception of competence* refers to the extent to which an individual considers oneself to be the originator of one's own fulfilment (deCharms, 1968).

The perceptions of competence and autonomy likely perform as a crucial psychological factor in adaptive customization services. Compared to a consumption context when customers shop for a standardized design, using services for adaptive customization likely involves fulfillment of the two cognitive needs to some extent, because the consumption experience involving adaptive customization entails a cognitively-demanding process (Franke *et al.*, 2010). Self-designing process entails consumers' choice making activities based on the individuals' active mental processing (McFadden, 1986; Zhan & Fitzsimons, 1999). A decision should be based on the relevant consequences of the different options, and a decision rule that allows trade-offs (Frisch & Clemen, 1994).

The individuals' pre-structured preference schema in the product category should be evoked and consumers voluntarily make decisions by actively comparing across various design options like for colors and aesthetic details of the product (Grisso *et al.*, 1995). The more the choice alternatives are available, the more intense mental engagement it would take for the designing process, until consumers get to their finalized, customized designs.

While no research has explored the direct relationships between the process of adaptive customization service and the cognitive needs fulfillment, there have been a couple of studies reporting its possibility. For instance, Franke *et al.* (2010) explored potential positive effects of the process-related psychological mechanisms in adaptive customization services. They showed that the customizing experience generates the perception of subjective ownership, and this increases perceived utility of the custom output. In a similar vein, Mathwick *et al.* (2010) reported that need for control, a psychological construct that is highly relevant to the perceptions of cognitive needs fulfillment, performs as a crucial antecedent to customers' intention to participate in the adaptive customization process. In sum, the extant results suggest that individuals' cognitive needs have a crucial role in the dynamics of consumer behavior regarding adaptive customization. Based on the literature, we posit:

H1: Consumers will report a higher perception of autonomy when they are in the context of shopping using adaptive customization services than in the context of shopping for standardized designs.

H2: Consumers will report a higher perception of competence when they are in the context of shopping using adaptive customization services than in the context of shopping for standardized designs.

Perceived design utility

Fulfilling the two innate cognitive needs are crucial for the individuals in evaluating their subjective quality of the mental tasks. Accordingly, the perceptions of cognitive needs fulfillment likely increase perceived utility of the customized design. *Perceived design utility* refers in this study to the subjective utility that the customer evaluates on the customized output (Franke *et al.*, 2010). The rationale comes from the previous research findings that

intrinsic motivation fulfilment likely leads to a better mental task performance (e.g. Baard *et al.*, 2004; Roca & Gagné, 2008) and this subsequently results in a better evaluation on the task's *output* (Zhan & Fitzsimons, 1999). That is, when individuals perceive a mental challenge contributing to their cognitive needs fulfilment, they tend to put more time and effort so they maintain the positive inner states (Ryan & Deci, 2000). Moreover, people tend to believe that their decision would be a good one when they invest their own mental labor, since they tend to think that the amount of mental effort positively correlates to the end result's functional performances (Natale *et al.*, 2003).

Verhoef *et al.* (2009) reported the distinct function of the purchase or consumption processes impact overall task and/or outcome evaluations. Research has documented that fulfilling the innate cognitive needs can be the key psychological mechanism underlying a problem-focused coping strategy adapted in mentally-challenging consumption (e.g., Bettman *et al.*, 1998; Finucane & Gullion, 2010; Roca & Gagné, 2008). Nix *et al.* (1999) showed that when people felt both competent and autonomous, successful performance improved, leading to higher satisfaction. Perception of autonomy or competence increases self-esteem, and subsequently improves subjective evaluation on the individual performance (Thompson, 2006). Studies have been showed that autonomy leads to greater engagement in an initially uninteresting activity and increased positive feelings toward the activity (e.g. Deci *et al.*, 1994; Joussement *et al.*, 2004). Thomson (2006) found that the more a person perceives a brand as fulfilling his or her autonomy needs, the more intensely satisfied he/she will be with the brand. Hsu and Chiu (2006) referred that fulfilling the innate needs has positive effect on acceptance intentions of e-commerce. Indeed, Dahl and Moreau (2007) found that fulfillment of needs for competence and autonomy is highly important in gaining a high-level enjoyment during the assembly processes. Innate desire for controlling the environment was found to be as a major initiative for individuals to try advanced technology in virtual consumption (Mathwick *et al.*, 2004). According to Moreau and Herd (2010), intervening psychological factors play a major role as to how the users evaluate the value of adaptive customization services. More relevant to the current context, Franke *et al.* (2010) indicated that the subjective ownership that the users perceive regarding

customized products is an important antecedent in the perceived utility of the customized *outputs* (designs). On the basis of the literature we expect:

H3: Perception of autonomy will increase perceived design utility.

