

IMPACT OF ONLINE FLOW ON BRAND EXPERIENCE AND LOYALTY

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ABSTRACT

This study examined the relationships between consumers' skill, perceived challenge, online flow, brand experience, and brand loyalty in the context of online shopping on an apparel brand's website. Data were collected using an online survey with a national sample of 400 female adults (age 20-34). Respondents were asked to perform an online browsing task on an existing brand's website randomly assigned to them and answer questions about the task. The results from structural equation modeling analysis show that more skillful consumers are more likely to reach a state of online flow on a brand's website, and the relationship between skill and online flow was moderated by the level of challenge felt by consumers about the given task. Further, online flow positively influenced sensory and affective brand experiences, which in turn led to brand loyalty. Theoretical and managerial implications of the findings are discussed along with limitations and recommendations.

Keywords: Online; Flow; Brand; Experience; Loyalty

1. Introduction

Many firms have tried to foster brand loyalty. Because brand loyalty results from a close relationship between a brand and its customers, it can offer a robust customer base – a strong competitive advantage [Meyer & Schwager 2007; Pine & Gilmore 1998]. Strong brand loyalty is reflected by customers' emotional attachment to a brand and their patronage behavior toward the brand [Chaudhuri & Holbrook 2001]. As one way to build strong brand loyalty, it has been emphasized that firms need to convey positive brand experiences to consumers [Mascarenhas et al. 2006; Nysveen et al. 2013]. Considering that brand experience is comprised of consumers' synthesized perceptions of all points of contact with a brand [Morgan-Thomas & Veloutsou 2013], a brand's website is regarded as a crucial channel for conveying brand experience because consumers can freely explore the brand's online offerings through richer and more interactive ways than through other channels [Berthon et al. 1996; Keller 2010; Müller et al. 2008; Pine & Gilmore 1998].

Consumers' interaction with brand-related stimuli on the website has not been sufficiently investigated in regard to accumulated consumer experience with a brand. Prior studies focusing on the experience of online flow -- a state of optimal, outstanding, memorable, extraordinary, totally absorbing, or engaging online experience -- have demonstrated the positive effect of online flow on online learning [e.g., Hoffman & Novak 1996; Skadberg & Kimmel 2004] and on online shopping [e.g., Hausman & Siekpe 2009; Hsu et al. 2012; Rose et al. 2012]. Given that online flow can be defined as a consumer's complete absorption in an online activity such as online shopping [van Noort et al. 2012], the momentary, fragmentary experience of enjoyment in online shopping is likely to create an overall positive perception of the website where the shopping activity happened. However, there are no published studies verifying the benefits of online flow in enhancing consumers' overall brand experience, and thereby, their brand loyalty. To fill this gap in the literature, the present study proposes that online flow, experienced on a brand's website, positively influences brand experience and leads to enhanced brand loyalty.

In addition to examining the influence of online flow on brand experience and brand loyalty, it is necessary to know how consumers reach a state of online flow when visiting a brand's website. Consumers' flow experience is known to result from their expectation of control over web navigation [Chen et al. 1999; Dailey 2004; Hoffman & Novak 1996; Novak et al. 2000]. Flow theory postulates that consumers can reach flow only when they have sufficient skill to complete a task that is manageably challenging [Csikszentmihalyi 1991; Csikszentmihalyi 1997]. For a given online task, skill is a user's ability to accomplish the task, while challenge is the amount of effort required to accomplish the task. Prior studies have focused on skill and challenge only in terms of online navigational tasks [e.g., Chen et al. 1999; Dailey 2004; Hoffman & Novak 1996; Novak et al. 2000; Richard & Chandra 2005], which may be insufficient for investigating actual online shopping. Moreover, depending on the product category for the online shopping task, category-specific skill and challenge may influence the level of flow a consumer reaches during online shopping. For example, consumers shopping for fashion products online are likely to need an expert knowledge of recent fashion trends as well as navigation skills using a browser in order to undergo a flow experience. For this reason, the range of skill and challenge need to be extended in consideration of a specific context of online shopping (e.g., what kind of products consumers are looking for).

The purpose of this study is to examine the relationships between skill, challenge, online flow, brand experience, and brand loyalty in the context of online shopping on an apparel brand's website. The specific objectives are to examine (1) an interaction between skill and challenge that leads to online flow on a brand's website; (2) the relationship between the online flow experienced on a brand's website and consumers' brand experience; (3) the relationship between consumers' brand experience and their brand loyalty; and (4) the mediating role of brand experience on the relationship between online flow and brand loyalty. It is notable that the present study examines the role of skill and challenge in flow experience in the context of online apparel shopping. Specifically, this study explores perceived challenges relevant to online browsing tasks on an apparel brand's website and the various skill dimensions (e.g., online shopping skill, clothing shopping skill, and general shopping skill) necessary to complete these tasks as potential antecedents of reaching an online flow experience on the apparel brand's website. Apparel brand websites are appropriate to this study because they provide ample opportunity for visitors to be actively involved in processing the abundant and dynamic information available, such as size, color, design, price, and materials. Because the ability to convey full information on dominant product attributes (e.g., touch and feel information) for experience goods such as apparel products are limited on websites [Song & Kim 2012], apparel brand websites have used various visual and textual stimuli to help consumers evoke mental images of product use [Schlosser et al. 2003]. These stimuli are likely to engage consumers in performing the browsing tasks used in the study.

2. Theoretical Framework

2.1. Effects of Skill and Challenge on Online Flow

Flow is defined as "the state in which people are so involved in an activity that nothing else seems to matter" and represents the highest possible quality of experience [Csikszentmihalyi 1991]. Online flow is the flow state specific to online environments, conceptualized as a multidimensional construct embracing various dimensions, such as focused concentration on a task, a sense of being in control, autotelic experience (also referred to as intrinsic reward or enjoyment), a sense of time distortion, and telepresence [Guo & Poole 2009; Hoffman & Novak 2009]. According to flow theory, flow is determined by two factors: skill and challenge. Flow occurs only when a formidable challenge is manageable by a person's skills; that is, the levels of both skill and challenge are high. Thus, online flow is determined by the level of a user's navigational skill and the level of challenge of an online search task [Hoffman & Novak 1996; Novak et al. 2000].

