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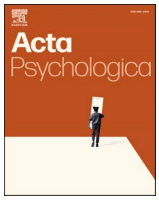

Sex(ism) doesn't sell: Disentangling the effects of nudity and sexism in advertising

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ABSTRACT

Though advertisers frequently use sex appeal to improve advertising effectiveness, its effects on recipients' attitudes are not fully understood. In fact, a recent meta-analysis by Wirtz et al. (2018) reports heterogeneous effect sizes and suggests that differences among sexual stimuli might contribute to this heterogeneity. We adopt this proposition and argue that while scholars mostly use nudity to manipulate sex appeal in advertising, these manipulations often confound nudity and sexism. We seek to disentangle unique and interactive effects of nudity and sexism on attitudes towards the ad and the brand. We conduct two preregistered experiments using 16 real and fictitious print ads of female models, respectively. Through an orthogonal manipulation of nudity and sexism, we provide a rigorous estimation of the independent effect sizes and show that effects of nudity are small, whereas sexism exerts medium to strong effects on attitudes. Therefore, sexism rather than nudity appears to drive consumers' negative responses.

Female sex appeal is one of the most prominent and frequently used advertising techniques (e.g., Matthes & Prieler, 2020) that has stimulated theorizing (e.g., Blair et al., 2006; Choi et al., 2016; Leung Luk et al., 2017) and research in the fields of psychology and marketing (e.g., Morrison & Sherman, 1972; Steadman, 1969; Trivedi & Teichert, 2021). As sexual appeals are also part of societal debates and subject to bans and regulations, studies on this important topic are manifold. Recently, Wirtz et al. (2018) have summarized findings using meta-analyses. While they do report evidence that sex appeal enhances ad memory, effects on attitudinal outcomes and purchase intentions appear somewhat ambiguous. In addition, Wirtz et al. emphasize the "significant dispersion in the effect size" (p. 188) that spans a broad range of negative as well as positive figures.

One potential cause of the dispersion of effect sizes may be associated with the manipulation of sex appeal. Specifically, there appears to be a divide between studies that seek to manipulate sex appeal by either nudity or other attributes. Nudity appears to be the most prominent manipulation of sex appeal (cf. Reichert, 2002; Wirtz et al., 2018). It refers to the amount of clothing of models depicted in ads and is an objective characteristic that is easily identifiable (e.g., Matthes & Prieler, 2020; Soley & Reid, 1988) and easy to manipulate (e.g., Reichert et al., 2011). Yet, studies point to further stimulus attributes that affect participants' attitudes. For example, stimuli may convey sensual romantic feelings (e.g., Dahl et al., 2009), objectify models (Ketelaar et al., 2014), or appear inappropriate (Wyllie et al., 2015). Unfortunately, studies have largely examined either nudity or other attributes and we know little about the joint or interactive effects of these manipulations. In fact, some studies appear to confound nudity and other attributes such as objectification and inappropriateness (e.g., Ketelaar et al., 2014; Wyllie et al., 2015), that represent sexism rather than sex appeal. This hardly allows conclusions on their distinct effects and also limits our knowledge regarding potential interactions between nudity and these other attributes. For example, whether nudity amplifies effects of objectification or whether nudity has no effect in ads deemed inappropriate remains largely unexplored (a notable exception is Black & Morton, 2017).

In this study we focus on nudity and sexism, and examine their distinct and joint contribution to attitudinal evaluations of females in print ads. We examine the distinct effects of nudity and sexism by orthogonally manipulating both within the same study. Sexism refers to "prejudice that specifically subordinates women to men" (Barreto & Doyle, 2023, p. 99) and its range of negative consequences has been well documented (for overviews see Barreto & Doyle, 2023 and Ward, 2016). In advertising, sexism includes a range of attributes, such as objectification, submissiveness, and other variations (Advertising Standards Bureau, 2013; Black & Morton, 2017; Stankiewicz & Rosselli, 2008;

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Wyllie et al., 2015). Most likely, these different facets of sexism influence attitudes in a similar way, as they induce a negative moral judgment (e.g., de Kerviler et al., 2022; Ketelaar et al., 2014) and studies consistently show negative effects on attitudes across these facets (e.g., Keller et al., 2020; Ketelaar et al., 2014; Wyllie et al., 2015). We assume that sexism more strongly than nudity affects attitudes and examine the interaction of the two concepts. We test our assumptions in two preregistered experiments that examine effects on attitudes towards the ad and the brand, the very measures that exhibited insignificant and/or broadly varying effects in Wirtz et al.'s (2018) study. To assure adequate rigor of our experimental studies, we explicitly focus on print ads with female models, as ads with sexual appeals predominantly depict female models in reality (Monk-Turner et al., 2008; Panarese, 2023; Reichert & Carpenter, 2004; Reichert et al., 2012).

Our paper contributes to the literature in several ways. First, we further our knowledge on heterogeneous effects of sex appeal. While Wirtz et al. (2018) have mostly examined moderating effects of study characteristics such as sample composition or publication year, we examine whether heterogeneity is also due to characteristics of the advertising stimuli themselves. In fact, recent research has begun to take this heterogeneity on the stimulus side into account (e.g., Black & Morton, 2017; Ketelaar et al., 2014; Wyllie et al., 2015). The orthogonal manipulation of nudity and sexism provides insights into their independent and joint effects, as well as their relative effect sizes. Because nudity and sexism can be easily confounded, gauging the effect size of nudity requires controlling for sexism. Possibly, nudity is not as "bad" as we think. Second, the potential confounding of nudity and sexism may have implications on our views of recipients. Whether we attribute presumably lower attitudes to nudity or sexism may affect how we see recipients, that is, whether they appear conservative or rightfully offended, respectively. Finally, this study contributes to debates on legislation and regulation of sexist advertisements. Research has highlighted the negative consequences of sexist advertisements (for an overview see Ward, 2016), including their impact on violence against women (e.g., Bareket & Fiske, 2023) and their detrimental effects on recipients' health and well-being (e.g., McKenzie et al., 2018). While these findings provide ample justification for banning sexist advertisements, our focus on attitudinal effects offers valuable insights into more proximal effects of sexual stimuli and might provide further incentives for practitioners to reconsider their portrayals of women.

1. Theoretical background

1.1. Sex appeal in advertising

Sex appeal refers to "a persuasion attempt that uses words, images, and/or actions by models appearing in ads to deliver an explicit or implicit sexual message designed to evoke sexual thoughts, feelings, and/or arousal in a target audience" (Wirtz et al., 2018, p. 169). Reichert (2002) further specifies several types of sexual content: body display/nudity, explicit or implicit sexual behavior, sexual referents (e.g., sexual innuendo, double entendre), sexual embeds and symbolism, and contextual factors (e.g., a romantic setting). With regard to the effects of sex appeal, the meta-analysis by Wirtz et al. (2018) summarizes findings from 78 studies published in 72 articles. Sex appeal enhances ad recognition and recall, but has no effects on brand memory. Concerning attitudes, Wirtz et al. report a significant, small effect of sex appeal on attitude towards the brand (A_{brand}, i.e., $d = -0.22$, $k = 47$ studies), but an insignificant effect on attitudes towards the ad (A_{ad}, i.e., $d = -0.07$, $k = 100$). In examining several moderators Wirtz et al. (2018) report that samples with college students as well as predominantly female samples exhibited more negative attitudes than more diverse or male samples, respectively. Most importantly, however, they emphasized that effect sizes of their primary studies for attitudes varied greatly and this might limit the interpretation of their results (cf. Higgins et al., 2003). Several statistics indicated that the variation between effects sizes may be due to unexplained, but systematic differences between studies that leave room for additional moderators.

