

The advertising performance of non-ideal female models as a function of viewers' body mass index: a moderated mediation analysis of two competing affective pathways

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(Received 7 November 2014; accepted 3 December 2015)

Advertisements often display ideal female bodies which create unattainable standards of beauty, generating body anxiety and disorders in female viewers. Accordingly, public health concerns would encourage the use of natural, unedited models in advertisements. However, the advertising performance of natural models remains contentious. We argue that previous inconsistent findings about this performance may result from a complex causal framework in which natural models impact performance through two affective mediators (body anxiety, and repulsion toward the model), while allowing moderation by the viewer's own body mass index (BMI). Data collected in a nationally representative sample of 400 young women largely (but not entirely) validate this causal framework. Natural models triggered repulsion in viewers with higher BMI, which hurt advertising performance. Body anxiety, however, was positively correlated with advertising performance, and did not mediate any effect of natural models.

Keywords: advertisement; model; body; anxiety; repulsion; performance

Advertisement makes an intensive use of female models whose bodies seem far from natural. These idealized models are pictured in unnatural postures emphasizing their thinness, before photographs are thoroughly edited to make them look even thinner, and to give their skin a perfectly smooth texture without blemishes or wrinkles. The distinction between a natural and an ideal model is not straightforward or unidimensional, because the advertising and entertainment media do not themselves apply a straightforward or unidimensional recipe when creating ideal female models. Indeed, ideal female models have been diversely characterized as especially thin and attractive (Durkin, Paxton, and Sorbello 2007; Monro and Huon 2006); especially thin, young, attractive and provocative (Etcoff 2011); or especially thin with long legs, light eyes, clear skin and no wrinkles (Haboush, Warren, and Benuto 2012). At the very least, ideal models differ from natural models in terms of body size and complexion, which are digitally altered toward an unrealistic range, and typically result in higher physical attractiveness. Natural models, on the other hand, are minimally altered models whose body size and complexion all pertain to a realistic range (Bower and Landreth 2001).

The idealized bodies that result from digital alterations create unattainable and unrealistic standards of beauty, congruent with social ideals but incongruent with the viewers'

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self-image (Bissell and Rask 2010; Dittmar, Halliwell, and Stirling 2009; Watson, Wells, and Jemison Hudson 2011), resulting in body anxiety for female viewers (Grabe, Ward, and Hyde 2008), partly because viewers overestimate the degree to which others subscribe to the beauty ideal embodied by altered models (Park 2005; Park et al. 2007). The provocative depiction of ideal models as sex objects further increases this body anxiety (Lavine, Sweeny, and Wagner 1999), adding to the negative effects of ideal models on consumers' well being. As a result of this negative impact on consumers' psychology and well-being, the depiction of women in advertising has become a pressing societal concern (Halliwell 2015; Van Hellemond and Van den Bulck 2012), and many voices have called for a change in advertising practices. Popular media, for example, have started praising the use of natural size models, and shaming the practice of extreme digital alteration (Waller 2015). In parallel, social scientists have observed that female viewers reaped psychological benefits from exposure to natural, girl-next-door models (Diedrichs and Lee 2011; Martin and Xavier 2010). Given this concordance, and the moral imperative to redress the negative consequences of advertising, even when unintended (Pollay 1986), why are natural models still the exception in advertising campaigns?

One possibility is that advertising professionals may be wary that natural models might not be as effective an advertising device as ideal models. This is a legitimate concern, and one that must be addressed if a consensus is to be reached on advertising practices that serve both public health and economic performance. As we will see, the available data are inconclusive about whether ads featuring natural models achieve as good a performance as ads featuring ideal models (e.g., Hüttel and Gierl 2012; Sohn and Youn 2013). Progress on this difficult question will only be achieved by running experiments that investigate complex causal and statistical frameworks, in order to identify the channels (mediators) and the contexts (moderators) that determine the impact of natural models.

