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Eonyou Shin¹ and Fatma Baytar¹

Abstract

The objectives of this study were to investigate whether images of female bodies shown in a website influence female consumers' level of body satisfaction and to examine how these variables affect online shoppers' concerns with garment fit and size and their intentions to use a virtual try-on model. We conducted an experiment using a 2×2 between-subject factorial design with 249 college students. The results showed the main effects of female bodies associated with body satisfaction on female consumers' concerns with garment fit and size. We also found a negative relationship between body satisfaction and concerns with garment fit and size as well as a positive relationship between concerns and intentions to use virtual try-on technology. However, we found no significant effect of female bodies on female consumers' body satisfaction.

Keywords

body satisfaction, online shopping, virtual model

A thin body has been culturally desirable for U.S. women, an ideal that can make women feel bad about their bodies and compel them to lose weight in order to be perceived as more attractive (Kaiser, 1990; Levine & Harrison, 2004). The gap between women's actual body sizes and thin ideal models leads to body dissatisfaction that is highly associated with negative self-perception and consequent negative health behaviors such as depression, eating disorders, and lack of exercise (Bearman, Presnell, & Martinez, 2006; Grabe & Hyde, 2006; Halliwell & Dittmar, 2006; Harrison, 2001). Given that apparel is a highly body-related product, consumers' body dissatisfaction may significantly influence intention to buy garments (Cases, 2002). This influence can be augmented especially in body-absent purchase environments, such as online shopping (Rosa, Garbarino, & Malter, 2006). In an online apparel-shopping environment, a consistent struggle for female

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consumers has been the lack of direct body-related experiences due to their inability to see body shapes similar to their own. Many e-retailers prefer using Size 2 or Size 4 models instead of those available within the wide range of sizes from 0 to 20. However, this approach to altering the psychology and increasing purchase intentions can cause a female consumer to perceive a certain degree of discrepancy between her body and promoted images of ideal bodies (Kim & Damhorst, 2010; Rosa et al., 2006). To avoid this consequence, some online apparel retailers are using realistic models (Kim & Damhorst, 2010).

Wagner (2007) provided compelling evidence that dynamic imagery has the potential to decrease the differences between online and offline shopping experiences that may help consumers reduce the perceived risk of buying clothes without first wearing them. Virtual try-on technology is becoming more advanced in applying a garment to the human's realistic virtual body model (avatar), enabling consumers to determine the fit of the chosen virtual clothing in a purchase setting. E-retailers, such as Tesco (2013), Quiz Clothing (n.d.), and Qvit (n.d.), are increasingly interested in using virtual technology that allows consumers to use their own virtual body models to try on garments. For virtual try-on, avatars can be created by using either three-dimensional (3D) full-body-scanning technology (D'Apuzzo, 2009) or computer-aided design (Divivier et al., 2004). Utilizing realistic avatars in virtual environments can allow users to see themselves from a third person perspective (Kim & Sundar, 2012). The authors of several studies have reported that avatars' physical appearances can positively influence avatar users' perceptions toward their physical bodies and their real-life, health-related behaviors (Fox & Bailenson, 2009; Kim & Sundar, 2012; Yee & Bailenson, 2007).

Using virtual model devices for examining body-related experiences, such as body satisfaction, in an online shopping environment has not been widely investigated. Therefore, there is a need to examine how models' virtual bodies (MVBs), developed from consumers' real body measurements, versus models' ideal bodies (MIBs) can affect consumers' cognitions related to body satisfaction and concerns with finding clothing for their bodies. Extending this line of reasoning, we designed this study to investigate (a) the impacts of images of models' bodies and body satisfaction of female consumers on their concerns about garment size and fit and (b) how these factors may affect female consumers' intentions to use virtual try-on technology. The researchers examined females' reactions to viewing models' bodies during online apparel shopping using the stimulus–organism–response (S-O-R) paradigm as the organizing principle. This study provides significant empirical findings on the effects of using MVBs on body satisfaction in relation to concerns with clothing fit and size during online apparel shopping. The results of this research could provide important information about how the virtual model can be used in online apparel retail environments to reduce female consumers' body dissatisfaction, which may be triggered when consumers compare themselves to MIBs.