H4: Perception of competence will increase perceived design utility.

METHOD

Study design

This study employed three fashion web retail sites employing self-designing configuration toolkits for adaptive customization: i) Customink.com, ii) Spreadshirt.com, and iii) Zazzle.com. The three retailers were selected from a set of pretests. First, from the Google search results we randomly picked 10 fashion retailers providing self-designing toolkits on their web shopping malls. We then performed a pretest survey (n=30, aged 18~32, female 53%) on the ten web retailers to measure consumers' attitudes towards the retailers. We employed asked the participants how well they know the web retailers using 5-point Likert scale items. The three web retailers were chosen because of their lowest brand awareness scores among the companies in the initial company list (M Customink=1.41, M Spreadshirt=1.27, M Zazzle=1.22). Furthermore, their awareness levels were statistically insignificant ($p>.10$). From this pretest, popular brands like Nike or Adidas were excluded from the potential list of stimuli for the experiment because the high levels of brand awareness or fondness may affect the participants' evaluations towards the websites and the resulting designs. Using multiple commercial websites in the study is consistent with the extant literature testing consumer responses online (e.g., Mummalaneni, 2005; Franke *et al.*, 2010). The rationale to choose multiple actual websites as the study stimuli is two-fold; i) participants can experience realistic shopping context using the services, and ii) employing multiple websites lowers the possible effect of the participants' perceptions regarding the company, increasing external validity of the study's results (Mummalaneni, 2005).

The web retailers provide multi-step self-designing services for various fashion items. On each item sold in the web site, shoppers

can determine whether they shop for standardized products only, without using the configuration toolkit, or participate in the self-designing process to create their own designs with customized elements. Based on a standardized design platform (e.g., a plain body of T-shirt with no design elements), the configuration toolkit provides a wide range of choice alternatives for product type and design at each of the self-designing steps: (i) choose a product type (e.g., hoodies, tank-top, polo shirt, etc.), (ii) choose colors, and (iii) create text elements, and/or upload images/graphics. Each toolkit provides 15-19 steps to complete the process of self-designing, and 10-20 design alternatives (e.g., colors, font styles, text types) are available for each of the steps. After finishing the process, the shoppers can save and email the image of the customized design they create.

Sample and data collection

Data was collected using an online survey administered to a web panel recruited through a professional market research company with an online consumer panel composed of over 1 million U.S. individuals. Introduction of the survey was posted in a pre-specified area on the web by the company which is accessible to all registered web panel of the company. If interested, the participants were guided to enter the survey website through the given URL, through which they can access the web sites to customize their fashion designs and to participate in the online survey asking their evaluation on the experience. During one week, a total of 321 responses were obtained, eight incompletes were excluded. Also, six were dropped because of their prior familiarity with the suggested websites. Finally, a total of 313 responses were remained and used for the analysis.

The participants were instructed to choose a fashion item at one of the three web sites, and complete a survey after that. Each participant was randomly assigned to one of three websites, and one of three study conditions (standardized shopping/low-intensity/high-intensity adaptive customization conditions). In the standardized shopping condition (Condition I), the participants were instructed just to shop for a standardized product design at the web site, without using the self-design configuration toolkit. Comparatively, in the low-intensity adaptive customization condition (Condition II), the participants were guided to use the

first three steps of the total designing process in the configuration toolkit only. In the high-intensity adaptive customization condition (Condition III), the participants were asked to use all the self-designing steps to customize the fashion items. Cell sizes for the three websites and the three different experimental conditions were ranged from 32 to 38 (n Condition I=107, n Condition II=104, and n Condition III=102). The shopping experience for this research completed once the participants put their chosen designs in the shopping cart. Having finished the customization process at the web site, the participants were guided to complete a questionnaire through a web-based survey containing demographics and the core measures of the study.