The conceptual breadth of sex appeal that is evident from the definition might be a cause of these divergent findings. This breadth bears the risk that studies capture different aspects of sex appeal and might hinder cumulative knowledge building (Leising et al., 2022; Wirtz et al., 2018), for example when different aspects yield diverging findings. In fact, Reichert (2002) acknowledges that different types exist and often co-occur in stimuli used to induce sexual thoughts and feelings. Likewise, Wirtz et al. (2018) presume that one cause of the variation of attitudinal effects of sex appeal is differences in its' operationalization. Unfortunately, they were not able to test this presumption, but recommended future research to disentangle the influence of different stimulus characteristics.

In the present study, we follow this recommendation by separating the effects of nudity and sexism. We argue that the effects of sexism are much stronger than those of nudity and the confounding of sexism and nudity in prior studies may contribute to the variation in effect sizes. To provide a clearer picture and assure experimental rigor, we focus our studies as well as our theorizing in three important ways. First, our review of the literature largely concentrates on nudity since it is the most prominent manipulation of sex appeal (Kiper & Ulema, 2021; Matthes & Prieler, 2020; Reichert, 2002; Trivedi & Teichert, 2021). We do not discuss findings about more subtle manipulations of sex appeal (e.g., sexual embeds). Second, we confine our study to female models in ads because this is the most frequent depiction of sex appeal in real ads (Prieler, 2016; Reichert & Carpenter, 2004) and women are more likely to be depicted in a scarcely dressed and sexist manner (Matthes & Prieler, 2020; Monk-Turner et al., 2008; Panarese, 2023). Therefore, we do not discuss gender differences in depth since it would require a stronger theoretical emphasis on the literature on gender differences as well as a more complex design with male stimuli. Finally, we focus on attitudes towards the ad (A_{ad}) and the brand (A_{brand}), because they are the most common dependent variables in research on sex appeal (Trivedi & Teichert, 2021; Wirtz et al., 2018).

1.2. Nudity and sexism

Nudity, the amount of clothing a model wears, is easy to manipulate and the most prominent manipulation of sex appeal (Kiper & Ulema, 2021; Matthes & Prieler, 2020; Reichert, 2002; Trivedi & Teichert, 2021). Soley and Reid (1988) developed a frequently used scale to differentiate states of nudity. It's four ordinal categories are demure, suggestive, partially clad, and nude. Scholars have used the scale in content analyses of advertising (Matthes & Prieler, 2020; Reichert & Carpenter, 2004), analyses of real ads (e.g., Trivedi & Teichert, 2021) and in experimental manipulations of sex appeal (e.g., Reichert et al., 2011). Content analyses of real ads have revealed that advertisers rarely use entirely unclad models, but frequently use partially dressed or suggestively dressed models (Reichert, 2002; Reichert & Carpenter, 2004). Female nudity is widespread, although the extent varies across nations and media channels (Matthes & Prieler, 2020; Nelson & Paek, 2008). For example, Matthes and Prieler (2020) found no TV commercials depicting nudity in the United States, China, and Romania while these were more common in Germany, France, and Slovakia. In contrast, the United States exhibited the highest percentage of nude models in print advertising (Nelson & Paek, 2008). Note however, that although incidences and absolute effects of nudity may differ, the effects of nudity appear to follow similar trends across countries (e.g., Choi et al., 2022; Dianoux & Linhart, 2010; Terlutter et al., 2022).

In establishing a hypothesis of effects of nudity on attitudes, scholars mostly expected negative effects of nudity on attitudes (e.g., Dianoux & Linhart, 2010). They attribute these effects to social norms that deem the depiction of nudity as unethical or immoral (e.g., Black & Morton, 2017; Dianoux & Linhart, 2010; LaTour & Henthorne, 1994). Yet, other scholars reported positive (e.g., Trivedi & Teichert, 2021) or null effects

(Reichert et al., 2011) of nudity on attitudes, indicating the existence of boundary conditions, such as, possibly, sexism. Here we predict a main effect of nudity on both, A_{ad} as well as A_{brand}. This serves to replicate prior findings while simultaneously controlling for sexism as we will explain in the following paragraphs.

H1. Nudity in advertising leads to a) more negative A_{ad} and b) A_{brand} in comparison to advertising without nudity.[1]

To further explain the heterogeneous effects of sex appeal on attitudes (cf. Wirtz et al., 2018), it seems important to gauge the impact of additional characteristics that may drive more or less favorable attitudes. Ads are complex stimuli and the literature holds several accounts of additional characteristics that may affect recipients' attitudinal responses. Next to the perceived fit between product and advertisement (e.g., Black & Morton, 2017; Chang & Tseng, 2013) or participants' gender (Dianoux & Linhart, 2010; Reichert et al., 2007; Wirtz et al., 2018), sexism plays a crucial role in the evaluation of sexual ads (e.g., Black & Morton, 2017; Keller et al., 2020; Ketelaar et al., 2014).

Advertising scholars and industry institutions define it as a broad concept of discrimination against people based on their gender that includes a range of attributes, such as objectification, submissiveness, and other variations (Advertising Standards Bureau, 2013; Black & Morton, 2017; Stankiewicz & Rosselli, 2008; Wyllie et al., 2015). It becomes manifest in "organizational, institutional or cultural practices, that either reflect negative evaluations of individuals based on their gender or support unequal status of women and men" (Swim & Hyers, 2009, p. 407). Criteria for determining sexism in advertising include a) the suggestion of sexual availability, b) an exclusive focus on specific body parts like breasts or buttock, c) the objectification of people, d) the portrayal of models in stereotypical gender roles, or e) depiction of gender-related submissiveness/dominance (German Advertising Standards Council, 2014; see also Stankiewicz & Rosselli, 2008).

Regarding these criteria, it appears plausible that advertising stimuli often suffer from a confounding of nudity and sexism. Nude models can often be interpreted as objectified, or can be featured in ads that solely focus on their breasts and buttocks. However, it is important to note that not every depiction of scantily or undressed models is inherently sexist, and also, that there are instances of sexist ads featuring fully clothed models as well (e.g., Ketelaar et al., 2014; Stankiewicz & Rosselli, 2008). In this vein, it is important to note that sexism is not a manipulation of sex appeal. Conceptually, sex appeal is used to evoke sexual thoughts or feelings (Wirtz et al., 2018) and its purpose is engagement and attraction, not marginalization. Sexism, by definition, involves prejudice and practices that devalue or subordinate individuals based on gender and goes far beyond the construct of sex appeal.

Even though studies show the negative impact of sexist ads on recipients' wellbeing and self-objectification (e.g., Karsay et al., 2018; McKenzie et al., 2018; Ward, 2016) advertisers frequently use sexism. According to Stankiewicz and Rosselli (2008), about half of US print ads depict women as sex objects and are sexist (see also findings by Panarese, 2023 in Italy or Royo-Vela et al., 2008 in Spain). Similarly, Plakoyiannaki et al. (2008) found that about 70 % of the online advertising of global products present women in roles linked to notions of sexism (i.e., traditional or decorative roles). These practices not only lead to a variety of negative societal effects as highlighted in the introduction (e.g., Barreto & Doyle, 2023); research has also reported their negative effects on recipients' attitudes towards ads and brands. For example, Keller et al. (2020) manipulated gender related submissiveness with passive vs. agentic slogans and found that passive (i.e., more submissive) slogans resulted in more negative attitudes. Also, Black and Morton (2017) focused on objectification and compared ads showing a couple in an either intimate or objectifying (i.e., sexist) pose, reporting more negative attitudes for the objectifying pose. Taken together, those studies share the common ground we denote as sexism, that is, they use 'inappropriate' (Wyllie et al., 2015), 'objectifying' (Black & Morton, 2017), or 'degrading' sexual stimuli (Advertising Standards Bureau, 2013). Hence, we pose:

H2. Sexist advertisement leads to a) a more negative A_{ad} and b) a more negative A_{brand} in comparison to non-sexist advertisement.

