Correlational and Experimental Effects of Online Apparel Shopping Behavior on Gaze
Behavior, Appearance Attitudes, and Self-Worth in Women

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Abstract

Online apparel shopping is popular among women, with possible negative body image consequences, particularly when the website imagery is body-focused. We investigated both correlational and experimental effects of online apparel shopping on women's ($N = 113$) explicitly and implicitly measured self-worth, appearance attitudes, and body gaze behavior. Correlational results showed that online apparel shopping correlates negatively with self-esteem, and positively with appearance attitudes and self-objectification. During a simulated online shopping activity, women who were exposed to a body-focused activewear website felt worse than usual about their looks, when compared to women who were exposed to a non-body focused casualwear website. Unexpectedly, exposure to the activewear website primed *lower* body gaze towards subsequent images of partially and fully clothed women. Furthermore, gaze behavior did not significantly correlate with any of the other measures. Given that women have a natural tendency to gaze at faces, the deprivation of facial stimuli in the activewear condition presumably led to a compensatory gaze effect, whereby subsequent attention toward bodies was comparably low, possibly as a protective mechanism. These results suggest potential implications of short- and long-term exposure to online apparel imagery, as well as highlighting the complexity of interpreting female gaze behavior.

Keywords: appearance; women; self-esteem; objectification; gaze; shopping

Introduction

Online apparel shopping is a popular e-commerce activity, particularly among women (Seock & Bailey, 2008; Ward, 2021). Some estimates suggest that the womenswear e-commerce industry in the US is worth \$187 billion, more than double that of menswear e-commerce (\$86 billion) (Ward, 2021). Importantly, online womenswear retailers often utilize images of female models who conform to thin and attractive ideals to enhance the appeal of their products (Pounders, 2018). While such imagery is primarily designed to encourage women to purchase clothing, it can also encourage women to adopt idealistic body standards and re-appraise their own appearance (Brown & Tiggemann, 2016; Cohen et al., 2017). That is, frequent exposure to online apparel imagery could be harmful to women's wellbeing if it adversely influences appearance attitudes, enhances self-objectification, and reduces self-worth. Furthermore, exposure to appearance-focused imagery of women could also prime specific gaze patterns which, if habituated, could lead to an enduring propensity to objectify the self and others (Gervais et al., 2018; Hollett et al., 2019; Karsay et al., 2018). Given that participation in apparel e-commerce continues to grow, particularly amongst women, the present study aimed to provide correlational and experimental evidence that online apparel shopping in women is linked to negative body image, appearance comparisons, self-worth attitudes, and gaze behavior.

Online Apparel Shopping and Appearance Comparisons

Online apparel shopping involves unique motivational characteristics compared to more generic exposure to idealized female imagery. Specifically, when women are shopping for clothing online, they are deliberately making relative assessments between themselves and the models because they are actively considering purchasing the garments to wear themselves. Exposure to other forms of idealized female imagery (e.g., those encountered on social media) are not necessarily accompanied by attempts to cognitively simulate oneself in

another's outfit. Even when compared to traditional "bricks-and-mortar" apparel shopping (where garments are typically hung on racks), online apparel shopping is a particularly powerful vehicle for facilitating appearance comparisons. Appearance comparison is a form of social comparison that involves making relative appraisals of physical characteristics, such as weight and shape, between others and the self (Schaefer & Thompson, 2014). These appraisals have been consistently linked to women's body dissatisfaction and self-worth attitudes (Davison & McCabe, 2005; Myers & Crowther, 2009; Schaefer & Thompson, 2014).