In the context of shopping on a brand's website, online flow can be regarded as the extent to which a consumer is engaged in interaction with brand-related stimuli on a brand's website while performing an online shopping task. Skill in this context may be defined as the extent to which a consumer is equipped with all the abilities needed to shop on the brand's website. In the case of apparel brand websites, consumers' online shopping skill, encompassing online navigational skill, general shopping skill, and apparel specific shopping skill, is likely to influence their online flow positively. Challenge in online shopping can be regarded as the level of mental discomfort provoked by the required effort to reach a purchase decision on a brand's website. In addition to navigational challenge related to the website design, shopping challenge related to characteristics of the merchandise such as quality, size, price, and variety needs to be considered to conceptualize challenge in online shopping.

As suggested in the flow theory, people are most likely to reach flow only when both skill and challenge are high [Csikszentmihalyi 1991; Csikszentmihalyi 1997], as it is the interaction between high levels of skill and challenge that leads to online flow. If consumers have a high level of skill, they may not be challenged and fail to reach online flow; if consumers without a high level of skill perceive a high level of challenge, they may feel

overwhelmed by their lack of skills to overcome the challenge. Thus, neither skill nor challenge contributes to flow in a linear manner; the level of challenge must be paired with the appropriate level of skill [Richard et al. 2010]. In the context of online shopping as well, online flow is likely to be determined by the interaction between skill and challenge. Thus, the effect of skill on online flow is expected to be moderated by the level of challenge. Based on this rationale, the two following hypotheses are proposed.

H1. The higher the online shopping skill, the greater the online flow.

H2. Challenge moderates the relationship between skill and online flow such that the relationship between skill and online flow is stronger when challenge is perceived to be high (vs. low).

2.2. Effects of Online Flow on Brand Experience

The term “brand experience” is defined as cumulative consumer experiences with brand-related stimuli that are part of a brand’s design and identity, packaging, communications, and environments [Brakus et al. 2009], implying that consumer perceptions of brand experience can be influenced by marketing communications such as website content and marketing environments such as website design. As a brand’s website is typically both a marketing communication and a sales channel, the variety of stimuli on a website can provoke positive (or negative) interactions between a consumer and the brand’s website, contributing to the consumer’s overall brand experience. If the interaction on the brand’s website is characterized as outstanding, memorable, extraordinary, or optimal, the state of online flow is likely to have occurred; this flow experience is expected to have enhanced the consumer’s overall brand experience. Schembri [2009] suggests that experiential meaning of a brand is formed from a customer’s specific individual experiences, supporting the notion that an episode of online flow on the brand’s website may positively influence a consumer’s overall brand experience.

More specifically, the online flow experienced while visiting a website is expected to enhance the four dimensions of brand experience (i.e., sensory, affective, behavioral, and intellectual) suggested by Brakus et al. [2009]. Sensory, affective, and intellectual brand experiences are subjective, internal responses, representing the sensations, feelings, and cognitions, a consumer has toward stimuli related to the brand. On the other hand, behavioral brand experience refers to consumers’ responses to a brand that are observed through their physical behavior toward specific brand-related stimuli (e.g., consumers work out more energetically wearing Nike workout clothes). Given that online flow entails subjective internal responses as well as behavioral responses [Hoffman & Novak 1996; Hoffman & Novak 2009], online flow is probably related to all the sensory, affective, behavioral, and intellectual dimensions of brand experience. For example, consumers experiencing online flow on a brand’s website are awake and focused (i.e., concentration dimension), so their visual and auditory senses are highly activated, which may lead to increasing sensory brand experience. This hyper-focused state on a brand’s website may also facilitate consumers’ brain activity, which is likely to enhance their intellectual brand experience. Similarly, shopping enjoyment on a brand’s website (i.e., autotelic experience dimension of online flow) may cause increased affective brand experience. Moreover, behavioral brand experience can be enhanced through a feeling of being in other real-life situations where a brand product is being used (i.e., telepresence dimension of online flow) because consumers are likely to be exposed to various stimuli calling for the brand-like action (e.g., brand mission) on the brand’s website. Thus, the following hypothesis is proposed.

H3. The greater the online flow on a brand’s website, the more positive the (a) sensory, (b) affective, (c) behavioral, and (d) intellectual brand experiences.

2.3. Effects of Brand Experience on Brand Loyalty

Brand loyalty is thought to result from the search and attribute evaluation process that leads to beliefs of brand superiority as well as repeat purchase [Holland & Baker 2001; van den Brink et al. 2006]. This study posits that brand loyalty includes consumers’ belief that a brand is preferable to others and their subsequent intention to engage in loyal behaviors such as recommending the brand to others and repeatedly purchasing the brand.

The relationship between brand experience and brand loyalty has been suggested in prior studies [Biedenbach & Marell 2010; Brakus et al. 2009; Mascarenhas et al. 2006; Meyer & Schwager 2007] because brand loyalty is often built on the basis of long-term and close relationships between a customer and a brand. Some studies show empirical evidence that a positive brand experience can significantly increase brand loyalty [Biedenbach & Marell 2010; Morgan-Thomas & Veloutsou 2013]. Lin and Kuo [2013] demonstrate that consumers’ loyalty intention is influenced by their experiences formed during their most recent shopping, implying that positive brand experience could be key to strong brand loyalty.

Since brand experience has been conceptualized as a multidimensional construct consisting of the sensory, affective, behavioral, and intellectual dimensions [Brakus et al. 2009], the positive relationship between brand experience and brand loyalty needs to be verified more specifically. Nysveen et al. [2013] have considered the multidimensional construct of brand experience in verifying the effects of brand experience dimensions on brand loyalty. The authors have found that only relational dimension of brand experience has a significant, direct effect on

brand loyalty whereas the other dimensions, including the sensory, affective, behavioral, and intellectual dimensions, do not. Given that Nysveen et al.'s [2013] study focuses on a service brand context, their findings may be less applicable to other contexts such as shopping a product on an apparel brand's website. But more importantly, their findings support the notion that the effect of brand experience on brand loyalty can differ depending on brand experience dimensions. Considering that consumer experience with apparel product brands can be well applied to the dimensionality of brand experience suggested by Brakus et al. [2009], we predict that all types of brand experience are likely to influence brand loyalty, as reflected in the following hypothesis.