Measures

We mainly constructed our survey instrument based on established measurement constructs from prior research, but adapted aspects of these to the context of our research. The variables of the study were measured with seven-point Likert type items adapted to this context from a published scale (see Table 1 for the specific items). Autonomy was measured with a set of four items adapted from Dahl and Moreau (2007). Competence was measured with four items by Dahl and Moreau (2007) that had been developed from their interviews with consumers within the context of consumption experience. Perceived design utility was measured with three items from the established literature (Ashok *et al.*, 2002; Fornell *et al.*, 1996). The responses for all measures were given on a scale that ranged from 1 (*not at all*) to 7 (*very much*).

RESULTS AND ANALYSIS

Sample profile

The demographic profile of the participants indicated that 67% of the participants were women, and 33 percentages were men. The sample represented a wide age range: 9% of them were between the ages of 18 and 24 years, 18% between 25 and 29 years, 11% between 30 and 34 years, 10 % between 35 and 39 years, 9% between 40 and 44 years, 15% between 45 and 49 years, 14% between 50 and 54 years, 4% between 55 and 59, and 10% being 60 or older. The ranges of household income were 4% under \$30,000 per year, 28% between \$30,000 and \$49,999, 29%

Table 1. Item measures and construct evaluation

Construct and Items	Standardized Factor Loadings	C.R.	AVE	α
Perceived Autonomy				
While shopping on the website, I felt:				
Pressured. (r)	.77			
Controlled. (r)	.72	.96	.82	.95
Free to express myself.	.92			
That I could control my surroundings.	.95			
Perceived Competence				
While shopping on the website, I felt:				
Smart.	.91			
Capable.	.91			
Competent.	.89	.82	.72	.82
Talented.	.91			
Perceived Design Utility				
The design of the item that I chose on the website was exactly what I need.	.84			
The design of the item that I chose on the website provided me with aesthetics and function that I like.	.87	.89	.74	.90
The design of the item that I chose on the website was not useful to me. (r)	.87			

Notes: a. $X^2=305.693$, $df=133$, $p<.001$, $GFI=.90$; $AGFI=.85$; $CFI=.96$; $NFI=.94$; $RFI=.91$, $RMSEA=.06$

b. r=reversed item

between \$50,000 and \$79,999, 27% between \$80,000 and \$99,999, and approximately 12% earning \$100,000 per year or more. A majority of the respondents were Caucasian (71%). Ninety-one percentages of the respondents reported that they had made a purchase online within the past three months. The average hours the respondents spent on the Internet were 6.9 hours per week. The results of ANOVA indicated no significant difference in any of the demographic characteristics across the three web retailers employed for this study.

Data analysis

Confirmatory factor analysis (CFA) was performed to verify the convergent and discriminant validity of the measures. All the factor loadings of the indicators were significant, exceeding .6 to the latent variable. This indicated that the measures possess convergent validity (Fornell & Larker, 1981). The composite reliability (CR) and average variance extracted (AVE) of the constructs meet the suggested levels of .7 and .5 (Fornell & Larker, 1981). Table 1 summarizes the aforementioned results on the measurement validity and Table 2 shows descriptive statistics,

correlations, and discriminant validity analysis for all factors. The AVE for one construct was greater than the squared correlation between that construct and any other, confirming discriminant validity of the constructs (Anderson & Gerbing, 1988). In order to check for common method bias from the use of similar scales with the same number of response options, we performed an ex post one-factor test, which demonstrated that there was no common factor loading on all measures. This factor analysis resembles Hermon’s one factor test (Podsakoff & Organ, 1986) and shows that common method bias is non-problematic within this dataset. We evaluated the internal reliability of the measurement constructs using Cronbach’s alpha coefficients (see Table 1). The reliability coefficients for the variables ranged from .82 to .95, falling into the satisfactory range (Nunnally, 1978).

Hypotheses testing

The research hypotheses 1-2 were tested with analysis of variance (ANOVA). Table 3 summarizes the results of ANOVA across the three study conditions: Condition I (shopping for standardized designs), Condition II (shopping for low-intensity

Table 2. Construct means, standard deviations, and squared correlations

Model Constructs	Mean	SD	Squared Correlations		
			1	2	3
1. Perceived Autonomy	3.58	1.55	.82 ^a		
2. Perceived Competence	3.17	1.44	.47 ^b	.72	
3. Perceived Design Utility	3.66	1.54	.52	.56	.74

Notes: a. The diagonal matrix is average variance extracted (AVE).
 b. All significant at $p < .001$.