Importantly, the propensity to engage in appearance comparisons has been shown to moderate the negative effects of exposure to idealized female imagery on body image (Betz et al., 2019; Fardouly et al., 2017). These negative effects are likely due to upward comparisons involving relative appraisals to women perceived as superior (Fardouly et al., 2017; Schaefer & Thompson, 2014). That is, when making appraisals of highly idealized female imagery, women experience a heightened discrepancy between their own appearance and that of a physical ideal, leading to lower satisfaction with their own bodies (Homan et al., 2012; Kleemans et al., 2018). Consequently, we argue that exposure to online apparel imagery could instigate or sustain negative body image and self-worth attitudes, partly through appearance comparisons processes. Indeed, evidence suggests that exposure to thin and athletic imagery leads to lower body satisfaction and mood, particularly for women who have high trait self-objectification (Homan et al., 2012; Prichard et al., 2018). Research also shows that specific patterns of visual attention (body gaze) towards idealized women in fashion advertisements is linked with higher appearance comparisons and lower body satisfaction in women (Tiggemann et al., 2019). These findings suggest that appearance comparisons, characterized in part by body-biased gaze behavior, might facilitate negative body image and self-worth, possibly as a function of self-objectification.

Self-Objectification and Self-Worth

Self-objectification is a socio-cognitive process whereby a person's perceived value is largely determined by their body parts (Fredrickson & Roberts, 1997; Loughnan & Pacilli, 2014), which can manifest in women as increased body surveillance and shame (Moradi & Varnes, 2017). The negative valence inherent to body shame is considered particularly relevant for explaining potential links between self-objectification and self-worth (Choma et al., 2010; Mercurio & Landry, 2008; Moradi & Huang, 2008). Specifically, because women's perceived self-worth is often highly dependent on their physical appearance, any shame and anxiety derived from a woman's body can lead to more general perceptions of a lower self-worth (Adams et al., 2017; Choma et al., 2010; Moya-Garófano & Moya, 2019). Importantly, exposure to idealized female imagery can prime women to self-objectify their own bodies (Betz et al., 2019; Prichard et al., 2018). Consequently, we sought to better understand the mechanisms which promote self-objectification and potentially lower overall self-worth by exploring how self-objectification and self-worth are associated with exposure to apparel retail imagery. One mechanism which might facilitate self-objectification is body-biased gaze behavior, which can be primed and elicited by exposure to idealized and/or sexualized imagery of women (Hollett et al., 2019; Karsay et al., 2018). That is, increased visual attention towards female body parts may enhance the belief that these attributes are more valuable for determining a woman's worth when compared to other characteristics (e.g., social, emotional, intellectual) (Hollett et al., 2019). Since gaze is essential for evaluating visual stimuli, women who are exposed to online apparel imagery may be more likely to exhibit gaze patterns that enhance self-objectification attitudes. To understand the potential impact of online apparel marketing on women's gaze preferences, we first summarize women's typical gaze patterns when presented with female stimuli.

Gaze Behavior in Women

When presented with same sex imagery, women typically exhibit face-biased (faster and longer fixations) gaze patterns (Hall et al., 2011; Hewig et al., 2008; Hollett et al., 2019; Nummenmaa et al., 2012). However, when female imagery is sexualized, women tend to exhibit stronger body gaze preferences (Hollett et al., 2019; Lykins et al., 2008; Nummenmaa et al., 2012), in some cases similar to, or stronger than, the body gaze preferences of men (Karsay et al., 2018; Rupp & Wallen, 2007). Overall, evidence to date suggests that women and men exhibit heightened interest in gazing at the bodies of sexualized females. In men, this body-biased gaze behavior towards women has been linked to objectification attitudes (Bareket et al., 2018; Sussenbach et al., 2015), and is likely to be sexually motivated (Hollett et al., 2019). By contrast, there is little evidence, if any, for a link between women's gaze towards women and objectification attitudes. Therefore, research examining the associations between female gaze behavior and objectification attitudes is important, particularly for understanding the development of negative body image and self-worth attitudes. That is, specific gaze behaviors in women towards other women could be important markers of their vulnerability to engage in upward appearance comparisons and experience body dissatisfaction.

