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Gaze behaviour, body image in women and online apparel shopping

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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 behaviour. Self-reported online apparel shopping behaviour positively correlated with self-objectification and a tendency to value and compare one's appearance. Following a simulated online shopping activity, women who browsed a body-focused activewear website felt worse about their looks, when compared with women who browsed a non-body-focused casualwear website. The activewear condition also primed lower subsequent visual attention towards female bodies in a gaze task, when compared with the casualwear condition. Given that women tend to naturally gaze at faces, the deprivation of facial stimuli in the activewear condition presumably led to a compensatory gaze effect, whereby subsequent attention towards bodies was comparably low. Importantly, dollars spent in the activewear condition correlated positively with appearance comparison and body shame attitudes. These results suggest that online apparel imagery exposure may negatively impact women's well-being. We also find evidence suggesting that gaze behaviour plays a role in how apparel marketing influences subsequent attention.

KEYWORDS
activewear, gaze, objectification, self-esteem, shopping, women

1 | 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 United States 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, thin and attractive images of women 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 well-being 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).

Indeed, specific 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 (Brice et al., 2022; Lipson et al., 2020; Wood, 2020). Activewear, while often entwined with the promotion of a healthy lifestyle (e.g., diet and fitness), is also capable of promoting harmful social comparisons among women (Monks et al., 2021).

Although activewear originated as a form of fitness apparel, it is increasingly being worn in casual settings (Horton et al., 2016; Watts & Chi, 2019; Zhou, 2018). Internationally, there has been particularly rapid growth in athleisure sales following the onset of the COVID-19 pandemic (Australia Post, 2021; Bringé, 2021). This sales growth has considerable implications for increasing women's online apparel imagery exposure and purchase intentions (Shukla et al., 2022). It is, therefore, important to determine what impact, if any, exposure to activewear imagery has on body image attitudes and behaviour, because it is becoming more readily purchased and worn by women. However, there is also the broader goal of determining whether shopping for *any* form of women's apparel online is associated with potentially harmful consumer attitudes and behaviour. Given that participation in apparel e-commerce continues to grow, particularly amongst women, the present study aimed to provide evidence that online apparel shopping in women is linked to negative body image, appearance comparisons, self-worth attitudes and gaze behaviour.

1.1 | Online apparel shopping and appearance comparisons

Online apparel shopping is a context in which consumers typically evaluate the potential fit and appearance of garments by making direct comparisons between themselves and the models wearing the product of interest (Kim & Damhorst, 2010; Lee & Johnson, 2012). As such, we argue that online apparel shopping may elicit particularly threatening evaluative processes when compared with some other forms of female imagery exposure. Specifically, when women are shopping for clothing online, they are more likely to make relative assessments between their own physical appearance and the models' because they are actively considering purchasing the garments to wear themselves (Lee & Johnson, 2012). Exposure to other forms of idealized female imagery, such as those encountered on social media, is not necessarily accompanied by attempts to cognitively simulate oneself in another's outfit. That is, we contend that online apparel shopping is a particularly powerful vehicle for facilitating appearance comparisons because humans are used as 'beautiful hangers', a concept that contrasts with traditional bricks-and-mortar apparel shopping where garments are mostly hung on racks (Kim & Damhorst, 2010, p. 250). Appearance comparison is a form of social comparison that involves making relative appraisals of physical characteristics, such as weight and shape, between oneself and others (Schaefer & Thompson, 2014). While appearance-focused social comparisons were originally assumed to prioritize comparisons to *similar* others (Festinger, 1954), evidence suggests that women are particularly vulnerable to engaging in comparisons involving unrealistic and dissimilar others (e.g., thin media images) (Myers & Crowther, 2009). While some evidence suggests that women's comparison behaviours reduce with increasing age (Yu et al., 2013), body dissatisfaction and the importance of appearance remain relatively stable (Quittkat et al., 2019). Given that fashion imagery predominantly utilizes younger women (e.g., younger than 40) (de Freitas et al., 2018; Han & Rudd, 2015), it is plausible that body image threat via appearance comparisons might increase with consumer age. Indeed, evidence suggests that female consumers between the ages of 30–60 reported higher positive beliefs towards advertisements and greater purchase intentions when fashion imagery depicts older models (Kozar, 2010). Therefore, associations between women's age, appearance comparison and body image are likely complicated and may need to be accounted for through moderation or statistical controls.