Table 3. ANOVA Results

Model Constructs	Mean (S.D.)			F-Value
	Condition I	Condition II	Condition III	
Perceived Autonomy	3.64 (1.62) A*	4.97 (1.36) B	5.02 (1.48) B	52.33***
Perceived Competence	2.95 (1.42) A	4.36 (1.33) B	3.98 (1.72) AB	40.26***
Perceived Design Utility	2.96 (1.57) A	4.49 (1.56) B	4.13 (1.83) AB	43.58***

*Results of Duncan's Multiple Range Tests

customized designs), and Condition III (shopping for high-intensity customized designs).

With the hypotheses 1 and 2, higher perceptions of competence and autonomy were expected in Condition II and Condition III (where the participants experienced shopping with adaptive customization services), compared to those in Condition I (where the participants shopped for standardized designs only). In the results, perceived autonomy was significantly higher in Condition II than in Condition I (M Condition I=3.64, M Condition II=4.97). In line with this, the perceived autonomy in Condition III was statistically higher than that in Condition I (M Condition I=3.64, M Condition III=5.02). The results of Duncan test revealed that perceived autonomy was significantly higher in Conditions II and III then in Condition I. In sum, H1 was supported. Likewise, the results indicated that the participants in Condition II and III reported higher competence perceptions than did those in Condition I (M Condition I=2.95, M Condition II=4.36; M Condition I=2.95, M Condition III=3.98). Indeed, the Duncan test revealed that the

perceived competence was significantly lower in Condition I than in Condition II or Condition III. Accordingly, H2 was supported.

The hypotheses 3 and 4 were tested with a regression model whose parameters were estimated using hierarchical regression analysis. The possible problem of multicollinearity was addressed by employing averaged scores for all scales with multiple items, because this mitigates problems of multicollinearity, increases the validity of linear regression analysis, and minimizes the unexpected effect of outliers in the data on the results (Edwards & Lambert, 2007; Hart, 1983). Perceived autonomy and competence were the independent variables and perceived design utility was the dependent variable. To control for the effects of socio-demographic variables on perceived design utility, we also included covariates in the regression model, such as gender, age, education, and household income. Likewise, in order to control the effect of participants' attitudes toward the web retailer, we included website awareness as a covariate in the regression model (Verhoef *et al.*, 2002). The results show that perceptions of autonomy (H3: $b=.29, p<.001$) and

Table 4. Results of regression analysis

Step	Variables	b (SE)	β	R ²	ΔR^2	ΔF
1	Age	-.06(.10)	-.03	.01	-.00	.89
	Gender	-.22(.19)	-.06			
	Education Level	-.01(.07)	.00			
	Income Level	.01(.05)	.00			
	Website Awareness	.01(.05)	.00			
	Prior Experience on Adaptive Customization Services	.05(.21)	.00			
	2	Age	-.01(.07)	-.01	.56	.55
Gender		-.12(.13)	-.07			
Education Level		.00(.05)	.00			
Income Level		.01(.01)	.00			
Website Awareness		.01(.01)	.00			
Prior Experience on Adaptive Customization Services		.05(.11)	.00			
Autonomy		.29(.05)	.28**			
Competence		.62(.05)	.57***			

Notes: a. We used two dummy variables: gender (0=female, 1=male), prior experience on adaptive customization services (0=not experienced, 1= experienced).

b. *** $p < .001$ ** $p < .005$ * $p < .01$

competence (H4: $b = .62, p < .001$) make significant contributions to perceived design utility (see Table 4). No significant effect of the demographic characteristics, prior experience on adaptive customization services, or website awareness was revealed ($p > .10$). In total, this supports the hypotheses H3 and H4.