While few studies have examined priming effects of media exposure on women's gaze behavior, some recent evidence suggests that music videos featuring female vocalists and imagery of female video game characters are capable of priming body-biased gaze behavior in women towards women (Hollett et al., 2019; Karsay et al., 2018). Given that no study has examined the priming effects of apparel shopping on subsequent gaze behavior, it is unclear precisely how women's gaze might be influenced by engaging in apparel shopping. It seems intuitive to predict body-biased gaze patterns following apparel shopping because

women will be deliberately directing their visual attention towards garments being worn on the body. However, because face gaze is a more naturalistic behavior for women when exposed to non-sexualized imagery, it is plausible that idealized, but not sexualized, women's apparel imagery may prime more balanced gaze profiles (e.g., similar attention towards face and body). Indeed, some preliminary evidence from non-priming research suggests that women show more balanced gaze profiles when exposed to idealized, but not sexualized, female imagery (Holleth et al., 2021). Due to the priming conditions used in the present study, it was expected that online apparel shopping would prime body-biased gaze behavior, but this effect would be statistically stronger when the apparel imagery was sexualized.

The Present Study

While we argue that some apparel marketing imagery encourages appearance comparisons, self-objectification, and potentially body-biased gaze behavior, particular retailers and clothing styles are likely to be more impacting than others. For instance, activewear (or “athleisure”), a multi-billion-dollar branch of fashion often exemplified by form-fitting and revealing clothing, tends to promote body-focused ideals via sexualized imagery that emphasizes a thin and muscular body, particularly for women (Lipson et al., 2020; Wood, 2020). Although activewear originated as a form of fitness apparel, it is increasingly being worn in casual settings (Horton et al., 2016). Internationally, there has been particularly rapid growth in athleisure sales following the onset of the COVID19 pandemic (Australia Post, 2021; Bringé, 2021), which has considerable implications for increasing women's online apparel imagery exposure. It was therefore important in the present study to determine what impact, if any, exposure to activewear imagery has on body image attitudes and behavior because it is becoming more readily purchased and worn by women. However, there also lies the broader goal of determining whether shopping for any form of women's apparel online is associated with potentially harmful consumer attitudes and

behavior. Indeed, we recognize that elevated levels of apparel shopping behavior could itself be a marker for problematic trait-level body image attitudes.

Due to the challenge of determining a potential causal influence of apparel image exposure on attitudes and behavior, we included both correlational and experimental methodologies in the present study. Specifically, we first aimed to demonstrate, through correlational analysis, that recently reported online apparel shopping is correlated with appearance attitudes, self-esteem, and self-objectification. We then aimed to demonstrate, through experimental analysis, that exposure to specific brands of women's apparel leads to differences in negative appearance attitudes, implicit self-worth, and body gaze behavior towards partially and fully-dressed images of women. In this regard, participants in the control condition were exposed to a popular non-objectifying women's casualwear website where the imagery was often face-focused, and the clothing was not revealing or sexualized. By contrast, participants in the experimental condition were exposed to a popular objectifying activewear website where the imagery was largely body-focused, revealing, and sexualized (emphasising a model's buttocks, breasts, and/or thighs). By examining the immediate effects of these simulated shopping conditions, we expected to better understand the potential role that specific types of online apparel imagery might play in influencing women's perceived body image, self-worth attitudes, and gaze behaviors. Consistent with prior eye tracking studies (Hollett et al., 2021; Lykins et al., 2008; Nummenmaa et al., 2006), we included images of partially and fully-dressed women in our gaze task to examine the potential differences and interaction effects in body gaze that might be dependent on subject appearance. In line with our aims, the following hypotheses were developed:

1. We expected that self-reported online apparel shopping behavior in women would be correlated positively with (a) appearance attitudes and (b) self-objectification, but negatively with (c) self-reported self-esteem.

2. We expected that body-biased gaze behavior would be correlated positively with (a) self-objectification and (b) appearance comparison attitudes.
3. We expected that shopping for objectifying activewear would prime (a) a negative body image attitude, (b) a lower implicit self-esteem, and (c) a higher body-biased gaze behavior in women towards partially and fully dressed images of women, when compared to shopping for non-objectifying casualwear. For body-gaze behavior, we also expected (d) an interaction effect, such that body gaze would be particularly high for the activewear condition when exposed to the partially dressed female subjects.
4. As an exploratory analysis, we examined whether engagement with the apparel in both conditions, as measured by dollars spent, would be correlated with appearance, self-objectification, and self-worth attitudes.