The negative effects of appearance comparisons on women are likely due to upward comparisons involving relative appraisals against women perceived as superior, likely as a function of youth and attractiveness (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). Repeated upward appearance comparisons are argued to be damaging to self-image and may result in clinical disturbances, such as disordered eating and affective states (Holland & Tiggemann, 2016; Leahey et al., 2007). Consequently, we argue that exposure to online apparel imagery could instigate or sustain negative body image and self-worth attitudes, partly through appearance comparison processes and adopting high appearance standards. Indeed, experimental evidence suggests that exposure to images of thin and athletic models leads to lower body satisfaction and mood in women (Brown & Tiggemann, 2016; Homan et al., 2012; Prichard et al., 2018). Research also shows that disclaimer labels regarding the authenticity and potential harm of female fashion imagery can prime body-biased patterns of visual attention towards idealized women (Tiggemann et al., 2019). These body gaze patterns in women were found to correspond with higher appearance comparisons regardless of labelling and lower body satisfaction when images were unlabelled. Taken together, these findings suggest that appearance comparisons and engaging in body-biased gaze behaviour might facilitate negative body image and self-worth, possibly as a function of self-objectification.

1.2 | Self-objectification and self-worth

Derived from objectification theory, self-objectification can be described as a socio-cognitive process whereby a person internalizes the viewpoint that their overall value is largely determined by the

appearance of their body parts (Fredrickson & Roberts, 1997; Loughnan & Pacilli, 2014). Self-objectification is largely regarded as disproportionally harmful to women, particularly when it manifests as increased body surveillance and shame (Gervais et al., 2018; Moradi & Varnes, 2017). Body surveillance refers to a habitual preoccupation with the status of one's appearance (e.g., checking that clothes look good), whereas body shame refers to the affective response experienced when considering one's appearance (e.g., being ashamed of one's size) (McKinley & Hyde, 1996). 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 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.

1.3 | Gaze behaviour in women

One mechanism that might facilitate self-objectification is body-biased gaze behaviour, which can be primed and elicited by exposure to idealized and/or sexualized imagery of women (Hollett et al., 2019; Karsay et al., 2018). In line with prior eye-tracking research, we define idealized imagery as depictions of women who are generally slender, well-proportioned (e.g., small waist-to-hip ratios) and attractive. By contrast, sexualized imagery involves more deliberate strategies to highlight sexual body parts (breasts, buttocks, crotch and thighs) through revealing clothing, posture and cropping (e.g., Gervais et al., 2013; Hollett et al., 2019; Nummenmaa et al., 2012). Imagery that facilitates 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 with other characteristics (e.g., social, emotional and 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.

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 behaviour 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 behaviour and objectification attitudes is important, particularly for understanding the development of negative body image and self-worth attitudes. That is, specific gaze behaviours 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 behaviour, some recent evidence suggests that music videos featuring female vocalists and imagery of female video game characters are capable of priming body-biased gaze behaviour 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 behaviour, it is unclear precisely how women's gaze might be influenced by engaging in apparel shopping. Because we assume that women deliberately direct their visual attention towards garments being worn on the body when online apparel shopping, it seems intuitive to predict body-biased gaze patterns following apparel shopping. However, because face gaze is a more naturalistic behaviour 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 (Hollett et al., 2022). Due to the idealized *and* sexualized nature of activewear imagery, it was expected that exposure to activewear would prime stronger body-biased gaze behaviour when compared with casualwear exposure.

1.4 | The present study

Theoretical and empirical evidence to date has provided substantial guidance towards understanding how media exposure impacts the well-being of women (Daniels et al., 2020; Tiggemann & Slater, 2015). However, despite the popularity of online apparel shopping among women, only a few studies have specifically explored its potential effects on women's attitudes and behaviour (Kim & Damhorst, 2010; Lee & Johnson, 2012). Therefore, we set out to provide initial evidence in support of the assumption that online apparel shopping behaviour is associated with appearance and self-worth attitudes. We accompanied this broad goal with a more specific investigation on the effects of contemporary segments of clothing on women's body image and visual attention. First, using correlational analyses, we aimed to test that recently reported online apparel shopping is

correlated with appearance attitudes, trait self-esteem and self-objectification in women. Second, using experimental analyses, we aimed to test whether exposure to two popular women's apparel websites leads to differences in negative appearance attitudes, implicit self-worth and body gaze behaviour towards images of women. In accordance with our aims, the following hypotheses were developed:

Hypothesis 1. In line with research linking media exposure to body image and self-worth attitudes (Meier & Gray, 2014; Modica, 2019), we expected that self-reported online apparel shopping behaviour would be positively correlated with (a) appearance importance and (b) self-objectification but negatively correlated with (c) self-reported trait self-esteem.

