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The Imaginary Intrasexual Competition: Advertisements Featuring Provocative Female Models Trigger Women to Engage in Indirect Aggression

Sylvie Borau¹ · Jean-François Bonnefon²

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Abstract Recent research suggests that women react to idealized female models in advertising as they would react to real-life sexual rivals. Across four studies, we investigate the negative consequences of this imaginary competition on consumers' mate-guarding jealousy, indirect aggression, and drive for thinness. A meta-analysis of studies 1–3 shows that women exposed to an idealized model report more mate-guarding jealousy and show increased indirect aggression (i.e., derogation and social exclusion), but do not report a higher desire for thinness. Study 4 replicates these findings and reveals that the main driver of aggression is the sexually provocative attitude of the model (a signal of a flirting behavior and of sexual availability), rather than her thin body size. The ethical implications of these findings for advertising are discussed in light of recent concerns about female bullying, online, and in the workplace.

Keywords Advertising models · Derogation · Intrasexual competition · Mate-guarding jealousy · Provocative attitude · Slut-shaming

Introduction

Female advertisement models tend to be highly physically attractive as well as thin and portrayed in a sexually provocative manner (Reichert 2002). Much research has been devoted to the detrimental effects of exposure to these ideal female models on women's self-esteem and body satisfaction. For example, it is commonly assumed that women internalize the thin-ideal displayed in the media, which they then strive to conform to—even when the picture has been digitally retouched (American Psychological Association 2007; Thompson and Stice 2001). The failure to live up to these extremely high standards is assumed to hurt self-esteem and body satisfaction (Grabe et al. 2008) and to lead to eating disorders (Stice and Shaw 1994).

Evolutionary psychology inspired a complementary approach to the detrimental effects of ideal advertisement models, centered on the concept of intrasexual competition (i.e., competition among same-sex individuals for access to the best mating partners). According to this approach, the same evolutionary forces which led men to seek physically attractive partners led women to pursue an attractive appearance and to compete against same-sex rivals on physical attractiveness (Buss and Schmitt 1993). As a consequence, women exposed to idealized female advertising models would react as if these models were real-life sexual rivals, compete against them on physical attractiveness (Li et al. 2014; Yong et al. 2016), and experience a strong drive for thinness as part of a self-improvement strategy (Abed 1998; Ferguson et al. 2011).

Self-improvement, though, is only one of the strategies that women use against each other in the service of intrasexual competition. In this article, we argue that advertising models trigger the indirect aggression patterns which are typical of female mate-guarding jealousy (Arnocky et al.

✉ Sylvie Borau
s.borau@tbs-education.fr

Jean-François Bonnefon
jean-francois.bonnefon@tse-fr.eu

¹ University of Toulouse, Toulouse Business School, 20 bd Lascrosses, Toulouse, France

² Toulouse School of Management, Toulouse School of Economics, 21 allée de Brienne, 31015 Toulouse, France

2014). Female mate guarding is the act of protecting a mate from potential female competitors to maintain access to both reproductive opportunities and parental resources. Mate-guarding jealousy can lead to indirect aggression patterns that aim at disparaging female rivals through derogation and social exclusion. This pernicious form of bullying, which typically involves fat-shaming and slut-shaming (i.e., insulting comments about the target's body shape and sexual behavior), is common both online and in the workplace and has been a topic of intensive research in business ethics (Boddy 2011; Bulutlar and Öz 2009; LaVan and Martin 2008; Pilch and Turska 2015; Valentine et al. 2016). Here we investigate whether the use of idealized female models in advertising can trigger such indirect forms of bullying.

Accordingly, the current article moves beyond standard ethical considerations regarding the use of idealized female models in advertising (namely idealized models hurt women's self-esteem and body satisfaction) and brings into focus a new detrimental effect (idealized models trigger women to engage in indirect aggression), which should inform the ethical decisions of advertising professionals and regulators (Hyman 2009).

This article also attempts to identify the features of the model that drive indirect aggression by disentangling the respective roles of the sexually charged attitude of the model and her thin body size. Because there is strong evidence that women react negatively to female sexually charged attitude in daily life and do so regardless of the body size of the woman displaying the attitude (Benenson 2013; Campbell 2013; Stockley and Campbell 2013; Vaillancourt 2013), we will hypothesize that they react broadly the same to idealized advertising models. That is, we will hypothesize that the provocative attitude of the model, more than her thinness, triggers indirect aggression in female viewers.

In the rest of this article, we develop this theoretical background into a series of testable predictions. We then report three studies investigating whether idealized female models trigger the mate-guarding jealousy and indirect aggression usually aimed at same-sex rivals. An additional study cross-manipulates the body size of the model and her provocative attitude, in order to identify which of these two factors is the main driver of indirect aggression.

Overall, we show that female viewers engage in an imaginary intrasexual competition against advertisement models, targeting them with the same aggressive strategies they would use toward real-life rivals: mate-guarding jealousy, derogation, and social exclusion. Furthermore, we show that these aggressive strategies are mainly triggered by the sexually provocative attitude of the model, and not by her thin body size.

This research contributes to the extant literature on the ethics of using idealized and decorative female models in

advertising (Bishop 2000; Borau and Bonnefon 2017; Borau and Nepomuceno 2016; Cohan 2001; Lin and Yeh 2009; Plakoyiannaki et al. 2008; Spurgin 2003) by showing that these models can trigger worrisome behavioral patterns among women and promote a culture of female bullying based on slut-shaming and social exclusion.

Conceptual Background

The Imaginary Competition Against Advertising Female Models

When it comes to attracting or retaining a mate, women see physically attractive women as very dangerous competitors (Campbell 2013). Unsurprisingly, under this definition, most of the female models used in advertisement are formidable intrasexual competitors. Models are selected on the basis of their attractiveness and their fit to the sociocultural thin-ideal, and they are depicted in postures and attires meant to enhance this attractiveness. Women who are exposed to these idealized female models in magazines or other media are well aware, of course, that they are unlikely to actually meet these models or their look-alike in real life—after all, the physical appearance of the models is not only exceptional to start with, but also digitally edited to match some stereotyped ideal of perfection. However, this knowledge does not prevent women from wanting to resemble the models (Borau and Nepomuceno 2016; MacCallum and Widdows 2016), or from comparing themselves to the models (see Friederich et al. 2007, for neuroimaging evidence). As a result, female advertisement models can trigger in female viewers the cognitive patterns that characterize intrasexual competition, by virtue of reminding the viewers of their competition against real-life rivals (Arnocky et al. 2016; Buss et al. 2000; Ferguson et al. 2011; Hill and Buss 2006, 2008; Dijkstra and Buunk 1998).

Of course, the severity of this imaginary competition should be dependent on a range of individual factors. First, not all women have the same propensity to engage in intrasexual competition against other women. Women who score high on intrasexual competitiveness have a distinct pattern of interaction with other women, especially in the context of contact with men. Generally speaking, they experience stronger negative feelings when meeting a more attractive woman, or when men pay attention to another woman; they tend to have a higher propensity to compare themselves to others; and they tend to score lower on agreeableness (Buunk and Fisher 2009). Second, previous research suggests that the behavioral expression of intrasexual competition depends on other personal characteristics such as relationship status, age, and body size

(Bendixen and Kennair 2015; Vaillancourt 2013). Even though these personal characteristics are not the focus of our research, we will systematically record them and include them as covariates in our analyses.

Behavioral Manifestations of the Imaginary Competition

Because idealized female models should be perceived as threatening competitors, we contend that advertisement models trigger in female viewers the suite of cognitions and behaviors which characterizes intrasexual competition, even though they are never to be met in real life. Specifically, we expect women to express feelings of mate-guarding jealousy directed at the model and to activate indirect aggression as a behavioral strategy.