Method

Participants

Self-reported female participants ($N = 113$), aged 18 to 65 years ($M = 32.95$, $SD = 11.77$), were recruited from the university community. The two experimental conditions were equivalent in age ($p = .87$) and self-reported time (last month) spent online fashion shopping ($p = .71$).

Materials

Online Apparel Shopping Habits. Participants were asked to estimate how many days a week (1-7 days) and for how long on a typical day (ranging from 15 minutes to 8 hours) they had browsed for women's clothing online in the last month. These two responses were multiplied to estimate weekly apparel shopping time in minutes.

Self-Esteem. The 10-item Rosenberg Self-Esteem Scale (Rosenberg, 1965) measured global self-esteem by capturing positive and negative feelings about the self. Participants

rated the items from 1 (*strongly disagree*) to 4 (*strongly agree*). Composite scores were created by summing the item ratings (range 10-40). Cronbach's alpha in this study was .90.

State Body Image. A single item from the Body Image States Scale (Cash et al., 2002) measured the experimental impact of the website exposure on state body image. Specifically, "Right now I feel..." and participants selected from 1 (*a great deal worse about my looks than I usually feel*) to 7 (*a great deal better about my looks than I usually feel*).

Appearance Beliefs. The 20-item Beliefs about Appearance Questionnaire Revised (ASI-R) (Cash et al., 2004) measured the perceived importance of personal appearance. Participants rated the items from 1 (*strongly disagree*) to 5 (*strongly agree*). Composite scores were created by summing the item ratings (range 20-100). Cronbach's alpha in this study was .90.

Appearance Comparisons. The 11-item Physical Appearance Comparison Scale-Revised (PACS-R; Schaefer & Thompson, 2014) measured the tendency to compare one's physical appearance to that of others. Participants rated the items from 0 (*never*) to 4 (*always*). Composite scores were created by averaging the item ratings. Cronbach's alpha in this study was .96.

Self-Objectification. Two subscales (16 items) from the Objectified Body Consciousness Scale (OBCS; McKinley & Hyde, 1996) measured the extent to which respondents engage in surveillance of their own body and the shame they experience in relation to their body. Participants rated the items from 1 (*strongly disagree*) to 7 (*strongly agree*). Composite scores were created by averaging the item ratings for each subscale. The Cronbach's alpha in this study for surveillance was .84 and .85 for body shame.

Implicit Self-Esteem. A combined adaption of the Self-Esteem Implicit Association Test (Greenwald & Farnham, 2000) and the Brief Implicit Association Task (BIAT; Sriram &

Greenwald, 2009) measured implicit self-esteem. Participants categorized self (e.g., I, me) or other (e.g., they, them) words with either positive (e.g., smart, loved) or negative (e.g., stupid, hated) words across 4 blocks of 20 trials. Measures of association strength were computed using *D*, an effect-size measure with a range of -2 to +2 (Greenwald et al., 2003). Higher and positive scores indicate a stronger association between the self and positive words and negative or lower scores indicated a stronger association between the self and negative words.

Apparel Websites. First-page Google results for women's activewear and casualwear brands were screened by all the authors. An activewear website, echt.com.au, was chosen for the experimental condition, for its predominant use of objectifying (body-focused) female imagery. A casualwear website with a similar target demographic to ECHT, dotti.com.au, was chosen for the control condition, for its predominant use of non-objectifying female imagery.

Eye Tracking. Gaze data was sampled at 30Hz using a screen-based Tobii eye tracker (X2–30) with up to .4° accuracy and .32° spatial resolution, mounted on a 20-inch LCD screen. Tobii Pro Studio was used to display stimuli and process gaze data. Fully and partially clothed images of five female subjects were obtained from Shutterstock, totalling 10 images, each displayed at 6.6cm x 25cm. Facial expressions across the fully and partially clothed images were homogenized where necessary using Photoshop (e.g., see Figure 1). Due to differing bodily proportions across subjects, image sizes were standardized using head dimensions (2.4cm x 3.4cm). Two areas of interest (AOIs) were defined for each subject (head and body). The head AOI included the top of the head, hair, and face to the chin. The body AOI included the entire area below the chin. Fixations were defined as consecutive gaze samples below a 30°/s velocity for a minimum duration of 100ms using the Tobii Velocity Threshold Identification (I-VT) filter. Fixations towards each AOI were summed to determine the total duration (in milliseconds) spent fixating separately on the

head and body. Similar to recent studies (Bareket et al., 2018; Hollett et al., 2021), we adopted a *relative* body gaze score, whereby head fixation time was subtracted from body fixation time. That is, larger and positive scores reflected body-biased gaze behavior.