Our main interest in this study concerns the separate and interactive effects of sexism and nudity. We assume that nudity itself might not be the problem; rather, negative evaluations may arise from sexism. Concerning their separate effects, the present orthogonal manipulation of nudity and sexism provides a better opportunity to compare the effects of nudity and sexism when both are balanced. Without an orthogonal manipulation of nudity and sexism, we do not experimentally control for either one and our estimates how much variance is attributable to nudity or sexism remains ambiguous. This hinders both: a precise estimation of the individual effect sizes of sexism and nudity as well as an understanding the driving factor behind recipients' negative responses. Prior studies have mostly manipulated either nudity or sexism and, ideally, held the respective other concept constant, or to the worse, may have even confounded them. For example, studies might have manipulated nudity using a constant level of sexism. Yet, if effects of nudity depend upon sexism, generalizability of effects may be limited. As an example of a potential confound, Ketelaar et al. (2014) report that objectification, which represents one component in definitions of sexisms, decreased attitudinal ratings. Concerning their experimental conditions, they neither crossed nor balanced nudity and objectification, as most objectified ads depicted nude or demure models, whereas the non-objectifying ad did not. Thus, while manipulating the amount of sexism the extent of nudity changed as well, confounding their effects. If both constructs affect attitudes, it is important to include appropriate methodological controls in studies and to disentangle their effects.

Aiming to disentangle nudity and sexism, we hypothesize that sexism shows stronger negative effects on attitudes than nudity. We infer this assumption from multiple observations: First, nudity leads to more positive attitudes if paired with lower objectification (Keller et al., 2020; Ketelaar et al., 2014). For example, Keller et al. (2020) showed that nudity was rated more positively when paired with an agentic (i.e., non-sexist) slogan. As the authors did not vary nudity, how sexism without nudity affects recipients remains open. Second, studies indicate that ethical judgments are important to ad evaluations (Choi et al., 2016; Ketelaar et al., 2014; LaTour & Henthorne, 1994) and some studies have shown that the moral judgment depends on the level of sexual objectification (e.g., Ketelaar et al., 2014). Indeed, recipients may evaluate sexism as immoral, rather than nudity itself. To test this, we predict a rank order of the effects of sexism and nudity, that should arise when nudity has a smaller effect than sexism.

H3. a) A_{ad} and b) A_{brand} exhibit the following rank order from positive to negative attitudes: 1) low sexism, low nudity, 2) low sexism, high nudity, 3) high sexism, low nudity, and 4) high sexism, high nudity.

In addition, we will explore a potential interaction of sexism and nudity, that to our knowledge, has not been examined before. Most prior studies have only examined two of the potential four conditions that result from crossing nudity and sexism (Keller et al., 2020; Ketelaar et al., 2014; Latour & Henthorne, 1994; Mittal & Lassar, 2000; Wyllie et al., 2015). For example, Wyllie et al. (2015) found that an "explicit sexual stimulus" depicting an entirely unclad model was rated less favorably than an "implicit sexual stimulus". However, raters described

[1] Note that we had originally followed Wirtz et al.'s (2018) meta-analytical findings to derive our hypotheses. Although this meta-analysis focuses on sex appeal, which is broader than nudity, it represents the most robust evidence base available. Because Wirtz et al. report an insignificant effect of sex appeal on A_{ad}, we had initially used this null finding as a starting point and did not preregister an effect of nudity on A_{ad} in our first study. Yet, as we will describe in the respective studies, following a significant finding in Study 1, we did preregister an effect of nudity on A_{ad}, denoted as Hypothesis 1a for Study 2.

the explicit sexual stimulus as "inappropriate" and "graphic" in a pretest, indicating a high level of sexism, whilst they described the implicit sexual stimulus as "sensual", indicating a lower level of sexism. Similarly, Ketelaar et al. (2014) mostly combined objectified ads with nudity, and non-objectified ads with clad models and report significant differences. We can therefore only speculate on the specific form, for example, how people evaluate sexist ads with clad models, or whether sexism aggravates or attenuates effects of nudity. It is nevertheless important to explore this interaction. Therefore, we predict a general interaction of sexism with nudity.

H4. There is an interaction between nudity and sexism for a) A_{ad} and b) A_{brand}.

2. Research overview

We conducted two preregistered experiments to examine the effects of nudity and sexism on A_{ad} and A_{brand}. All studies were conducted in Germany and used print ads with one female model. Study 1 tests our main hypotheses using 16 real advertisements in a student sample. To examine the generalizability, Study 2 seeks to replicate our findings using fictitious ads and brands in a more representative sample.

2.1. Transparency and openness

We preregistered both experiments and provide preregistrations, power calculations, experimental data, and analysis codes (using syntax in SPSS) on the Open Science Framework at https://osf.io/a8h7n/files. Due to proprietary ownership rights, we cannot present the actual advertisements for Experiment 1. However, for Experiment 2 stimuli are available on OSF. Furthermore, we report the sample recruitment, data exclusion, manipulations, and measurements.

Regarding hypothesis 1, which predicts an effect of nudity on A_{ad}, we had originally followed Wirtz et al. (2018) and did not preregister this hypothesis for the Experiment 1. Therefore, the respective test of Hypothesis 1a is a post hoc test. In Experiment 2, we built on the findings from Experiment 1 and additionally preregistered Hypothesis 1a, that nudity affects A_{ad}. All other hypotheses were consistently preregistered in both experiments. We also developed hypotheses on the effects of recipients' gender (Study 1 and 2) and perceived product fit (Study 1), but, to maintain focus, do not report these findings in detail here. We refer interested readers to the supplementary materials.

3. Experiment 1

Experiment 1 serves as a first test of our research hypotheses. We used a convenience sample from Germany and a 2 (low vs. high nudity) x 2 (low vs. high sexism) within-subjects design with 16 pretested real advertisements to assess participants' attitudes.

3.1. Method

3.1.1. Sample and procedure

In the first quarter of 2022, we recruited a convenience sample using a range of communication channels (e.g., groups on social media, university websites) for an online study on advertising. Participants received no compensation, but we offered undergraduate psychology students course credit required towards their degree. Power analyses indicated that we would need to recruit at least $N = 92$ participants with complete data (for a more detailed description see OSF), and we preregistered to either stop the study at a certain date or continue until we reached a sample size of 92. We stopped data collection at the preregistered date because 161 participants had by then completed our survey. As preregistered, we excluded a total of 29 participants, because 5 participants failed an attention check (i.e., "Please respond with 'fully agree' to this item"), 8 participants completed the study within an unrealistic timeframe (i.e., less than 5 min.), 5 participants indicated they did not possess adequate command of German language, and 11 participants exhibited extreme data points of ±3 standard deviations below the respective mean of a variable. Our final sample size is thus $N = 132$ participants. Ninety participants (68.2 %) identified as female, 38 (28.8 %) as male, and 4 participants identified as non-binary (3 %). The majority identified as heterosexual (68.2 %, $N = 90$). 12.1 % ($N = 16$) identified as bisexual, 9.1 % ($N = 12$) as homosexual, 5.3 % ($N = 7$) as pansexual, and 0.8 % (N = 1) as asexual. Additionally, 4.5 % ($N = 6$) chose not to disclose their sexual orientation. Participants' mean age was 29.24 (SD = 11.95) and the majority were students (109 or 83 %).

The study was an online experiment with a 2 (low vs. high nudity) x 2 (low vs. high sexism) within-subjects design. Participants rated 16 print advertisements, 4 ads in each of four conditions. Note that using 4 ads per condition strengthens the robustness of our study because idiosyncratic characteristics of every single ad are less likely to affect our findings (Winer, 1999). Following informed consent, participants received instructions to rate advertisements in a spontaneous manner. To preclude order effects, we then presented 16 ads in random sequence and participants rated each ad on three scales. Next, participants responded to further items assessing demographic data, study involvement, and political opinions. Finally, we thanked participants and requested their email address in case they needed course credit.