Jealousy is one of the central psychological mechanisms underlying intrasexual competition for mates (Arnocky et al. 2012; Buss 2002; Buss et al. 2000). More specifically, jealousy is hypothesized to be a response to threats of a partner infidelity, with the objective to guard one's mate from potential sexual rivals (Massar and Buunk 2016). The assessment of a possible threat to the relationship and the emotional response to protect it can occur automatically, whether this rival is real or imagined (Massar et al. 2009). Accordingly, we predict that female viewers will express feelings of mate-guarding jealousy when exposed to a threatening idealized female model.

Jealousy is also an emotion that alerts the individual that an action has to be taken to guard their relationship partner from a potential rival (Massar et al. 2009). It functions as a signal that intrasexual competition might be underway and triggers a search for an appropriate behavioral strategy. The two most common intrasexual competition strategies adopted by women are self-promotion and indirect aggression (Campbell 2013; Fisher and Cox 2009, 2011; Vaillancourt 2013). Self-promotion involves the alteration of one's appearance (through dieting, use of cosmetics, and other means) and appears to be the most effective tactic to attract a mate (Vaillancourt 2013). Indirect aggression involves the use of derogation and social exclusion and appears to be women's primary tactic against rivals or mate poachers (Benenson 2009; Stockley and Campbell 2013). For example, Fisher et al. (2009) had shown that women involved in a romantic relationship tend to rely more on indirect aggression than self-promotion when faced with a rival. In other words, self-promotion is mostly used by women to attract a mate, while indirect aggression is mostly used by women to guard a mate. In addition, it seems reasonable to assume that when faced with a female model that has an idealized physical appearance, women would opt for indirect aggression rather than self-promotion—as it appears extremely difficult to attain the level of

physical attractiveness set by a digitally edited picture of a professional model.

Accordingly, we expect that female viewers exposed to idealized models experience mate-guarding jealousy and engage in indirect aggression (i.e., pejorative gossip and social exclusion), but we do not necessarily expect these women to engage in self-promotion efforts such as dieting.

Drivers of the Imaginary Competition

Not all advertisement models are equally salient or threatening as sexual rivals, which implies that not all advertisement models have the same likelihood of drawing viewers into an imaginary intrasexual competition. Here we distinguish between two important drivers of intrasexual competition, thinness, and sexual provocativeness. First, there is strong evidence of fierce female intrasexual competition for thinness (Abed 1998; Ferguson et al. 2011; Li et al. 2015), which, not coincidentally, is the focus of extensive digital editing in advertisement pictures. Second, a provocative, sexually charged attitude is also an important trigger of intrasexual competition, since women appear to be especially intolerant of other women whose dress or demeanor may be perceived as signaling promiscuity (Bleske and Shackelford 2001; Campbell 2013; Keys and Bhogal 2016; Vaillancourt 2013; Vaillancourt and Sharma 2011).

While these two dimensions (thinness and provocative posture) are relevant to female intrasexual competition, a provocative posture should be more likely to be perceived as a threat than a thin body shape (Campbell 2013). First, a sexually provocative attitude can communicate confidence about one's sex appeal, which confers an advantage in intrasexual competition (Murphy et al. 2015). Second, and more controversially, a sexually provocative attitude can be a signal of fertility (Grammer 1996), which increases the threat to other women's romantic relationships (Hurst et al. 2016; Krems et al. 2016). Finally, and most importantly, a sexually provocative attitude can signal flirtatiousness, sexual availability, and promiscuity; communicates an intention to seduce men (Moor 2010); and elicits male sexual desire (Smolak et al. 2014). As a result, sexually provocative women can be perceived as frightening rivals. Indeed, women's derogatory comments about rivals often focus on their promiscuity, sexual openness, and sexual history (Fisher et al. 2009).

As a result, we expect that models with either a thin body size or a provocative posture may trigger intrasexual competition, but we have reasons to expect that a provocative posture will be a stronger driver of intrasexual competition than a thin body size. More specifically, we predict that the provocative posture of the model will trigger mate-guarding jealousy and indirect aggression and that the model's perceived flirtatiousness and promiscuity will mediate these effects.

In studies 1–3, we adopt a holistic approach contrasting a typical *ideal* model (i.e., fitting the stereotyped media ideals of female appearance, with a thin body size and a sexually provocative posture) to a *non-ideal* model comparable to that featured in the Dove ‘natural beauty’ campaign (i.e., not fitting the stereotyped media ideals of female appearance, with a body size closer to the population average, and a non-sexually provocative posture). In Study 4, we adopt a more focused approach by using four pictures of the same model, orthogonally manipulating body size and provocative posture.

Studies 1, 2, and 3

Studies 1, 2, and 3 tested whether exposure to ideal models would cause the mate-guarding jealousy and indirect aggression typically triggered by exposure to intrasexual rivals. Furthermore, Study 2 and Study 3 tested whether this effect would be mediated by the model’s perceived flirtatiousness and promiscuity. Because the three studies were very similar in design and procedure, we describe them all at once, and we focus on the meta-analytic estimation of the effect of ideal models in the three studies, in addition to reporting the specific results of each study.

Methods

Study 1

The sample consisted of 95 women (mean age = 30, SD = 10), recruited in the UK by the Prolific Academic crowdsourcing panel. Here and in all subsequent studies, participants received a small financial compensation. Additionally, here and in all subsequent studies, we filtered out the (female) participants who had an exclusive preference for dating women, because some items in the survey assumed that respondents were interested in the romantic attention of men.

Participants were randomly assigned to one of two experimental groups, corresponding to exposure to a non-ideal or ideal model. Model shots were extracted from real ad campaigns to stick to current communication strategies

in the beauty industry. Shots were chosen so that models wore similar bathing suits and adopted broadly comparable body postures, while differing in their fit with current media stereotypes of ideal beauty, body size, and provocative attitude. The provocativeness of the ideal model is noticeably expressed by her pouting lips and arching hips, both of which have sexual undertones (Duncan 1990). A professional graphic designer created the pictures by matching the bathing suit colors, removing backgrounds, and positioning the models. A pretest conducted with 98 female participants confirmed that the ideal model differed from the non-ideal model along a number of dimensions: fit to current media stereotypes of beauty, body size, body weight, and sexually provocative attitude (see Table 1 for descriptive and inferential statistics and Appendix of Table 9 for details about the measures). At the start of the survey, participants were asked to imagine that their partner (boyfriend, husband, or hypothetical partner) was looking at a full-page ad featuring one of the visual. All individual items in the survey are listed in Appendix of Table 10, together with descriptive statistics.

Mate-guarding jealousy was measured with five items from Barelds and Barelds-Dijkstra (2007) and Buunk (1997), slightly adapted to the context of our survey, e.g., *I am concerned that my partner would find a woman like this female model more attractive than me.*

Indirect aggression was assessed by measuring derogation and social exclusion. Derogation was measured with three items from Arnocky et al. (2014), e.g., *I would make a joke about how ugly she is*, and four items specific to the context of our survey, e.g., *I would mention that the picture is digitally retouched.* Social exclusion was measured by asking participants to indicate the extent to which they could become friend with a woman like the model.

Self-promotion was measured by asking to what extent participants intended to lose weight in the future.

In addition, participants offered information about their age, weight, height, dating preference (men, women, both), dating status (currently single or not), and proclivity to individual intrasexual competitiveness (4 attractiveness-related items from the Buunk and Fisher 2009 scale of women’s intrasexual competition scale, e.g., *I can’t stand it when I meet another woman who is more attractive than I*

Table 1 Pretest results for the natural and ideal models featured in Study 1 and Study 2 (means and standard deviations for all measures, results of the *t* test comparing the two models, two-tailed)

	Stereotyped	Body size	Body weight	Provocative
Ideal (<i>N</i> = 59)	5.9 (1.0)	4.6 (3.2)	106 (10.6)	5.36 (1.2)
Natural (<i>N</i> = 59)	4.2 (1.7)	8.7 (3.5)	120 (18)	3.84 (1.3)
<i>t</i>	6.6	−6.6	−5.1	6.6
<i>p</i>	<0.001	<0.001	<0.001	<0.001

Scores are given on 7-point scales except for size (US standards) and weight (in pounds). Among the 98 respondents, 20 were exposed to both the natural model and the ideal model

am). Body mass index was computed as the participant's weight in kilograms divided by the square of her height in meters. Finally, this study included two additional questions that are not discussed further in this article: How many pounds would you like to lose in total? How easy would it be for you to attain the model's weight?