DISCUSSION

Research on consumer-oriented value of adaptive customization services has continued for the past decade. While most prior research has focused on the value of the services' outputs, this study attempted to address consumers' responses toward the services' processes, by focusing on the increased cognitive needs fulfillment and its impact on the consumer evaluation on the services' outputs. The results from the experiment using three actual websites showed that participation in the services significantly contribute to fulfilling the two cognitive needs (i.e., autonomy, competence); as predicted, the participants who used low- or high-level adaptive customization services (Condition II or Condition III) reported higher perceptions of autonomy and competence, than did the participants who were not engaged in the services (Condition I). Indeed, the results indicated that such

cognitive mechanisms during the services' processes significantly contribute to the perceived utility of the customized design, or the services' outputs.

This study has some theoretical implications to the extant literature where academic interest has rapidly increased on the dynamics of process-oriented psychology toward consumer-perceived value of interactive services (Franke *et al.*, 2010). Firstly, findings of this study add an empirical support to the extant - mostly-conceptual - arguments on the positive role of adaptive customization services (e.g., Simonson, 2005). Meanwhile, we tested the underlying psychology of adaptive customization services and its influence on the perceived utility of the self-design output; this should be viewed as one of the initial steps in the relevant research flow exploring the effect of process-oriented mechanism in interactive consumption contexts (Franke *et al.*, 2010). In specific, our findings on the increased cognitive needs fulfillment within the adaptive customization contexts (compared to the standardized shopping contexts) are somewhat contrasting to the traditional, economic perspective in consumer behavior - which assumes consumers as cognitive misers who negatively evaluate their own mental efforts spent on consumption (e.g., Tversky & Kahneman, 1973). From a broader perspective, however, our

results support the recent research flow highlighting the importance of process-oriented mechanisms in consumption results (e.g., Hess *et al.*, 2012; Verhoef *et al.*, 2009; Zhan & Fitzsimons, 1999); the findings also support with recent discussions on the positive role of consumer engagement in their evaluations on the overall service quality (Roca & Gagné, 2008) as well as on the services' *outputs* even (Dahl & Moreau, 2007; Franke *et al.*, 2010).

Theoretically, the results are in line with the traditional views emphasizing the power of human's innate desires for self-growth (Festinger, 1954) and the significant role of cognitive optimal functioning and balance on decision makings (Zhang & Fitzsimons, 1999). In particular, the crucial effect of perceived autonomy on consumers' evaluation on the self-designed products is consistent with the prior studies suggesting that consumers' needs for control - which are closely related to individuals' innate needs for autonomy - are the important antecedents to their intention to use adaptive customization services (e.g., Mathwick *et al.*, 2010). In addition, the findings of this study show that perceived competence - another crucial factor of innate need fulfillment (Deci & Ryan, 2010; Dahl & Moreau, 2007) - may play a significant role in gauging the consumer-perceived value of adaptive customization services.

To best to the authors' knowledge, the conceptual constructs of cognitive needs fulfillment used in this study have first been employed in fashion in specific, and in home economics in general, to explain consumer responses towards interactive services. As interactivity in services has become one of the most dominant topics in various disciplines of consumer services, the conceptual constructs explored here can be applied to various consumption contexts, including those of online education, home collections, interior designs, and food/grocery order services; it will provide some inspiration to the marketers as to how they should actively engage their customers in their online contents, and how this would improve their overall evaluation of the *output* of the services.

Another notable point in the findings is that, while it was not the scope of our hypotheses, there was no significant difference on perceived autonomy between Condition II and Condition III, and the perceived competence and design utility were even lower in Condition III than those were in Condition II (see Table 3). In sum, it can be viewed as an indication of a weak negative effect of task intensity on the overall cognitive mechanisms

of adaptive customization services. Interestingly, the findings are somewhat consistent with the results of Dahl and Moreau (2007); they suggested that consumers enjoy constrained creative experiences only, because when the task intensity increased in their experiments, perceived cognitive needs fulfillment did not always increase accordingly. Meanwhile, our results are somewhat in line with a dominant perspective in the literature of consumer behavior which suggested that increased task intensity may negatively affect consumers' choice making processes; self-designing process entails consumers' choice making activities where individuals' pre-structured preference schema in the product category should be evoked (Grisso *et al.*, 1995) and their decisions should be based on the relevant consequences of the different options and a decision rule that allows trade-offs (McFadden, 1986; Zhan & Fitzsimons, 1999; Frisch & Clemen, 1994). The more the choice alternatives are available, the more intense mental engagement it would take for the designing process until consumers get to their finalized, customized designs; this may somewhat negatively affect their cognitive fulfillments during the interactive designing process. Accordingly, it can be assumed from our results that task intensity of adaptive customization may not be a positive contribution to the cognitive mental psychology of consumers.