3.1.2. Materials

We selected 16 print ads from a set of 40 ads that had resulted from of a broader search of real ads. To secure comparability across experimental conditions, we chose only ads in German and excluded ads depicting violence, children/ teenagers, celebrities, and sale offers. Ads also had to depict a single real female or female body parts (e.g., lips, torso; no men, no cartoons) and "standard" models (e.g., no plus-size models). In a pilot study (for instructions and measures see online supplement) three judges rated all 40 ads using Soley and Reid's (1988) single item nudity scale (1 = *demure*, 4 = *naked*) and a single item sexism measure (7-point Likert scale, 1 = *not sexist*, 7 = *sexist*). For the latter, we provided the judges with the five criteria to identify sexism of the German Advertising Standards Council (2014). Subsequently, we used both nudity and sexism ratings to select 16 ads, of which 4 represented each of our experimental conditions: 1) low sexism and low nudity 2) low sexism, high nudity 3) high sexism, low nudity 4) high sexism, high nudity. The final selection of stimuli included pictures that received ratings of either low nudity (rated as 1 or 2) or high nudity (rated as 3 or 4) by the judges. Regarding sexism, pictures were categorized as low on sexism if they were rated below 2.0 or high on sexism if they were rated above 6.0. Thirteen ads were real ads and 3 ads had been professionally designed as exemplars of sexist and non-sexist ads. Of these latter ads, there was one in each but the high nudity, low sexist condition. To check the robustness of our findings we also report analyses without these ads in our results section.

3.1.3. Measures

3.1.3.1. Attitude towards the ad. We used a German adaptation of Bergkvist and Rossiter's (Bergkvist & Rossiter, 2008, see also Bergkvist, 2015) single, item ("how do you find the Ad?") with a seven-point bidirectional scale (1 = *I disliked it very much,* 7 = I liked it *very much*) to measure A_{ad}.

3.1.3.2. Attitude towards the brand. Following the recommendations by Bergkvist and Rossiter (2007), we measured A_{brand} with the same single item format as A_{ad} ("How do you find the brand?", 1 = *I disliked it very much,* 7 = I liked it *very much).*

3.1.3.3. Additional measures. Since gender and product fit are common moderators of sexual appeal (Wirtz et al., 2018), we assessed

participants' gender identity (0 = *male*, 1 = *female*, 2 = *non-binary, 3 = prefer not to tell),* as well as the perceived product fit for each stimulus ("how appropriate do you find the advertisement for the product: 1 = *very inappropriate*, 7 = *very appropriate*). Furthermore, we assessed four variables to control for their effect on our dependent variables (Becker, 2005). As studies show that familiar brands can lead to more positive attitudes (e.g., Ladeira et al., 2022; Rhee & Jung, 2019), we assessed brand familiarity, by asking participants whether they knew the brand or not (1 = *yes*, 2 = *no*). On average, participants were familiar with 24.7 % of the 16 brands (*SD* = 10.11). Additionally, we controlled for political orientation, by asking participants to rate their orientation using a left – right classification on a five-point Likert scale (1 = *left wing*, 3 = *center*, 5 = *right wing*). We did so, because people with a left-wing political orientation evaluate sexism more negatively than people with a more conservative, right-wing political orientation (e.g., Austin & Jackson, 2019). We also asked participants to indicate their sexual orientation using six categories: *heterosexual, homosexual, bisexual, asexual, pansexual, not specified*. Previous studies mentioned that it might prove valuable to control for sexual orientation, even though they have not included the variable (e.g., Black & Morton, 2017; Trivedi & Teichert, 2021; Wan et al., 2014). Note that political as well as sexual orientation were dummy coded for the present analyses. Finally, we combined three items on the importance of equal rights and involvement in feminism and sexism into a scale on attitudes towards feminism (α = 0.81, seven-point Likert scale, 1 = *not at all* – 7 = *very much*).

3.1.4. Analyses and transparent changes

As the 16 stimuli are nested within participants, we used multilevel modelling to account for the dependencies in our data. Specifically, level 1 represents stimulus ads that are nested within persons at level 2. Nudity and sexism represent level 1 variables, that we treated as fixed variables and, similar to ANOVAs, employed effects coding to represent the effects of nudity and sexism. It is important to note that due to the repeated measurement of 16 ads with 132 individuals, we observed attitudes on 2112 stimulus presentations that form our level 1 sample size. As an effect size measure of mean differences between experimental conditions we report Hedges δt as defined in McCoach (McCoach, 2010, formula 15, see also Hedges, 2007). This measure is equivalent to Cohen's *d* (McCoach, 2010) and describes mean differences between treatment and control group, whilst controlling for the variances at different levels. Therefore, we will interpret the effect sizes along the standards of *d* (Cohen, 1977), with δt = 0.2 representing a small, δt = 0.5 a medium, and δt = 0.8 a large effect, respectively.

Note that we did not preregister one detail of our modelling decisions: We accounted for variation between stimuli by introducing a diagonal level 1 covariance structure that models one error term for each of the 16 stimuli (see Heck et al., 2014) instead of a single error term for all stimuli.

3.2. Results

Table 1 shows descriptive statistics of dependent variables across the four conditions. Tables 2 and 3 hold findings from multilevel analyses to test our hypotheses regarding A_{ad} and A_{brand}, respectively. In both tables, Model 1 represents a baseline model with only an intercept. Intraclass correlations showed that person-level does not dominate our study (A_{ad}: ICC = 0.106; A_{brand}: ICC = 0.145) and most variance is located at the stimulus level.

Table 1
Means and standard deviations across conditions (Study 1).

	Low sexism		High Sexism	
	Low nudity	High nudity	Low nudity	High nudity
	M (SD)	M (SD)	M (SD)	M (SD)
A_{ad}	4.34 (1.50)	4.10 (1.58)	2.41 (1.64)	1,67 (1.19)
A_{brand}	4.29 (1.28)	3.87 (1.31)	3.13 (1.73)	2.08 (1.25)

Note. $N = 2112$ observations of 16 stimuli on 132 individuals.

Table 2
Multilevel regression of nudity and sexism on A_{ad} (Study 1).

	Model 1	Model 2	Model 3
	b (se)	b (se)	b (se)
Fixed effects			
Person effect, π_{0i}			
Intercept, β_{00}	2.57** (0.07)	3.04** (0.06)	3.05** (0.06)
Nudity, π_{1i}			
Intercept, β_{10}		-0.44** (0.05)	−0.37** (0.05)
Sexism, π_{2i}			
Intercept, β_{20}		−2.40** (0.05)	−2.36** (0.05)
*Nudity * sexism, π_{3i}*			
Intercept, β_{30}			−0.40** (0.11)
Random effects			
Level 1	[a]	[a]	[a]
Level 2	0.47** (0.08)	0.44** (0.07)	0.44** (0.07)
Goodness of fit			
Restricted -2LL	8450,72	7209.84	7201.35
Number of parameters	18	20	21
BIC	8580.85	7339,96	7331.46

Note. Standard errors in parentheses. N = 2112 observations for models 1–3. Nudity and sexism are effects-coded (−0.5 = low, 0.5 = high).

[a] *The error covariance structure is a diagonal matrix with unique error terms for each of the 16 stimuli and not shown here.*

* $p < .05$.

** $p < .01$.

Table 3
Multilevel regression of nudity and sexism on A_{brand} (Study 1).

	Model 1	Model 2	Model 3
	b (se)	b (se)	b (se)
Fixed effects			
Person effect, π_{0i}			
Intercept, β_{00}	3.54** (0.06)	3.27** (0.06)	3.29** (0.06)
Nudity, π_{1i}			
Intercept, β_{10}		−0.65** (0.05)	−0.68** (0.05)
Sexism, π_{2i}			
Intercept, β_{20}		−1.57** (0.05)	−1.49** (0.05)
*Nudity * sexism, π_{3i}*			
Intercept, β_{30}			−0.63** (0.11)
Random effects			
Level 1	[a]	[a]	[a]
Level 2	0.41** (0.07)	0.40** (0.06)	0.40** (0.06)
Goodness of fit			
-2LL	7775.51	7074.21	7049.31
Number of parameters	18	20	21
BIC	7905.65	7204.33	7179.42

Note. Standard errors in parentheses. N = 2112 observations for models 1–4. Nudity and sexism are effect-coded (−0.5 = low, 0.5 = high).