Figure 1.

Example of Female Imagery in the Fully and Partially Clothed Imagery Conditions, Respectively.

Procedure

Self-identified females were invited to a 30–45-minute laboratory session using flyers (print and digital) and an undergraduate research participation scheme. Upon arrival and provision of consent, participants were randomly allocated to the activewear or casualwear website exposure conditions. They were directed to freely browse the relevant website while mentally constructing outfits for themselves for 10 minutes, followed by five minutes to add selections to their shopping cart. The subtotal (\$AUD) of the garment selections were recorded for each participant as a measure of engagement with the apparel imagery. The average amount spent in each condition was not statistically different ($p = .06$).

Directly after the shopping activity, participants completed the gaze task and implicit self/positive BIAT (in counterbalanced order) followed by the self-report measurements. For the gaze task, participants were calibrated and informed they would see several images of women. They were asked to look at each image as they would normally look at a person. Images were then presented in a random lateral location to the left or right of the center of the display for four seconds each (see Figure 1.). The image sequence was randomized then fixed with the order reversed for every other participant. Each image was presented twice (once on the left and once on the right side of the screen) with fixation durations averaged across these two presentations. A break was offered halfway through the presentation. Prior to each image exposure, a central fixation cross appeared at the location of the vertical boundary between the head and the body for one second. On completion, participants received course credit or a \$20 (AUD) voucher. These procedures were approved by the University Human Research Ethics Committee.

Research Design and Data Analysis

The current study employed both correlational and experimental designs. All measures were subject to bivariate correlational analysis to test the first two hypotheses and explore associations amongst all the variables. However, as the experimental manipulation occurred prior to collecting data from participants, the experimental condition was controlled for in all associations. Group comparison analyses were used to test the third set of hypotheses and Cohen's d was used to quantify the magnitude of all pairwise effects. For examining the experimental effects of the shopping conditions on implicit self-esteem (dependent variable), an independent samples t-test was used to compare the two conditions. For examining the experimental effects of the shopping conditions and eye tracking stimuli on gaze behavior (dependent variable), a mixed factorial ANOVA was used that included one between-subjects factor (Shopping Condition [casualwear and activewear]) and one within-

subjects factor (Subject dress [partially and fully]). The gaze score represented the mean difference between body and head fixation durations (body fixation duration subtract head fixation duration), such that positive scores indicated a preference for gazing at the subject's body and negative scores, at the head. The exploratory analysis involved performing Pearson correlations between the self-report measurements and amount spent, separately, for each shopping condition.

Results

Data Screening

Due to technical issues and poor calibration, eight cases were excluded from eye tracking analyses. Participants (six) were also excluded from BIAT analyses for technical issues and low accuracy (<70%). Several (three) outliers were identified on the self-reported weekly online apparel shopping variable. However, these extreme values were plausible estimates (360-540 minutes p/week) so were winsorized for retention (converted to an upper threshold of 350 minutes p/week).

Correlational Analyses

To test the first two sets of hypotheses, the associations between self-reported online apparel shopping, self-report, implicit and gaze measures have been reported in Table 1. Specifically, online apparel shopping positively correlated with appearance attitudes (beliefs, comparison, and thin/low fat desires) and self-objectification (surveillance and shame), supporting hypotheses 1a and 1b respectively. Furthermore, online apparel shopping negatively correlated with self-esteem, supporting hypothesis 1c. Body gaze scores did not correlate significantly with self-objectification (surveillance or shame) or appearance comparison attitudes, so hypotheses 2a and 2b were not supported, respectively. Notably, the implicit self/positive score correlated negatively with thin/low fat desires and there was also a

trend-level ($p = .055$) positive association between the partially clothed body gaze score and thin/low fat desires.