In the causal framework we develop and test in this article, the effect of natural models on advertising performance operates through two affective mediators, body anxiety and repulsion. Whereas much research investigated the negative affect (i.e., body anxiety) triggered by ideal models (Halliwell 2015; Dittmar, Halliwell, and Stirling 2009; Watson, Wells, and Jemison Hudson 2011), less attention has been paid to the possibility that natural models may trigger negative affects as well. Our core hypothesis is that while natural models decrease body anxiety, they also trigger a negative affect akin to disgust. These two affective reactions, we suggest, have opposite effects on advertising performance. In line with our focus on affect, advertising performance will be measured with scales which are commonly used when assessing the role of affective factors in advertising: attitude toward the ad, attitude toward the brand, and purchase intention (e.g., Batra and Ray 1986; Cho and Stout 1993; Derbaix 1995; Edell and Burke 1987; Holbrook and Batra 1987; Morris et al. 2002).

A key moderator in our framework is the respondent's own body mass index (BMI).¹ Although BMI is not commonly considered yet in studies of advertising performance (but see the call of D'Alessandro and Chitty 2011), it is linked to both our mediating variables, as it moderates the body anxiety triggered by ideal models (Durkin and Paxton 2002; Durkin, Paxton, and Sorbello 2007; Madanat, Brown, and Hawks 2007) as well as negative attitudes towards other women (Gallup and Wilson 2009; Muñoz-Reyes et al. 2012). Finally, our framework includes two general covariates known to influence ad performance independently from its contents, in order to partial out their effects when comparing the performance of natural vs. ideal models: general attitude toward advertising (Lutz 1985), which captures the predisposition to respond favorably or not to advertising (James and Kover 1992; MacKenzie and Lutz 1989), and product involvement (Batra and Ray

1986), which captures the personal relevance and significance of the product to the viewer (Leclerc and Little 1997; Te'eni-Harari, Lehman-Wilzig, and Lampert 2009).

Overall, this article goes beyond previous analyses of the emotional outcomes of exposure to ideal or natural models, by (i) testing the hypothesis that natural models may evoke negative as well as positive affects, (ii) investigating the opposite impacts of these negative and positive affects on advertising performance, and (iii) allowing for individual variations in these opposite impacts as a function of the viewer's BMI. As a result, we aim at providing a response to the puzzling question of whether (and for which viewers) natural models impair or improve advertising performance – thus, helping policy-makers and advertising professionals in their search for mutually acceptable policies, practices, and recommendations.

We report the results of a controlled experiment conducted in France, a country which recently considered several policies restricting the depiction of female models in advertisements (mandatory labelling of digitally altered models, prohibited depiction of unhealthy thin models). Because ideal, highly attractive models are most commonly used in the promotion of attractiveness-relevant products (Bower and Landreth 2001), our experiment focused on ads featuring body-care products. The experiment recruited female participants in the 18–35 age range, this group being the largest online consumer segment for such body-care products (cf. Brandbank 2012 report on health and beauty).

1. Conceptual background

1.1. *What is the performance of ads featuring natural models?*

This section considers prior data on the performance of ads featuring natural models. The indicators of performance retained for this brief literature review are that we will retain for our experiment (plus, occasionally, the willingness to pay for the product): attitude toward the ad, attitude toward the brand, and purchase intention.

As noted above, the distinction between natural and ideal models is multifaceted, comprising at least body size, skin complexion, and general physical attractiveness. Previous research mostly focused on attractiveness and body size, to inconclusive results. Depending on the study, the effect of attractiveness or body size on ad performance can be described as negative, positive, or nonexistent. This section offers a brief review of positive, negative, and null results relating attractiveness or body size to at least one component of ad performance.

Some studies suggested that natural models may impair ad performance, by virtue of being relatively less attractive, or by virtue of being of relatively larger body size. Less-attractive models impair the attitude toward a product and the willingness to pay for it (Buunk and Dijkstra 2011) – although this effect is stronger when female viewers are primed on their gender, or when they score high in social comparison orientation. Likewise, heavier models have been found to impair the attitude toward a product and the related purchase intention (Hüttl and Gierl 2012) – although this effect was limited to one product (perfume and not telephone), and obtained with a sample where all respondents were of average size.