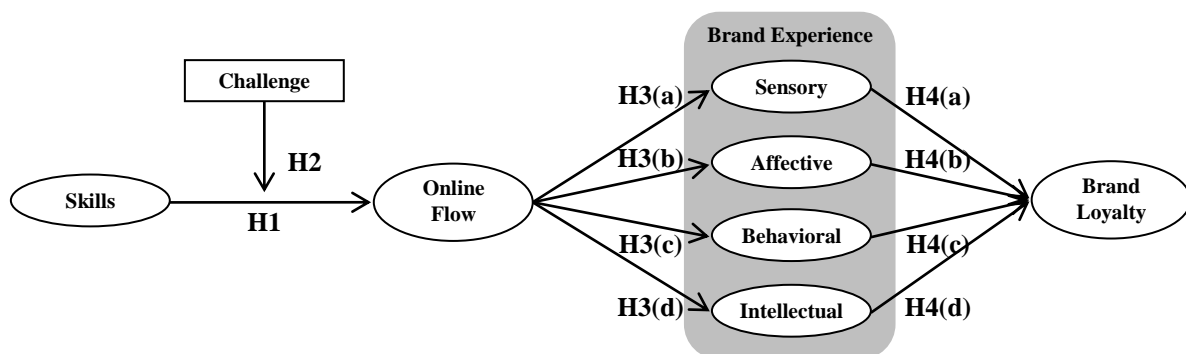
H4. The more positive the (a) sensory, (b) affective, (c) behavioral, and (d) intellectual brand experiences on a brand's website, the greater the brand loyalty.

2.4. Mediating Effects of Brand Experience on the Relationship between Online Flow and Brand Loyalty

Literature has suggested the plausible, positive effect of online flow on brand loyalty [Brodie et al. 2013; Cha 2011; Gabisch & Gwebu 2011; Mu & Galletta 2007; Nambisan & Watt 2011; Siekpe 2005]. Because interactive experience within a brand's website engages the consumer with the brand and thereby enhances consumer loyalty [Brodie et al. 2013], online flow can also enhance brand loyalty given that online flow is an interactive experience of the highest quality [Csikszentmihalyi 1991]. Furthermore, Siekpe [2005] has demonstrated that flow experiences on websites could result in repeat visits. Despite the potential effect of online flow on brand loyalty, no published study has empirically examined this relationship, perhaps because it takes time to become loyal to a specific brand. Online flow is thought to be a situational experience at a specific moment [Chen et al. 1999]. Accumulating online flow experiences on a brand's website can lead to brand loyalty, established by providing positive experiences with a brand over time [van den Brink et al. 2006]. However, given that online flow may influence overall brand experience (as predicted in H3), which in turn may lead to brand loyalty (as predicted in H4), it is plausible that the effect of online flow on brand loyalty suggested in the prior studies is mediated by enhanced brand experience. Thus, the following hypothesis is proposed.

H5. (a) Sensory, (b) affective, (c) behavioral, and (d) intellectual brand experience mediates the relationship between online flow and brand loyalty.

The research model portraying all the hypothesized relationships in the present study is shown in Figure 1.



Note. H5 (i.e., mediating relationship) is not noted separately in this Figure.

Figure 1. Research Model

3. Methods

This study employed an online survey including an online browsing task and a questionnaire for a large sample size necessary to alleviate concern over sampling errors [Jackson et al. 2013] that could hinder the validity and reliability of newly developed items used in this study. Moreover, a large sample is necessary to test the hypotheses in a single framework by using structural equation modeling (SEM), which is one of major contributions of this study. In order to evoke perceived challenge and create an environment to facilitate reaching the state of flow, participants were asked to perform a task of browsing an apparel brand's website and answer questions related to the task at hand, rather than simply answering questions based on their memories about a recent online flow experience. The data were collected through the Internet to allow online flow to be measured immediately after the respondents completed the browsing task.

3.1. Instruments

3.1.1. Online Browsing Task

The online browsing task required each respondent to select a shirt or top she would like to wear from the apparel brand website randomly assigned from eight well-known existing apparel brands' websites. Well-known

existing brands were more suitable to the context of this study than new or lesser known brands because brand loyalty may be built through repetitive experiences with a brand. To select the brands used in the online browsing task, first, a panel of three experts in the apparel merchandising field examined vertically-integrated apparel brands targeting female consumers (e.g., Victoria Secret) listed in trade publications [Internet Retailer 2010; WWD 2008] in terms of their retail format and target market. Then, content analysis of the brands' websites was conducted to identify whether they have sufficient selections of merchandise to choose from and whether their price ranges fit the task requirement. Based on the shirt/top merchandise assortment of the brands' websites, 10 brands' websites were selected and subjected to a pilot test with a convenience sample of 150 female college students. Two of the brands' websites were eliminated because no pilot test respondents had shopped on these websites for an apparel product. Thus, the remaining eight brands' websites were retained to be used for the browsing task in the main study.

The instructions for the browsing task were described to generate varying levels of perceived challenge among respondents. Respondents were asked to browse the assigned brand website to select a shirt or top by simultaneously judging several product characteristics including quality, style, color, fit, coordination with existing wardrobe, and price, which is often a challenge that creates difficulties in apparel shopping [Claxton & Ritchie 1979]. Specifically, the browsing task instruction stated that the shirt/top selected must be made by the given brand, be a style and color that suits the respondent, reflect good quality materials and workmanship, fit the respondent well, go well with other apparel items the respondent already has, and be priced under \$50. The level of challenge from this task perceived by the aforementioned pilot test sample was widely distributed from 1 to 6.25 ($M = 3.5$, $SD = 1.16$) on a 7-point Likert scale.

Unlike experimental research, survey research presents difficulties in controlling respondents, which could prevent us from confirming whether respondents actually conducted the task. To ensure respondents' participation in the task, respondents were subsequently asked to describe the shirt/top they selected during the task (e.g., product name, color, size, price, etc.). The responses without the information about the shirt/top selected were excluded from the data used for further analysis.

3.1.2. Measurements

When consumers shop and order through the Internet, their skills to buy a product online could be affected by multiple factors, such as factors related to online only and factors related to shopping in general [Zhou et al. 2007]. Accordingly, a 15-item scale (see Table 1) was developed by the researchers to assess respondents' skills in various areas, including e-commerce skill, clothing shopping skill, general shopping skill, and web navigation skill, relevant to online apparel shopping based on literature [Novak et al. 2000; Reece & Kinnear 1986]. Challenge was measured by four items adapted from Novak et al.'s [2000] navigational challenge items to reflect the challenge posed by the online browsing task assigned in this study (see Table 1). In order to include all the dimensions of online flow proposed in the original literature [Hoffman & Novak 1996] and subsequently develop a more comprehensive measure of online flow, 36 online-flow items were culled and adapted from various existing online flow scales which tend to focus on selective dimensions of online flow [Guo & Poole 2009; Jackson & Marsh 1996; Klein 2003; Novak et al. 2000; Webster et al. 1993] (see Table 2). Brand experience was measured by a 12-item scale adapted from Brakus et al. [2009] (see Table 3). Seven brand loyalty items (see Table 3) were developed by the researchers to measure favorable beliefs and behavioral intentions toward the brand based on the concept of brand loyalty, defined as a customer's belief in the priority of a brand over other rival brands and their subsequent behavioral intentions to repurchase, revisit, and recommend the brand, and pay a price premium for the brand [Oliver 1999; van den Brink et al. 2006]. Many existing measurement scales of brand loyalty [van den Brink et al. 2006], brand beliefs [Uwaifo 2008], brand image [Grewal et al. 2003], and behavioral intention [Veletsianos & Miller 2008] were referenced to generate a comprehensive list of loyalty items. Finally, demographic characteristics of respondents were measured through questions asking their age, marital state, educational state, ethnicity, and annual household income. For all measures, 7-point Likert scales (1 = Strongly Disagree, 7 = Strongly Agree) were used.