Hypothesis 2. In line with research conceptualizing body gaze behaviour as a marker of objectifying attitudes and appearance-focused evaluations (Gervais et al., 2013; Gervais et al., 2018; Hollett et al., 2022), we expected that body-biased gaze behaviour would be positively correlated with (a) self-objectification and (b) appearance comparison attitudes.

Hypothesis 3. We expected that shopping for objectifying activewear would prime (a) a negative body image attitude, (b) lower implicit self-esteem and (c) a higher body-biased gaze behaviour towards subsequent images of partially and fully dressed women, when compared with shopping for non-objectifying casualwear. We also expected (d) an interaction effect, such that body-biased gaze would be particularly high for the activewear condition when exposed to the subsequent partially dressed female subjects.

Hypothesis 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.

2 | METHOD

2.1 | Participants

Participants who identified as females ($N = 113$), aged 18–65 years ($M = 32.95$, SD = 11.77), were recruited from an Australian university community through advertisements on digital and physical noticeboards accessible to students, staff and the public. The two experimental conditions were equivalent in age, t (111) = −.16, $p = .875$, $d = -.03$ and self-reported time (last month) spent online fashion shopping, t (111) = −.29, $p = .770$ and $d = -.06$. An a priori power analysis estimated that we required a sample of 52–126 participants to detect statistically significant ($\alpha = .05$) between-subjects effects for a medium to large effect size ($d = .50$–.80) with a power level of .80.

2.2 | Materials

2.2.1 | 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 min to 8 h) 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.

2.2.2 | Self-esteem

The 10-item Rosenberg Self-Esteem Scale (Rosenberg, 1965) measured trait self-esteem by capturing positive and negative feelings about the self. Participants rated the items from 1 (*strongly disagree*) to 4 (*strongly agree*). An example item from this scale is 'On the whole, I am satisfied with myself'. Total scores were created by summing the item ratings (range 10–40). Cronbach's alpha in this study was .90.

2.2.3 | State body image

A single item from the Body Image States Scale (BISS; Cash et al., 2002) was chosen to measure the experimental impact of 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 9 (*a great deal better about my looks than I usually feel*). As the current study design did not include baseline measurement of body image ratings prior to the experimental exposure, this item offered some utility in understanding the immediate impact of the apparel shopping conditions on women's body image. Single-item measures are often used to estimate the effectiveness of short-term experimental manipulations (e.g., Kambouropoulos & Staiger, 2001; Rosenberg, 2009).

2.2.4 | Appearance importance beliefs

The 20-item Appearance Schemas Inventory Revised (ASI-R; Cash et al., 2004) measured the belief that personal appearance is an important influence in one's life. Participants rated the items from 1 (*strongly disagree*) to 5 (*strongly agree*). An example item from this scale is 'I try to be as physically attractive as I can be'. Total scores were created by averaging the item ratings. Cronbach's alpha in this study was .90.

2.2.5 | 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*). An example item from this scale is 'When I'm out in public, I compare my physical appearance to the appearance of others'. Total scores were created by averaging the item ratings. Cronbach's alpha in this study was .96.

2.2.6 | 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*). Example items from these subscales are 'During the day, I think about how I look many times' (surveillance) and 'I feel ashamed of myself when I haven't made the effort to look my best' (shame). Total 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.

2.2.7 | Implicit self-esteem

A combined adaptation 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. The strength of the association between the self and positive words was computed using D, a specialized effect size measure unique to this task, with a range of -2 to $+2$ (see Greenwald et al., 2003; Sriram & Greenwald, 2009). Higher and positive D scores indicate a stronger association between the self and positive words and negative or lower D scores indicated a stronger association between the self and negative words. This task was chosen as a state measure to test the experimental hypothesis that exposure to objectifying activewear imagery would prime lower implicit self-esteem. Evidence shows that self-esteem IATs are sensitive to short-term manipulations designed to threaten mood or identity (e.g., Gemar, 2001; Greenwald, 2002; Rudman, 2007).