Table 1.

Intercorrelations and Descriptive Statistics for Explicit, Implicit and Gaze Measures, While Controlling for Experimental Condition.

Variables	Correlations										<i>M</i>	<i>SD</i>
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.		
1. Apparel Shopping p/w (mins)	-										70.82	85.32
2. Self Esteem	-.21	-									29.35	5.55
3. Appearance Beliefs	.30	-.38	-								70.47	12.85
4. Thin/Low Fat Desires	.25	-.24	.56	-							3.06	.92
5. Athletic/Muscular Desires	.14	.02	.28	.32	-						2.54	1.02
6. Appearance Comparison	.28	-.50	.70	.45	.20	-					1.76	1.06
7. Body Surveillance	.25	-.37	.83	.54	.21	.64	-				4.58	1.06
8. Body Shame	.29	-.65	.64	.46	.11	.71	.55	-			3.82	1.25
9. Implicit Self/Positive Score [†]	-.12	.16	-.18	-.22	-.03	-.13	-.11	-.18	-		.54	.42
10. Fully Clothed Body Score [#]	.17	.11	-.02	.12	-.03	-.05	-.07	-.07	-.13	-	242.97	1075.55
11. Partially Clothed Body Score [#]	.14	.06	.12	.19	-.04	.07	.11	.04	-.16	.80	341.75	1158.15

Note. $N = 113$; [†] $N = 107$; [#] $N = 105$; Significant effect sizes in boldface; Experimental condition controlled for in all associations. Higher body scores (milliseconds) represent a visual preference for the body, relative to the head.

Experimental Analyses

To test hypothesis 3a, the single body image item (feeling better/worse about looks than usual) was compared across conditions. Participants in the activewear condition reported feeling worse ($M = 4.22$, $SD = 1.43$) about their looks, compared with participants in the casualwear condition ($M = 4.72$, $SD = 1.22$), $t(111) = -2.00$, $p = .048$, $d = -.38$, supporting the

hypothesis. However, there were no conditional differences for the self/positive ($p = .24$) implicit association task so hypothesis 3b was not supported.

To examine the impact of the experimental conditions on body gaze preferences on subsequent exposure to fully and partially clothed images of women, the 2 (Shopping Condition) x 2 (Subject Dress) ANOVA revealed that there was no main effect of subject dress, $F(1, 103) = 2.37, p = .13, \eta_p^2 = .02$, and no interaction, $F(1, 103) = .71, p = .40, \eta_p^2 = .01$. However, there was a main priming effect of shopping condition $F(1, 103) = 7.70, p = .007, \eta_p^2 = .07$, such that participants in the casualwear condition exhibited higher subsequent body gaze behavior, compared to the activewear condition (see Figure 2.). While there was a condition effect, it was in the opposite direction to the hypothesis (3c), and the absence of an interaction meant that hypothesis 3d was also unsupported. Gaze behavior for fully clothed and partially clothed images following each shopping priming condition have also been illustrated using heatmaps in Figure 3.

Further correlations were conducted to explore potential associations between self-reported attitudes and engagement with the shopping task (amount spent) in each of the experimental conditions. In the activewear condition, the amount spent (\$AUD) in the shopping activity correlated significantly with self-esteem (-.24), appearance comparison (.38) and body shame (.31). There were no significant correlations with amount spent in the casualwear condition.

Figure 2.

Body Gaze Scores Split by Shopping Priming Condition and Subject Dress with 95% Confidence Intervals. Positive Scores Indicate a Preference for the Body, Negative Scores Indicate a Preference for the Head.

Figure 3.