[a] *The error covariance structure is a diagonal matrix with unique error terms for each of the 16 stimuli and not shown here.*

* $p < .05$.

** $p < .01$.

3.2.1. Attitude towards the ad

Concerning A_{ad}, Model 2 of Table 2 shows findings for main effects of sexism and nudity and Model 3 contains the interaction, as well. As the interaction is significant, we use the full Model 3 to test our hypotheses. Note that even though we did *not* preregister nor predict an effect of nudity on A_{ad} for this study, we did find a small significant effect of nudity on A_{ad}, $\beta_{10} = -0.37$, $SE = 0.05$, $t = -6.80$, $p < .001$, $\delta t = -0.20$. Hypothesis 2a predicted an effect of sexism on A_{ad} that was supported by a significant, large effect, $\beta_{20} = -2.36$, $SE = 0.05$, $t = -42.99$, $p < .001$, $\delta t = -1.30$. Hypothesis 4a, which predicted an interaction of nudity and

sexism also received support. The interaction was significant and of small size, $\beta_{30} = -0.40$, $SE = 0.11$, $t = -3.67$, $p < .001$, $\delta t = -0.22$. Fig. 1 (left panel) shows that A_{ad} exhibited the highest mean in the 1) low nudity, low sexism condition and decreased across the 2) high nudity, low sexism 3) high sexism, low nudity, and 4) high sexism and high nude conditions (see also Table 1). This order exactly corresponds to the order predicted in Hypothesis 3a. As a formal test, we used a planned contrast coding conditions from zero to 3 in the predicted order (Rosnow & Rosenthal, 2002). The contrast was significant, estimate = −1.00, SE = 0.02, $t = -44.54$, $p < .001$, providing support for Hypothesis 3a. In sum, the present study shows full support for our hypotheses and also an unpredicted effect of nudity on A_{ad}.

To further explore the interaction of sexism and nudity, we examined the effects of nudity within the low sexism and high sexism conditions using dummy coding. The effect of nudity within the low sexism condition was not significant, estimate = −0.17, $SE = 0.09$, $t = -1.95$, p = .052, but the effect within the high sexism condition was significant, estimate = −0.57, $SE = 0.07$, $t = -8.74$, $p < .001$. As confidence intervals did not overlap, the effect within the high sexism condition (95 % CI = −0.54 − −0.70) was significantly stronger than in the low sexism condition (95 % CI = −0.34 − 0.001).

3.2.2. Attitude towards the brand

Concerning A_{brand}, Hypothesis 1b predicted an effect of nudity. In support of this, Model 3 of Table 3 shows a significant negative effect of small to medium size on A_{brand}, $\beta_{10} = -0.68$, $SE = 0.05$, $t = -12.74$, $p <$ .001, $\delta t = -0.43$. Hypothesis 2b, which predicted an effect of sexism on A_{brand} was also supported, $\beta_{20} = -1.49$, $SE = 0.05$, $t = -27.93$, $p < .001$, $\delta t = -0.93$. Again, the order of means was in line with our predictions of H3b. Attitudes were most positive in the 1) low nudity, low sexism condition, followed by the 2) high nudity, low sexism and 3) low nudity, high sexism conditions, and 4) high nudity and high sexism condition. In support of Hypothesis 3b, the planned contrast was significant, estimate = −0.76, $SE = 0.02$, $t = -34.38$, $p < .001$ (see Fig. 1, right panel). Finally, the interaction of nudity and sexism that we predicted in Hypothesis 4b was supported and significant, $\beta_{30} = -0.63$, $SE = 0.11$, t = −5.89, $p < .001$, $\delta t = -0.40$. Using dummy coding again, the effect of nudity within the low sexism condition, estimate = −0.37, $SE = 0.07$, t = −5.12, $p < .001$ was significant, as was the nudity effect within the high sexism condition, estimate = −0.99, $SE = 0.08$, $t = -12.54$, $p <$ .001. Confidence intervals showed that the effect within the high sexism conditions (95 % CI = −1.15 − −0.84) was significantly stronger than in the low sexism conditions (95 % CI = −0.23 − −0.51).

3.2.3. Secondary and exploratory analyses

In further analyses, we examined whether control variables, gender and product fit affected our findings. Specifically, we entered main effects of brand familiarity, political orientation, sexual orientation, and attitudes towards feminism into our multilevel analyses and examined whether substantive findings (i.e., the significance of effects reported in this section) changed. All tests of our hypothesis remained substantively similar. Findings also remained similar when we limited analyses to the 13 real ads, excluding those designed to demonstrate sexism. In additional preregistered analyses we examined whether gender and product fit moderated the present findings. While moderation existed, findings did not alter the present substantive interpretations. To maintain the focus of this paper, we provide findings and their interpretation in the Online Supplement. In short, we find that in line with our additional hypotheses, women rated sexism significantly more negatively than men. Also, they rated ads containing nudity significantly more negatively but no effects on the attitude towards the brand or the three-way interaction were found. In addition, higher product fit significantly increased attitudes but we found no interactions with nudity or sexism.

3.3. Discussion

This study investigated the independent and interactive effects of sexism and nudity in advertisements. Most importantly, we find that while both affect attitudes, sexism has stronger effects than nudity. The effect of sexism is at least two times larger than the effect of nudity and results in the predicted order of effects. In addition, despite an insignificant effect of sex appeal on A_{ad} in Wirtz et al.'s (2018) meta-analysis, we do find a small effect of nudity, the most prominent operationalization of sex appeal on A_{ad}. Possibly, other operationalizations of sex appeal might have weakened the effect in Wirtz et al. We also find an interaction indicating that the joint presence of nudity and sexism amplifies negative attitudes of recipients. Overall, effects for our dependent variables, A_{ad} and A_{brand} were largely similar.

The present study is not without limitations that lend themselves to plausible alternative explanations. First, our mostly female student sample might have affected findings as students might hold more liberal attitudes towards nudity and female participants might hold more negative attitudes towards sexism. Note however, that the majority of publications uses college students and Wirtz et al. (2018) show that compared to the general population student samples do not seriously distort, but exhibit similar (A_{brand}) or stronger (A_{ad}) effects. Second, though our use of real ads assures external validity, ads may differ in their design beyond nudity and sexism posing a threat to internal validity. However, using multiple ads per condition should alleviate

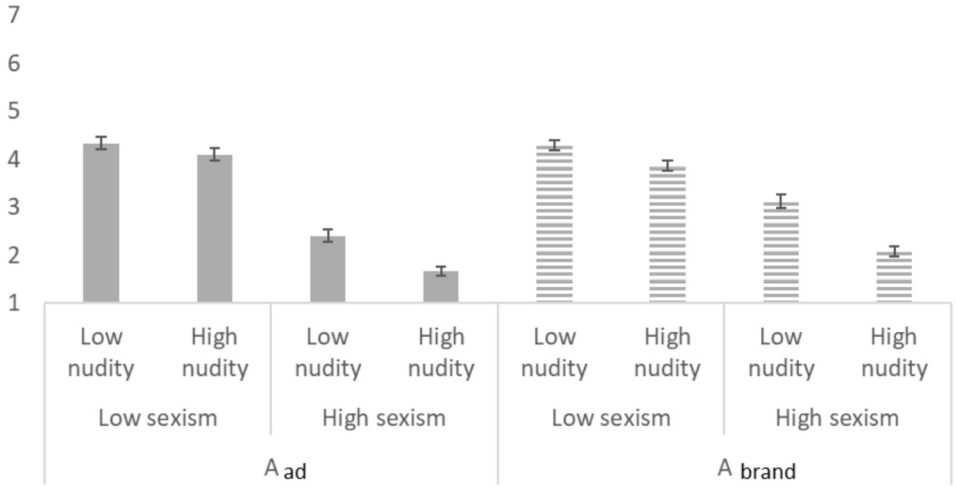

Fig. 1. Effects of nudity and sexism on A_{ad} and A_{brand} (Experiment 1).

potential extraneous effects of single ads. In addition, most ads that we classified as nude consisted of partially clad models (Soley & Reid, 1988), as we did not find many real ads depicting nude models. As in other studies, our distinction is thus a matter of degree of clothing or nudity and one might argue that partially clad models represent a "low dose" of nudity. In contrast, our sexism manipulation was stronger since we only used the extreme poles to classify stimuli as low or high on sexism. Finally, the single item attitude measures we used might exhibit low reliability. Though some scholars argue that single item measures are reliable and appropriate (Bergkvist & Rossiter, 2008; Brown & Stayman, 1992), we cannot test this assumption in the present study. We address these concerns in Experiment 2.