2.2.8 | Eye tracking

Gaze data was sampled at 30 Hz 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 6.6×25 cm. Subjects were only selected if a suitably matched image of the same model could be obtained (full frontal profile clearly showing face and body in similar posture and an absence of props) in both partial (e.g., bikini) and full dress (e.g., casual). All the models were ethnically white, aged approximately between 20 and 35 years and could be described as ideal in their body shape (i.e., slender, small waist-to-hip ratios and attractive) (Gervais et al., 2013). Importantly, these models shared similar characteristics to the imagery typically encountered when online shopping for women's apparel. 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 (2.4×3.4 cm). 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 100 ms 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., 2022), we adopted a *relative* body gaze score, whereby head fixation time was subtracted from body fixation time. That is, larger and positive scores reflected greater body-biased gaze behaviour.

2.3 | Procedure

Participants were invited to a 30–45-min laboratory session using flyers (print and digital) and an undergraduate research participation scheme whereby students could earn course credit for completing research studies. Upon arrival and provision of consent, participants were randomly allocated to one of two website exposure conditions. Participants in the control condition were exposed to a popular casualwear website, while participants in the experimental condition were exposed to a popular activewear website. These websites were selected following a first-page Google search for 'women's activewear' and 'women's casualwear' brands. Each author performed an independent content analysis on a random selection of images from each search result to identify suitable exemplar websites for each condition. An activewear website, echt.com.au, was chosen for the experimental condition, for its predominant use of objectifying (body-focused) female imagery. Specifically, the activewear website contained more images that cropped in on specific body parts (breasts, buttocks and legs) which, coupled with the form-fitting clothing and high proportion of sexualized poses, was assumed to prime body-biased attentional processing (Gervais et al., 2013; Hollett et al., 2022). 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. Specifically, the casualwear website contained more images which included faces,

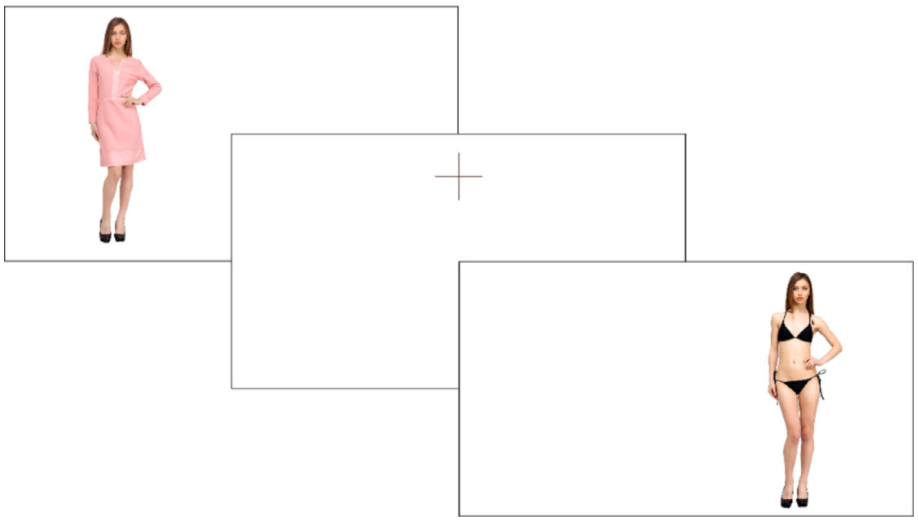

FIGURE 1 Example of female imagery in the fully and partially clothed imagery conditions, respectively.

loose-fitting clothing and fewer examples of sexualized posture relative to the activewear website.

For the simulated shopping activity participants were told 'You have an unlimited budget. Spend 10-minutes on the following website to look for several full outfits that you feel would make you look the most attractive to others. During these 10-minutes you may browse, mentally construct outfits and think about your choices, but do not add anything to your cart yet. I will come back after 10-minutes and then ask you to place your chosen outfits into your shopping cart. Please do not open any other tabs or webpages during this activity'. The subtotal ($AUD) of the garment selections was recorded for each participant as a measure of their engagement with stimuli. Participants spent a statistically similar amount in each condition, t (111) = 1.93, p = .057, d = .36 ($M_{activewear}$ = 467.70, $SD_{activewear}$ = 236.26; $M_{casualwear}$ = 388.85, $SD_{casualwear}$ = 192.95).