Other studies, all focused on body size, contradicted these findings and reported either positive effects of average-sized models, or negative effects of extremely thin models. For example, extremely thin models can hurt advertising performance by eliciting negative impressions about the ethical character of the ad (Andersen and Paas 2012). Other studies found that average-size models could generate more positive brand attitude and purchase

intention than thin models, although this effect was dependent on individual characteristics of the respondent, such as skepticism towards advertising (Sohn and Youn 2013) or fashion leadership (Janssen and Paas 2014).

Finally, some other studies reported a failure to detect any effect of natural models on advertising performance. For example, both Diedrichs and Lee (2011) and Halliwell and Dittmar (2004) reported that average-sized models and thin models led to similar attitudes toward the brand. This null effect was considered good news in both studies, and framed as a positive signal to advertising professionals, encouraging them to use (average-sized) natural models, instead of (thin) ideal models. Given the other, inconsistent results reviewed above, and the current lack of a meta-analysis, caution may still be required as to whether natural models can promote products as well as ideal models.

Why did different studies find inconsistent, opposite effects of natural models on ad performance? One potential explanation for these inconsistent results is that natural models may impact ad performance through different channels, whose relative strengths may vary in different contexts. If natural models both improve and impair ad performance, only through different causal pathways, and if the power of these different causal pathways vary by context, then different studies may well vary in the overall, net effect they eventually report. This article proposes to test such a causal framework. This framework is built on the idea that natural models can alleviate one form of negative affect (body anxiety) but yet generate another form of negative affect (repulsion). Empirical research on ad-evoked feelings has established that negative affective responses have substantial detrimental effects on persuasion and ad efficacy (Edell and Burke 1987; Holbrook and Batra 1987). For example, viewers who experience negative affects after being exposed to a model tend to evaluate a product negatively (Bower 2001). In the two following sections, we expose our rationale for postulating that natural models may decrease body anxiety while increasing repulsion (both effects being moderated by the viewer's BMI). If we are correct, then the advertising performance of natural models can be construed as the outcome of an affective competition between body anxiety and repulsion. That is, natural model may simultaneously improve ad performance by decreasing body anxiety, while impairing ad performance by increasing repulsion.

1.2. Body anxiety

Body anxiety can imply feelings of worry and concern about one's own body image, or negative judgments about one's own body image. It is primarily assessed by self-reports of negative emotions such as 'I'm anxious, stressed, anguished about my hips' (Reed et al. 1991) or 'I am extremely dissatisfied with my waist' (Berscheid, Walster, and Bohrnstedt 1973). Women experience body anxiety when they encounter media depictions of ultra-thin, idealized female bodies. Meta-analytic reviews have largely confirmed this finding, as well as its undesirable consequences in terms of eating disorders (Grabe, Ward, and Hyde 2008; Groesz, Levine, and Murnen 2002). This effect is so robust that it survives disclaimers that models were digitally modified, or warnings that trying to resemble them would be unhealthy (Ata, Thompson, and Small 2013; Selimbegovic and Chatard 2015).

It seems natural to expect that body anxiety would decrease if natural models were used in advertisements, and several experimental studies have indeed confirmed this expectation. Women experience less body anxiety when they are exposed to average-size models, especially if they have strongly internalized cultural ideals of beauty (Diedrichs and Lee 2011; Halliwell and Dittmar 2004). Likewise, exposition to large-size models

also result in less body anxiety, as well as a lower perceived pressure to be thin (Martin and Xavier 2010). Finally, women experienced less body anxiety when they could see side by side the digitally altered, thin version of a female model, and the original, unaltered picture (Reaves et al. 2004). We note, however, that one study measuring the discrepancy between actual and ideal self (which can be construed as a form of body anxiety) did not find any positive effect of the exposure to a natural model (Bissell and Rask 2010).