Heatmaps Illustrating Aggregated Gaze Preferences following Each Shopping Priming Condition (Vertical Panels) for Both Fully and Partially Clothed Imagery Respectively

Casualwear Condition

Activewear Condition

Discussion

The results of the present study have provided correlational and experimental evidence that online shopping for women's apparel is linked to negative body image and self-worth, with preliminary findings that gaze behaviors may be sensitive to changes in state body image attitudes. In support of the first hypothesis, we found evidence for significant positive associations between self-reported online apparel shopping in women and

appearance attitudes, including self-objectification and appearance comparisons. While apparel shopping correlated negatively with self-esteem, the effect was modest ($-.21$) and there was no association with implicit self-esteem. These findings further support existing correlational research showing that idealized imagery exposure (e.g., social media, magazines) is linked with women's appearance attitudes and self-worth (Fardouly et al., 2017; Holland & Tiggemann, 2016).

In addressing our second hypothesis, we did not observe any correlations between body-biased gaze behavior and self-reported or implicit measures, although there was a trend-level positive association between desires to be thin or have low body fat, and body-biased gaze towards partially dressed women. Without finding significant gaze correlates, further speculation regarding the importance of women's gaze behavior for explaining socio-cognitive processes such as self-objectification and appearance comparisons is limited. While recent evidence suggests that body gaze and appearance attitudes are correlated, these prior effects were modest and statistically over-powered (Tiggemann et al., 2019). However, we also recognize that measuring gaze behavior towards our relatively small and non-representative sample of female images constrains variability and generalizability (Holleth et al., 2021). That is, by prioritizing image standardization in our gaze task, we have sacrificed external validity. We suspect that gaze patterns towards our largely homogenous studio images of women likely differ from the gaze patterns that women exhibit towards apparel marketing imagery and real women. With further research, it is plausible to anticipate that gaze behavior towards more varied female imagery might correlate with self-reported appearance and self-objectification attitudes. Research directed towards understanding same-sex gaze behavior in women is particularly important because women's body gaze patterns often lack consistency, when compared to men (Gervais et al., 2018; Hollett et al., 2021), suggesting more complex underlying motivations.

In partial support of our third hypothesis, we found experimental evidence that exposure to an activewear website primed negative appearance attitudes, when compared to exposure to a casualwear website. This is an important finding because it suggests that sexualized imagery may have particularly adverse effects on women, even when compared to idealized imagery of women. These results further support experimental research showing that body-focused imagery is potentially harmful to women because of its influence on their appearance and self-worth perceptions (Betz et al., 2019; Prichard et al., 2018). However, this negative body image effect was not accompanied by a higher level of subsequent body gaze behavior in the activewear condition, as expected. Instead, we found that the activewear shopping website primed *lower* subsequent body gaze when compared to the casualwear website. Given that prior research has shown women engage in body-biased gaze behavior when presented with sexualized imagery (Hewig et al., 2008; Hollett et al., 2019; Nummenmaa et al., 2012), it is likely that the activewear condition elicited *higher* body-biased gaze *during* the shopping activity, which presumably led to the negative self-reported body image effect. That is, when women are exposed to sexualized imagery of other women, their body image concerns become elevated and their natural tendency to gaze at faces is disrupted. Consequently, women may subsequently gaze more at faces to compensate for this disruption whilst also alleviating potential discomfort related to their own body image. Given that exposure to sexualized female imagery is consistently linked with negative body image attitudes (Paslakis et al., 2020), our findings suggest that subsequent visual attention directed *away* from bodies, following acute exposure to objectifying imagery of women, could serve as a protective mechanism. Specifically, body-avoidant gaze patterns might be used to restore or prevent further threat to a woman's body image.

An interesting finding in the present study was that women in the activewear condition with lower self-esteem, higher appearance comparison propensity, and body shame spent

more money on activewear clothing during the shopping activity. This suggests that women who experience negative body image and low self-worth are more likely to engage with (and possibly purchase) objectifying clothing. Indeed, appearance investment via clothing choices has been identified as important for understanding the role of clothing in maintaining positive or negative body image, despite being under-researched (Tiggemann & Lacey, 2009). Our findings extend this line of investigation by suggesting that objectifying apparel may be particularly desirable to women with body image and self-worth concerns, making them more vulnerable to marketing material which emphasizes the value of women's bodies. Our results also suggest that shopping behaviors for certain styles of clothing (e.g., activewear) may serve as a marker for problematic body image and self-worth attitudes.