3.2. Sampling and Data Collection Procedure

A national sample of 815 female consumers in the United States, who were between 20 and 34 years old and had shopped online, participated in the survey. The sample was randomly selected from members of an online consumer panel of a market research firm and was recruited via email. Participants first completed the skill measure on the online questionnaire, and then visited the apparel brand website randomly assigned to them to conduct the

Table 1: Exploratory and Confirmatory Factor Analysis Results for Skill and Perceived Challenge

Variable	Dimension	Item	Factor Loading	
			EFA ^a	CFA ^b
Skill	Online Shopping Skill (AVE = .743, Cronbach's α = .901)	I am skilled in using the web.	.782	.904
		I have good web search techniques.	.753	.955
		I know how to find what I am looking for on the web.	.748	.941
		I easily complete the purchase process on a shopping website.	.672	.598
	Clothing Shopping Skill (AVE = .627, Cronbach's α = .866)	I can judge whether a clothing product has high quality.	.786	.745
		I can judge whether a clothing product fits me well.	.779	.891
		I am usually aware of how trendy a clothing product is.	.718	.667
		When I shop for clothing, I can choose the right style and color for me.	.621	.846
	General Shopping Skill (AVE = .616, Cronbach's α = .822)	I usually know what to buy when I shop for something.	.805	.766
		I easily narrow down product choices.	.785	.850
		It is easy for me to find the right product that I am looking for in a store.	.759	.733
	Eliminated items	It is hard for me to compare product choices to decide what to buy. ^R I know somewhat less than most users about using the web. ^R I often have difficulties in shopping online. ^R I have no trouble in buying something online.	-	-
	Challenge (Cronbach's α = .806)	This task challenged me to perform to the best of my ability. I found that this task stretched my capabilities to my limit. This task was challenging to me. This task provided a good test of my skills in online shopping.	.822	N/A
.820				
.806				
.684				

^a $n = 191$, except challenge for which $n = 400$

^b $n = 209$

^R Reverse-coded items.

online browsing task. After completing the browsing task, participants returned to the online questionnaire, entered information about the product they chose during the task, and completed the remaining measures including challenge perceived during the task, online flow, brand experience, brand loyalty, and demographic characteristics.

The market research firm provided respondents with a small incentive for participation. In addition to the small incentive, all respondents had a chance to enter a random drawing to receive the product they selected for the task. This drawing was intended to better engage respondents in the browsing task and actively sustain cognitive processing [Mollen & Wilson 2010]. By providing an opportunity to gain the product selected, respondents could regard the browsing task as a shopping event similar to real shopping situations, rather than a mock activity for a survey.

Among the 815 responses, 58 responses were eliminated from the data because they included invalid data or did not provide information about the product they chose from the online browsing task. The remaining data were not evenly distributed across the eight brands. In order to avoid an unwanted effect resulting from an idiosyncrasy of a particular brand more highly represented in the data, we randomly selected about 50 responses from each brand based on the sample size of the least represented brand. The final sample used for data analysis consisted of 400 women age 20 to 34 ($M = 27.8$, $SD = 3.92$).

Educational experience of the respondents varied substantially; the largest group had some college or technical school (44.8%), followed by those with a 4-year college degree (22.6%), a high school degree (18.8%), and others (13.8%). A majority of the respondents were non-Hispanic White (63.8%), followed by non-Hispanic Black (12.8%), Hispanic (7.2%), and Asian (7.2%). The sample characteristics were generally consistent with the U.S. national female population with ages of 20-35 years as reported by the U.S. Census Bureau [U.S. Census Bureau 2009a; U.S. Census Bureau 2009b; U.S. Census Bureau 2010a; U.S. Census Bureau 2010b].

Table 2: Exploratory and Confirmatory Factor Analysis Results for Online Flow

Dimension	Item	Factor Loading	
		EFA ^a	CFA ^b
Telepresence (AVE = .674, Cronbach's α = .939)	During this task, my body was in the room, but my mind was inside the world created by the computer.	.869	.894
	I felt I was more in the web world than the real world around me when I was doing the task.	.865	.872
	When I completed this task, I felt like I came back to the real world after a journey.	.845	.872
	I forgot about my immediate surroundings when I was doing the task.	.824	.887
	During this task, I felt I was in the world the website created.	.792	.877
	During this task, I forgot I was in the middle of a survey.	.759	.740
	The website seemed to me somewhere I visited rather than something I saw.	.708	.807
Autotelic Experience (AVE = .697, Cronbach's α = .948)	I lost track of time while doing this task.	.616	.562
	This task was interesting.	.771	.853
	I really enjoyed doing this task.	.748	.880
	I loved the feeling of completing this task.	.748	.824
	I found this task experience rewarding.	.742	.838
	This task was fun for me.	.728	.883
	The experience of doing this task left me feeling great.	.720	.794
Control (AVE = .582, Cronbach's α = .901)	This task stimulated my curiosity.	.693	.831
	This task made me curious.	.685	.768
	I felt calm because I understood the process to complete this task.	.860	.863
	I clearly knew the right things to do to complete this task.	.843	.759
	I felt calm because I was sure about what to do to accomplish this task.	.841	.859
	I felt clear about what to do to accomplish this task.	.839	.795
	During this task, I made the correct movements without thinking.	.760	.634
Eliminated items	During this task, I felt in control.	.688	.736
	I reacted to the website automatically during this task.	.626	.661
	During this task, I made an effort to keep my mind on the task. ^R		
	I was concerned about how well I was completing this task. ^R		
	I was worried about how I was performing during this task. ^R		
	I was self-conscious during this task. ^R		
	This task stimulated my imagination.		
	During this task, my attention was focused entirely on what I was doing.		
	I was completely focused on this task at hand.	-	-
	During this task, time appeared to go by very quickly.		
During this task, I did things spontaneously and automatically without having to think.			
Things just seemed to be happening automatically during this task.			
Time flew during this task.			
I had total concentration to complete this task.			
This task bored me. ^R			

^a n = 191

^b n = 209

^R Reverse-coded items.