To maximize the likelihood of detecting attentional effects, participants completed the gaze task and implicit self/positive BIAT (in counterbalanced order) directly after the shopping activity. Following the shopping activity and attentional/implicit tasks, the self-report measurements were then presented together in a randomized order. 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 centre of the display for 4 s each (see Figure 1.). The image sequence was randomized and 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 the two. A break was offered halfway through the presentation. Prior to each image, a central fixation cross appeared at the location of the vertical boundary between the head and the body for 1 s. Consistent with prior eye-tracking studies (Hollett et al., 2022; Lykins et al., 2008; Nummenmaa et al., 2006), we included imagery of women in different states of dress (partially and fully dressed) in our gaze task. Participants in both conditions completed the same eye-tracking task and were thus exposed to the same set of images. On completion, participants received course credit or a $20 (AUD) voucher. These procedures were approved by the University Human Research Ethics Committee. As our experimental manipulation involved a common real-world activity amongst women (online apparel shopping), the project was reviewed and approved by a low-risk subcommittee.

2.4 | Research design and data analysis

This investigation employed both correlational and experimental design elements, with all the procedures and measures conducted within the same data collection. All measures were subject to partial bivariate correlational analysis to test the Hypotheses 1 and 2 and explore associations amongst all the variables. Importantly, as the experimental manipulation occurred prior to collecting data from participants, the condition allocation was controlled for in all associations. We also controlled for age in our correlational analysis for two reasons. First, our sample had a wide age range and because online shopping imagery often involves younger models, discrepancies between model and consumer age might a play role in the impact of online shopping on body image. Second, there is evidence that women's comparison behaviours reduce with age (Yu et al., 2013), further complicating the associations between online shopping and body image measures. As our sample was not large enough to explore moderating effects of age, we opted to eliminate the variance contributed by age through statistical controls. This decision allowed us to make conclusions independent of age when interpreting the correlational analyses. Note that, while gaze behaviour and implicit self-esteem were chosen primarily as dependent variables for the experimental design, we also explored the possibility that individual differences in these measures might correlate with the attitudinal self-report measures. Examining correlations between gaze behaviour and attitudinal self-report measures was expected to be helpful for understanding the role of gaze in facilitating or sustaining self-objectification and appearance comparisons.

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 apparel 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 apparel shopping conditions and eye tracking stimuli on body gaze scores (dependent variable), a mixed factorial ANOVA was used that included one between-subjects factor (Shopping Condition: casualwear; activewear) and one within-subjects factor (Subject Dress: partially; fully). The ANOVA allowed us to test for the predicted interaction effect between apparel shopping condition and subject dress. The body 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 the amount spent, separately, for each apparel shopping condition.

3 | RESULTS

3.1 | Data screening

Due to technical issues and poor calibration, eight cases were excluded from eye-tracking analyses. Six participants were also excluded from BIAT analyses for technical issues and low accuracy (<70%). Three scores were found to exceed three standard deviations from the mean on the self-reported weekly online apparel shopping variable. While these outlying values were extreme relative to the mean, they were plausible estimates (360–540 min p/week). However, to minimize their impact on the distribution (e.g., skew), they were winsorized for retention (converted to an upper threshold of 350 min p/week) (Dixon, 1980).

3.2 | Correlational analyses

To test the first set of hypotheses that self-reported online apparel shopping would be associated with appearance importance beliefs, self-objectification and self-worth measures, partial correlations amongst these measures were performed and are reported in Table 1. Descriptive statistics for each measure are also reported in Table 1. These results showed, after controlling for experimental condition and age, that online apparel shopping positively correlated with appearance attitudes (importance beliefs, comparison and thin/low fat desires) and self-objectification (surveillance and shame), supporting Hypothesis 1a,b, respectively. Specifically, women who reported spending more time online shopping for clothing also reported placing higher importance on their appearance, had a higher desire to be thin with low fat, were more likely to compare their appearance to the appearance of other women, were more likely to monitor their own appearance and experience shame related to their appearance. Prior online apparel shopping did not correlate with trait self-esteem, and thus Hypothesis 1c was not supported. However, the association between self-reported online shopping and self-esteem was shown to be statistically stronger ($r = -.35$) in the activewear condition, compared with the casualwear condition ($r = .10$) when tested using Fisher's Z ($p = .034$). While controlling for experimental conditions allowed general conclusions to be made about the subsequently measured self-report associations, it is possible that the experimental

TABLE 1 Intercorrelations and descriptive statistics for explicit, implicit and gaze measures, while controlling for experimental condition and age.