The results provide some managerial implications. The findings suggest that, while the dominant perspective in consumer behavior is that consumers detest their own mental laboring and this negatively affects their evaluation towards the consumption, in certain consumption situations where consumers' engagement is emphasized, one's own mental laboring could become a positive factor increasing the final evaluation on the results of the consumption experience. This is consistent with the recent studies on consumption experience documenting the importance of consumers' willingness and ability in successfully executing consumer-empowering services (e.g., Simonson, 2005). The result is also in line with the past research arguing that customers' psychological responses during the process of consumption experience should be addressed separately from the end-result of the experience, and the process-induced psychology does impact how they evaluate the end-result (e.g., Hu *et al.*, 2007).

On the basis of the results, consumers' creativity and the relevant mechanisms in adaptive customization services should

be considered as a strategic management point for the company and the customer to fully benefit from using the services. The significant increase of perceived autonomy and competence in the adaptive customization contexts urges the managers to actively implement and expand the use of various toolkits for adaptive customization services on their websites. In most industrial contexts, consumption process taking consumers' own mental laboring has been something that should be avoided (e.g., Bechwati & Xia, 2003). Contrasting to this traditional perspective, cognitive laboring in adaptive customization services can be a positive factor in the service process that increase the overall consumer evaluations. Evaluation on the perceived design utility can be a subjective decision for consumers, and how they felt cognitively during the service process does impact the utility perceptions. Meanwhile, the way how the choice alternatives are presented should affect perceived cognitive needs fulfillment (Valenzuela *et al.*, 2009) and subsequently perceived design utility (Bettman *et al.*, 1998; McFadden, 1986). For instance, differences in self-customization procedure likely affect the product configuration that customers prefer, the degree of decision difficulty in product customization, and the degree of satisfaction with the customized option (Valenzuela *et al.*, 2009). Therefore, strategic designs of the customization toolkits need considerations of customers' preferences in the layouts of options in self-designing.

The limitations of this study lead to ideas for future work. First, in order to increase the reality of the experiment, this study employed actual fashion websites. Although the participants' brand awareness and attitudes towards the brand were included in the regression analysis and were insignificant, there is a possibility that the current study's results might reflect any hidden effect of the participants' pre-formed attitudes on the companies. Future studies may consider developing a new fashion web site and its self-designing configuration toolkit and expand the scope of the current research. Furthermore, it would enhance the construct and discriminant validity/reliability of the data of the current study. In next studies, authors may consider observing consumer's individual characteristics (e.g., perceived risk) or contextual characteristics (e.g., product type; Dhar & Wertenbroch, 2000) on the dynamics of self-fulfillment effect in adaptive customization and the relevant interactive services. This will further verify the possibility on

the limited positive roles of cognitive needs fulfillment and the negative effect of task intensity of the process-oriented consumer psychology on adaptive customization services.

While the three websites for our experiment had been chosen from the pretests in order to minimize the effects of individual websites, our results are still somewhat subject to potential effects of websites' characteristics or personal factors of the participants. For instance, although the effects of website awareness and familiarity had been excluded during the pretests as well as in the regression model (Table 4), other individual responses regarding the website assigned, such as their personal impressions on the website's aesthetic factors might affect their perceptions of design utility. Indeed, we have excluded the effect of consumers' prior experience on the adaptive customization – which has been indicated to be one of the most crucial factors determining attitudes towards the services' usage (e.g., Simonson, 2005) – other personal characteristics likely have an impact. In addition, while we had controlled the number of self-designing steps and the number of choice options at each step in the experiment, we could not control all the details in the choice settings; consequently, *outputs* from the self-designing processes were not completely identical across individuals by nature, and this might have an impact on the perceived design utility. Therefore, future research would seek for possible ways to screen out the different contextual/individual factors in the cognitive mechanisms.