4. Experiment 2

Experiment 2 serves to conceptually replicate Experiment 1 and alleviate several potential limitations of that study. Specifically, Experiment 2 uses a more representative sample provided by a professional online market research company. It uses 16 fictitious print ads and also multi-item scales to measure A_{ad} and A_{brand}. Concerning nudity, we also increased the dose only using ads with entirely unclad models. By doing so, we make sure that the difference in effect sizes was not due to different extremities of our stimuli. The multilevel analyses were similar to those of Experiment 1 and there were no changes to our preregistered analyses.

4.1. Method

4.1.1. Sample and procedure

We aimed to recruit a representative sample of 120 individuals with the support of an online panel service provider. In the first quarter of 2024, the company invited a total number of 159 individuals of which we excluded 15 participants who did not complete the study or failed an attention check item, as preregistered. No participants needed to be excluded due to language criteria or extreme data points of ±3 standard deviations. Therefore, we obtained a sample of 144 participants rating 16 ads, which resulted in a total of 2.304 data points. Participant gender was about evenly split, with 57.6 % identifying as male and 42.4 % as female (no participants identified as non-binary). The majority identified as heterosexual (91.7 %, $N = 132$). A small percentage identified as homosexual (2.1 %, $N = 3$) and bisexual (2.1 %, N = 3). Additionally, 1.4 % ($N = 2$) of participants identified with another sexual orientation, such as pansexual or asexual. A total of 2.8 % ($N = 4$) chose not to disclose their sexual orientation. The mean age of the participants was 45 years (SD = 14.21). Furthermore, participants were diverse in terms of their highest educational degree: 20.1 % reported completion of high school, 46.5 % completed additional vocational education, and 33.3 % held a college degree. Also, participants indicated their political orientation on a spectrum ranging from right wing to left wing. The distribution was as follows: 3.5 % identified as left wing, 22.9 % as left-wing to centre, 41.7 % identified as centre, 24.3 % as centre to right wing, and 2.8 % as right wing. The vast majority of the sample identified as heterosexual (91.7 %).

The procedure of the present study was identical to Experiment 1. It was an online experiment, using a 2 (low vs. high nudity) x 2 (low vs. high sexism) within-subjects design. Following informed consent, participants rated 16 ads with regard to A_{ad} and A_{brand}, and responded to demographic questions and control items afterwards.

4.1.2. Materials

For this study, we created a new set of 16 fictitious print ads using fictitious brands. We initially created a set of 34 German ads utilizing stock photographs of women, both clad and unclad. In consideration of ethical concerns, the pictures never revealed any genitals or breasts. Additionally, they incorporated slogans that were either sexist or non-sexist, along with fictitious brand names. To keep the level of product fit constant, all advertisements were specifically designed for hygiene products, that could be used by both sexes (e.g., deodorant, shower gel, excluding menstrual items). To ensure comparability of the stimuli, we only employed pictures of *white* women (no "plus-size" models). The focus of the images was solely on one woman, not depicting any additional features (e.g., humans, animals, products). The 34 stimuli were rated by a panel of ten judges who received instructions and measures identical to those used to rate nudity and sexism in Experiment 1. We chose 16 out of the 34 ads, with four ads in each experimental condition: 1) low nudity/low sexism 2) high nudity/ low sexism 3) low nudity/high sexist 4) high nudity/high sexism. The final selection of stimuli (available at OSF) included ads that received unanimous ratings of either demure (rated as 1) or nude (rated as 4) by the judges. Regarding sexism, ads were categorized as low on sexism if they were rated below 2.6 or high on sexism if they were rated above 6.0 on a seven-point Likert scale.

4.1.3. Measures

4.1.3.1. Attitude towards the ad. We assessed A_{ad} with six items, that were rated on a 7-point semantic differential scale. Five items were taken from Ketelaar et al. (2014) and translated to German: *good/bad*, *not irritating/irritating*, *nice/not nice*, *appeals to me/does not appeal to me*, and *positive feeling/negative feeling*. An additional item *I don't like it/I like it* was added from Mitchell & Olson (1981) and worded as semantic differential (dislike/like). Note that all items except *nice/not nice* belong to Bergkvist and Langner's (2019) top ten items to measure A_{ad}. Internal consistency for the 16 stimulus ratings ranged from 0.97 to 0.98.

4.1.3.2. Attitude towards the brand. The scale used for measuring attitude towards the brand was based on Black and Morton (2017) and comprised five 7-point semantic differential items: *like/dislike*, *good/bad*, *pleasant/unpleasant*, *high quality/poor quality*, *tasteful/tasteless*. Except for *tasteful/tasteless*, all items belong to Bergkvist and Langner's (2019) top ten items to measure A_{brand}. Internal consistency for the 16 stimuli ranged from 0.97 to 0.98.

4.1.3.3. Additional measures. To control for possible gender differences, we assessed participants' gender identity (0 = *male*, 1 = *female*, 2 = *non-binary, 3 = prefer not to tell)*. Furthermore, we assessed several variables to control for potential alternative explanations of our findings (Becker, 2005). Participants rated their sexual orientation (1 = *heterosexual*, 2 = *homosexual*, 3 = *bisexual*, 4 = *other*, 5 = *prefer not to tell*) and indicated their political orientation (1 = *left wing*, 3 = *center*, 5 = *right wing*).

4.2. Results

Table 4 displays descriptive statistics for dependent variables across the four conditions. Tables 5 and 6 present the results of multilevel analyses testing hypotheses, following the same procedure as in Experiment 1. In comparison to Experiment 1, intraclass correlations indicate that a higher amount of variance is due to individual differences at level 2 (A_{ad}: ICC = 0.49; A_{brand}: ICC = 0.50), but there still is substantial variation at the stimulus level and thus between our experimental conditions.

Table 4
Means and standard deviations across conditions (Study 2).

	Low sexism		High sexism	
	Low nudity	High nudity	Low nudity	High nudity
	M (SD)	M (SD)	M (SD)	M (SD)
A_{ad}	4.81 (1.48)	4.23 (1.79)	3.47 (1.86)	3.72 (1.86)
A_{brand}	4.60 (1.36)	4.31 (1.46)	3.76 (1.59)	4.03 (1.56)

Note. $N = 2304$ observations of 16 stimuli on 144 individuals.

Table 5
Multilevel regression of nudity and sexism on A_{ad} (Study 2).

	Model 1	Model 2	Model 3	Model 4
	b (se)	b (se)	b (se)	b (se)
Fixed effects				
Person effect, π_{0i}				
Intercept, β_{00}	4.06** (0.11)	4.06** (0.06)	4.06** (0.11)	3.97 (0.11)**
Nudity, π_{1i}				
Intercept, β_{10}		−0.16** (0.05)	−0.16** (0.05)	
Sexism, π_{2i}				
Intercept, β_{20}		−0.93** (0.05)	−0.93** (0.05)	−1.35** (0.07)
Nudity * sexism, π_{3i}				
Intercept, β_{30}			0.84** (0.10)	
Nudity_nos, π_{4i}				
Intercept, β_{40}				−0.58** (0.07)
Nudity_withs, π_{5i}				
Intercept, β_{50}				0.25** (0.07)
Random effects				
Level 1	1.71** (0.05)	1.47** (0.04)	1.42** (0.04)	1.42** (0.04)
Level 2	1.65** (0.21)	1.66** (0.21)	1.66** (0.21)	1.66** (0.21)
Goodness of fit				
-2LL	8173,96	7858.84	7792.12	7792.12
Number of parameters	18	20	21	21
BIC	8189.44	7874.33	7807.60	7807.60

Note. Standard errors in parentheses. $N = 2304$ observations for models 1–3. Nudity and sexism are effects-coded (−0.5 = low, 0.5 = high).
* $p < .05$.
** $p < .01$.

