

RESEARCH

Open Access



College students' acceptance of online mass-customized athletic shoes

Yuli Liang^{1*} , Chuanlan Liu² and Lisa Barona McRoberts³

*Correspondence:

Yuli.Diana.Liang@gmail.com

¹ The Department of Human Ecology, State University of New York at Oneonta, 205A Human Ecology, Oneonta, NY 13820, USA
Full list of author information is available at the end of the article

Abstract

This research intends to understand the acceptance of online mass-customized athletic shoes among college students through applying the theory of reasoned action with a focus on whether utilitarian value and need for uniqueness influence favorable attitude formation differently. The questionnaires were distributed to 260 college students in a major southeastern US university using extra class credit as participation incentive. SPSS 23.0 and SPSS Amos 23 were used in data analysis. Structural equation modeling with a path comparison were used to assess construct validity and test the proposed hypotheses and conceptual framework. Results showed that college students' acceptance and purchase intention could be predicted by attitudes and subjective norm. In addition to perceived security of the online environment, utilitarian value and need for uniqueness equally facilitated formation of favorable attitude toward acceptance of online mass-customized athletic shoes among college students. Theoretical and practical implications, as well as the limitations of the study are further discussed.

Keywords: Online mass-customization, Theory of reasoned action, Athletic shoes, College students

Introduction

Mass-customization (MC), which gives customers the option to customize certain features of a product within a mass-production structure, has been identified as an important competitive advantage (Grimai and Guerlain 2014; Salvador et al. 2009). It allows customers to specify unique requirements or modify product design precisely so that individuals' preferences, and their need for uniqueness, are better fulfilled (Hunt et al. 2013; Merle et al. 2010). MC is a strategic application in the athletic shoe industry. Nike was the first company to introduce its "NIKEiD" customization program in 1998 (Moser et al. 2006), followed by its major competitor Adidas with the "mi-Adidas" program in 2000 (Baena 2016). Continuing with this trend, established athletic shoe companies such as New Balance and Reebok also started their MC programs by offering mass-customized athletic shoes. In response to the trend of online shopping, MC programs were made available on official websites of these athletic shoe companies (Brohan 2010). By offering online MC programs, companies are able to sell their athletic shoes directly to consumers, establish effective communication, and increase their online presence (Flynn and Vencat 2012). However, since the development and application of MC programs for

athletic shoes is still in its beginning stages, consumers' acceptance and purchase intentions for this product have not been systematically examined.

Boër and Dulio (2007) categorized MC for footwear into three levels: style customization, which concentrates on aesthetics (such as the colors, components and materials); best-matched fit, which was designed to provide comfort to feet; and custom fit, which produces shoes based on customers' morphometric data. Style customization was also available in the latter two levels. Because it is not common for customers to access foot-scanners in their daily lives, the custom fit was not widely used in online MC. Moreover, athletic shoes are consumer goods worn to show an individual's taste, style, and personality. Among all three levels of MC for footwear, style customization was found to cost least in design and production (Boër and Dulio 2007). Consequently, instead of providing best-matched fit, all the athletic shoe companies that offer online MC programs provide style customization. Furthermore, in order to reduce the chances that consumers fail to fully appreciate MC due to the number of overwhelming options (Simonson 2005), most athletic shoe companies only provide limited options. These include selecting laces, changing stripes, designing the color scheme, and monogramming personalized messages on limited styles of shoes on their online MC programs (Baena 2016; Schlesinger 2015). Nevertheless, previous research has indicated that aesthetics is not the primary interest when consumers purchase running shoes (Head and Porter 2011). When consumers are in active and endurance sports, an athletic shoe's performance is strongly correlated with functional features such as comfort and fit (Shishoo 2005). Therefore, further development of online MC programs will bring best-matched fit customization and balancing style customization options. From an investment perspective, it is imperative to understand how consumers will prefer aesthetic and fit options when purchasing online mass-customized athletic shoes.

The key component of online MC is to create offers that meet a consumer's individual preferences (Moon and Lee 2014). However, individual consumers may not have well-defined preferences, or the preferences of varied consumer groups may differ when buying different categories of products (Simonson 2005). College students are important market segments for online mass-customized athletic shoes; they exert a strong demand for athletic shoes because of their physically active lifestyles (Deng 2009; Tong and Su 2014). Most college students purchase new athletic shoes every 8–9 months (Hsu and Chang 2008). In addition, college students have more access to online channels than most other consumer segments (Jones 2008; Kim and LaRose 2004). They are young enough to try and accept new options and are exposed to a higher frequency of online shopping than the general population (Lin 2007), making it easier for them to participate in the process of online MC. Moreover, fashion and accessory consumption among college students is also strongly associated with their search for a sense of belonging to social groups, as well as the contrasting pursuit of distinctiveness (Brewer 1991; Deng 2009).

To this end, this study focuses on understanding the extent to which college students are willing to purchase online mass-customized athletic shoes, with an emphasis on examining consumers' attitudes towards using online MC and what preferred online MC features drive their acceptance of online mass-customized athletic shoes. In addition, how college students' perceptions of security in an online environment, and how

the pressures from the social environment have influenced their attitudes and purchase intentions, were also included in the analysis. From a practical perspective, MC in athletic shoes has a bright future and has not yet reached its limit (Baena 2016); the research findings will contribute to a better understanding of consumers' preferences of this certain type of products and develop guidelines for further investments on online MC programs to become a secure source of revenue. From a theoretical perspective, this research intends to provide a theoretical foundation by extending the theory of reasoned action into a more specific context of predicting consumers' purchase intention of online mass-customized athletic shoes and other types of online mass-customized products.