Literature Review

S-O-R Paradigm

The S-O-R paradigm explains the relationship between the physical environment and the human behavior. It demonstrates that environmental stimuli (S) cause consumers' evaluations (O) and that these evaluations evoke an approach to or avoidance of (R) the environment (Mehrabian & Russell, 1974). The stimulus (S) refers to attributes (e.g., product features, layout, music, and services) that are located in the environment and that influences individuals' affective and cognitive states (O). The individual's affective and cognitive states affected by stimuli result in a behavioral response (R; Baker, Parasuraman, Grewal, & Voss, 2002; Eroglu, Machleit, & Davis, 2001).

In online apparel-shopping environments, female models' bodies often differ from a consumer's body in both shape and size and may influence consumers' affective and cognitive processes (Kim &

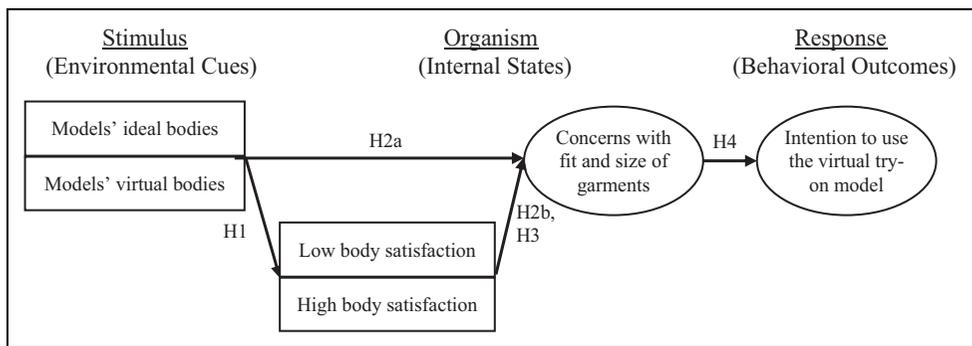


Figure 1. Research model: The effects of female models' bodies on consumer internal states and behavioral outcomes in online apparel shopping contexts.

Damhorst, 2010). In this study, female models' bodies in the online apparel-shopping context were considered to be stimuli (S). Because body satisfaction and concerns about garment fit and size are related to an individual's internal mental state (Eroglu et al., 2001), these cognitive conditions were studied as organisms (O). According to the S-O-R paradigm, consumer responses refer to approach (such as purchase intentions) or avoidance behaviors that are consequences of affective and cognitive states (Eroglu et al., 2001). Behavioral intention to use a virtual try-on model, response (R), can be considered as a function of body satisfaction and of concerns about garment fit and size.

The research model for this study addresses how models' bodies influence consumers' internal states and behavioral responses in the online apparel-shopping context (see Figure 1). The sequence of the effects in the model is that representations of female bodies (S) affect consumers' body satisfaction and concerns about garment fit and size (O) and that this interaction influences consumers' intentions to use a virtual try-on model (R) when shopping in an online retail store.

Effects of Images of Models' Bodies and Body Satisfaction on Concerns About Garment Fit and Size (Stimulus–Organism Link)

According to self-discrepancy theory by Higgins (1987), self-discrepancy occurs when a difference between one's actual image and his or her internalized ideal image exists. The unrealistic images of celebrities' and models' bodies affect individuals' self-perceptions of their body shapes, thus resulting in negative emotional states and unhealthy behaviors (Kim & Sunder, 2012). Numerous scholars reported that young females who were exposed to a thin ideal body were less likely to be satisfied with their bodies than those who were not exposed to such an image (Altabe & Thompson, 1996; Botta, 2003; Cash & Prunzinsky, 1990; Halliwell & Dittmar, 2006; Hargreaves & Tiggemann, 2004; Harrison, 2001; Hofshire & Greenberg, 2002; Irving, 1990; Jung, 2006; Jung, Lennon, & Rudd, 2001; Stice & Shaw, 1994). In fact, individuals whose bodies are similar to those of the models do not experience body-image self-discrepancy (Bessenoff, 2006). Kim (2008) explained that when looking at the visual stimulus represented by idealized models, consumers might place themselves in the picture to decide whether a particular type of clothing (fit, color, and style) would look good on them. In the realm of online shopping, MVBs, which women are exposed to, may influence their body satisfaction differently when compared to the ones exposed to MIBs. Accordingly, the following hypothesis was proposed:

Hypothesis 1: Females who are exposed to MIBs will experience lower body satisfaction than females who are exposed to MVBs developed from their own body measurements.