	Correlations											
Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	***M***	***SD***
1. Apparel shopping p/w (mins)	–										70.82	85.32
2. Self-esteem	−.17	–									29.35	5.55
3. Appearance importance beliefs	**.26**	**−.33**	–								3.52	.64
4. Thin/low-fat desires	**.22**	−.17	**.51**	–							3.06	.92
5. Athletic/muscular desires	.11	.07	**.25**	**.30**	–						2.54	1.02
6. Appearance comparison	**.25**	**−.46**	**.67**	**.39**	.17	-					1.76	1.06
7. Body surveillance	**.22**	**−.32**	**.82**	**.50**	.18	**.61**	–				4.58	1.06
8. Body shame	**.26**	**−.63**	**.61**	**.42**	.07	**.70**	**.52**	–			3.82	1.25
9. Implicit self/positive score[a]	−.09	.12	−.14	−.18	−.01	−.09	−.07	−.15	–		.54	.42
10. Fully clothed body score[b]	.18	.11	−.02	.12	−.04	−.05	−.07	−.08	−.06	–	242.97	1075.55
11. Partially clothed body score[b]	.14	.08	.11	.19	−.05	.06	.11	.04	−.10	**.80**	341.75	1158.15

Note: $N = 113$; significant ($p < .05$) effect sizes in boldface; experimental condition and age (years) controlled for in all associations. Higher body scores (milliseconds) represent a visual preference for the body, relative to the head.
[a]$N = 107$;
[b]$N = 105$.

conditions differentially influenced responses on the self-esteem measure.

To test the second set of hypotheses that body gaze scores would associate with self-objectification and appearance comparison attitudes, correlations amongst these measures were performed and are reported in Table 1. After controlling for experimental condition and age, body gaze scores did not correlate significantly with self-objectification (surveillance or shame) or appearance comparison attitudes, so Hypothesis 2a,b were not supported, respectively.

To address our exploratory analysis, further correlations were conducted to examine 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 ($AUD) in the shopping activity correlated significantly with appearance comparison ($r = .38$, $p = .003$) and body shame ($r = .31$, $p = .017$). That is, for women in the activewear condition, selecting a higher volume of clothing was associated with a greater tendency to compare their own appearance to others as well as experiencing higher body shame. There were no significant correlations with the amount spent in the casualwear condition.

3.3 | Experimental analyses

To test the Hypothesis 3a that the activewear condition would prime lower body image ratings compared with the casualwear condition, the single-item body image scores (feeling better/worse about looks than usual) were 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) $= -2.00$, $p = .048$ and $d = -.38$, supporting the hypothesis. To test Hypothesis 3b that the activewear condition would prime lower implicit self-esteem, the BIAT scores were compared across conditions. As there were no conditional differences for the self/positive implicit association test, t (106) $= 1.18$, $p = .241$, $d = .23$, this hypothesis was not supported.

To test the Hypothesis 3c,d that the activewear condition would prime higher subsequent body gaze when compared with the casualwear condition, and this effect would be particularly elevated when exposed to the partially dressed subjects in the eye tracking task, a 2 (shopping condition) × 2 (subject dress) ANOVA was performed. The analysis revealed that there was no main effect of the 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 apparel 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 behaviour, compared with the activewear condition (see Figure 2). That is, the condition effect was in the opposite direction to Hypothesis 3c, and the absence of interaction meant that Hypothesis 3d was also unsupported. Gaze behaviour for fully clothed and partially clothed subjects following each shopping priming condition has been illustrated using heatmaps in Figure 3.

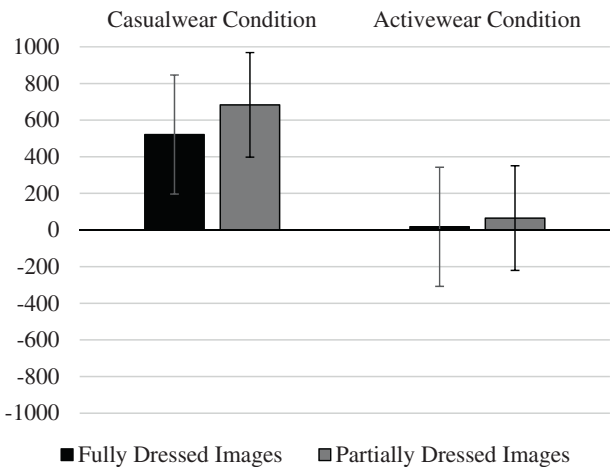

FIGURE 2 Body gaze scores split by shopping priming condition and subject dress with 95% confidence intervals. Positive scores indicate a preference for the body, negative scores indicate a preference for the head.