Literature review

Theoretical framework

The theory of reasoned action (TRA) was applied to develop a conceptual model to guide this empirical study. TRA assumes that favorable attitudes and subjective norms (SN) inevitably lead to behavioral intentions (Ajzen and Fishbein 1980; Fishbein and Ajzen 1975). Central to the TRA is the concept of behavioral intention, which is described as an individual's cognitive plan to perform a specific behavior motivated by needs and wishes. The intention is determined by two factors: an individual's attitude towards the behavior, and SN, the person's perception of the social pressure under which he or she performs, or does not perform, the behavior (Fishbein and Ajzen 1975). TRA has been used to understand consumers' purchase intentions and behaviors towards MC or personalized apparel products (Halepete et al. 2009; Wu et al. 2015). Halepete et al. (2009) summarized that consumers' attitudes towards personalization of apparel was positively related to the purchase intention of personalized fair trade apparel, and Wu et al. (2015) confirmed the influence of SN in predicting consumers' purchase intention in an online MC context.

Attitudes are defined as lasting general evaluations of people, objects, or issues (Baron and Byrne 1987). According to Katz (1960), individuals' attitudes are determined by their motives in meeting different needs and wishes. The cognitive structure proposed by the functional theory of attitude explains not only how attitudes facilitate social behavior, but also indicates how attitudes are changed to address different motives or changing cognitive structures (Lutz 1975). Solomon (2009) proposed an ABC model of attitudes that includes three components: Affect (A), Behavior (B), and Cognition (C). According to Solomon (2009), attitudes can be generated by consumers' feelings about an attitude object (affect), their intention to take consumption actions (behavior), and their beliefs about what is true of the attitude object (cognition). In a standard learning hierarchy (consumer approaches a product decision as a problem-solving process), an individual forms attitudes based on beliefs about the attitude object generated from cognitive information processing, and the intention to engage in some behavior concerning the attitude object (Solomon 2009).

In this research, TRA served as the overarching theoretical framework by which we investigated the effect of the attitude of using online MC and SN towards the intention to purchase online mass-customized athletic shoes. In the following sections, variables in the model were discussed, and hypotheses were proposed.

Utilitarian value and attitude towards using online MC

Utilitarian value refers to rewards that are acquired from the degree of closeness between product characteristics and individual preferences (Merle et al. 2010). It is a functional performance factor, which has been regarded as the most salient to consumers when they are making purchase decisions online (Kim et al. 2007; Lennon et al. 2007; Scarpi 2012). Utilitarian value of online MC is achieved by obtaining a mass-customized product with better functional features of fit and/or aesthetic features of style, color, and design that meet individuals' exact preferences (Schreier 2006). Merle et al. (2010) found that consumers purchase online mass-customized products because they believe that such options provide exactly what they are looking for. When consumers develop positive beliefs towards online MC on its ability to meet their needs for fit and aesthetic features of athletic shoes, they may form favorable attitudes towards it. Thus, the current research model posits:

H1 Utilitarian value derived from using of online MC positively influences attitude towards using online MC to purchase athletic shoes.

Need for uniqueness and attitude towards using online MC

Need for uniqueness was promoted initially by Snyder and Fromkin (1980), who stated that persons are motivated to maintain a sense of being special when they define themselves on others on various critical, self-related dimensions. Customization provides some degree of exclusivity (Tian et al. 2001) and enables consumers to express their individuality through uniqueness. Fiore et al. (2004) verified that the desire to obtain a unique product is one of the most salient motivations in participating in MC. Halepete et al. (2009) identified a positive effect of the need for uniqueness on attitude towards customization of products that have discernible preferred differences, such as apparel. Thus, we posit the following hypothesis:

H2 Individuals' need for uniqueness positively influences attitude towards using online MC to purchase athletic shoes.

Perceived security (PS) and attitude towards using online MC

Perceived security can be defined as "the extent to which a user believes that using a particular application will be risk free" (Fang et al. 2005, p. 130). In the context of online MC, PS was regarded as users' perception of protection against security risks in the MC program of the website. The degree of PS reflects reduced or no risk concerns which negatively affect individuals' attitude and usage of online shopping and transaction. Meanwhile, because online MC is based on personal information that may be private and sensitive, such as measurements and preferences, a high degree of PS allows consumers be concern-free while customizing their products, and form the trust of the website which facilitate individuals to obtain more experiential shopping value. Thus, a high degree of PS will encourage consumers to form a positive attitude towards the seller and online MC (Cho and Fiorito 2009). Thus, the following hypothesis is proposed:

H3 Perceived security positively influences attitude towards using online MC to purchase athletic shoes.

Influence of SN on attitude and purchase intention

Ajzen and Fishbein (1980, p. 6) defined SN as an individual's "perception of the social pressures put on him or her to perform or not perform the behavior." It makes an individual generate inferences about what other related people would think of his or her behavior, or the motivation to be consistent with the inferred views of these people. In marketing-related studies focused on the specific purchase and use situations, Shim et al. (1989) proposed that SN could be interpreted as the desirability that the consumers' friends and family would like them to perform the consumption behaviors. Bandura (1986) recognized that people acquire a significant portion of their behavioral tendencies through observation and imitation of others in a social context. For example, role models, such as parents and peers, have a direct influence on establishing adolescent consumers' purchase attitude and behavior (Martin and Bush 2000). Previous research argued that the influence of SN can be classified as compliance effects, and voluntary effects (e.g., Lu et al. 2005; Venkatesh 2000). When individuals respond to social pressure, the evidence is reflected from people's complying in the situations. However, when individuals want to gain social status, they voluntarily alter their beliefs about a new system utilization. In the context of online MC, the compliance effects may push consumers to follow trends or gain a group identity; while voluntary effects may pull individuals to gain some recognition among their social groups including having fashion taste, being a fashion leader.