Females who are dissatisfied with their bodies tend to express negative attitudes toward clothing (Shim, Kotsiopoulos, & Knoll, 1991). A recent qualitative study with 20 women aged 18 to 45 years found that females' perceptions of their bodies are highly associated with the fit of clothes (Grogan, Gill, Brownbridge, Kilgariff, & Whalley, 2013). Harden, Butler, and Scheetz (1998) showed that women who expressed higher satisfaction with their bodies chose clothing that accentuated the body and those who expressed lower satisfaction selected concealing clothing. There appears to be a relationship between high body satisfaction and satisfaction with fit of clothing (LaBat & DeLong, 1990; Shim et al., 1991).

Concerns with fit and size of garments were defined as "subjectively determined expectations and amount of risk perceived by a shopper in relation to the fit and size of the garment in contemplating a particular purchase decision" (Kim & Damhorst, 2010, p. 242). In body-absent online apparel-shopping environments, consumers who had higher body dissatisfaction revealed more concerns with overall appearance, inability to try on, projecting a correct impression, unavailability of size, and imagining fit and size (Kim & Damhorst, 2010). Although Kim and Damhorst (2010) only used the fit models in the five most frequently visited apparel websites, it is possible to have similar relationships between body satisfaction and concerns with fit and size of garments after viewing models' bodies (MIBs vs. MVBs). A thorough review of literature found no study that directly investigated the relationships between viewing MVBs and MIBs with varying levels of body satisfaction and concerns with fit and size of clothing. Individuals who are exposed to MVBs that are consistent with their bodies may have greater concerns with garment fit and size. When females are exposed to websites with MVBs rather than MIBs, or when females had lower body satisfaction, concerns with fit and size of garments may increase. Thus, the following hypotheses were proposed:

Hypothesis 2: Female models' bodies associated with body satisfaction will affect concerns with garment fit and size.

Hypothesis 2a: Females after viewing MVBs will have greater concerns about garment fit and size than females after viewing MIBs.

Hypothesis 2b: Females with low body satisfaction will have greater concerns about garment fit and size than females with high body satisfaction.

Hypothesis 3: Female consumers' body satisfaction is negatively related to their concerns about garment fit and size.

Concerns About Garment Fit and Size and Intentions to Use a Virtual Try-On Model in Apparel Shopping (Organism–Response Link)

Consumers' perceived risks associated with online shopping are greater than those associated with other shopping modes (Tong, 2010). According to the perceived risk theory, individuals who are confronted with a risk in a variety of situations try to solve problems through the acquisition and handling of information (Cox, 1967). Shim and Lee (2011) found that informative benefits of 3D virtual models that convey detailed product information can reduce consumers' perceived product risk. Virtual try-on technology is one of the interactive technologies increasingly used in online apparel shopping. This technology uses either parametric avatars with adjustable body measurements and generalized appearances (My Virtual Model, 2012; Metail, n.d.) or realistic 3D body scans of consumers (Bodymetrics, 2013; Loker, Ashdown, & Carnrite, 2008). Users can select garments and overlay them on their digital body models. Depending on the technology's complexity, users view garments as either 2D (i.e., front and back images) or 3D on their parametric or body scan models (Calhoun, Ashdown, & Lyman-Clarke, 2009). Consumers are likely to use virtual try-on technology to reduce perceived risk of purchasing online by creating models that have their physical

characteristics (Kim & Forsythe, 2008). Thus, individuals who feel a higher degree of concern about garment fit and size may be more willing to use a virtual try-on model. Therefore, the following hypothesis was proposed:

Hypothesis 4: Concerns about garment fit and size are positively related to intention to use virtual try-on technology.

Method

This research consists of two stages: Study 1 to develop stimuli for MIBs and Study 2 to test consumers' responses to MIBs and MVBs. In Study 1, websites of two online apparel retailers were content analyzed in order to select two MIBs. Then, these MIBs were used as stimuli for the second study in order to test the effects of the level of body satisfaction and models' bodies on consumers' concerns about garment fit and size and their intentions to use virtual try-on models.