Study 2

The sample consisted of 159 women ($M_{age} = 35$, $SD = 12$) recruited in the USA by the Crowdfunder panel. Participants were exposed to an ad that promoted a slimming pill and were randomly assigned to a version of the ad that featured either a non-ideal or an ideal model. The models featured in these advertisements were the models used in Study 1. We used a slimming pill as the target product because purchasing such a pill is a less ambiguous self-promotion strategy than other means of losing weight, such as healthy eating and exercise. Slimming pills offer little other benefits than pursuing an idealized appearance, contrary to the health benefits which can come from changing one's diet or exercising more.

Participants were exposed twice to the visual. After the first exposure, they answered questions about the model's perceived flirtatiousness (see Appendix of Table 11 for details about all the measures) as well as questions about mate-guarding jealousy, derogation, and social exclusion. After the second exposure, they answered questions relative to self-promotion (intention to lose weight) as well as to their intention to purchase the product. Purchase intention was assessed with a 3-item scale of Putrevu and Lord (1994) (e.g., It is very likely that I will buy this product). Finally, participants responded to the same personal questions as in Study 1 (age, height, weight, dating status and preference, intrasexual competitiveness).

Study 3

The sample consisted of 198 women ($M_{age} = 30$, $SD = 7$) recruited in the USA by the Prolific Academic crowdsourcing panel. The methods were the same as in Study 2, but for a few changes. First, the items measuring our main variables of interest appeared in a different order (intention to lose weight, flirtatiousness, social exclusion, derogation, mate-guarding jealousy). Second, participants responded to 5 items measuring the perceived promiscuity of the model (e.g., *she frequently has casual sex with different partners*; see Appendix of Table 12). Third, the stimuli in Study 3 used two sets of non-ideal and ideal models. The first set was the same as in studies 1 and 2. The second set aimed at better controlling the similarity in hair, skin, and eye color between the ideal and non-ideal models. To construct this second set, two pictures featuring the same thin model were

Table 2 Pretest results for the stimuli featured in Study 3 (means and standard deviations for all measures, significance tests are two-tailed)

	Body size	Body weight	Provocative
Ideal ($N = 59$)	4.14 (3.3)	102.7 (9)	5.6 (1.2)
Natural ($N = 58$)	12.37 (3.7)	142.6 (21)	4.0 (1.4)
t	-12.16	-13.3	6.6
p	<0.001	<0.001	<0.001

Provocative attitude is scored on a 7-point scale, body size is scored for US standards, and weight is in pounds. Among the 102 respondents, 15 were exposed to both the natural and the ideal models

extracted from advertising material. The model wore the same golden bikini in the two pictures, but her posture varied in sexual provocativeness. Furthermore, the picture featuring the non-ideal model was digitally altered to increase the model's body size. A pretest conducted among 102 women confirmed that the two pictures led to significantly different perceptions of body size, body weight, and sexual provocativeness (see Table 2).

Results

All analyses were conducted in R (R Core Team 2015) using the *meta* package (Viechtbauer 2010) for meta-analyses and the *mediation* package (Tingley et al. 2014) for mediation analyses. Correlational analyses (see Table 3) showed several associations between individual variables and our measures of interest. Consequently, these individual variables (proclivity to intrasexual competition, BMI, age, dating status) were included as covariates in all regression and mediation analyses. Tables 4, 5, and 6 present the detailed regression results obtained in each study, controlling for individual variables, as well as the mean and standard deviation of all experimental measures in the different conditions. Although we report these results for the sake of completeness, we focus in this section on the meta-analysis of the impact of ideal models across the three studies.

Meta-analyses

In order to get an overall assessment of the impact of ideal models on women's mate-guarding jealousy, indirect aggression (derogation and social exclusion), and self-promotion (drive for thinness), we performed a meta-analysis across studies 1, 2 and 3. This analysis detected a significant meta-analytic effect of the model on mate-guarding jealousy, derogation, and social exclusion, but a nonsignificant meta-analytic effect on intention to lose weight (Fig. 1a). More specifically, and as predicted,

Table 3 Results of the correlational analyses between intrasexual competitiveness, BMI, age, dating status and the dependent variables (jealousy, derogation, social exclusion, and intention to lose weight) for Study 1 (A), Study 2 (B) and Study 3 (C)

	Jealousy	Derogation	Exclusion	Lose weight
A. Study 1. <i>N</i> = 95				
Intrasexual competitiveness	.220*	.193	-.127	.051
BMI	.283**	.275**	.392**	.497**
Age	.072	.078	.269**	.171
Dating status	-.050	-.100	-.026	-.008
B. Study 2. <i>N</i> = 159				
Intrasexual competitiveness	.569**	.513**	-.031	.034
BMI	-.153	-.172*	.099	.296**
Age	-.416**	-.344**	.049	-.063
Dating status	-.014	.034	.026	-.022
C. Study 3. <i>N</i> = 198				
Intrasexual competitiveness	.581**	.310**	.119	.190**
BMI	-.009	-.037	-.001	.203**
Age	-.036	.020	.024	.039
Dating status	-.128	.032	-.010	-.067

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 4 Regression results obtained in Study 1, controlling for individual variables (A) as well as the mean and standard deviation of all experimental measures in the different conditions (B)

	Jealousy	Derogation	Exclusion	Lose weight
A. Dependent variable				
Model (ideal)	0.64* (0.31)	0.50** (0.16)	1.02*** (0.28)	0.55 (0.39)
Intrasex	0.37** (0.13)	0.17* (0.07)	-0.08 (0.12)	0.26 (0.16)
Age	-0.02 (0.02)	-0.01 (0.01)	0.01 (0.02)	-0.02 (0.02)
Status (single)	-0.04 (0.36)	0.08 (0.19)	-0.02 (0.33)	-0.19 (0.45)
BMI	0.09** (0.03)	0.04** (0.01)	0.07** (0.02)	0.18*** (0.03)
Constant	-0.30 (0.79)	0.60 (0.41)	1.12 (0.72)	-0.49 (0.99)
Observations	95	95	95	95
R^2	0.20	0.23	0.27	0.29
Adjusted R^2	0.15	0.18	0.23	0.25
Residual std. error ($df = 89$)	1.49	0.78	1.35	1.85
F statistic ($df = 5; 89$)	4.42**	5.19***	6.70***	7.24***
	Jealousy	Derogation	Exclusion	Lose weight
B.				
Ideal model	3.08 ± 1.85	2.40 ± 0.88	4.06 ± 1.59	4.66 ± 2.14
Natural model	2.34 ± 1.27	1.85 ± 0.75	2.90 ± 1.26	3.88 ± 2.09

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

participants exposed to the ideal model expressed greater mate-guarding jealousy [$d = 0.35$, with a 95% confidence interval of (0.16, 0.54)], greater derogation [$d = 0.70$

(0.38, 1.02)], and engaged in greater social exclusion [$d = 0.46$ (0.12, 0.79)], but they did not manifest a greater desire to lose weight [$d = -0.05$ (-0.47, 0.36)].