Implications

By examining both correlational and experimental effects, the findings of the present study raise several potential practical considerations. Firstly, online apparel shopping could be an important predictor, or outcome, of negative body image and self-worth. This has practical significance because shopping for apparel represents a somewhat essential activity, particularly in a global climate where e-commerce is the predominant form of retail, and the pandemic has offered less flexibility on how to acquire consumer products (Eger et al., 2021; Pantano et al., 2020). Furthermore, the particularly rapid growth of fitness apparel sales is a notable feature of the apparel e-commerce environment, with fierce competition between retailers and aggressive marketing, particularly towards women, in this segment (Gazzola et al., 2020; Ward, 2021). Many apparel retailers are also well-integrated with social media platforms which enhances the effectiveness of their marketing (Wang et al., 2019). Therefore, women are being targeted more than ever before with apparel marketing, and are at greater risk of being subjected to imagery that can impact their wellbeing. One practical consideration arising from the relationship between retailers and consumers is the ethical

promises that brands make to their customers, often as a strategy to elevate their brand above others (Gazzola et al., 2020; Miotto & Youn, 2020). For instance, some brands have become more conscious of their commitment to various environmental and social issues in the manufacturing and marketing of their products (Joy et al., 2012; Miotto & Youn, 2020). These commitments could be extended to, for example, safeguarding women from experiencing negative body image, by using more representative and less objectifying marketing imagery. Experimental research such as ours is important for encouraging and supporting the value of such commitments amongst apparel retailers.

Another key implication of our findings is that a relatively short simulation of a shopping activity influences subsequent body image attitudes and gaze behavior. It can only be assumed that more profound effects would occur for longer-term and repeated exposure to these activities. While women will have varying thresholds to which they tolerate inspecting idealized or sexualized images of other women before it negatively impacts their own body image attitudes, reducing their exposure is potentially the most effective protective solution. Our research further emphasizes that individuals need to manage their own exposure to such imagery, particularly if they are already vulnerable to experiencing negative body image. Practically, smart device technologies are becoming more capable of managing exposure to certain platforms and networks (e.g., social media or even the internet) through user-defined controls (Ghosh et al., 2018; Kim et al., 2017; Madakam & Date, 2016). Encouraging user responsibility for managing connectedness to digital material is a public health strategy which our research supports.

Limitations and Future Directions

We acknowledge several limitations which constrain our conclusions. Firstly, our manipulation was brief (15 minutes) and unlikely to elicit enduring or more potent priming effects. Secondly, we did not include a baseline gaze measurement, which would have

permitted analysis of potential *changes* in gaze behavior resulting from the manipulation. Consequently, we encourage future researchers to utilize repeat-measure designs with longer manipulations when examining media effects on gaze behaviors. Thirdly, we recognize that gaze behavior towards our eye tracking stimuli may not generalize well to real people or apparel marketing imagery. Specifically, there was considerable homogeneity in the age and ethnicity of the models in our eye tracking task, preventing conclusions about gaze that reach beyond young Caucasian females. Whilst securing high quality matched imagery for eye-tracking tasks is challenging and can be costly, we encourage future researchers to invest in developing high quality matched stimuli with more diverse demographic characteristics.

Despite the limitations, the present study possessed several strengths and makes a meaningful contribution to the existing literature. Foremost, we implemented a controlled experiment with an adequately powered sample. Furthermore, the correlational evidence and detection of both attentional and self-reported priming effects, after a relatively brief shopping task, suggest that ongoing and more acute online apparel shopping could have a substantial impact on women's wellbeing. Our data also provides valuable continuing support for arguments that women's overall self-worth is strongly integrated with appearance attitudes and self-objectification, with correlations ranging from .28-.83. We hope that our methods and preliminary findings encourage other researchers to further pursue similar simulations of real-world media exposure, particularly with respect to marketing imagery which targets women.

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Declarations

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Compliance with Ethical Standards

The data collection procedures reported were approved by the authors' university human research ethics committee. Informed consent was obtained from all participants.

Conflicts of Interest

The authors declare that this research was conducted in the absence of any conflicts of interest.

Availability of Data

The data will be provided as part of the supplementary materials and publicly on figshare.com