Study 1 to Develop Stimuli for MIBs

Researchers used a structured method to select two MIBs to be displayed in a mock online shopping website used in Study 2. Websites for two department stores, Neiman Marcus and Saks Fifth Avenue, were selected from the five most successful department store websites (i.e., Macy's Inc., J.C. Penney Co. Inc., Nordstrom Inc., Saks Direct, and Neiman Marcus Group Inc; Internetretailer, 2010) as female models for premier designer brands have the greatest influence on consumers in terms of status and image (Kamenidou, Mylonakis, & Nikolouli, 2007).

Content analysis was used to select images of MIBs because it is a fundamental method used to evaluate pictorial information on retail websites (Kim, 2008; Park & Lennon, 2009). Because dresses are a popular designer clothing category (Fogel & Schneider, 2010), the researchers selected ideal female images wearing shape-revealing dresses. The Neiman Marcus site contained a total of 302 models. The images of MIBs were coded based on two categories: body thinness, with a scale of eight body widths at 50% (underweight); 70%, 90%, and 100% (realistic body); and 110%, 130%, 150%, and 170% (overweight; Brown & Slaughter, 2011); and body shape: A-type, X-type, V-type, and H-type (August, 1981). To validate the coding scheme, researchers thoroughly reviewed 200 models from among all 592 models. The remaining 392 images were coded independently to check reliability of coding between the two coders. Good intercoder reliability (.91) was established for both categories (i.e., body thinness and body shape). Analyses of frequency distributions in SPSS 19.0 showed that of the 592 models, about 65% ($n = 382$) of the models were of the 70% body width. In addition, nearly 60% of the models ($n = 354$) had an X-shaped body. Based on the frequency analysis findings, 20 images were randomly selected from among the most pervasive body images (models with thin 70% body width and X-shaped bodies).

After receiving institutional review board (IRB) approval, e-mails were sent to 300 female students attending a major U.S. Midwestern university; 40 students responded, which is a 14% response rate. These respondents viewed all 20 body images and evaluated each body for the following two characteristics using a 7-point Likert-type scale: (a) ideal body thinness (1 = *highly disagree* and 7 = *highly agree*) and (b) ideal body shape (1 = *highly disagree* and 7 = *highly agree*). SPSS 19.0 was used to measure mean scores, standard deviations, and Cronbach's α s. Reliabilities of the 2 scale items were high (Cronbach's α s >.9). Based on these reliabilities, scores were summed from the 2 items to develop a single indicator of how participants perceived ideal body shape and ideal thinness for each picture (ranging from 2 to 14). Two images of MIBs with medium mean scores (the 10th and 11th ranks) were selected for Study 2. Median means of 7.61 and 7.77 indicated that the