Table 5 Regression results obtained in Study 2, controlling for individual variables (A) as well as the mean and standard deviation of all experimental measures in the different conditions (B)

	Jealousy	Derogation	Exclusion	Flirtatiousness	Purchase intent	Lose weight
A. Dependent variable						
Model (ideal)	0.23 (0.20)	0.54** (0.17)	0.34 (0.22)	1.44*** (0.24)	-0.66* (0.27)	-0.69* (0.27)
Intrasex	0.50*** (0.07)	0.38*** (0.06)	-0.08 (0.08)	0.25** (0.09)	0.34*** (0.10)	0.09 (0.10)
Age	-0.03** (0.01)	-0.02* (0.01)	0.01 (0.01)	-0.002 (0.01)	-0.03* (0.01)	-0.01 (0.01)
Status (single)	0.07 (0.22)	-0.07 (0.19)	0.24 (0.25)	0.05 (0.27)	-0.07 (0.31)	0.09 (0.31)
BMI	-0.002 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	0.06*** (0.01)
Constant	2.59*** (0.57)	2.18*** (0.48)	4.34*** (0.63)	2.92*** (0.68)	3.31*** (0.77)	3.52*** (0.79)
Observations	159	159	159	159	159	159
R ²	0.38	0.34	0.03	0.24	0.19	0.14
Adjusted R ²	0.36	0.31	0.003	0.22	0.16	0.11
Residual std. error (df = 153)	1.25	1.06	1.39	1.49	1.70	1.72
F statistic (df = 5; 153)	18.41***	15.48***	1.10	9.76***	7.17***	5.00***
	Jealousy	Derogation	Exclusion	Flirtatiousness	Purchase intent	Lose weight
B.						
Ideal model	3.37 ± 1.37	3.16 ± 1.13	2.80 ± 1.67	4.92 ± 1.43	2.43 ± 1.63	4.30 ± 1.84
Natural model	3.10 ± 1.73	2.60 ± 1.38	1.97 ± 1.39	3.48 ± 1.64	3.04 ± 2.04	4.97 ± 1.77

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

For exploratory purposes, we also conducted a meta-analysis of the correlation between our measures of interest and participants' proclivity to intrasexual competition (Fig. 1b). Intrasexually competitive participants were more likely to report greater mate-guarding jealousy [$r = .47$ (.25, .69)] and to resort to indirect aggression, in the form of derogation [$r = .35$ (.17, .53)]. They did not, however, report greater social exclusion [$r = .04$ (-.09, .17)] or a greater desire to lose weight [$r = .10$ (-.01, .21)].

In sum, studies 1–3 offered robust overall evidence that women exposed to ideal models were more likely to display behavioral patterns of indirect aggression (as compared to women exposed to non-ideal models). Additionally, studies 1–3 confirmed that such behavioral patterns of indirect aggression were characteristic of women who are highly competitive against other women.

Mediation Analyses

We measured the perceived flirtatiousness of the model in studies 2 and 3, as well as the perceived promiscuity of the model in Study 3. To investigate whether

perceived flirtatiousness or perceived promiscuity mediated the effect of the ideal model on jealousy and indirect aggression, we conducted nine mediation analyses whose results are summarized in Fig. 2. All analyses used the quasi-Bayesian Monte Carlo simulation method of the R *mediation* package, set up to 5000 simulations.

The three analyses of mate-guarding jealousy detected a significant indirect effect of the ideal model, mediated by flirtatiousness or promiscuity. This indirect effect was small, though, and smaller than the direct effect of the model in 2 out of 3 cases. The same was true of the three analyses of derogation. Finally, the three analyses of social exclusion did not show any mediation by flirtatiousness, and only a barely significant mediation by promiscuity.

In sum, studies 1–3 globally supported our expectations that the mate-guarding jealousy and indirect aggression triggered by the ideal model would be mediated by the model's perceived flirtatiousness and promiscuity, but they also suggest that much of the effect of the model went through other mediators.

Table 6 Regression results obtained in Study 3, controlling for individual variables (A) as well as the mean and standard deviation of all experimental measures in the different conditions (B)

	Jealousy	Derogation	Exclusion	Flirtatiousness	Promiscuity	Lose weight
A. Dependant variable						
Model (ideal)	0.66*** (0.16)	0.93*** (0.13)	0.56** (0.21)	1.68*** (0.22)	0.51** (0.17)	-0.24 (0.28)
Intrasex	0.51*** (0.05)	0.20*** (0.04)	0.07 (0.06)	0.33*** (0.07)	0.16** (0.05)	0.24** (0.09)
Swimsuit	-0.01 (0.16)	-0.08 (0.13)	-0.02 (0.21)	0.61** (0.22)	0.11 (0.17)	0.08 (0.28)
Age	-0.01 (0.01)	-0.002 (0.01)	-0.004 (0.02)	0.02 (0.02)	-0.02 (0.01)	0.01 (0.02)
Status (single)	0.36* (0.18)	-0.09 (0.14)	0.13 (0.24)	-0.01 (0.25)	-0.03 (0.19)	0.40 (0.31)
BMI	0.003 (0.01)	-0.002 (0.005)	0.001 (0.01)	0.01 (0.01)	-0.01 (0.01)	0.03** (0.01)
Constant	0.70 (0.44)	1.39*** (0.35)	2.67*** (0.58)	0.88 (0.61)	2.39*** (0.46)	2.63*** (0.76)
Observations	198	198	198	198	198	198
R ²	0.41	0.30	0.04	0.32	0.11	0.09
Adjusted R ²	0.39	0.28	0.01	0.29	0.08	0.06
Residual std. error (df = 153)	1.13	0.89	1.49	1.57	1.18	1.96
F statistic (df = 5; 153)	21.74***	13.53***	1.41	14.74***	3.87**	3.22**
	Jealousy	Derogation	Exclusion	Flirtatiousness	Promiscuity	Lose weight
B.						
Ideal model	2.86 ± 1.50	2.73 ± 0.98	2.56 ± 1.81	4.74 ± 1.62	2.68 ± 1.29	4.40 ± 2.01
Natural model	2.24 ± 1.34	1.81 ± 0.90	1.87 ± 1.45	3.07 ± 1.72	2.19 ± 1.12	4.64 ± 2.04

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Discussion

In studies 1–3, exposure to an ideal female model did not trigger female consumers to lose weight. It did make them experience mate-guarding jealousy, though, and triggered them to use indirect aggression tactics such as derogation and social exclusion. Not coincidentally, these feelings of jealousy and tendencies to indirect aggression were also more pronounced for women who were especially competitive against other women. In addition, and as predicted, the impact of ideal models on mate-guarding jealousy and indirect aggression were partially mediated by the perceived flirtatiousness or promiscuity of the model.

Accordingly, the results we obtained so far support the idea that ideal models trigger women to engage in indirect aggression, and they suggest that the model's provocative attitude is a driver of this effect. The stimuli used in studies 1–3, though, confounded two characteristics of ideal models: their slim body and their provocative posture. In order to tease out the effects of these two characteristics, Study 4 manipulated orthogonally the body size and

provocativeness of the models and measured their effects (as in previous studies) on mate-guarding jealousy, indirect aggression, and self-promotion.

Study 4

Method

Participants

The sample consisted of 148 women (mean age = 37, SD = 11), recruited in the USA by the Crowdfunder survey panel.

Design and Stimuli

Participants were randomly assigned to one of four experimental groups, corresponding to a 2 × 2 between-participant design, manipulating the model's body size and the provocative nature of her posture. These materials were