Table 6
Multilevel regression of nudity and sexism on A_{brand} (Study 2).

	Model 1	Model 2	Model 3	Model 4
	b (se)	b (se)	b (se)	b (se)
Fixed effects				
Person effect, π_{0i}				
Intercept, β_{00}	4.17** (0.09)	4.17** (0.09)	4.17** (0.09)	4.17** (0.10)
Nudity, π_{1i}				
Intercept, β_{10}		−0.01 (0.04)	−0.01 (0.04)	
Sexism, π_{2i}				
Intercept, β_{20}		−0.57** (0.04)	−0.57** (0.04)	−0.84** (0.06)
Nudity * sexism, π_{3i}				
Intercept, β_{30}			0.55** (0.09)	
Nudity_nos, π_{4i}				
Intercept, β_{40}				−0.29** (0.06)
Nudity_withs, π_{5i}				
Intercept, β_{50}				0.27** (0.06)
Random effects				
Level 1	1.16** (0.04)	1.08** (0.03)	1.06** (0.03)	1.06** (0.03)
Level 2	1.18** (0.15)	1.18** (0.15)	1.18** (0.15)	1.18** (0.15)
Goodness of fit				
-2LL	7300.33	7144.80	7106.43	7106.43
Number of parameters	18	20	21	21
BIC	7315.82	7160.28	7121.91	7121.91

Note. Standard errors in parentheses. $N = 2304$ observations for models 1–4. Nudity and sexism are effect-coded (−0.5 = low, 0.5 = high).
* $p < .05$.
** $p < .01$.

4.2.1. Attitude towards the ad

We used Model 3 in Table 5 to test our hypotheses concerning A_{ad}. Hypothesis 1a predicted an effect of nudity on A_{ad}, which was supported: nudity had a small, but significant effect on the attitude towards the ad ($\beta_{10} = -0.16$, $SE = 0.05$, $t = -3.29$, $p = .001$, $\delta t = -0.09$). Hypothesis 2a, predicting a negative effect of sexism on A_{ad}, was supported by a significant, medium sized effect ($\beta_{20} = -0.93$, $SE = 0.05$, $t = -18.68$, $p < .001$, $\delta t = -0.52$). Hypothesis 3a predicted a specific rank order of means across conditions. Specifically, we predicted that attitudes would decrease from the 1) low nudity, low sexism condition, via the 2) high nudity, low sexism and 3) low nudity, high sexism conditions to the 4) high nudity and high sexism condition. Note that despite a significant planned contrast, estimate = −0.40, $SE = 0.02$, $t = -17.78$, $p < .001$), the rank order did not follow our prespecified pattern. Fig. 2 shows that the mean in high nudity/ high sexism condition was higher than the mean in low nudity/ high sexism condition and violated the specified rank order. This provides partial support for hypothesis 3a, at best. Hypothesis 4a predicted an interaction of nudity and sexism that was significant, $\beta_{30} = 0.84$, $SE = 0.10$, $t = 8.40$, $p < .001$, $\delta t = 0.47$, providing support for hypothesis 4a. Fig. 2 (see also Table 2) indicates that the interaction is disordinal. We further examine this effect in Model 4 in Table 5, where we separate effects of nudity within conditions. The effect of nudity was negative in the low sexism condition ($\beta_{40} = -0.58$, SE = 0.07, $t = -8.27$, p < .001, $\delta t = -0.32$) whereas it was positive in the high sexism condition ($\beta_{50} = 0.25$, SE = 0.07, $t = 3.61$, p < .001, $\delta t = -0.13$). As confidence intervals did not overlap, the effects were significantly different (effect within the high sexism condition: 95 % CI = 0.12 – 0.39; effect within the low sexism condition: 95 % CI =

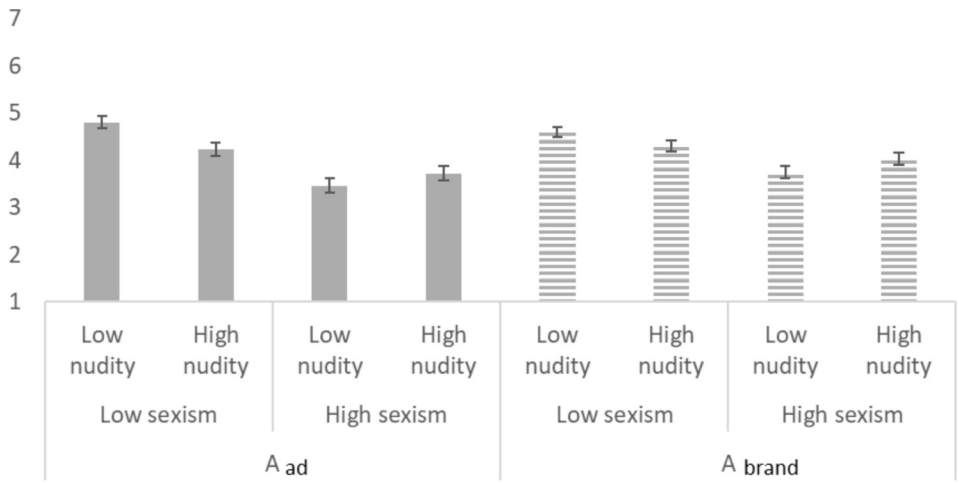

Fig. 2. Effects of nudity and sexism on A_{ad} and A_{brand} (experiment 2).

−0.72 to −−0.44).

4.2.2. Attitude towards the brand

Concerning A_{brand}, Table 6 shows the results of our hypothesis tests. Hypothesis 1b predicted a negative effect of nudity on A_{brand}, that was not supported, ($\beta_{10} = -0.01$, $SE = 0.04$, $t = -0.19$, $p = .85$, $\delta t = -0.01$). In contrast Hypothesis 2b, predicting a negative effect of sexism was significant and thus received support ($\beta_{20} = -0.57$, $SE = 0.04$, $t = -13.19$, $p < .001$, $\delta t = -0.38$). The planned contrast testing the rank order predicted in Hypothesis 3b was again significant ($\beta = -0.23$, $SE = 0.02$, $t = -11.69$, $p < .001$), but the means across conditions did not follow it exactly. Again the mean of the high nudity/ high sexism condition violated the rank order, as it was higher than the mean of the low nudity/ high sexism condition. Again, this provides partial support for Hypothesis 3b, at best. Hypothesis 4b predicts an interaction between nudity and sexism and was fully supported and significant, $\beta_{30} = 0.55$, $SE = 0.09$, $t = 6.47$, $p < .001$, $\delta t = 0.36$. Again, the interaction was disordinal (see Fig. 2). Analyzing separate effects of nudity within the low sexism condition and the high sexism condition showed that they were of opposite sign: While nudity exhibited a significant negative effect in the low sexism conditions ($\beta_{40} = -0.29$, $SE = 0.06$, $t = -4.71$, $p < .001$, $\delta t = -0.17$), its effect was significantly positive within the high sexism conditions ($\beta_{50} = 0.27$, $SE = 0.06$, $t = 4.44$, $p < .001$, $\delta t = 0.16$). Confidence intervals did not overlap (effect within the high sexism condition: 95 % CI = 0.15–0.39; effect within the low sexism condition: 95 % CI = −0.40 - -0.17).