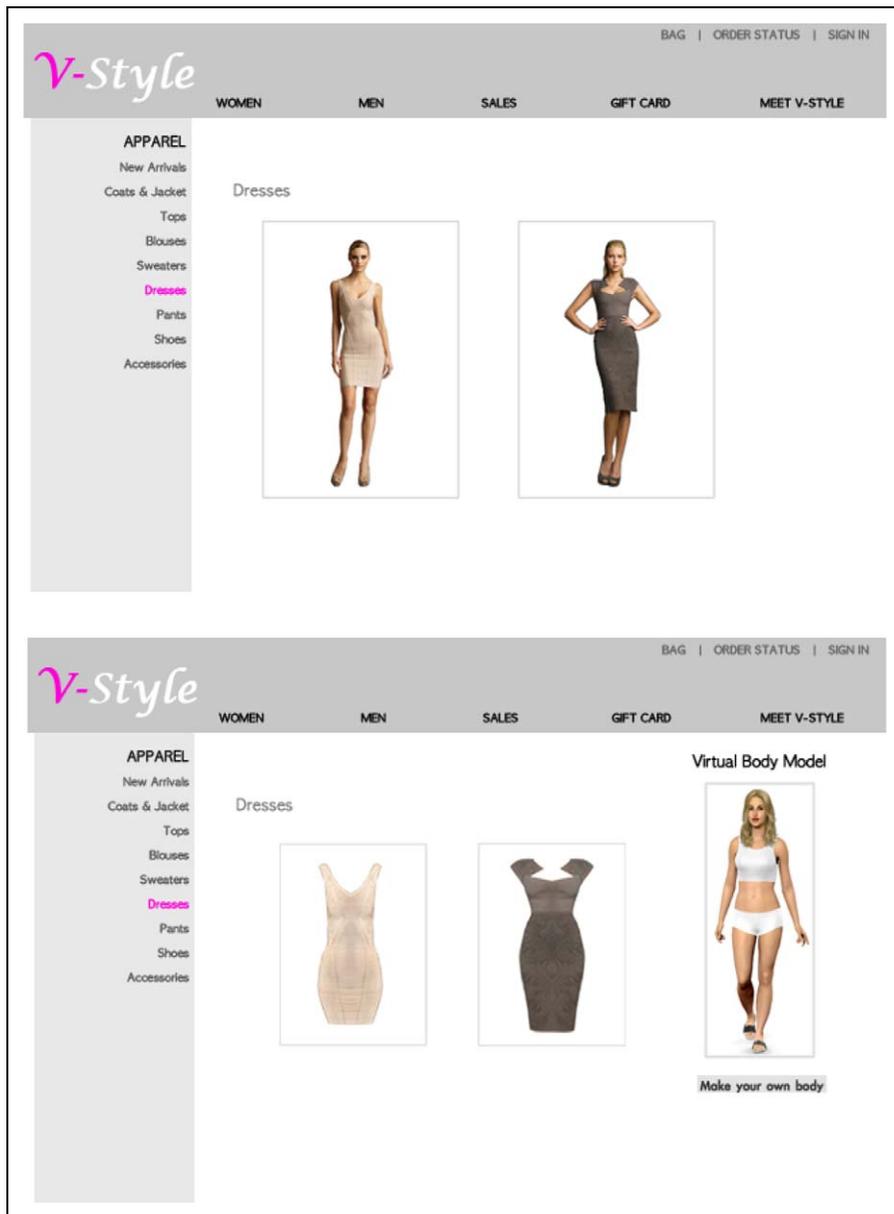


Figure 2. Two experimental conditions: The first mock website with two images of models' ideal bodies (on the top) and the second mock website with the two dresses and the models' virtual bodies (on the bottom). An image of the virtual model in the second mock website (on the bottom). Adapted from Model My Diet, n.d. Retrieved from <http://www.modelmydiet.com>. Copyright 2012-2013 by Model My Diet, Inc. Reprinted with permission.

chosen female images were representative of the current ideal body and could be used as stimuli for the second study.

Two mock websites were developed by a professional web developer to resemble real websites as closely as possible (see Figure 2). In order to avoid any influence on consumers' responses due to the

use of well-known brand names, a fictitious brand, “V-Style,” was used. On the welcome page, participants were given statements to make them concentrate on the models’ bodies: “Please observe the models/your avatar and think how much they/it resemble(s) your own body.” The first mock website showed participants the photos of MIBs selected in Study 1. Two MIBs were displayed, each wearing a body-hugging dress (see Figure 2). The second mock website allowed participants to enter their body measurements to create realistic-looking virtual models. The virtual model application was embedded in the mock website during its development stage with the permission of Model My Diet, Inc. On this website, the participant’s virtual model was wearing underwear; next to her virtual model, dresses displayed on the MIBs site were shown but not on an MVB.

Study 2 to Evaluate Responses to Models’ Bodies

Sampling and Data Collection. Female participants were recruited from a large Midwestern U.S. university for the following reasons: (a) college students are the most eager shoppers in online sales (Cassis, 2007); (b) clothing is one of the most popular online shopping product categories for this group (Case & King, 2003); and (c) young women have been shown to be negatively influenced by images of exceptionally thin female models (Bissell & Rask, 2010). After obtaining IRB approval, invitation e-mails were sent to 3,000 female undergraduate students randomly selected by the university registrar. Recipients wishing to participate in the study could log onto the mock website using the URL provided and were randomly assigned to one of the two sites.

2 × 2 Between-Subject Factorial Design. The experimental design was chosen to compare the effects of models’ bodies, MIBs and MVBs, and body satisfaction (low vs. high) on consumers’ internal states (concerns about garment fit and size) and to examine consumers’ intentions to use virtual try-on technology. This study employed a 2 × 2 between-subject factorial design. Two mock apparel-shopping websites were developed to evaluate the effects of two models’ bodies, MIBs versus MVBs, on body satisfaction and apparel fit and size concerns. For comparing the levels of body satisfaction (low vs. high), the researchers used the standardized median value (0) of body satisfaction scores in each group and divided participants into two groups (i.e., 0 and positive values of standardized body satisfaction scores for high body satisfaction group versus negative values of standardized body satisfaction scores for low body satisfaction group). Participants were randomly assigned to one of the two experimental conditions.