4 | DISCUSSION

The present study provides correlational and experimental evidence that online shopping for women's apparel is linked with negative body image and self-objectification. Preliminary findings also suggest that gaze behaviours may be sensitive to changes in state body image attitudes. Our study is the first of its kind to explore women's online shopping behaviours using self-reported, implicit and attentional measures. We suspect our methodology and findings will provide a useful starting point for more intensive investigations into causal relationships between online apparel shopping behaviour and women's well-being.

In support of the first hypothesis, we found significant positive associations between self-reported online apparel shopping in women and appearance attitudes, including self-objectification and appearance comparisons. However, overall, self-reported online apparel shopping did not correlate significantly with trait or implicit self-esteem. These findings further support correlational research showing that idealized imagery exposure (e.g., social media, magazines) is linked with women's appearance and self-objectification attitudes (Fardouly et al., 2017; Holland & Tiggemann, 2016).

Importantly, our correlational results are supportive of multiple theoretical frameworks. First, greater online apparel shopping activity amongst women who also engage in more appearance comparisons aligns with conceptualizations of social comparison theory, suggesting that women are particularly vulnerable to engaging in upward appearance comparisons despite the potential negative consequences (Myers & Crowther, 2009). Second, and consistent with theoretical accounts of self-objectification, we found evidence that women who engage in more appearance comparisons and internalize high appearance standards for themselves are also more likely to experience body shame (Moradi & Huang, 2008). These findings provide further empirical evidence that negative body image amongst women can be

FIGURE 3 Heatmaps illustrating aggregated gaze preferences following each shopping priming condition (vertical panels) for both fully and partially clothed imagery, respectively. Visual interest ranges from green (some interest), yellow (moderate interest) to red (intense interest).

attributed to the perpetuation of an objectifying culture, which not only implicates men objectifying women but also women objectifying themselves.

In addressing our Hypothesis 2, we did not observe any correlations between body-biased gaze behaviour and self-reported or implicit measures. As such, further speculation about the relevance of women's gaze behaviour to explain 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 overpowered (Tiggemann et al., 2019). We also recognize that measuring gaze behaviour towards a relatively small and non-representative sample of female images constrains variability and generalizability (Hollett et al., 2022). 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-photographed women likely differ from the gaze patterns that women exhibit towards apparel-marketing imagery and real women. As such, further research is needed to understand same-sex gaze behaviour in women, particularly because women's body gaze patterns often lack consistency when compared with men (Gervais et al., 2018; Hollett et al., 2022).

An interesting finding in the present study was that women in the activewear condition with higher appearance comparison propensity and body shame were prepared to spend more money on activewear during the shopping activity. The absence of similar correlations in the casualwear condition suggests that women who experience greater body shame and engage in more appearance comparisons are more likely to engage with (and possibly purchase) objectifying clothing when the opportunity arises. 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). Increased spending on activewear in those with higher body shame is consistent with research suggesting that consumers are more likely to purchase products when they feel powerless (Rucker & Galinsky, 2008). That is, increased consumer spending on some products may reflect an attempt to compensate for aversive states, such as inadequacy. Our findings extend these lines of investigation by suggesting that objectifying apparel may be particularly desirable to women with body image concerns, making them more vulnerable to marketing material that emphasizes the value of women's bodies.

In partial support of our Hypothesis 3, we found experimental evidence that exposure to an activewear website primed a negative body image attitude when compared with 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 with 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 behaviour in the activewear condition, as expected. Instead, we found that the activewear shopping website primed lower subsequent body gaze when compared with the casualwear website. Given that prior research has shown that women engage in body-biased gaze behaviour 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. While we did not measure gaze behaviour during the shopping activity in our study, we speculate that 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 a further threat to a woman's body image. Indeed, avoidance behaviours are commonly recognized as a self-preserving coping mechanism in response to uncomfortable or stressful body image situations (Cash et al., 2005). For instance, women have been shown to discount threatening information (e.g., breast cancer risk) when aspects of their identity are made salient (e.g., female gender) (Puntoni et al., 2011). Our findings are therefore consistent with prior research suggesting that attentional avoidance strategies are readily utilized to defend against short-term threats (Suls & Fletcher, 1985), particularly those that target self-image (Cramer, 2000). However, further research is needed to support these arguments in the context of apparel imagery.