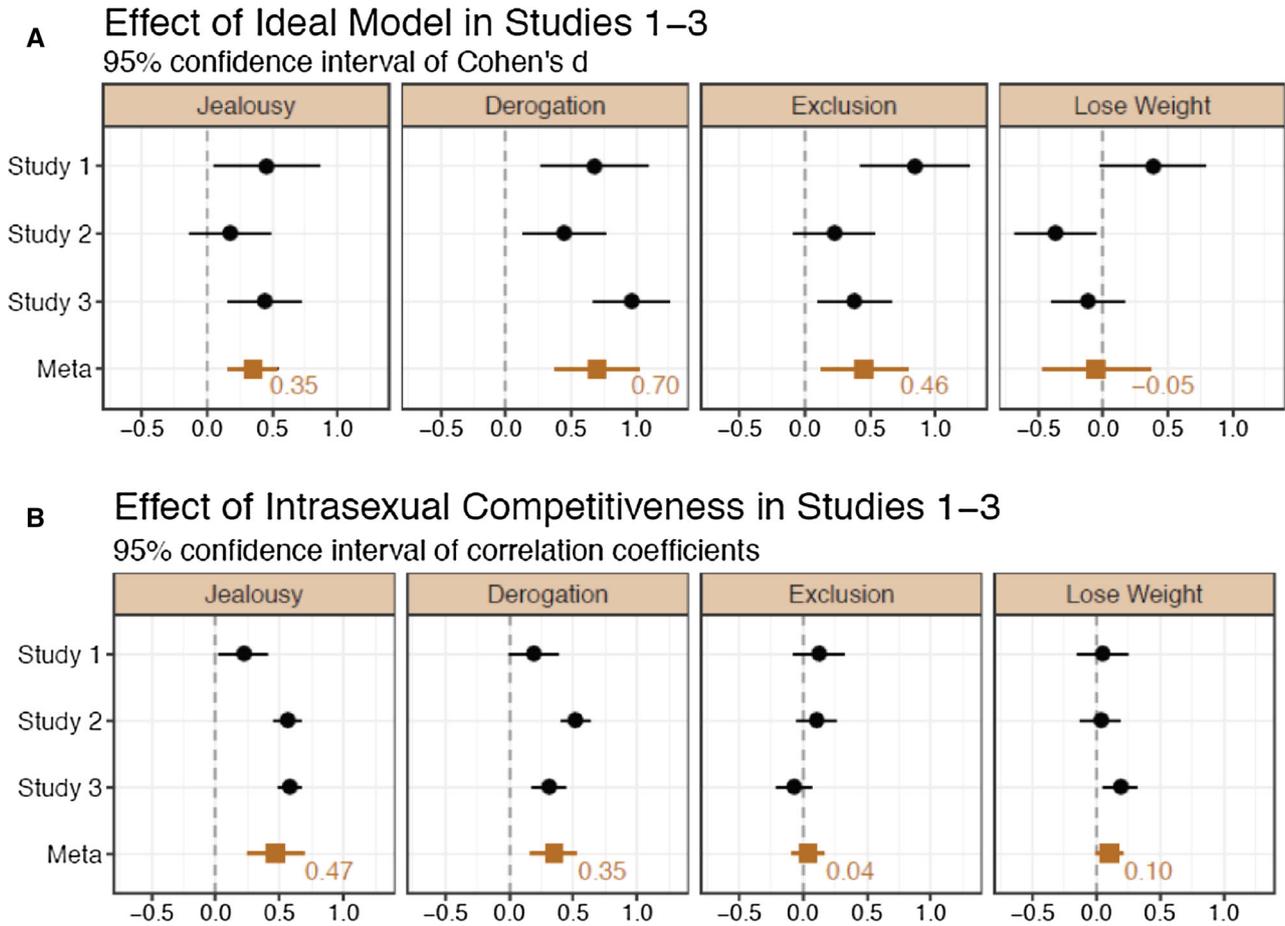


Fig. 1 Forest plots—results of the meta-analysis across studies 1–3

Fig. 2 Forest plots—results of the mediation analyses

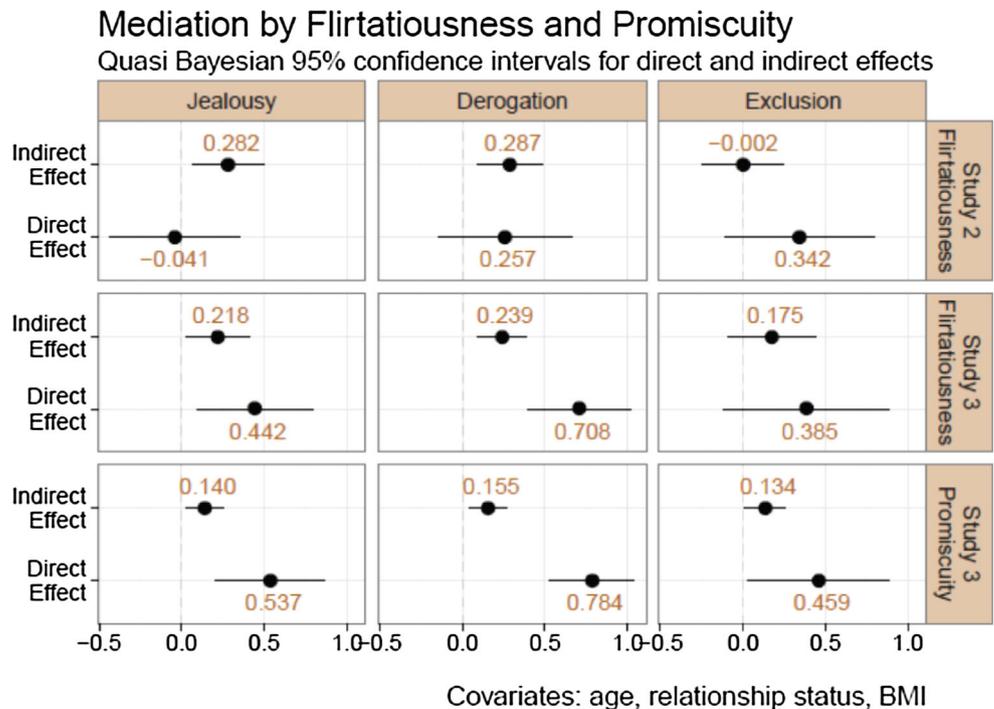


Table 7 Pretest results for the stimuli featured in Study 4 (means and standard deviations for all measures, significance tests are two-tailed)

	Body size	Body weight	Provocative
Minus size	4.88 (3.6)	105.7 (11.3)	5.1 (1.4)
Plus size	10.89 (4.2)	133.5 (22.9)	4.6 (1.4)
<i>t</i>	-11.8	-11.8	2.7
<i>p</i>	<.001	<.001	<.01
Provocative	6.8 (4.6)	113.4 (19)	5.4 (1.2)
Non-provocative	9.0 (5.0)	125.8 (24.3)	4.4 (1.4)
<i>t</i>	-3.6	-4.28	6.26
<i>p</i>	<.001	<.001	<.001

Provocative attitude is scored on a 7-point scale, body size is scored for US standards, and weight is in pounds. Respondents were randomly exposed to one, two or three different versions of the model

validated by a pretest conducted among 123 female respondents, whose results are shown in Table 7. The pretest results showed that the manipulations of size and posture were successful: The thin version of the model was indeed perceived as thinner, and the provocative version of the model was indeed perceived as more provocative. It proved difficult to have a fully orthogonal manipulation of these variables, though. As shown in Table 7, the provocative posture makes the model look thinner to some extent, and the thinner model is, to some extent, perceived as more provocative. The size of these unintended effects was substantially smaller than that of the intended manipulations, though, and we proceeded to the main experiment with this version of the stimuli. In addition to the data reported in Table 7, a convenience sample of 50 international undergraduate female students was asked whether the model in the ad was looking at a man, or at another woman. The attitude of the model made a large difference in that respect: 81% of respondents reported that the provocative models were looking at a man, but only 58% did so for the non-provocative models. No such difference was observed between plus-size models (70%) and minus-size models (78%).

Procedure and Measures

Procedure and measures were the same as in Study 1 (see Appendix of Table 13). In line with Study 1, women were first asked to imagine that their partner was looking at a full-page ad featuring the model before answering the questions.

Results

We estimated four general linear models with mate-guarding jealousy, derogation, social exclusion and drive for thinness as dependent variables, respectively;

provocativeness and size of the model as fixed factors; and respondent's intrasexual competitiveness, age, body size, and dating status as covariates.

As shown in Table 8, results indicated that the provocative attitude of the model, to a much greater extent than her thin body size, was a trigger of mate-guarding jealousy and indirect aggression (both derogation and social exclusion). All four GLM analyses detected a main effect of the provocative attitude of the model, but no comparable effect of the body size of the model. Furthermore, results did not show any significant effect of the body size nor the provocative attitude of the model on the drive for thinness. Finally, all four analyses detected a main effect of the intrasexual competitiveness covariate, such that participants scoring higher on intrasexual competitiveness also displayed stronger signs of jealousy, indirect aggression, and drive for thinness after exposure to the models.