After interacting with the mock websites, participants were directed to a web-based survey hosted by SurveyGizmo (n.d.). The web-based survey questionnaire asked participants to answer questions related to body satisfaction, concerns about garment fit and size, intentions to use virtual try-on models, and their demographic background. Body satisfaction was measured by responses to 22 items using a 7-point Likert-type scale (1 = *none* and 7 = *very much satisfied*). Although originally a 9-point Likert-type scale was used (LaBat & DeLong, 1990), limitations of the web survey required a decrease in our scale options. Concerns about garment fit and size (22 items) were assessed using scales developed by Kim (2008), and the items were rated on 7-point Likert-type scales (1 = *strongly disagree* and 7 = *strongly agree*). Four items related to intention to use virtual try-on technology were adapted from Klopping and McKinney (2004) and were rated on a 7-point Likert-type scale (1 = *strongly disagree* and 7 = *strongly agree*).

Results

Of the 3,000 students invited to participate, 281 (9%) completed the online instruments. Of those responses, 249 were useable. In all, 140 participants were randomly assigned to the ideal-body mock website, and 109 participants were assigned to the individualized-virtual-body mock website. The

Table 1. ANOVA Results for the Effect of Female Models' Bodies on Body Satisfaction.

	Female Models' Bodies		Main Effect: <i>F</i> <i>df</i> (1, 248)
	Ideal	Virtual	
Body satisfaction	4.65 (.05)	4.69 (.05)	.09

Note. ANOVA = analysis of variance; *df* = degrees of freedom. Standard Deviations appear in parentheses below means. **p* < .05. ***p* < .01. ****p* < .001.

average age of the respondents was 21 (standard deviation [*SD*] = 2.19). Most were Caucasian (83.9%), with far fewer Asian or Asian American (6.0%), African American (3.6%), and Latino/Hispanic American (2.8%). The majors and academic ranks of the participants were diversely distributed. Of the 249 participants viewing the mock websites, about 92% of them had purchased apparel online. The majority of the participants responded that they purchased apparel online one to two times a month (75.9%), three to four times a month (6.8%), and 5 times or more (5.2%). Among the 249 participants who had experienced online apparel shopping, approximately 98% of them had never used a virtual try-on model before.

Manipulation Checks

Evidence of successful manipulations in perceived differences of models' bodies from own body was provided in manipulation checks. With the use of univariate analyses of variance, main effects were found for models' bodies' discrepancies on body perceptions after being shown MIBs or MVBs, $F(1, 248) = 98.879, p = .000, \eta^2 = 28.6\%$. Participants exposed to MIBs more so perceived them to be different from their own body ($M = 1.75, SD = .69$) than those exposed to MVBs ($M = .88, SD = .67$).

Hypothesis Testing

As shown in Figure 1, the proposed research structure or theory was divided into two parts. In Part 1, the researchers tested Hypotheses 1, 2a, and 2b to understand the effects of viewing models' bodies (independent variable) and of body satisfaction levels (independent variable) on consumers' concerns about garment fit and size when shopping online (dependent variable) using a 2×2 between-subject factorial analysis of variance (ANOVA) in SPSS 19.0. In Part 2, the researchers analyzed Hypotheses 3 and 4 to evaluate the relationship between female consumers' concerns about garment fit and size and their intentions to use a virtual try-on model in online apparel shopping by using a model-fitting process in structural equation modeling (SEM) to determine the goodness of fit between the hypothesized model and the sample data. This was done by using SPSS Amos 19.0.

The Relationship Between Body Satisfaction and Viewing Models' Bodies (Hypothesis 1). As shown in Table 1, ANOVA results revealed no significant differences between body satisfaction upon exposure to MIBs ($M = 4.65, SD = .053$) and body satisfaction upon exposure to MVBs ($M = 4.69, SD = .060$), $F(1, 248) = .09, p = .77$. Thus, Hypothesis 1 was not supported.