4.1 | Implications

By examining both correlational and experimental effects, the findings of the present study raise several potential practical considerations. First, 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 well-being. 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). These commitments could be extended to safeguarding women from experiencing negative body image by using more representative and less objectifying marketing imagery. Experimental research such as ours is important for supporting the value of these commitments amongst apparel retailers. However, there remains a tension between capitalizing on threats to women's body image to boost sales and offering a less harmful apparel shopping experience. We urge those in managerial positions to consider the ethical consequences of their branding and marketing strategies by exploring alternative avenues for profitability which do not involve threatening women's body image. As such, we encourage managers to consider partnering with researchers who can deploy suitable research designs to find evidence for sustainable solutions which balance profitability with consumer wellbeing.

We also acknowledge several clinical implications resulting from our work. Most notable is the potentially counterproductive role that online apparel shopping activities might play for women who are vulnerable to or are diagnosed with, clinical disorders. Research has consistently pointed to idealized media exposure as a risk factor for the development and maintenance of eating and affective disorders (Levine & Murnen, 2009; Tiggemann et al., 2009; Tiggemann & McGill, 2004). While these factors are likely well understood by informed clinicians, it may be important to specifically recognize the potential harm that some apparel retailers pose to clients who may be receiving treatment. For instance, interventions that are designed to challenge unrealistic body image standards (Devaraj & Lewis, 2010; Stice, 2004) could be rendered less effective if clients concurrently engage in online apparel shopping activities. One recommendation from our line of research would be to advise at-risk women or clients to refrain from online apparel shopping activities or suggest apparel retailers that promote more positive body image standards. However, to further substantiate such recommendations, we recognize that further work is needed to properly link mood, body dissatisfaction and disordered eating to online apparel shopping activities.

4.2 | Limitations and future directions

We acknowledge several limitations that constrain our conclusions. First, our manipulation was brief (15 min) and unlikely to elicit enduring or more potent priming effects. Our conclusions are further limited by the absence of baseline measurements prior to the shopping activity, which would have permitted analysis of potential changes in gaze behaviour and body image ratings resulting from the manipulation. Consequently, we encourage future researchers to utilize repeated-measure designs with longer manipulations when examining media effects on gaze behaviour and body image ratings. We also acknowledge that our assumptions regarding women's gaze behaviour during the shopping activity could only be confirmed by tracking their eye movements in real time. However, prolonged and dynamic tracking of multiple areas of interest would produce a substantially higher volume of data, requiring considerable manual post-processing, which is far less practical and more resource-intensive than pre/post designs.

Importantly, we recognize that gaze behaviour 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.

We also offer some suggestions for future research to further inform correlational analyses and draw more convincing conclusions regarding online apparel shopping behaviours. For instance, the measurement of self-reported online shopping behaviours could be substantially improved through ecological momentary assessments to capture women's exposure to objectifying media. Similar methods have successfully been used to predict self-objectification from daily, sexually objectifying experiences (Holland et al., 2017).

5 | CONCLUSION

Despite the limitations, the present study possessed several strengths and makes a meaningful contribution to the existing literature.

Specifically, we implemented a controlled experiment and used a combination of self-report, attentional and implicit methods to measure the association between online apparel exposure and women's body image attitudes. In summary, we found correlational evidence that online apparel shopping behaviour is associated with heightened appearance comparisons and self-objectification attitudes. We also found experimental evidence that exposure to sexualized apparel imagery negatively influences body image attitudes and primes lower visual attention towards female bodies, when compared with less sexualized apparel imagery. Importantly, we detected these self-reported and attentional priming effects after a relatively brief shopping task. These findings suggest that ongoing and more acute online apparel shopping could have a substantial impact on women's well-being. Our work further encourages the online fashion industry to adopt imagery that is less threatening to women's body image by focusing less on body parts and more on the whole person. 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 that targets women.

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CONFLICT OF INTEREST STATEMENT

The authors have no relevant financial or non-financial interests to disclose.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in figshare at https://figshare.com/articles/dataset/manuscript_data_csv/20480007, reference number 10.6084/m9.figshare.20480007.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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