4.2.3. Secondary and exploratory analyses

Results remained substantially similar when we included control variables. Therefore, we do not discuss them here. We present detailed analyses and interpretations of analyses including moderating effects of gender in the Online Supplement. Again, we find that women rated sexism more negatively than men. The effects regarding nudity were mixed with women rating ads depicting nude models more negatively but we found no gender differences regarding A_{brand}. Additionally, there was no three-way interaction between sexism, nudity and gender.

4.3. Discussion

Experiment 2 largely replicates our initial findings using a more representative sample and different stimulus materials. This provides evidence for the generalizability of these findings. Although we used more extreme stimuli for nudity, effects of nudity were small and even insignificant for A_{brand}, whereas effects of sexism were of medium size. While we also found a significant interaction effect, the form of the interaction, as well as the rank order of the means across conditions was slightly different from the order in Experiment 1. Two conditions might be responsible for this deviation: either attitudes in the high nudity/high sexism condition were too positive or those in the low nudity/high sexism condition were too negative. One potential explanation for this result is that the stimuli in the low-nudity/high-sexism condition may have been too blatant. In an effort to make advertisements with fully clothed models appear sexist, we used relatively blatant and derogatory slogans, which may have led to lower attitudinal ratings in this condition. In this vein, we need to acknowledge that in spite of the pretest, which assured that ads conveyed the intended attributes of sexism and nudity, we used fictitious ads. These fictitious ads were constructed by scholarly researchers and we might have not reached the sophistication of ads constructed by professional advertisers or modern AI tools (e.g., van Berlo et al., 2024). Therefore, ads in experiment 2 could systematically have been perceived as less credible or professional, particularly the ones featuring low nudity and high sexism. In fact, this might be a limitation of Experiment 2. Note, however, that using real print ads in Experiment 1 somewhat alleviates these concerns, and we did obtain the predicted order of conditions.

5. General discussion

In this study, we sought to dissolve some of the variation that has been evident in the effects sex appeal on attitudes. We argued that nudity and sexism may have distinct effects and have often been confounded in prior research. We therefore orthogonally manipulated nudity and sexism in two studies to examine their distinct and joint effects. Our findings from two experiments with diverse samples and stimuli add to prior findings showing that a more nuanced consideration of the manipulations of sex appeal and potential confounding factors is valuable. We believe that the broader category of sexist advertising we use here is helpful in mapping and summarizing various meanings, such as objectification or submissiveness. Future research is necessary to further examine the viability of this concept.

Our results highlight that heterogeneity of effects and differences between prior studies might not only hinge upon the manipulation of sex appeal, but also upon the amount of sexism present in ads. The differences between conditions in our experiments show that confounding nudity with sexism can significantly distort estimates of the effects of sex appeal. This might have well contributed to the large variation in effect sizes reported by Wirtz et al. (2018). Some studies might have produced large effects, because they used ads that contained sexism, or small effects when they used ads that only manipulated nudity. This variability underscores how outcomes in studies on sex appeal can depend heavily on confounding attributes that even go beyond the manipulation of sex appeal and may convey additional meanings, such as sexism. We

therefore recommend future research to carefully consider whether their manipulations of sex appeal also yield to sexism taking place.

Our findings also suggest that in some manipulations of sex appeal, sexism might drive negative evaluations of these ads. In comparing the main effects of nudity and sexism we find that sexism consistently resulted in negative effects of at least medium size in both studies. In contrast to these effects of sexism, effects of nudity were also negative, but small at best, and the higher product fit in Experiment 2 might have contributed to an even insignificant effect of nudity on A_{brand}. Therefore, our findings support the assumption that nudity might not be that bad. We also note that effect sizes of nudity on A_{ad} were small, but slightly stronger than the effects sizes for sex appeals reported in Wirtz et al. (2018). Possibly, this meta-analysis also included weaker manipulations or taking both, between and within person variance into account with our multilevel models might explain a larger amount of variance that would have been attributed to error variance in ANOVA.

Overall, participants favored ads without sexual content (i.e., neither nude nor sexist). We assume that the stronger effect of sexism compared to nudity is due to participants perceiving degradation and objectification as more offensive and morally wrong. This aligns with research suggesting that negative attitudes stem from moral or ethical concerns about sex(ist) appeal in ads (e.g., Choi et al., 2016; LaTour & Henthorne, 1994). As we focused on explaining heterogeneity in effects of sexual appeals, future research needs to further corroborate this presumption.

5.1. Practical implications

While this study bears new implications for future research, it reiterates and emphasizes prior implications for marketing and practitioners. First, we show that nudity has small, but negative effect on recipients' attitudes. Practitioners need to be aware of this when they consider using female bodies as a marketing strategy, along with evidence from studies demonstrating negative consequences of depicting female bodies and beauty ideals on consumers' body esteem (e.g., Dens et al., 2009), and mental well-being (Hawkins et al., 2004). Second, our study expands implications regarding sexism. As a society we need to question whether we want to create and consume sexist ads that are discriminative in nature and mirror societal problems (Eisend, 2010) as well as actively form our opinions and belief systems (Eisend et al., 2019; Tsichla, 2020; Ward, 2016). Indeed, studies have shown that sexist ads can lead to a higher tolerance of sexual violence against women (Ward, 2016) and result in greater self-objectification and reduced well-being (e.g., Karsay et al., 2018; McKenzie et al., 2018; Ward, 2016). The present study adds that beyond these ethical and political considerations, sexist ads have disadvantageous effects for practitioners, as well. They negatively impact consumers' attitudes towards the ad, shape unfavorable brand perceptions and likely impact the financial bottom line.

5.2. Constraints on generality

We consider the preregistered, high-powered design with multiple, pretested stimuli per condition in two experiments a distinct strength of our study. However, our studies also have several limitations regarding their generality. First, as we focused on female models and recipients' attitudes, findings may not generalize to male models and they do not pertain to other important measures (e.g., attention, memory). Second, both studies were conducted in Germany, and the use of nudity and sexism in advertising varies across countries and cultures. Although there is preliminary evidence that effects of sex appeal might be comparable (Dianoux & Linhart, 2010), we recommend replications in other contexts or, ideally, comparing effects across different countries or cultures. Finally, our studies and also our theorizing fall short of providing a comprehensive account of sex appeal. Rather, we focus on the most prominent scholarly manipulation of sex appeal, nudity, and show that further attributes of stimuli are important, as well. In this vein, our choice of sexism as a rather broad construct supplements more specific findings concerning attributes such as mild vs. explicit stimuli (Wyllie et al., 2015), agentic vs. passive slogans (Keller et al., 2020), or objectifying stimuli (Black & Morton, 2017). Due to the breadth of our category, we cannot specify whether any particular attributes drove our findings. However, it also represents an operationalization at the level relevant in practice (e.g., German Advertising Standards Council, 2014) that typically deals with discrimination and sexism in advertising.

6. Conclusion

In line with Wirtz et al.'s (2018) account of stimulus heterogeneity, we find that effects of sex appeal in advertising do indeed depend upon the stimuli being used. Disentangling the effects of nudity and sexism, we show that nudity, even though it is a common and an easy way to operationalize sex appeal, may not be central in provoking negative effects; sexism contributes more to this effect. Practitioners should carefully weigh these findings in their decisions to use sexist advertisements. Researchers should carefully consider what meanings beyond nudity the stimuli they use convey and keep in mind that sexism, but not nudity may evoke strong effects. Sexist advertising appears not beneficial. It has a harmful impact on recipients' health and wellbeing and also lowers consumers' attitudes.

CRediT authorship contribution statement

Mira Hertel: Writing – original draft, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Laura Palla:** Methodology, Data curation, Conceptualization. **Hans-Georg Wolff:** Writing – review & editing, Visualization, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation.

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Declaration of competing interest

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.actpsy.2025.104909.

Data availability

All preregistrations, experimental data, and analysis code are available on the Open Science Framework repository (OSF: https://osf.io/a8h7n/files).

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