General Discussion

The use of thin and idealized female models in advertising has been criticized for fostering body anxiety among female viewers, and much research has been devoted to providing evidence for this effect. In this article, though, we drew attention to another ethical implication of using idealized models. Because of their sexually provocative attitude, these models are perceived as sexual rivals by female viewers, and trigger feelings and behaviors which are usually reserved for real rivals: mate-guarding jealousy, derogatory gossip, and social exclusion.

Our four studies provided robust evidence for this phenomenon. First, a meta-analysis conducted across three studies showed that women exposed to ideal models expressed more mate-guarding jealousy, more derogatory comments, and more social exclusion of their imaginary rival. That female viewers would be jealous of the model is not unexpected (Buunk et al. 2016; Massar et al. 2009), but this article offers the first demonstration that advertising models can trigger patterns of indirect aggression, over and above their effects on self-esteem or body anxiety. Second, mediation analyses suggested that advertising models promote indirect aggression because their attitude conveys the impression that they are willing to flirt and have sex with men. Third, in line with these mediation analyses, we observed in our last study that the provocative posture of the models, and not her thin body size, was the characteristic that triggered viewers to engage in indirect aggression. This is an important result, given the emphasis that previous research put on the ethical implications of the models' body size (e.g., Ata et al. 2013; Dittmar et al. 2009), rather than on their attitude or posture. In the rest of this article, we consider the theoretical and ethical implications of our findings for consumer and advertising research.

Table 8 Regression results obtained in Study 4, controlling for individual variables (A) as well as the mean and standard deviation of all experimental measures in the different conditions (B)

	Jealousy	Derogation	Exclusion	Lose weight
A. Dependent variable				
Size (plus)	-0.52 (0.32)	-0.26 (0.20)	-0.19 (0.37)	-0.42 (0.38)
Attitude (non-provocative)	-0.64* (0.31)	-0.75*** (0.20)	-1.16** (0.37)	-0.52 (0.37)
Intrasexual comp.	0.75*** (0.08)	0.44*** (0.05)	0.28** (0.10)	0.38*** (0.10)
Age	-0.01 (0.01)	-0.01 (0.01)	0.002 (0.01)	-0.01 (0.01)
Status (single)	0.40 (0.26)	-0.03 (0.17)	-0.13 (0.30)	-0.47 (0.31)
BMI	0.03 (0.02)	-0.003 (0.01)	-0.03 (0.02)	0.18*** (0.02)
Size × attitude	0.23 (0.45)	0.22 (0.29)	-0.08 (0.53)	0.56 (0.53)
Constant	0.94*** (0.62)	2.05*** (0.40)	4.66*** (0.73)	-0.57 (0.74)
Observations	148	148	148	148
R ²	0.44	0.41	0.20	0.43
Adjusted R ²	0.41	0.38	0.16	0.40
Residual std. error (df = 140)	1.34	0.87	1.59	1.61
F statistic (df = 7; 140)	15.63***	13.76***	4.97***	15.07***
	Jealousy	Derogation	Exclusion	Lose weight
B.				
Thin and provocative model	3.63 ± 1.89	2.84 ± 1.21	4.63 ± 1.58	4.39 ± 2.02
Normal and provocative model	2.84 ± 1.74	2.36 ± 1.10	4.21 ± 1.60	4.42 ± 2.10
Thin and non-provocative model	2.82 ± 1.59	1.99 ± 0.63	3.37 ± 1.75	4.05 ± 2.32
Normal and non-provocative model	2.60 ± 1.64	1.93 ± 1.18	3.00 ± 1.58	4.47 ± 1.88

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Women bullying women may not always be as openly aggressive as men bullying men, but indirect aggression (derogatory gossip, slut-shaming, social exclusion) is, nonetheless, a serious concern, given its dramatic consequences that include depression and suicide (Vega and Comer 2005). While we can hardly eliminate all the sources of conflict that lead to indirect aggression, we must be mindful of media contents and advertising strategies that promote a culture of indirect aggression, and especially when they do so insidiously. Our findings suggest that the mere depiction of needlessly sexualized, provocative models is enough to trigger the patterns of indirect aggression usually reserved for real-life rivals. Repeated exposure to such models is bound to reinforce patterns of indirect aggression way beyond what would be expected from daily interactions with actual women, for at least two reasons.

First, the proportion of sexually provocative women found in advertising materials is absurdly high: in 2003, 27% of ads from six mainstream magazines featured sexual imagery (Reichert et al. 2012). Second, the attitude of the women depicted in sexualized ads arguably goes beyond everyday levels of flirtatiousness. In daily life, women who wear revealing clothing are already more likely to be targeted for bullying and slut-shaming by other women (Keys and Bhogal 2016; Papp et al. 2016). Sexualized advertising takes provocation to another level by showing models whose posture and attitude are suggestive of sexual availability, if not promiscuity. In fact, our results showed that the same model, wearing the same bikini, triggered higher levels of indirect aggression

when she adopted a provocative posture typical of sexualized advertising. Overall, women are exposed through advertising to an unrealistic number of unrealistically provocative female models, which take them through needless reinforcement of indirect aggression responses. This reinforcement, in turn, may promote an unhealthy culture of indirect aggression among women, by magnifying the frequency and intensity of the behaviors which are characteristic of female intrasexual competition.

Note that we do not mean that all detrimental effects of sexualized models are due to female intrasexual competition, nor that the only detrimental effect of female intrasexual competition in this context is to foster a culture of indirect aggression. First, the sexual objectification of women in advertising has detrimental effects on how men perceive and react to women, independently of the detrimental effects that operate through female intrasexual competition (Blake et al. 2016; MacKay and Covell 1997). Second, increased female intrasexual competition can have a slew of other effects in addition to promoting indirect aggression, such as generally negative feelings toward other women (Buunk and Fisher 2009), suboptimal spending on conspicuous goods (Wang and Griskevicius 2014), and a higher propensity to eating disorders (Li et al. 2010). While we acknowledge the importance of all these effects, we wish to emphasize in this article that advertising strategies based on sexually provocative models have ethical implications for the indirect bullying of women by women.

To make informed decisions about these ethical implications, we need to better understand exactly which features of advertising models trigger which adverse effects. For example, our findings suggest that if we worry about the effect of advertising on female–female bullying, it may be more productive to focus on the sexualization of the models, rather than on their body size, and conversely that if we worry about the effect of advertising on eating behavior, it may be more productive to focus on the body size of the models, rather than on their sexualization. Indeed, we never found any effect of provocative models on the intention to lose weight, and we never found any effect of the body size of the models on indirect aggression.

What we did find was that advertising models who are depicted in a sexually provocative manner prompted women to experience and engage the suite of feelings and behaviors usually reserved for real-life sexual rivals, which suggests that the use of sexually provocative models may reinforce and foster a culture of indirect aggression among women, fueling the alarming trends of female–female bullying and slut-shaming.

Restrictive regulations of sexual provocation in advertising would face important obstacles and objections, though. Indeed, restrictive regulations in advertising typically address ‘hard’ issues such as deception and verification of claims, rather than ‘soft’ issues such as sexuality and the objectification of women (Boddewyn 1991). To impose restrictive regulations on some advertising practice, one must have a clear definition of the practice, and a strong argument that this practice is sufficiently wrong to justify a restriction of various rights, notably free speech (Gould 1994; Henderson et al. 2009).

Consider, for example, the practice of digitally altering the body size of advertising models to make them exceptionally thin. Because this practice is arguably deceptive, it qualifies as a hard issue. Furthermore, it is relatively easy to define: either the body size of the model was altered, or it was not. Finally, there are strong arguments that this practice is wrong, both on deontological grounds (it amounts to lying; Bishop 2000; Cohan 2001), and on consequential grounds (it demonstrably hurts women’s well-being, Grabe et al. 2008; Groesz et al. 2002). Accordingly, various governments have proposed to regulate this practice (e.g., in France, Israel, Australia, and the UK), notably by requiring the inclusion of disclaimers when the model has been digitally altered (Friedman 2017; Geuss 2012; Paxton 2015).