In sum, it can be expected that women exposed to a natural model will feel lower body anxiety. Because lower body anxiety is an improved affective state (as compared to higher body anxiety), and because ads that evoke improved affective states commonly result in better advertising performance (Batra and Ray 1986; Derbaix 1995; Holbrook and Batra 1987; Walther and Grigoriadis 2004), it can be tentatively predicted that natural models will result in better advertising performance through the body anxiety mediating variable.

One possible moderator of this effect, though, is the viewer's own body size. More specifically, ideal models may create greater anxiety for viewers whose BMI identify them as overweight. This prediction is supported by the findings of Durkin and Paxton (2002), who found that women with high BMI and poor body image experienced stronger impairment of body image when exposed to ideal models (for comparable findings in Jordan, see Madanat, Brown, and Hawks 2007); and by the findings of Halliwell (2013), according to which women with a positive body image are protected to some extent from anxiety-inducing ideal models. It turns out that women with a normal BMI tend to enjoy a more positive body image than overweight women, whose anxiety typically focuses on lower body fat (Bissell and Rask 2010; Durkin, Paxton, and Sorbello 2007; Monteath and McCabe 1997). On this basis, it can be expected that model type will have a greater effect on the body anxiety of overweight women, and ultimately a greater impact on advertising performance in this segment of the population.

In sum, we predict that natural models will result in lower body anxiety, especially for high BMI viewers, and that this lower body anxiety will mediate a positive effect on advertising performance.

1.3. Repulsion

Natural models may lessen the viewer's body anxiety, but the body of the model herself may generate negative affective reactions. Here, we introduce the novel hypothesis that natural models may trigger some measure of the feelings usually evoked by overweight people. Our rationale is that *within the population of advertising models*, natural models are outliers in terms of body size. In other words, if ideal models are taken as a reference point, natural models may elicit, to some extent, the feelings associated with anti-fat biases – in particular, repulsion (Lieberman, Tybur, and Latner 2012; O'Brien et al. 2013; Vartanian 2012; Vartanian, Thomas, and Vanman 2013). Repulsion amounts to experiencing feelings of unpleasantness and physical disgust (as opposed to moral disgust) semi Tybur, Lieberman, and Griskevicius 2009) toward a stimuli, in this case the body of the model featured in the ad.

To our knowledge, this hypothesis has never been directly tested. We know of only one study which showed that exposure to a natural model (in terms of body size) resulted in a more negative mood (over and above any effect of body anxiety) than exposure to an ideal model or no model at all (Anschutz et al. 2009). The study did not identify the

causes of this negative mood, which means that we cannot confidently attribute it to feelings of repulsion.

If natural models do trigger at least some measure of repulsion, this negative affect may transfer to the ad, the brand or the product, hurting one or several measures of advertising performance. Furthermore, it is possible that this effect might be moderated by the viewer's own BMI, although the data that may inform that prediction are not entirely consistent. Negative attitudes resulting from anti-fat prejudices seem to decrease as one's own BMI increases (Lieberman, Tybur, and Latner 2012; Schwartz et al. 2006), but these results were obtained for obese targets, and may not well apply to natural models. In parallel, studies showed that the BMI of a woman may influence her propensity to experience negative affects toward other women (e.g., anger, aggression, etc.); but these studies did not measure physical repulsion, and delivered inconsistent results about the direction of the link between BMI and negative affect (Gallup and Wilson 2009; Muñoz-Reyes et al. 2012). Overall, previous research suggests to include viewer's BMI as a potential moderator of physical repulsion, but it is too sparse to commit to a specific prediction regarding the direction of this moderation.

In sum, we predict that natural models will result in higher feelings of repulsion, moderated by viewers' BMI, and that these higher feelings of repulsion will mediate a negative effect on advertising performance.