Table 3: Exploratory and Confirmatory Factor Analysis Results for Brand Experience and Brand Loyalty

Variable	Dimension	Item	Factor Loading	
			EFA ^a	CFA ^b
Brand Experience	Sensory Experience (AVE = .683, Cronbach's α = .869)	This brand makes a strong visual impression.	.740	.780
		I find this brand interesting in product displays, product texture, background music and/or use of fragrance.	.761	.783
		This brand appeals to my senses of hearing, sight, touch, and/or smell.	.823	.910
	Affective Experience (AVE = .789, Cronbach's α = .916)	This brand induces my feelings and sentiments.	.893	.932
		I have strong emotions for this brand.	.900	.827
		This brand provokes emotions.	.900	.902
	Behavioral Experience (AVE = .824, Cronbach's α = .934)	I behave in a certain way when I wear this brand's clothes.	.871	.891
		I act differently when I use this brand.	.868	.910
		This brand results in a certain behavior.	.904	.922
	Intellectual Experience (AVE = .824, Cronbach's α = .933)	I engage in a lot of thinking when I encounter this brand.	.852	.901
		This brand makes me think.	.850	.937
		This brand stimulates my thinking and problem solving.	.875	.884
Brand Loyalty	(AVE = .720, Cronbach's α = .951)	I will buy this brand next time.	.929	.860
		I will think of this brand over other brands.	.928	.894
		I will pay a lot of attention to this brand over other brands.	.918	.886
		I will revisit this brand next time.	.899	.826
		I will consider this brand my first choice.	.892	.871
		I will recommend this brand to other people.	.878	.796
		I will pay more in order to buy this brand.	.833	.799

^a $n = 191$ ^b $n = 209$

4. Results

4.1. Measurement Validity and Reliability

The reliability and validity of the measures for skill, perceived challenge, online flow, brand experience, and brand loyalty were assessed before testing the hypotheses. For the four-item challenge scale, exploratory factor analysis (EFA) was conducted on the entire data set ($n = 400$) employing the procedure of principal component analysis with Varimax rotation. The EFA results assured the unidimensionality of the scale. The Cronbach's α for the four challenge items was .806, indicating good internal consistency [Cronbach & Shavelson 2004].

For the other measurements, the data were randomly split into two sets so that one set ($n = 191$) was used for EFA and the other set ($n = 209$) for confirmatory factor analysis (CFA). Results of independent samples t-test confirmed the non-difference in respondents' age ($t = -.375$, $df = 396$, $p = .708$) as well as the measurements of skill, online flow, brand experience, and brand loyalty (all $ps > .05$) between the EFA and CFA data sets. EFA using principal component analysis with Varimax rotation, analyzed by SPSS 19.0, was used to reduce items and identify factors with clear structure meaning. Then, CFA employing the maximum likelihood estimation procedure was conducted using AMOS 8.0 to confirm the factor structures resulting from the EFA and further refinement of the measurement models, if needed.

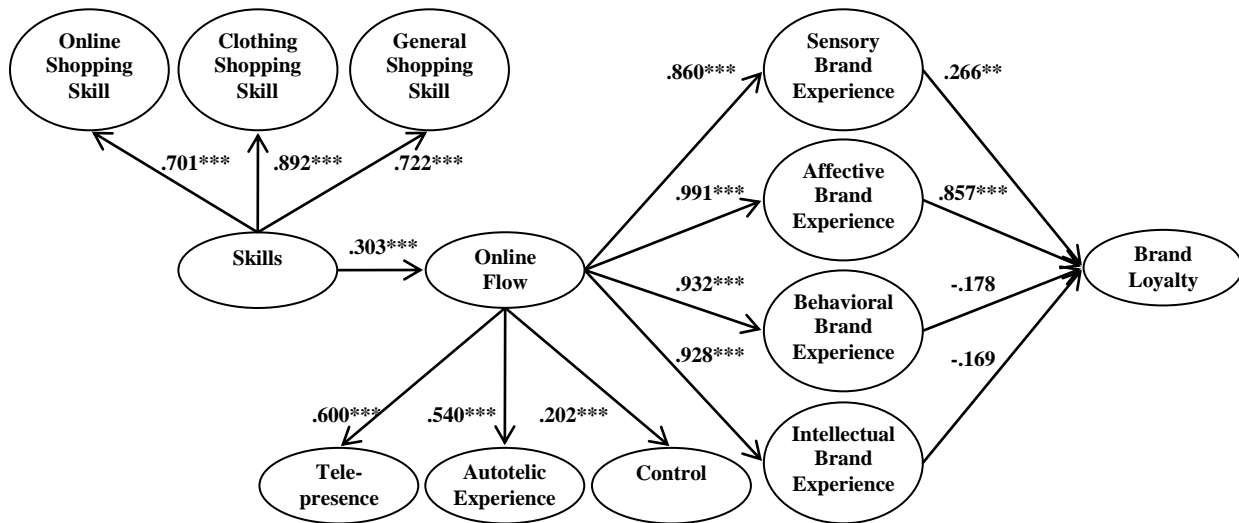
Based on results from the EFA and CFA, a three-factor model including 11 items was finalized as the measurement model for skill (see Table 1). The finalized CFA model fit was good ($\chi^2 = 53.362$, $df = 41$, $p < .01$; CFI = .992, TLI = .989; RMSEA = .038). The three skill factors were labeled online shopping skill, clothing skill, and general shopping skill. Further, the online flow measurement model finalized through the EFA and CFA was comprised of 23 items classified into three factors; telepresence, autotelic experience, and control (see Table 2). The final CFA model fit was acceptable ($\chi^2 = 467.646$, $df = 227$, $p < .001$; CFI = .939, TLI = .932, RMSEA = .071). Telepresence indicates cognitive immersion in the online browsing task, autotelic experience denotes intrinsic rewards from the browsing task (e.g., enjoyable and exploratory experiences on performing the task), and control refers to perceived sense of control over the browsing task. Next, a four-factor, 12-item measurement model was finalized for brand experience through the EFA and CFA (CFA model fit: $\chi^2 = 123.342$, $df = 48$, $p < .001$; CFI = .972, TLI = .962; and RMSEA = .087) (see Table 3). The four factors were labeled as sensory, affective, behavioral, and intellectual experiences, following the original classifications suggested by Brakus et al. [2009]. Finally, as

shown in Table 3, the EFA and CFA resulted in a single-factor, seven-item model for brand loyalty with an acceptable model fit from the CFA ($\chi^2 = 14.347, df = 8, p < .01$; CFI = .995, TLI = .988, RMSEA = .062).