Previous studies have found a positive relationship between subjective norm and intention (e.g., Belleau et al. 2007; Son wt al. 2013; Wu et al. 2015). College students are more independent from their families compared with adolescents. When they mature and become more socialized, parental influences still play a role in their decision, but less than that of peer influences. Hsu and Chang (2008) confirmed that college students' purchase intentions of athletic shoes were easily influenced by their peers and, to some degree, by their parents, showing that both the social norm influences young consumers' acceptance of new fashion products, or shopping channel with both compliance and voluntary effects. In the current research, SN is conceptualized as positive recognition and feedback from consumers' friends and parents about purchasing athletic shoes using online MC. Thus, the following hypotheses are proposed:

H4 Subjective norms positively influence (a) attitude towards using online MC to purchase athletic shoes and (b) intention to purchase online mass-customized athletic shoes.

Attitude and purchase intention

Ajzen and Fishbein (1980, p. 6) defined attitude as an "individual's positive or negative evaluation of performing the behavior." Previous research has confirmed the influence of consumers' attitudes on purchase intention (Belleau et al. 2007; Wu et al. 2015). In

current research, “attitude towards performing the behavior” has been conceptualized with consumers’ evaluations of using online MC to purchase athletic shoes. Because consumers purchase mass-customized products primarily for the functional benefits of performance and the aesthetic benefits of appearance and identity (Baena 2016; Franke and Schreier 2010; Merle et al. 2010), we proposed that attitudes towards online mass-customized athletic shoes are formed through consumers’ beliefs about meeting their needs for utilitarian and unique products by purchasing online mass-customized athletic shoes. Therefore, the following hypothesis is proposed:

H5 Attitude towards using online MC to purchase athletic shoes positively influences intention to purchase online mass-customized athletic shoes.

Methods

Data collection

Using twenty undergraduate students, a small scale pilot study was conducted with an aim to discover the ideal sportswear brands identified by college students. Participants were asked to write down the top five sportswear brands according to their knowledge. Results showed the top five brands were Nike, Adidas, Converse, New Balance, and Reebok. Then 30 undergraduate students were recruited to participate in the pre-test to assess face validity of measures of research constructs. Participants were asked to read through the questionnaire, and were encouraged to provide their opinions and suggestions on wording, and clarification. After pretesting, the final questionnaire was conducted using a pencil-and-paper survey. The questionnaire and a consent form were submitted to an Institutional Review Board. Once approval was received, the questionnaire with consent form was administered to respondents. The respondents were requested to answer each question concerning their attitudes and purchase intentions of mass-customized athletic shoes on the official sportswear retail websites (such as Nike.com, Adidas.com, etc.).

A convenience sample was recruited from a major southeastern US university using extra class credit as participation incentive. Participants were from various majors including natural sciences, business, and social science. The questionnaires were distributed to 260 college students after their classes and 239 respondents filled out the survey and turned back to researchers, accounting for a 92% response rate. An overall response rate of 88% was obtained after six incomplete responses and three unengaged responses were eliminated. The remaining 230 responses were used in the analysis.

Research instrument

The questionnaire contained four parts. In the first part, respondents were asked to indicate whether (Yes-or-No selection) they had purchased online mass-customized athletic shoes and which levels of MC would they prefer to have (style customization or best-matched fit customization). The second part included measures of all research constructs, and the items identified were developed to collect empirical data for model and hypothesis testing. Each item was measured by a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). All constructs were measured using multi-item scales

adapted from previous research and published reliabilities of the original scales ranged from 0.80 to 0.95 (Ha and Stoel 2009; Merle et al. 2010; Taylor and Todd 1995). Specifically, the scales used to measure attitude (6 items) were adapted from Taylor and Todd's (1995) research. We changed the objective to online MC and the Yes-or-No selection to a positive statement. For example, one attitude item in Taylor and Todd's (1995) scale is: "Using the CRC is a (bad/good) idea;" the item was adapted to be, "Using online MC to buy athletic shoes is a good idea." Other items used to measure attitude are: "Using online MC to buy athletic shoes is a smart idea," "I like the idea of using online MC to buy athletic shoes," and, "Using online MC to buy athletic shoes would be pleasant." The other two items, which were conceptualized as beliefs about online MC were, "I think it's interesting to mass-customize athletic shoes," and "The website or company made it fun to select the options." These were adapted from Merle et al. (2010) research. Intention (3 items) was adopted directly from Taylor and Todd's (1995) scale and SN (2 items) was adapted and revised to "parents" and "friends" rather than "people who influence my behavior" and "people who are important to me" in the original scale. Utilitarian (3 items) and uniqueness (3 items) were adopted directly from Merle et al. (2010) research. PS was measured using three items adopted directly from Ha and Stoel's (2009) research. The third part of the questionnaire contained demographic questions, and finally, respondents were invited to share their concerns about online mass-customized athletic shoes in the open-ended question at the end of the questionnaire.

Data analysis

SPSS 23.0 was used to analyze respondents' demographic information and to identify the measurement model in exploratory factor analysis. SPSS Amos 23 was used to test the reliability and validity of the measurements as well as testing the research model and hypotheses. To further test whether the difference of path coefficient was statistically significant, a path comparison was conducted in structural equation modeling.

Results

Demographics

Of the 230 participants in the research, there were 37 males and 193 females. The majority of the participants (88%) were under the age of 25. Approximately 63.91% of respondents indicated that they preferred best-matched fit customization. Nearly 30% of the respondents had purchased online mass-customized athletic shoes in the past. More demographics were described in Table 1.