The Effects of Viewing Models' Bodies and Body Satisfaction on Concerns With Fit and Size of Garments (Hypotheses 2: 2a, 2b). ANOVA results showed that viewing models' bodies significantly influenced consumers' concerns about garment fit and size, $F(1, 248) = 4.19, p = .04$ (see Table 2). When provided with MIBs ($M = 5.05, SD = .09$), participants reported experiencing less concern about

Table 2. ANOVA Results for Main Effects of Female Models' Bodies and Body Satisfaction on Concerns About Garment Fit and Size.

Concerns With Fit and Size of Garments	Female Models' Bodies			Main Effects: <i>F</i> <i>df</i> (1, 248)
	Ideal	Virtual	Total	
Low-body satisfaction	5.19 (.12)	5.56 (.14)	5.38 (.09)	8.66**
High-body satisfaction	4.91 (.12)	5.07 (.13)	4.99 (.09)	
Total	5.05 (.09)	5.32 (.10)	5.17	
Main effects: <i>F</i> <i>df</i> (1, 248)	4.19*			

Note. ANOVA = analysis of variance; *df* = degrees of freedom. Standard deviations appear in parentheses below means. **p* < .05. ***p* < .01. ****p* < .001.

Table 3. SEM Results for Hypotheses 3 and 4.

	Est.	SE	<i>t</i>
Structural path			
H3 Body satisfaction → concerns with fit and size of garments	γ -.28	.02	-8.26**
H4 Concerns with fit and size of garments → intention to use the virtual try-on model	β .47	.01	13.24**

Note. SE = standard error; SEM = structural equation modeling. **p* < .05. ***p* < .01. ****p* < .001.

garment fit and size than when provided with MVBs ($M = 5.32$, $SD = .10$). Therefore, Hypothesis 2a was supported. The researchers found a significant effect of body satisfaction on concerns about garment fit and size, $F(1, 248) = 8.66$, $p = .004$ (see Table 2). Female consumers who expressed low body satisfaction ($M = 5.38$, $SD = .09$) were more concerned about garment fit and size than female consumers who expressed higher body satisfaction ($M = 4.99$, $SD = .09$). Therefore, Hypothesis 2b was supported.

The Relationships Between Body Satisfaction, Concerns with Fit and Size of Garments, and Intention to Use a Virtual Try-On Model (Hypotheses 3 and 4). Examination of model fit indices indicated an acceptable model fit to the data, $\chi^2 = 1,189.83$, degrees of freedom = 689, comparative fit index = .90, international friction index = .91, Tucker–Lewis index = .91, normed fit index = .90, root mean square error of approximation = .056. For the research model, the construct reliabilities and variances were calculated based on the recommendation of Fornell and Larcker (1981). All factors showed high internal consistency in construct reliability (ranging from .91 to .96 at the .001 confidence level) and Cronbach's α values of .70 or higher.

For Hypothesis 3, the researchers found a significant negative relationship between body satisfaction and concerns about garment fit and size ($\gamma = -.28$, $p < .01$; see Table 3). Thus, Hypothesis 3 was supported. Findings for Hypothesis 4 showed a significant positive relationship between concerns about garment fit and size and intentions to use a virtual try-on model ($\beta = .47$, $p < .01$). The results of SEM revealed that females who expressed more concern about garment fit and size would be more likely to use the virtual try-on model in online apparel stores (see Table 3). Thus, Hypothesis 4 was supported.

Discussion and Conclusion

In this study, researchers investigated effects of viewing models' bodies and body satisfaction on female consumers' concerns about garment fit and size and their intention to use virtual try-on model technology when shopping online. The results from the content analysis revealed that two major online apparel retailers used thin females with X-shaped bodies, confirming the findings of numerous previous studies that the ideal thin female model used in online shopping is similar to the models presented in mass media (Anton, Perri, & Riley, 2000; Snyder, 1997).