The finalized measurement models were further tested for their construct validity, including convergent and discriminant validity [Hair et al. 2009]. The average variance extracted (AVE) for all factors exceeded .50, thereby demonstrating convergent validity [Fornell & Larcker 1981]. No factor correlation confidence intervals (i.e., plus and minus two standard errors around the factor correlation coefficients) contained 1.0, thereby indicating discriminant validity [Anderson & Gerbing 1988]. Further, through a series of chi-square difference tests, unconstrained models (i.e., the finalized CFA models) showed a significantly better fit over all the constrained models with a factor correlation coefficient of 1.0, reaffirming the discriminant validity of all scale factors [Anderson & Gerbing 1988]. Finally, Cronbach's α s of all scale factors exceeded .70, indicating the internal consistency of the scales [Cronbach & Shavelson 2004].

4.2. Hypothesis Testing

All hypothesized direct relationships (i.e., H1, H3a-d, and H4a-d) were tested through a single-group SEM with maximum likelihood estimation using AMOS. The SEM results (see Figure 2) demonstrated an acceptable fit ($\chi^2 = 3317.640, df = 1409, p < .001$; CFI = .905, TLI = .900, RMSEA = .058). The standardized regression coefficients indicated that skill positively influenced online flow ($\gamma = .303, p < .001$), supporting H1. The positive influences of online flow on sensory ($\beta = .860, p < .001$), affective ($\beta = .991, p < .001$), behavioral ($\beta = .932, p < .001$), and intellectual ($\beta = .928, p < .001$) brand experiences also were significant, supporting H3a-d. Moreover, sensory ($\beta = .266, p < .01$) and affective ($\beta = .857, p < .001$) brand experiences had a positive influence on brand loyalty, thereby supporting H4a and H4b. The influences of behavioral ($\beta = -.178, p = .162$) and intellectual ($\beta = -.169, p = .185$) brand experiences on brand loyalty were not significant, thereby failing to support H4c and H4d.



$\chi^2 = 3317.640, df = 1409, p < .001, CFI = .905, TLI = .900, \text{ and } RMSEA = .058$
 $p < .01, \text{ *** } p < .001$

Figure 2: Structural equation model and standardized coefficients for testing H1, H3a-d, and H4a-d ($n = 400$).

H2, predicting that the relationship between skill and online flow would vary between the high and low challenge groups, was tested using multiple-group CFA. Respondents were categorized into high and low challenge groups using a median split based on the average of the four challenge items. Then, as shown in Figure 3, a CFA model was created with two latent variables (i.e., skill and online flow) using second-order factor structures whereas each of the latent variables was indicated by their factors which were then indicated by their measurement items; the three second-order skill factors are online, clothing, and general shopping skills, whereas the three second-order online flow factors are telepresence, autotelic experience, and control. The multiple-group CFA results ($\chi^2 = 2261.9, df = 1174, p < .001$; CFI = .901, TLI = .894, RMSEA = .048) show the correlation between skill and online flow was higher for the high-challenge group ($\rho = .806, p < .001$) than for the low-challenge group ($\rho = .393, p < .001$). To determine whether this correlation difference between the two challenge groups was statistically significant, a chi-square difference test was run between this model and another multiple-group CFA model with a constraint that the skill-online flow factor correlation coefficient was equal between the high- and low-challenge groups. Results

from the chi-square difference test ($\Delta\chi^2 = 13.680$, $\Delta df = 1$, $p < .001$) show that the unconstrained model had a significantly better fit than the constrained model, indicating that the skill-online flow correlation significantly differs between the high- and low-challenge groups, thereby supporting H2.



$\chi^2 = 2261.9$, $df = 1174$, $p < .001$, CFI = .901, TLI = .894, and RMSEA = .048
 *** $p < .001$

Figure 3: Structural equation model for testing H2 ($n = 400$)

To further examine H2, a multivariate analysis of variance (MANOVA), followed by ANOVAs, was conducted on SPSS, with skill (the high vs. low skill groups based on a median split of the composite score of skill items) and challenge (the high vs. low perceived challenge groups) as the fixed factors and the composite scores of each of the three online flow dimensions as the dependent variables. MANOVA results show a significant skill \times challenge interaction effect (Wilks' $\lambda = .971$, $F_{3, 394} = 3.905$, $p < .01$) as well as significant main effects of skill (Wilks' $\lambda = .782$, $F_{3, 394} = 36.550$, $p < .001$) and challenge (Wilks' $\lambda = .831$, $F_{3, 394} = 26.685$, $p < .001$). As shown in Table 4, results from follow-up ANOVAs revealed that the skill \times challenge interaction effect was significant for autotelic experience ($F_{1, 396} = 7.165$, $p < .01$) and control ($F_{1, 396} = 10.572$, $p < .01$). Figure 4 describes that the difference in autotelic experience between the low and high skill groups was greater for the high challenge group ($M_{low-skilled} = 4.86$, $M_{high-skilled} = 6.10$) than for the low challenge group ($M_{low-skilled} = 4.40$, $M_{high-skilled} = 5.05$). In addition, there was a greater difference in control between the low and high skill groups for the high challenge group ($M_{low-skilled} = 5.05$, $M_{high-skilled} = 6.27$) than for the low challenge group ($M_{low-skilled} = 5.39$, $M_{high-skilled} = 6.00$). However, the skill \times challenge interaction effect for telepresence was not significant ($F_{1, 396} = 1.469$, $p = .384$), indicating that the effect of skill on telepresence was not different between the high- and low-challenge groups.