Construct validation

All of the scale items that measured the constructs were subjected to a series of exploratory factor analysis (EFA) using principal axis extraction and varimax rotation (Hair et al. 2009). Eigenvalues and scree plots were used to determine the number of factors to be extracted. As indicated in Table 2, one item, "I would use online MC in shopping for athletic shoes if available," was deleted due to high cross loading (>0.40 ; Hair et al. 2009). The final factor analysis solution had a total of 19 items that measured six factors and accounted for approximately 77.64% of the total variance. All commonalities ranged between 0.54 and 0.89, while Cronbach's alpha ranged from 0.77 to 0.90, demonstrating

Table 1 Demographic profiles of respondents

Characteristic	Percent
Age	
0–18	13.90
19–25	73.90
26–30	9.10
31 and above	3.00
Gender	
Male	16.09
Female	83.91
Grade	
Freshman	17.83
Sophomore	20.87
Junior	14.78
Senior	30.87
Graduate student	15.65
Purchased online mass-customized athletic shoes	
Yes	29.57
No	70.43
Race	
Caucasian	68.26
Black/African American	16.52
Hispanic or Latino	4.78
American Indian/Alaska Native	0.87
Asian	9.57
Major	
Natural science	17.83
Liberal arts and science	22.61
Art/design	38.70
Business	11.30
Engineering	9.56
Prefer which level of MC	
Style	36.09
Best-matched fit	63.91

good reliability of the scales. All EFA loadings, which ranged from 0.66 to 0.91, were reported in Table 2.

Next, a confirmatory factor analysis (CFA) with maximum likelihood was conducted on the 19 indicators of six latent constructs to ensure reliability and validity of the measurements. The goodness-of-fit test of the measurement model showed that the fit was within acceptable thresholds ($\chi^2 = 236.88$, $df = 136$, $\chi^2/df = 1.74$, $p < 0.001$, RMSEA = 0.06, CFI = 0.96, and GFI = 0.91), based on Hair et al. (2009) criteria. As reported in Table 2, each item loaded significantly on its proposed constructs, with composite reliabilities above 0.80, providing evidence of reliability of the measures (Hair et al. 2009). Therefore, the results showed that the internal consistency of multiple indicators for each construct was good. The average variance extracted (AVE), which ranged from 0.60 to 0.75, exceeded the recommended value of 0.50 (Fornell and Larcker 1981). All standardized CFA loadings were significant ($p < 0.001$) and exceeded 0.60 (ranging

Table 2 Measurement model results

Constructs/items	Cronbach's alpha	EFA item loading	Composite reliability	Average variance extracted (AVE)	CFA item loading
Attitude	0.90		0.90	0.60	
Using online mass-customization to buy athletic shoes is a good idea		0.82			0.75
Using online mass-customization to buy athletic shoes is a smart idea		0.79			0.73
I like the idea of using online mass-customization to buy athletic shoes		0.76			0.87
Using online mass-customization to buy athletic shoes would be pleasant		0.75			0.88
I think it's interesting to mass-customize athletic shoes		0.70			0.74
The website or company made it fun to select the options		0.66			0.64
Utilitarian value	0.88		0.89	0.73	
Online mass-customization would enable me to have exactly the pair of athletic shoes I want		0.74			0.73
I could create the pair of shoes that was closest to what I was looking for		0.87			0.88
I could create the pair of shoes I really wanted to have		0.85			0.93
Need for uniqueness	0.87		0.88	0.71	
Having mass-customized athletic shoes will enable me to be unique		0.82			0.82
By wearing this pair of shoes, I am slightly different from others		0.85			0.90
With online mass-customization, I could create a pair of shoes to represent who I am		0.76			0.80
Perceived security	0.84		0.86	0.68	
I trust these official sportswear retail websites to keep my information private		0.90			0.90
I feel my personal information will be protected during the customization of athletic shoes at this website		0.91			0.95
I will not hesitate to provide information about my personal preference (i.e. color, style) requested for customizing athletic shoes at these websites		0.67			0.58
Subjective norm	0.77		0.81	0.69	
My parents encourage me to shop athletic shoes via online mass-customization		0.90			0.66

Table 2 continued

Constructs/items	Cronbach's alpha	EFA item loading	Composite reliability	Average variance extracted (AVE)	CFA item loading
My friends encourage me to shop athletic shoes via online mass-customization		0.85			0.96
Purchase intention	0.85		0.86	0.75	
I would rather choose to mass-customize my athletic shoes online than choose a mass-produced sport shoes from website or store		0.83			0.94
I would rather buy mass-customized athletic shoes than other regular athletic shoes online		0.89			0.79
I would use online mass-customization in shopping for athletic shoes if available ^a					

CFA item loadings and EFA item loadings are based on the final measurement model

^a Item was deleted due to high cross loading (>0.40) of EFA

from 0.64 to 0.96), showing strong convergent validity (Anderson and Gerbing 1988; Hair et al. 2009). In addition, as shown in Table 3, the square roots of AVE for each construct were greater than the estimates of the correlations between constructs, confirming discriminant validity (Fornell and Larcker 1981; Hair et al. 2009).

Testing research model and hypothesis

Structural equation modeling (Hair et al. 2009; Kline 2010) was used to test the research model and hypotheses. The model achieved an excellent fit to the data ($\chi^2 = 237.19$, $df = 138$, $\chi^2/df = 1.72$, $p < 0.001$, $RMSEA = 0.06$, $CFI = 0.96$, and $GFI = 0.91$). With a good fit for the overall model, we turned our attention to the individual relationships contained within the model. All six hypotheses were supported. Figure 1 summarizes the results of the hypothesized relationships between the latent constructs.