Now contrast this practice with that of amping up the sexual provocativeness of advertising models. The provocative attitude of the model is not altered by digital means and is not ‘deceptive’ in any demonstrable sense. Furthermore, the practice is hard to objectively define (Wyckham 1987; Boddewyn 1991). In particular, issues of sexual provocativeness can easily be confounded with

issues of decency (here, a condemnation of all kinds of sexual provocation, however subtle, intentional, or private), which are notoriously thorny to regulate (Amy-Chinn 2007). Finally, there is no clear argument that the practice is wrong, or wrong enough to restrict free speech. Our findings suggest that provocative models may increase female–female bullying, but this effect is ‘psychoactive’ (it causes a well-defined group of viewers to feel hostile toward others; Hyman 2009; Hyman and Tansey 1990) rather than deliberate (as hate speech would be). Given how hard it is to define sexual provocation in advertising, and how difficult it is yet to characterize its ill effects, it would be a slippery slope to legally restrict it—as shown by the example of countries in which *all* depictions of female models are forbidden, for reasons of ‘decency’.

In other words, restrictions and regulations of thin and digitally retouched models are justified because the use of altered images is a deceptive practice that is morally wrong (Bishop 2000; Cohan 2001). Contrastively, strict government regulations toward advertisements picturing sexually provocative female models would be strongly controversial for the three main following reasons:

First, those who tend to oppose censorship require strong evidence that the incriminated ad causes harm (Gould 1994). Ads featuring sexually provocative models do trigger negative affective reactions and are thus considered as psychoactive ads (Hyman and Tansey 1990). However, one might argue that the experience of negative emotions is somewhat unavoidable in much advertising. For example, many ads make people feel miserable (e.g., envy, sadness) by showing an ideal life that requires the acquisition of new goods and services. These negative feelings intensify the pursuit of goals that could—according to advertising—only be fulfilled through consumption (Pollay 1986). Besides, ads featuring sexually provocative models appeal to subconscious affective reactions through an implicit message (i.e., female intrasexual competition is fierce). This type of implicit message can violate consumer autonomy (Nebenzhal and Jaffe 1998). That is, it is intrusive in consumers’ consciousness and can precipitate irrational feelings, attitudes, and behaviors (Pollay 1986). These effects are particularly strong given the pervasiveness of advertising and the efficacy of creative techniques utilized by advertising agencies. Under this logic, very many ads should be banned, since very many trigger negative emotions through implicit messages that can produce irrational reactions. But the elicitation of negative emotions and the activation of irrationality cannot be considered always socially undesirable. In social marketing, for example, negative emotions and irrationality are often activated (e.g., fear appeals to dissuade consumers of tobacco). Still these types of ads are not considered socially undesirable.

Second, some wonder how regulators would succeed in identifying a sexually provocative attitude (Wyckham 1987; Boddewyn 1991) for two reasons. The first reason is that a sexually provocative attitude is not only conveyed through the nudity of the model, but also through the posture and the movement of the model's body and face (Reichert and Ramirez 2000). These different postures and movements are difficult to define though. For example, in our research, just manipulating some characteristics of the model's posture (e.g., a cocked head showing the neck with extended arms to communicate sexual openness or a mouth pouting with plumped lips to show the model's sexual arousal) was sufficient to increase the model's sexual suggestiveness. But how can regulators decide which posture is deemed too suggestive? The second reason is that these postures and movements of the model's body and face can be perceived as more or less sexually provocative depending on the audience. For example, men and women differ in how sexually suggestive they regard different sexual appeals (Reichert and Ramirez 2000). Sexual appeals are also perceived differently in different cultures (Paek and Nelson 2007; Lysonski and Pollay 1990) and throughout history (Moore 2005). On the whole, ads picturing sexually provocative female models are difficult to regulate because—as it is generally the case with soft issues—‘they reflect a large variety of personally subjective, culturally related and historically changing values and attitudes’ (Boddewyn 1991).

Third, free speech advocates argue that prohibiting the use of sexually provocative models can violate people's liberties (the advertisers, the models and the viewers)—as it is the case in some countries with a very low representation of women in advertising, even non-sexualized ones. In ultra-conservative Saudi Arabia, for example, women often disappear from the ads (e.g., Abad-Santos 2012; Akbar 2017) as only women's eyes can be shown without being covered (Cader 2015). This extreme government regulation does not protect women's rights and goes against freedom of expression. To avoid interventions that are either not justified or too extreme, free speech advocates in the context of advertising favor minimal intervention in the lives of citizens and the market and appeal to ideals of a free enterprise economy (Henderson et al. 2009). Free speech right advocates opt for liberalism as a model of governance and express unwillingness to regulate the advertising industry. In this view, responsibility would then be placed upon the individuals, and not governments.

Based on these three main objections, the objective is not to eradicate sexual provocativeness from advertising. The objective is to try to contain its pervasiveness and to avoid the most vulnerable consumers to be overly exposed to such psychoactive ads that can trigger negative emotions

and irrational behaviors such as slut-shaming. Young audiences, for example, are both more targeted by sexual appeals and more vulnerable to its unintended effects (Reichert 2003). Besides, consumers—even educated and mature ones, are not always conscious of the unintended effects of advertising (Pollay 1986). This strongly questions the responsibility of individuals when processing advertisements featuring sexually provocative models.

Non-restrictive options exist, though, to curb the impact of sexual provocativeness in advertising. First, media literacy programs may be developed in order to raise awareness of the negative impact of sexual provocativeness among vulnerable populations, such as female teenagers (Reichert 2003). However, the efficacy of such programs is still questioned, even for ‘hard’ issues such as the alteration of body size (Borau and Nepomuceno 2016; MacCallum and Widdows 2016). Second, an appeal can be made to companies that they adopt self-regulatory, responsible practices (Arpp 2017). One such practice would be for companies to refrain from using provocative models in highly visible ads (e.g., on billboards or public transports), which make it impossible for the most vulnerable audiences to manage their exposure (Boddewyn and Loubradou 2011).

The efficacy of self-regulatory approaches heavily rests on public engagement, though (Harker and Cassim 2002). Consumer advocate organizations, media watchdogs, and concerned citizens have a large role to play, both for raising public awareness and for incentivizing companies to maintain responsible practices. While these incentives are typically negative (e.g., threats of name-and-shame; Reichert 2003), they do not have to be. For example, the APA task force on the sexualization of girls suggested to develop media awards for positive portrayals of girls as strong, competent, and non-sexualized (American Psychological Association 2007). In sum, the combination of self-regulatory practices, public awareness, and mixed incentives might currently be the best solution to approach the effects of sexualized ads on female–female hostility.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no competing interests.

Research Involving Human Participants and/or Animals All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Appendix

See Tables 9, 10, 11, 12, and 13.