Finally, with regard to H5, because the direct effects of behavioral and intellectual brand experiences on brand loyalty were not significant as reported earlier in relation to H4c and H4d; H5c and H5d, predicting the mediation of these two brand experience dimensions for the relationship between online flow and brand loyalty, were not supported. H5a and H5b, predicting the mediating role of sensory and affective brand experiences for the relationship between online flow and brand loyalty, was tested by running two additional SEM models. The first model was created by eliminating behavioral and intellectual brand experiences from the original SEM model shown in Figure 2 because the direct effects of the two brand experience dimensions on brand loyalty were not significant as mentioned above. The second model was created by adding the direct regression path from online flow to brand loyalty to the first model. In the first model, the effects of online flow on sensory ($\beta = .935$, $p < .001$) and affective ($\beta = .853$, $p < .001$) brand experiences as well as the effects of sensory ($\beta = .408$, $p < .001$) and affective ($\beta = .416$, p

< .001) brand experiences on brand loyalty were significant. In the second model, the direct effect of online flow on brand loyalty ($\beta = .923, p < .05$) and the effects of online flow on sensory ($\beta = .931, p < .001$) and affective ($\beta = .858, p < .001$) brand experiences were significant, whereas the effects of sensory ($\beta = -.274, p = .329$) and affective ($\beta = .178, p = .142$) brand experiences on brand loyalty became non-significant. These results indicate that online flow directly influences brand loyalty, rather than having an indirect influence mediated by brand experience, thereby rejecting H5a and H5b.

Table 4: ANOVA Results for Testing H2

Dependent Variable	Effect	Sum of Square	Mean Square	F	df	Error df	p
Telepresence	Skill	11.868	11.868	6.138	1	396	.014
	Challenge	85.071	85.071	44.001	1	396	< .001
	Skill × Challenge	1.469	1.469	.760	1	396	.384
Autotelic experience	Skill	88.776	88.776	70.987	1	396	< .001
	Challenge	56.904	56.904	45.502	1	396	< .001
	Skill × Challenge	8.961	8.961	7.165	1	396	.008
Control	Skill	83.553	83.553	95.384	1	396	< .001
	Challenge	.148	.148	.169	1	396	.681
	Skill × Challenge	9.260	9.260	10.572	1	396	.001

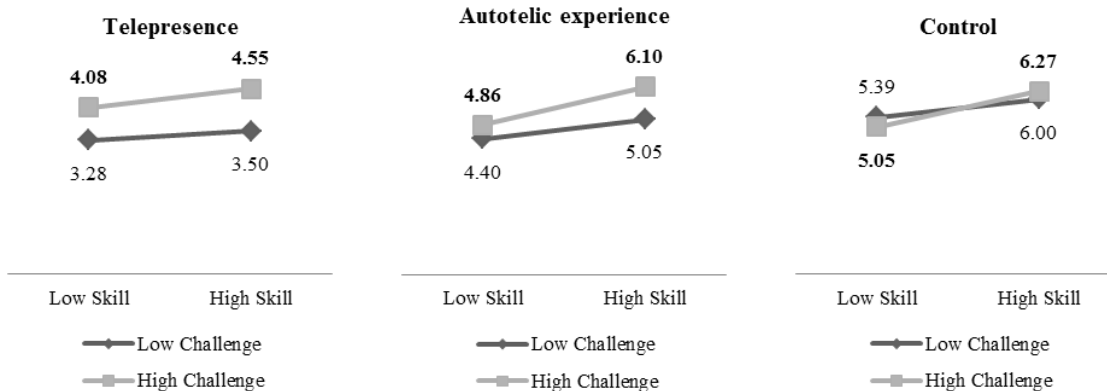


Figure 4: Mean scores of online flow dimensions depending on skill and challenge levels

5. Discussion

In the context of shopping for an apparel product on a brand’s website, this study demonstrates that the positive effect of consumers’ skill on online flow is strengthened more by a high level of perceived challenge than a low level of perceived challenge. Online flow positively influences the sensory and affective aspects of brand experience, which in turn lead to enhanced brand loyalty. In addition to these relationships, this study also finds the direct, positive effect of online flow on brand loyalty. The contribution of these findings is discussed from both theoretical and practical perspectives.

5.1. Theoretical implications

First, this study contributes to a better understanding of how brand experience and brand loyalty could be established through consumers’ experiences on the brand’s website, by illuminating the mechanism explaining the relationships among online flow, brand experience, and brand loyalty. Prior studies have proposed these relationships in fragments, but none has simultaneously investigated these variables in a single framework by using structural equation modeling. The present study verifies that experiencing the state of flow on a brand’s website can result in enhanced sensory and affective brand experiences, which leads to enhanced brand loyalty. The findings of this study point to online flow as important antecedents of brand experience and brand loyalty by explaining that online flow stimulates consumers’ five senses and provokes their emotions related to a brand, and these enhanced sensory and affective brand experiences lead consumers to believe the priority of the brand over other rival brands

and subsequently repeat positive behaviors for the brand (e.g., repurchase, revisit, recommendation to other consumers, payment of a price premium). In particular, the positive relationships between online flow and brand experience, demonstrated in this study, have not been clearly verified before. Thus, e-commerce research should focus on the significance of an intense, positive experience on a brand's website because the online experience can continuously generate positive effects on consumers' overall perception toward the brand.

Second, the present study demonstrates that online flow has direct, positive effects on brand loyalty as well as on brand experience, extending the findings of prior studies [Brodie et al. 2013; Hausman & Siekpe 2009]. This study hypothesizes a mediating effect of brand experience on the relationship between online flow and brand loyalty, but the mediating effect is only partial, providing empirical evidence for the notion that consumers engaged in interactive web-based experiences with a brand exhibit enhanced consumer loyalty [Brodie et al. 2013]. In this study, even though online flow occurs during a specific moment (Chen et al., 1999), it directly influences brand loyalty rather than being mediated by perception of overall brand experience, suggesting a potentially lasting impact of online flow that leads to brand loyalty. Thus, online flow research should further clarify the mechanism by which an instant consumer experience such as online flow can cause a persistent consumer response such as loyalty.

Third, this study sheds light on the relationships between different dimensions of brand experience and brand loyalty, which has not been studied in the context of online apparel shopping before. Rather than focusing on a specific dimension of brand experience [e.g., Nambisan & Watt 2011; Wang et al. 2010] or overall brand experience [e.g., Biedenbach & Marell 2010; Brakus et al. 2009], this study uses the construct of brand experience consisting of the four dimensions (i.e., sensory, affective, behavioral, and intellectual dimensions) suggested by Brakus et al.'s [2009] in order to identify which dimension can be influential in enhancing brand loyalty in the context of apparel product brands. Although Nysveen et al. [2013] has tested the relationship between each of the experience dimensions and other brand-related constructs including brand loyalty, their study was based on the context of service brands, which potentially could generate different results from the assessment of product brands [O'Cass & Grace 2004]. In particular, Nysveen et al. [2013] demonstrate that the only experience dimension directly influencing brand loyalty was found to be relational experience, which was added in consideration of the nature of service branding. Unlike the results of Nysveen et al.'s [2013] study, this study reveals the significant influences of sensory and affective brand experiences on brand loyalty, which implies that appealing to aesthetic senses and emotions related to a brand can strengthen brand loyalty. Given that the context of the present study was apparel brands' websites, the significant effects of the sensory and affective brand experiences on brand loyalty may be attributed to the uniqueness of the product category. When shopping for apparel products, consumers are likely to engage in sensory experiences to clarify how the product looks or fits on them [Song & Kim 2012]. Affective experiences such as enjoyment resulting from trying on various apparel products in a store or using a virtual try-on technology on a commercial website are also closely related to the nature of apparel products [Lee et al. 2010].