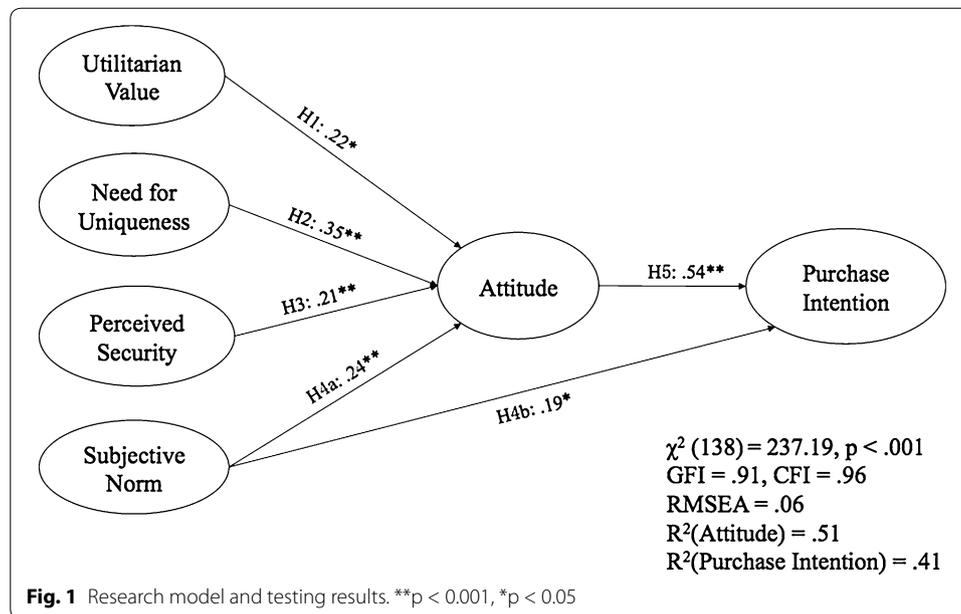
According to Floyd et al. (2012), standard path coefficient values between 0.05 and 0.14 indicate weak associations, between 0.15 and 0.24 indicate moderate associations, and above 0.25 indicate strong relationships. Therefore, attitude towards using online MC to purchase athletic shoes was strongly influenced by consumers' need for

Table 3 The comparison between square roots of AVEs and correlations

	Purchase intention	Attitude	Utilitarian value	Need for uniqueness	Perceived security	Subjective norm
Purchase intention	0.87 ^a					
Attitude	0.61	0.77				
Utilitarian value	0.31	0.54	0.85			
Need for uniqueness	0.35	0.61	0.61	0.84		
Perceived security	0.32	0.41	0.35	0.29	0.83	
Subjective norm	0.40	0.40	0.17	0.27	0.13	0.83

Correlation coefficients are estimates from Amos 22. All correlations are significant at $p < 0.001$

^a Diagonal elements are square roots for the AVE



uniqueness (H2: $\beta_2 = 0.35$, $p < 0.001$), and moderately influenced by utilitarian value (H1: $\beta_1 = 0.22$, $p < 0.05$), perceived security (H3: $\beta_3 = 0.21$, $p < 0.001$), and subjective norm (H4a: $\beta_{4a} = 0.24$, $p < 0.001$), supporting hypotheses H1, H2, H3, H4a. The four constructs together explained 51% variance in attitude towards using online MC to purchase athletic shoes. Subjective norm (H4b: $\beta_{4b} = 0.19$, $p < 0.05$) moderately influenced purchase intention, which supported hypothesis H4b, attitude ($\beta_5 = 0.54$, $p < 0.001$) significantly and strongly influenced purchase intention, supporting hypothesis H5. The two variables accounted for 41% variance in purchase intention.

The research results indicated that the coefficient of the path from need for uniqueness to attitude formation ($\beta_2 = 0.35$) was greater than that from the utilitarian value ($\beta_1 = 0.22$). To test whether the difference was statistically significant, a path comparison was conducted using SEM (Huh and Kim 2008; Liu and Forsythe 2011). We set up a constrained model by adding a constraint that made the two path coefficients equal. A Chi squared test between these two models suggested that both need for uniqueness and utilitarian value were equally significant in facilitating the formation of favorable evaluation towards attitude ($\chi^2_d = 2.15$, $p > 0.10$).

Discussion

This study examined major determinants of college students' attitudes and intentions to purchase online mass-customized athletic shoes based on TRA (Ajzen and Fishbein 1980). First, consistent with the results of a previous study (Merle et al. 2010), our results confirmed the positive influence of the utilitarian factor on the formation of favorable attitudes. This result seems logical because consumers may believe that online MC can maximize the rewards of buying a product that provides a close match between product features and individual needs (Merle et al. 2010). These results suggested that college students perceived online MC programs enable consumers to find and create the exact

pair of athletic shoes that they desire, and the satisfactions of finding ideal athletic shoes facilitate their positive attitudes towards the online MC program. At the managerial level, these results suggest that manufactures should focus on explaining the utilitarian value when advertising online MC options. Also, manufacturers or retailers can display some online mass-customized athletic shoes in the brick-and-mortar stores for consumers to try physically. Moreover, current athletic shoe companies that offer online MC program only provide certain styles of athletic shoes. Thus, based on consumers' preference and needs, companies can decide to expand the styles of athletic shoes in the online MC program so as to better satisfy consumers' need for utilitarian value.