Finally, the effect of task intensity on cognitive needs fulfillment in adaptive customization was not the scope of our study, and it may warrant an interesting research in the future; between the Conditions II and III we found the insignificant or negative effect of task intensity on perceived cognitive needs fulfillment and design utility. This is a point that needs further explorations. Future research may test a variety of different intensity levels to further look into possible patterns in the intensity effects on consumers' cognitive responses and resulting evaluations on the *output* (design) itself.

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REFERENCES

- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, *103*(3), 411-423.
- Ashok, K., Dillon, W.R., & Yuan, S. (2002). Extending discrete choice models to incorporate attitudinal and other latent variables. *Journal of Marketing Research*, *39*(1), 31-46.
- Baard, P. P., Deci, E. L., & Ryan, R. M. (2004). Intrinsic need satisfaction: A motivational basis of performance and well-being in two work settings. *Journal of Applied Social Psychology*, *34*, 2045-2068.
- Bechwati, N.N., and Xia, L. (2003). Do computers sweat? The impact of perceived effort of online decision aids on consumers' satisfaction with the decision process. *Journal of Consumer Psychology*, *13*(1-2), 139-148.
- Bettman, J.R., Luce, M.F., & Payne, J.W. (1998). Constructive consumer choice processes. *Journal of Consumer Research*, *31* (September), 402-411.
- Bolton, R.N., & Saxena-Iyer, S. (2009). Interactive services: A framework, synthesis and research directions. *Journal of Interactive Marketing*, *23*, 91-104.
- Cohen, J., and Cohen, P. (1983). West, S.G., and Aiken, L.S. *Applied multiple regression/correlation analysis for the behavioral sciences* (2nd Ed.). Hillsdale, NJ: Erlbaum.
- Dahl, D.W., & Moreau, C.P. (2007). Thinking inside the box: Why consumers enjoy constrained creative experiences. *Journal of Consumer Research*, *44*(August), 357-369.
- deCharms, R. (1968), *Personal causation*. New York, NY: Academic Press.
- Deci, E. L., Eghrari, H., Patrick, B. C., & Leone, D. (1994). Facilitating internalization: The self-determination theory perspective. *Journal of Personality*, *62*, 119-142.
- Dhar, R., & Wertenbroch, K. (2000). Consumer choice between hedonic and utilitarian goods. *Journal of Marketing Research*, *37*(1), 60-71.
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, *7*(May), 117-140.
- Finucane, M.L., & Gullion, C.M. (2010). Developing a tool for measuring the decision-making competence of older adults. *Psychology and Aging*, *25*, 271-288.
- Fornell, C., & Larcker, D.F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39-50.
- Fornell, C., Johnson, M.D., Anderson, E.W., Cha, J., & Bryant, B.E. (1996). The American customer satisfaction index: Nature, purpose, and findings. *Journal of Marketing*, *60*(October), 7-18.
- Franke, N., Schreier, M., & Kaiser, U. (2010). The "I designed it myself" effect in mass customization service. *Management Science*, *56*(1), 125-140.
- Frisch, D., & Clemen, R.T. (1994). Beyond expected utility: Rethinking behavioral decision research. *Psychological Bulletin*, *116*, 46-54.
- Fuchs, C. (2010). The psychological effects of empowerment strategies on customers' product demand. *Journal of Marketing*, *74*(1), 65-79.
- Grisso, T., Appelbaum, P. S., Mulvey, E., & Fletcher, K. (1995). The MacArthur Treatment Competence Study II: Measures of abilities related to competence to consent to treatment. *Law and Human Behavior*, *19*, 127-148.
- Gwinner, K.P., Bitner, M.J., Brown, S.W., & Kuma, A. (2005). Service customization through employee adaptiveness. *Journal of Service Research*, *8*(2), 131-148.
- Hameide, K.K. (2010), *Fashion Branding Unraveled*. New York, NY: Fairchild.
- Harter, H.L. (1983). Least Squares. In Kotz, S. and Johnson, N.L. (Eds.), *Encyclopedia of Statistical Sciences* (pp. 593-598), New York, NY: John Wiley & Sons.
- Hess, T.M., Queen, T.L., & Patterson, T. (2012). To deliberate or not to deliberate: Interactions between age, task characteristics, and cognitive activity on decision making. *Journal of Behavioral Decision Making*, *25*, 29-40.
- Hillebrand, B., Kemp, R.G.M., & Nijssen, E.J. (2011). Customer orientation and future market focus in NSD. *Journal of Service Management*, *22*(1), 67-84.
- Hsu, M.-H., & Chiu, C.-M. (2006). Internet self-efficacy and electronic service acceptance. *Decision Support Systems*, *38*(3), 369-381.
- Hu, J., Huhmann, B.A., & Hyman, M.R. (2007). The relationship between task complexity and information search: The role of self-