Fourth, the present study contributes to the literature by using a comprehensive scale to measure skill in applying flow theory to the context of online apparel shopping. Most prior studies of online flow have tended to operationalize skill and challenge specific to online navigational tasks [e.g., Hoffman & Novak 1996; Novak et al. 2000; Richard & Chandra 2005], limiting their applicability to actual (or simulated) online shopping contexts. This study adopts a broader conceptualization of skill and develops a measure of various dimensions of skills relevant to online shopping tasks for the chosen product category (apparel) beyond the navigational skills applicable to general web environments. The significant main effect of skill, conceptualized in three dimensions (i.e., online shopping skill, clothing shopping skill, and general shopping skill), on online flow in this study illuminates that diverse skill dimensions beyond the navigational skill can be predictors of online flow.

Fifth, this study makes a contribution to the flow literature by clarifying the significant moderating effect of challenge for the relationship between skill and online flow. Prior studies have suggested that online flow is determined by the matched high skill and high challenge [Novak et al. 2000; Skadberg & Kimmel 2004], but their findings usually show only the positive direct effects of skill and challenge on online flow instead of the effect of matched skill and challenge. This study empirically shows that the effect of skill on online flow is greater among the high-challenge group than among the low-challenge group, demonstrating that consumers are more likely to reach flow when they have sufficient skills to complete a task as well as the task is manageably challenging [Csikszentmihalyi 1991; Csikszentmihalyi 1997]. Although high challenge may hinder consumers from being confident of task achievement, high challenge involves them to a great extent in browsing a brand's website [Richard & Chandra 2005]. High skill superseding the difficulty of a task is likely to result in a less intense flow state [Smith & Sivakumar 2004], further emphasizing the significance of the matched high skill and challenge in online shopping.

5.2. Managerial implications

This study draws managerial attention to the potential of a brand's website in achieving their marketing goal of enhancing brand loyalty. This study shows that online flow on a brand's website enhances sensory and affective brand experiences as well as brand loyalty. A brand's website is crucial in conveying brand experience because consumers can actively interact with the brand's offerings on its website. Findings of this study confirm that marketers can build brand loyalty through a brand's website by stimulating consumers' sensations and feelings. Consumer experiences on an apparel brand's physical store can be enhanced through a chance to explore the entire store and inspect products, which stimulates a consumer's senses with colorful displays, ambient music, and texture inspections by touching [Siekpe 2005]. Likewise, a brand's website can enhance consumer experiences by stimulating visual and auditory senses with the combination of website design elements. Considering that each consumer has a different learning style among visual, auditory, read/write, and kinesthetic learning styles [Hossain et al. 2009], customization features of a brand's website (e.g., text-oriented website, visually attractive website, animated website) are likely to improve brand experience and brand loyalty. Moreover, marketers may try to strategically allocate marketing campaigns using aesthetic and emotional appeals to a brand's website so that the campaign messages are more likely to reach consumers and contribute to the formation of positive brand experience. Because a well-organized layout and differential design of a website can help visitors to perceive visual aesthetics of the website [Wang et al. 2010] and to enrich consumers' affective experiences by evoking pleasure [Nambisan & Watt 2011], marketers need to be concerned with great harmony of website design elements and marketing campaign messages.

This study also demonstrates that consumers need to not only have high skill but also perceive that the shopping task is sufficiently challenging in order to reach an intense flow state on a brand's website. This finding indicates that marketers need to challenge their brand's website visitors through the website design and web marketing strategies to encourage consumers' engagement. For example, marketers could design their brand's website like a game continually offering certain tasks and awards related to visitors' shopping behavior; visitors might need to post about personal comparison between the brand's new products and their existing wardrobe (i.e., a task), in order to receive 30% off coupon code applicable to purchase the new products (i.e., an award). Such a campaign could challenge website visitors, enhancing the likelihood they will reach the state of online flow. However, not all challenges would be accepted favorably by consumers, and the same challenge may be viewed with varying levels of favorability depending on the consumer characteristics such as skill levels. Therefore, recognizing the conditions under which target consumers are most likely to reach online flow is a crucial step to promote their loyalty toward a brand's website.

5.3. Limitations and recommendations

Findings of this study need to be interpreted with caution in light of the methodological limitation. Due to the nature of the online survey method, the researchers were not able to control the environment in which respondents performed the given browsing task on a brand's website and answered the measurement items. Since respondents answered the questionnaire at different times and places using computers that varied in Internet connection speed and screen resolution, uncontrollable method variances are likely. Future research employing laboratory experimental research designs, which allow researchers to identify computer specifications, manage the conditions of computers, and instruct about each step of task procedure, may help to control the environment in which data are collected and thus enhance the internal validity of the findings. Another limitation of this study can be considered as the limited ability to generalize findings to other contexts, given that the context of this study is specific to apparel shopping on a brand's website. Based on the findings of this study, the intellectual and behavioral dimensions of brand experience are not significantly associated with both online flow and brand loyalty, but the statistical significance may be verified in different contexts. For example, intellectual brand experience may play an important role in establishing brand loyalty in the context of electronic devices, such as smartphones, tablets, and computers, because these kinds of products are likely to facilitate consumers' information processing. Future research could improve the applicability of the findings to broader contexts by examining the hypotheses using different products, shopping tasks, and/or stimulus websites. Further, the relationship between online flow and brand experience can be investigated more carefully and closely in future research. The pure effect of online flow on brand experience is worth verifying for confirmation of the strategic importance of a brand's website. By controlling variables representing previous brand knowledge in an experimental setting, researchers could refine how much online flow contribute to enhanced brand experience compared to the contribution resulting from previous brand knowledge. Finally, this study used a unidimensional challenge measure, which was efficient in identifying the moderating effect of challenge for the relationship between skill and flow. However, further research is recommended to incorporate diverse dimensions of challenge that capture various conditions where challenge is generated. In doing

so, more specific insight might be obtained as to the kinds of challenges that are favorable versus unfavorable to consumers' online flow experience.

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