Furthermore, when manufacturers are designing online MC options, they also need to make the process interesting and convenient by providing an easy-to-follow option with clear guidelines. This would facilitate consumers' ability to find the exact athletic shoes they want. Furthermore, when examining college students' preferences for levels of customization, the results showed that 63.91% participants preferred best-matched fit customization, indicating that they desire both functionally useful and aesthetically appealing athletic shoes. To date, major athletic shoe companies provide style customization, but not all of them offer best-matched fit customization beyond the normal selection of sizes. It has been assumed commonly that best-matched fit customization can be fulfilled better in physical stores than online, which may limit the wide acceptance of online MC for purchasing athletic shoes (Boër and Dulio 2007). Thus, the acceptance of online MC depends on offering both functional and aesthetic customization options. Therefore, athletic shoe companies need to work on providing best-matched fit customization options. If athletic shoe companies implement best-matched fit customization in online MC, consumers will be encouraged to measure certain parts of their feet (such as net foot length, flat ball width, ball girth, and instep girth) and input these measurements into the online MC system. Then, the system will compare the consumers' feet with the lasts in the library and find the closest last. In this way, best-matched fit customization in online mass-customized athletic shoes could be achieved, and the utilitarian factor of these shoes would be enhanced.

Consistent with Merle et al. (2010) findings, research results showed that consumers' attitudes towards online MC programs were enhanced by their belief in the uniqueness of online mass-customized athletic shoes. The results also indicate that people were motivated to maintain a sense of individuality (Snyder and Fromkin 1980). Our findings demonstrate that consumers tend to form positive attitudes towards online MC options if they believe that online MC facilitates the expression of their distinct inner selves through the creation of a unique pair of athletic shoes. Such positive attitudes increased the likelihood of online MC acceptance. A plausible explanation for the positive correlation between uniqueness and attitude is that MC products can be regarded as scarce compared with other mass-produced products and the need for uniqueness drives consumers to purchase such relatively scarce products (Lynn 1991). Although college students tend to seek a sense of belonging to a certain group, they also want to build a unique identity separate from that of their in-group members (Brewer 1991; Hornsey and Jetten 2004). Because social identity (a person's knowledge that s/he belongs to a social category or group) is viewed as the reconciliation of opposing needs for assimilation and differentiation from others (Brewer 1991; Hogg and Abrams 1988), college

students tend to purchase certain brands of athletic shoes, while seeking styles unique from those of their peers. Because the results showed that both utilitarian and uniqueness factors are equally important, athletic shoe companies may position their online MC with a focus on aesthetic features that are based on a better understanding of consumers' exact preferences. Instead of providing consumers with more colors and patterns to the limited featured styles, expanding the styles of athletic shoes in the online MC program will also create new looks for consumers. In this way, consumers' desire for uniqueness will be better satisfied, and their attitudes and purchase intentions will be enhanced.

Additionally, our study also found that positive PS influenced college students' attitudes towards online MC significantly. Ha and Stoel's (2009) research supported the idea that consumers prefer shopping in the online environment when their personal information is well protected. Cho and Fiorito (2009) confirmed in their research that consumers value the privacy of their personal measurements when customizing apparel products online and our research also indicated that consumers' information about personal preferences and measurements need to be protected when customizing athletic shoes online. Therefore, secure and well-designed websites are welcomed. Companies can communicate with consumers about the security agreement of personal information during and after the online MC process so as to ensure consumers' trustiness and purchase intention. Meanwhile, a well-designed website will provide consumers with a smooth transaction and a satisfied shopping experience.

This study further confirmed the role that attitude and SN play in predicting individual behavior intentions, as suggested by the TRA (Fishbein and Ajzen 1975). The empirical results also revealed the additional positive relationship between SN and attitude. Our research confirmed that college students, even they are more emancipated from parental influences (Feltham 1998); their attitudes and purchase intentions were still influenced significantly by their parents and friends. Since college students' attitudes are susceptible to SN, this may indicate their cognitive beliefs have not been firmly established yet, and they tend to seek suggestions or confirmation from others. Therefore, when companies are promoting this type of product, they can create the image of how the mass-customized athletic shoes are worn within a team (of family or school) and their popularity among their peers.

Conclusion

The goal of this study was to contribute to the understanding of college students' intentions to accept online MC, with an emphasis on the roles of utilitarian value and need for uniqueness factors. Our study constructed a conceptual model and tested it empirically using a sample of college students from a major university in the southern United States. Unlike previous studies on this subject, which have been conducted primarily from the manufacturers' perspective in designing MC options, this study examined specific consumer group members' attitudes and purchase intentions of a specific product category—athletic shoes.

From a practical perspective, the study results provided suggestions to manufacturers and retailers on promoting and developing the online MC program. Research findings indicated that a secure website with clear guidelines will facilitate the online MC

process. Moreover, a well-developed online MC program with best-matched fit customization and expanded selection of styles will better fulfill consumers' functional and aesthetic needs of athletic shoes. Furthermore, college students' attitude and purchase intention of online mass-customized athletic shoes were positively influenced by their friends and family members, which provided further suggestions on positioning this product category. From a theoretical perspective, this study used TRA as the research foundation and the results supported the relationship as suggested by the TRA. This research suggested TRA was effective in analyzing consumers' purchase intention. This study was also meaningful in that it addressed the additional positive relationship between SN and attitude in the TRA. These findings, stated in the hypothesis and testing in the SEM, were beneficial for researchers to clarify understanding of subjective norms and to improve the theory in understanding consumers' attitude and purchase intention of apparel products. For researchers, this study contributed to building a theoretical foundation in understanding a certain type of mass-customized apparel product.