- efficacy. *Psychology & Marketing*, 24, 253-270.
- Keller, G. (2005). *Statistics for Management and Economics* (7th ed.). Thomson Higher Education.
- Kowal, J., & Fortier, M.S. (1999). Motivational determinants of flow: Contributions from self-determination theory. *The Journal of Social Psychology*, 139(3), 355-368.
- Lian, J.-W., & Yen, D.C. (2013). To buy or not to buy experience goods online: Perspective of innovation adoption barriers. *Computers in Human Behavior*, 29(3), 665-672.
- Mathwick, C., & Rigdon, E. (2004). Play, flow, and the online search experience. *Journal of Consumer Research*, 31(September), 324-332.
- Mathwick, C., Wagner, J., & Unni, R. (2010). Computer-mediated customization service tendency (CMCT) and the adaptive e-service experience. *Journal of Retailing*, 86(1), 11-21.
- McFadden, D. (1986). The choice theory approach to market research. *Marketing Science*, 5(Fall), 275-298.
- Moreau, C.P., & Herd, K.B. (2010). To each his own? How comparisons to others influence consumer self-design. *Journal of Consumer Research*, 36(5), 806-819.
- Mummalaneni, V. (2005). An empirical investigation of Web site characteristics, consumer emotional states and on-line shopping behaviors. *Journal of Business Research*, 58, 526-532.
- Natale, V., Alzani, A., & Cicogna, P. (2003). Cognitive efficiency and circadian typologies: a diurnal study. *Personality and Individual Differences*, 35, 1089-1105.
- Nix, G. Ryan, R.M. Manly, J.B., & Deci, E.L. (1999). Revitalization through self-regulation: The effects of autonomous and controlled motivation on happiness and vitality. *Journal of Experimental Social Psychology*, 35, 266-284.
- Nunnally, J.C. (1978). *Psychometric theory*. New York, NY: McGraw-Hill.
- Podsakoff, P.M., & Organ, D.W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management*, 12, 531-544.
- Roca, J.C., & Gagné, M. (2008). Understanding e-learning continuance intention in the workplace: A self-determination theory perspective. *Computers in Human Behavior*, 24(4), 1585-1604.
- Ryan, R.M., & Deci, E.L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68-78.
- Simonson, I. (2005). Determinants of customers' responses to customized offers: Conceptual framework and research propositions. *Journal of Marketing*, 69(1), 32-45.
- Spreng, R.A., MacKenzie, S.B., & Olshavsky, R.W. (1996). A reexamination of the determinants of consumer satisfaction. *Journal of Marketing*, 60(July), 15-32.
- Tversky, A.; Kahneman, D. (1973). Availability: a heuristic for judging frequency and probability. *Cognitive Psychology* 5(2), 207-232.
- Valenzuela, A., Dhar, R., and Zettelmeyer, F. (2009). Contingent response to self-customization procedures: implications for decision satisfaction and choice. *Journal of Marketing Research*, 46(6), 754-763.
- Verhoef, P. C., Franses, P. H., & Hoekstra, J. C. (2002). The effect of relational constructs on customer referrals and number of service purchased from a multi-service provider: does ages of relationship matter? *Journal of the Academy of Marketing Science*, 30(3), 202-216.
- Verhoef, P.C., Lemon, K.N., Parasuraman, A., Roggeveen, A., Tsiros, M., & Schlesinger, L.A. (2009). Consumer experience creation: Determinants, dynamics and management strategies. *Journal of Retailing*, 85(1), 31-34.
- Zhang, S., & Fitzsimons, G.J. (1999). Choice-process satisfaction: The influence of attribute alignability and option limitation. *Organizational Behavior and Human Decision Processes*, 77(3), 192-214.

Appendix

Sample webpages of adaptive customization toolkits employed in the experiment