The S-O-R paradigm was used to organize our understanding of females' body-related thinking processes during online apparel shopping. The effects of models' bodies and female shoppers' body satisfactions on their concerns about garment fit and size in the context of online apparel shopping can be explained by the relationships between environmental stimuli and cognitive evaluations (S-O link). Although some researchers argued that females who were exposed to thin ideal bodies were less likely to be satisfied with their bodies than those who were not exposed to such images (Anton et al., 2000; Homen, Mchugh, Wells, Watsons, & King, 2012; Snyder, 1997), the findings from our ANOVA tests showed that participants' body satisfaction levels did not change after viewing the mock websites MIBs or MVBs. Because the impact of mass media on females' thoughts about their bodies has long influenced perceptions of the ideal female body as thin and lean, this idealized thin body may serve as an internalized standard when females judge their bodies. Thus, females who were exposed to MVBs already may have been influenced by the ideal bodies presented in mass media.

The results revealed a main effect of models' bodies on female consumers' concerns about garment fit and size. Females who were exposed to MVBs experienced greater concerns about garment fit and size than those who were exposed to MIBs. This result indicates that females who viewed MIBs expressed less anxiety about clothing fit and size than females who viewed MVBs. The result implies that negative thoughts about clothing fit and size are more likely to occur when females view their own virtual models. However, clothing displayed to those viewing MIBs was not shown on the participants' MVBs, so comparison of self as reflected in the MVBs could likely have influenced participants' perceptions and concerns.

Researchers also tested the main effect of body satisfaction levels (low vs. high) to determine whether there was an impact on participants' concerns about clothing fit and size. The results strongly confirmed that females who express lower body satisfaction are likely to feel greater anxiety about clothing fit and size in the context of online shopping than females who express high body satisfaction. Although this research used a different experimental setting (i.e., developing mock websites) and different measurement scales (i.e., body satisfaction scale for 22 different body parts), the finding is in agreement with Kim and Damhorst's (2010) finding that the level of body satisfaction negatively affects consumers' worries about garment fit and size.

The researchers used SEM analysis to investigate the relationships among consumers' cognitive internal states (body satisfaction and concerns about garment fit and size) and behavioral response (intention to use a virtual try-on model; O-R link). Females with low body satisfaction expressed significantly greater concerns about garment fit and size when shopping online. This result provides empirical support for the findings of Kim and Damhorst (2010) who also explained that body satisfaction has a negative influence on concerns about garment fit and size. The findings indicate that females who have greater concerns about garment fit and size are more likely to use virtual try-on technology. SEM results indicated that female shoppers who expressed lower body satisfaction and greater concern about garment fit and size are more likely to use virtual try-on technologies.

Numerous researchers have focused on the effects of the apparel industry's use of idealized thin models on women's body satisfaction. Increasing use of online virtual models for shopping and now for virtual try-on of garments has implications for understanding women's body satisfaction and

overall health. This study demonstrates the tie between women's shopping behaviors and how the industry displays apparel on virtual models. Apparel researchers should take an active role in developing online shopping experiences that enhance the shopping experience for women.

Limitations and Suggestions for Future Research

Two mock websites were developed and used to conduct this research. Although the websites were developed to simulate realistic online shopping, functions were limited and may have affected results. Future studies should use more realistic shopping sites. A major limitation was in the design of the website using virtual models to show realistic bodies. Limited technology functions available to the researchers meant that the MVBs was displayed in underwear with dress options displayed in shape and form more related to current ideal body types. The researchers moved forward with this design because (a) the main emphasis was on comparing the effects of the MVBs with the MIBs on body satisfaction and concerns with fit and size of garments in apparel online shopping; (b) the dresses on the MIBs were very shape revealing and contrasted sufficiently with the MVBs site; and (c) it was important to provide the same mock website interface to both sets of participants instead of directing the MVBs users to another commercial website that could offer various product options. These technical issues might have had an impact on the MVB viewers' responses when evaluating concerns with clothing fit and size. Results of this study might not be directly applicable to real-world settings and should not be generalized beyond the experimental environments and manipulations described here.

This study's findings cannot be generalized to all female consumers in the United States. The sample's demographic characteristics should also be taken into consideration. Further studies may explore females' online apparel shopping behaviors in other developed and developing countries.

Personal characteristics, such as fashion involvement, as well as internalization of thin ideal concepts may affect responses. Future research should incorporate an understanding of individual differences. This study focused on female consumers' intentions to use one type of virtual try-on technology. Future research should investigate the effects of various virtual try-on technologies on body satisfaction, concerns about clothing fit and size, and behavioral intentions. By partnering with web developers, apparel researchers may influence direction and content of online shopping sites.

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