Limitations and future research

The findings of this study provide valuable information about college students' need for the unique and utilitarian qualities of online mass-customized athletic shoes. However, there are several limitations in the study. First, it used a convenience sample; therefore, interpretation and generalization of the findings should be made with care. Future research should include a larger sample of consumers to verify the results of this study. Next, during data collection, participants responded to questions based on descriptions, not on real online MC options. Future research may involve creating a simulated online store offering online MC options to track individuals' customization process, and to find out more specifically what facilitates or inhibits the acceptance of online MC in purchasing athletic shoes. Finally, only two SN items (parents and friends) were measured in the questionnaire. Other family members, such as siblings, could also be an important source of SN. Therefore, future research could include them in the analysis.

Authors' contributions

YL designed and conducted the research, collected and analyzed the data, and drafted the manuscript. CL supervised research design and conduction, drafted literature review of PS part, revised and improved the manuscript. LBM contributed to the improvement and revision of the manuscript. All authors read and approved the final manuscript.

Author details

¹The Department of Human Ecology, State University of New York at Oneonta, 205A Human Ecology, Oneonta, NY 13820, USA. ²Department of Textiles, Apparel Design & Merchandising, Louisiana State University, 145 Human Ecology Building, Baton Rouge, LA 70803, USA. ³Department of Textiles, Apparel Design & Merchandising, Louisiana State University, 147 Human Ecology Building, Baton Rouge, LA 70803, USA.

Competing interests

The authors declare that they have no competing interests.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Received: 14 September 2016 Accepted: 10 February 2017

Published online: 28 June 2017

References

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. New Jersey: Prentice Hall.

- 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.
- Baena, V. (2016). The next revolution in mass customization: An insight into the sneaker market. *International Journal of Marketing, Communication and New Media*, 4(6), 85–104.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. New Jersey: Prentice-Hall.
- Baron, R. A., & Byrne, D. (1987). *Social psychology: Understanding human interaction* (5th ed.). Needham Heights, Massachusetts: Allyn & Bacon.
- Belleau, B. D., Summers, T. A., Xu, Y., & Pinel, R. (2007). Theory of reasoned action: Purchase intention of young consumers. *Clothing and Textiles Research Journal*, 25(3), 244–257.
- Boër, C. R., & Dulio, S. (2007). *Mass customization and footwear: Myth, salvation or reality?* London: Springer [Adobe Digital Editions version].
- Brewer, M. B. (1991). The social self: On being the same and different at the same time. *Personality and Social Psychology Bulletin*, 17(5), 475–482.
- Brohan, M. (2010). Nike's web sales flourish in fiscal 2010. Retrieved from <https://www.internetretailer.com/2010/06/30/nikes-web-sales-flourish-fiscal-2010>.
- Cho, H., & Fiorito, S. S. (2009). Acceptance of online customization for apparel shopping. *International Journal of Retail and Distribution Management*, 37(5), 389–407.
- Deng, T. (2009). "Just Done It"—Nike's new advertising plan facing global economic crisis. *International Journal of Business and Management*, 4(3), 102–105.
- Fang, X., Chan, S., Brzezinski, J., & Xu, S. (2005). Moderating effects of task type on wireless technology acceptance. *Journal of Management Information Systems*, 22(3), 123–157.
- Feltham, T. S. (1998). Leaving home: Brand purchase influences on young adults. *Journal of Consumer Marketing*, 15(4), 372–385.
- Fiore, A. M., Lee, S.-E., & Kunz, G. (2004). Individual differences, motivations, and willingness to use a mass customization option for fashion products. *European Journal of Marketing*, 38(7), 835–849.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. Reading: Addison Wesley Publishing Company.
- Floyd, R., Meisinger, E., Gregg, N., & Keith, T. (2012). An explanation of reading comprehension across development using models from Cattell–Horn–Carroll theory: Support for integrative models of reading. *Psychology in the Schools*, 49(8), 725–743.
- Flynn, A., & Vencat, E. F. (2012). *Custom nation: Why customization is the future of business and how to profit from it*. Dallas: BenBella Books.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50.
- Franke, N., & Schreier, M. (2010). Why customers value self-designed products: The importance of process effort and enjoyment. *Journal of Product Innovation Management*, 27(7), 1020–1031.
- Grimai, L., & Guerlain, P. (2014). Mass customization in apparel industry—implication of consumer as co-creator. *Journal of Economics and Management*, 15, 105–121.
- Ha, S., & Stoel, L. (2009). Consumer e-shopping acceptance: Antecedents in a technology acceptance model. *Journal of Business Research*, 62(5), 565–571.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2009). *Multivariate data analysis* (7th ed.). New Jersey: Prentice Hall.
- Halepete, J., Littrell, M., & Park, J. (2009). Personalization of fair trade apparel: Consumer attitudes and intentions. *Clothing and Textiles Research Journal*, 27(2), 143–160.
- Head, M., & Porter, C. S. (2011). Developing a collaborative design toolkit for the personalisation of running shoes. *Design Principles and Practice: An International Journal*, 5(6), 303–325.
- Hogg, M. A., & Abrams, D. (1988). *Social identifications: A social psychology of intergroup relations and group processes*. London & New York: Routledge.
- Hornsey, M. J., & Jetten, J. (2004). The individual within the group: Balancing the need to belong with the need to be different. *Personality and Social Psychology Review*, 8(3), 248–264.
- Hsu, J. L., & Chang, K. M. (2008). Purchase of clothing and its linkage to family communication and lifestyles among young adults. *Journal of Fashion Marketing and Management: An International Journal*, 12(2), 147–163.
- Huh, Y. E., & Kim, S.-H. (2008). Do early adopters upgrade early? Role of post-adoption behavior in the purchase of next-generation products. *Journal of Business Research*, 61(1), 40–46.
- Hunt, D. M., Radford, S. K., & Evans, K. R. (2013). Individual differences in consumer value for mass customized products. *Journal of Consumer Behaviour*, 12(4), 327–336.
- Jones, S. (2008). *Internet goes to college: How students are living in the future with today's technology*. Pennsylvania: Diane Publishing Co.
- Katz, D. (1960). The functional approach to the study of attitudes. *The Public Opinion Quarterly*, 24(2), 163–204.
- Kim, J., Fiore, A. M., & Lee, H.-H. (2007). Influences of online store perception, shopping enjoyment, and shopping involvement on consumer patronage behavior towards an online retailer. *Journal of Retailing and Consumer Services*, 14(2), 95–107.
- Kim, J., & LaRose, R. (2004). Interactive e-commerce: Promoting consumer efficiency or impulsivity? *Journal of Computer-Mediated Communication*, 10(1), 1–25.
- Kline, R. B. (2010). *Principles and practice of structural equation modeling* (3rd ed.). New York: The Guilford Press.
- Lennon, S. J., Kim, M., Johnson, K. K. P., Jolly, L. D., Damhorst, M. L., & Jasper, C. R. (2007). A longitudinal look at rural consumer adoption of online shopping. *Psychology and Marketing*, 24(4), 375–401.
- Lin, H.-F. (2007). Predicting consumer intentions to shop online: An empirical test of competing theories. *Electronic Commerce Research and Applications*, 6(4), 433–442.
- Liu, C., & Forsythe, S. (2011). Examining drivers of online purchase intensity: Moderating role of adoption duration in sustaining post-adoption online shopping. *Journal of Retailing and Consumer Services*, 18(1), 101–109