Table 9 Items of the measures with grand means, standard deviations and reliability scores for the multi-item measures (pretest Study 1. $N = 98/128$ observations)

	Mean	SD	Chronbach alpha scores
<i>Fit with ideal stereotypes</i>			
This model corresponds to the beauty ideal conveyed today by the media	5.10	1.59	–
<i>Model's provocative attitude</i>			
She looks sexually provocative	4.56	1.53	
She is confident about her sexual appeal	5.50	1.40	
She feels sexually superior over other girls	4.19	1.83	
She is acting sexually superior	4.08	2.01	0.917
She displays her sexual appeal with superiority	4.47	1.90	
She looks over confident about her sexual appeal	4.57	2.04	
She wants to stand out from the crowd	4.83	1.65	

Table 10 Items of the measures with grand means, standard deviations, and reliability scores for the multi-item measures (Study 1. $N = 95$)

	Mean	SD	Cronbach alpha scores
<i>Mate-guarding jealousy</i>			
I am concerned that my partner would find a woman like this female model more attractive than me	3.27	1.94	0.833
I am afraid that my partner would be sexually interested in a woman like this female model	2.92	1.93	
I am worried about all the things that could happen if my partner came into contact with a woman like this female model	2.37	1.69	
I am worried that my partner would leave me for a woman like this female model if he had the opportunity	2.26	1.72	
I expect my partner not to look at a woman like this female model	2.55	1.75	
<i>Derogation</i>			
I would tell what a bitch she is	1.32	0.97	0.730
I would make a joke about how ugly she is	1.27	0.79	
I would call her a derogatory name	1.31	0.83	
I would make fun at her posture	2.27	1.75	
I would mention that the picture is digitally retouched	3.25	2.02	
I would say that the picture is unreal	2.81	1.78	
I would say that she must have been working out for hours everyday to get this body	2.96	1.67	
I would say that she must starved herself to get that body	1.80	1.29	
<i>Social exclusion</i>			
I could be friend with a woman like the model I just saw	4.53	1.54	–
<i>Intention to lose weight</i>			
To what extent do you intend to lose weight in the near future?	4.26	2.14	–
<i>Intrasexual competitiveness</i>			
I can't stand it when I meet another woman who is more attractive than I am	2.14	1.29	0.780
When I go out, I can't stand it when men pay more attention to a friend of mine than to me	2.98	1.67	
I tend to look for negative characteristics in attractive women	2.38	1.50	
When I'm at a party, I enjoy it when men pay more attention to me than to other women	3.95	1.75	

Table 11 Items of the measures with grand means, standard deviations and reliability scores for the multi-item measures (Study 2. $N = 159$)

	Mean	SD	Chronbach alpha scores
<i>Flirtatiousness</i>			
Is trying to seduce a man	4.09	1.80	0.968
Shows her physical charms to seduce a man	4.38	1.81	
Uses her sexual power over men	4.04	1.70	
Attempts to entice a man	4.28	1.78	
Is clearly intended to seduce men	4.11	1.87	
Adopts a seductive pose to attract men	4.48	1.95	
<i>Mate-guarding jealousy</i>			
I am concerned that my partner would find a woman like this female model more attractive than me.	3.66	1.95	0.889
I am afraid that my partner would be sexually interested in a woman like this female model	3.38	1.91	
I am worried about all the things that could happen if my partner came into contact with a woman like this female model	2.98	1.82	
I am worried that my partner would leave me for a woman like this female model if he had the opportunity	2.92	1.85	
I expect my partner not to look at a woman like this female model	3.25	1.80	
<i>Derogation</i>			
I would tell what a bitch she is	1.99	1.61	0.864
I would make a joke about how ugly she is	1.99	1.61	
I would call her a derogatory name	2.09	1.64	
I would make fun at her posture	2.92	1.88	
I would mention that the picture is digitally retouched	3.82	1.99	
I would say that the picture is unreal	3.50	1.89	
I would say that she must have been working out for hours everyday to get this body	3.95	1.82	
I would say that she must starved herself to get that body	2.90	1.82	
<i>Social exclusion</i>			
I could be friend with a woman like the model I just saw	4.74	1.36	–
<i>Intention to lose weight</i>			
To what extent do you intend to lose weight in the near future?	4.62	1.83	–
<i>Purchase intent</i>			
It is very likely that I will buy this product	2.68	1.86	0.968
I will purchase this product next time I need to buy diet pills	2.74	1.93	
I will definitely try this product	2.75	1.94	
<i>Intrasexual competitiveness</i>			
I can't stand it when I meet another woman who is more attractive than I am	2.76	1.76	0.849
When I go out, I can't stand it when men pay more attention to a friend of mine than to me	3.11	1.90	
I tend to look for negative characteristics in attractive women	2.77	1.76	
When I'm at a party, I enjoy it when men pay more attention to me than to other women	3.94	1.85	

Table 12 Items of the measures with grand means, standard deviations, and reliability scores for the multi-item measures (Study 3. $N = 198$)

	Mean	SD	Chronbach alpha scores
<i>Promiscuity</i>			
She frequently has casual sex with different partners	2.43	1.39	0.881
She is not choosy with her sexual partners	2.38	1.50	
Even when she's in a committed, long-term relationship, she is unfaithful	1.95	1.33	
She is very sexually active	3.31	1.80	
Sometimes, she has sex with multiple partners at the same time (orgy)	2.09	1.41	
<i>Flirtatiousness</i>			
Is trying to seduce a man	3.71	2.02	0.966
Shows her physical charms to seduce a man	3.98	1.99	
Uses her sexual power over men	3.68	1.96	
Attempts to entice a man	3.83	2.04	
Is clearly intended to seduce men	3.95	1.99	
Adopts a seductive pose to attract men	4.21	2.10	
<i>Mate-guarding jealousy</i>			
I am concerned that my partner would find a woman like this female model more attractive than me.	3.01	1.97	0.867
I am afraid that my partner would be sexually interested in a woman like this female model	2.79	1.88	
I am worried about all the things that could happen if my partner came into contact with a woman like this female model	2.29	1.70	
I am worried that my partner would leave me for a woman like this female model if he had the opportunity	2.24	1.71	
I expect my partner not to look at a woman like this female model	2.41	1.70	
<i>Derogation</i>			
I would tell what a bitch she is	1.41	1.05	0.811
I would make a joke about how ugly she is	1.40	0.98	
I would call her a derogatory name	1.46	1.15	
I would make fun at her posture	2.22	1.67	
I would mention that the picture is digitally retouched	3.38	2.07	
I would say that the picture is unreal	2.84	1.92	
I would say that she must have been working out for hours everyday to get this body	3.36	1.90	
I would say that she must starved herself to get that body	2.07	1.63	
<i>Social exclusion</i>			
I could be friend with a woman like the model I just saw	4.89	1.50	–
<i>Intention to lose weight</i>			
To what extent do you intend to lose weight in the near future?	4.52	2.02	–
<i>Intrasexual competitiveness</i>			
I can't stand it when I meet another woman who is more attractive than I am	2.64	1.79	0.881
When I go out, I can't stand it when men pay more attention to a friend of mine than to me	3.09	1.95	
I tend to look for negative characteristics in attractive women	2.89	1.87	
When I'm at a party, I enjoy it when men pay more attention to me than to other women	3.73	2.08	

Table 13 Items of the measures with grand means, standard deviations, and reliability scores for the multi-item measures (Study 4. $N = 148$)

	Mean	SD	Chronbach alpha scores
<i>Mate-guarding jealousy</i>			
I am concerned that my partner would find a woman like this female model more attractive than me	3.46	2.09	0.899
I am afraid that my partner would be sexually interested in a woman like this female model	3.34	2.06	
I am worried about all the things that could happen if my partner came into contact with a woman like this female model	2.64	1.73	
I am worried that my partner would leave me for a woman like this female model if he had the opportunity	2.49	1.76	
I expect my partner not to look at a woman like this female model	2.70	1.85	
<i>Derogation</i>			
I would tell what a bitch she is	1.80	1.42	0.841
I would make a joke about how ugly she is	1.58	1.19	
I would call her a derogatory name	1.80	1.44	
I would make fun at her posture	1.89	1.42	
I would mention that the picture is digitally retouched	3.12	1.93	
I would say that the picture is unreal	2.65	1.79	
I would say that she must have been working out for hours everyday to get this body	3.36	1.95	
I would say that she must starved herself to get that body	2.11	1.52	
<i>Social exclusion</i>			
I could be friend with a woman like the model I just saw	4.18	1.74	–
<i>Intention to lose weight</i>			
To what extent do you intend to lose weight in the near future?	4.33	2.08	–
<i>Intrasexual competitiveness</i>			
I can't stand it when I meet another woman who is more attractive than I am	2.14	1.47	0.840
When I go out, I can't stand it when men pay more attention to a friend of mine than to me	2.66	1.67	
I tend to look for negative characteristics in attractive women	2.22	1.51	
When I'm at a party, I enjoy it when men pay more attention to me than to other women	3.55	1.89	

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