- Lu, J., Yao, J. E., & Yu, C.-S. (2005). Personal innovativeness, social influences and adoption of wireless internet services via mobile technology. *The Journal of Strategic Information Systems*, 14(3), 245–268.
- Lutz, R. J. (1975). Changing brand attitudes through modification of cognitive structure. *Journal of Consumer Research*, 1(4), 49–59.
- Lynn, M. (1991). Scarcity effects on value: A quantitative review of the commodity theory literature. *Psychology and Marketing*, 8(1), 43–57.
- Martin, C. A., & Bush, A. J. (2000). Do role models influence teenagers' purchase intentions and behavior? *Journal of Consumer Marketing*, 17(5), 441–453.
- Merle, A., Chandon, J.-L., Roux, E., & Alizon, F. (2010). Perceived value of the mass-customized product and mass customization experience for individual consumers. *Production and Operations Management*, 19(5), 503–514.
- Moon, H., & Lee, H.-H. (2014). Consumers' preference fit and ability to express preferences in the use of online mass customization. *Journal of Research in Interactive Marketing*, 8(2), 124–143.
- Moser, K., Muller, M., & Piller, F. T. (2006). Transforming mass customisation from a marketing instrument to a sustainable business model at Adidas. *International Journal of Mass Customisation*, 1(4), 463–479.
- Salvador, F., De Holan, P. M., & Piller, F. (2009). Cracking the code of mass customization. *MIT Sloan Management Review*, 50(3), 71–78.
- Scarpi, D. (2012). Work and fun on the Internet: The effects of utilitarianism and hedonism online. *Journal of interactive marketing*, 26(1), 53–67.
- Schlesinger, J. (2015). New balance: The US company shaking up the sneakeronomics. Retrieved from <http://www.cnbc.com/2015/06/09/new-balance-the-us-company-shaking-up-the-sneakeronomics.html>.
- Schreier, M. (2006). The value increment of mass-customized products: An empirical assessment. *Journal of Consumer Behaviour*, 5(4), 317–327.
- Shim, S., Morris, N. J., & Morgan, G. A. (1989). Attitudes toward imported and domestic apparel among college students: The Fishbein model and external variables. *Clothing and Textiles Research Journal*, 7(4), 8–18.
- Shishoo, R. (2005). *Textiles in sport*. Florida: Woodhead Publishing Limited and CRC Press LLC.
- Simonson, I. (2005). Determinants of customers' responses to customized offers: Conceptual framework and research propositions. *Journal of Marketing*, 69(1), 32–45.
- Snyder, C. R., & Fromkin, H. L. (1980). *Uniqueness: The human pursuit of difference*. New York: Plenum Press.
- Solomon, M. R. (2009). *Consumer behavior: Buying, having, and being* (8th ed.). New Jersey: Pearson Education.
- Son, J., Jin, B., & George, B. (2013). Consumers' purchase intention toward foreign brand goods. *Management Decision*, 51(2), 434–450.
- Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information systems research*, 6(2), 144–176.
- Tian, K. T., Bearden, W. O., & Hunter, G. L. (2001). Consumers' need for uniqueness: Scale development and validation. *Journal of Consumer Research*, 28(1), 50–66.
- Tong, X., & Su, J. (2014). Exploring the personality of sportswear brands. *Sport, Business and Management: An International Journal*, 4(2), 178–192.
- Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating perceived behavioral control, computer anxiety and enjoyment into the technology acceptance model. *Information systems research*, 11(4), 342–365.
- Wu, J., Kang, J.-Y. M., Damminga, C., Kim, H.-Y., & Johnson, K. K. P. (2015). MC 2.0: testing an apparel co-design experience model. *Journal of Fashion Marketing and Management: An International Journal*, 19(1), 69–86.

Submit your manuscript to a SpringerOpen[®] journal and benefit from:

- Convenient online submission
- Rigorous peer review
- Immediate publication on acceptance
- Open access: articles freely available online
- High visibility within the field
- Retaining the copyright to your article

Submit your next manuscript at ► springeropen.com