1.4. Summary of research hypotheses

Based on a literature review, the current article will investigate the causal framework depicted in Figure 1. Within this framework, the use of a natural model impacts ad performance (decomposed in attitude towards the ad, attitude towards the brand, and purchase intention) through two competing, parallel affective pathways: (1) natural models decrease viewers' body anxiety, differently for viewers with different BMIs – specifically, a greater effect for greater BMIs; (2) natural models increase viewer's feeling of repulsion toward the model, allowing for a moderation by viewer's BMI, without committing to a specific directional prediction for this moderation; (3) finally, the two affective pathways mediate the advertising performance of natural models. In the rest of this article, these hypotheses are tested in a sample of 400 women aged from 18 to 35.

2. Methods

2.1. Participants

We aimed at recruiting a sample of French women aged 18–35. This age group is the largest online consumer segment for body-care products (cf. Brandbank 2012 report on health and beauty). Even though French women are often portrayed as less at risk for weight issues or obesity, national statistics paint a more concerning picture (Obepi Roche 2012). In particular, while it is correct that only 16% of French women are obese, compared to 19% for the OECD average and 37% for the USA, the prevalence of obesity for French women increased by 89% since 1997, compared to 62% for French men.

The Creatests company provided us with a sample of 400 French women aged 18–35 ($M = 27$, $SD = 5$), nationally representative in terms of BMI, education, socioeconomic group, and marital status (see Table 1 for sample characteristics after random allocation to one of four advertisement conditions). This sample was constructed from a large panel of respondents who had previously registered through one of the recruitment websites

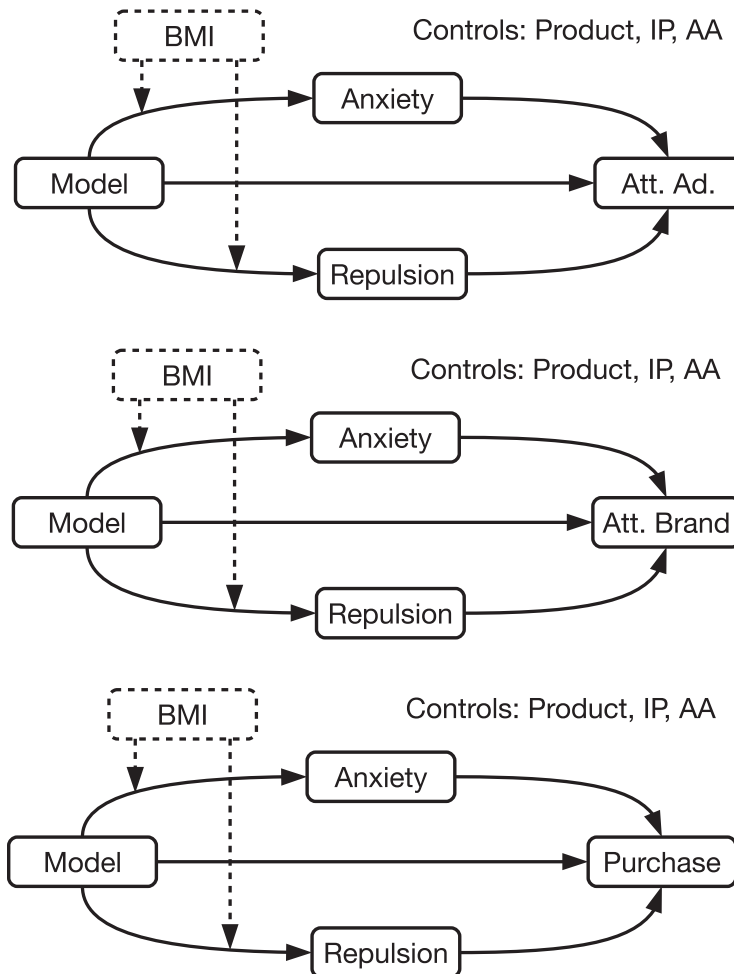


Figure 1. Moderated mediation analysis: Model type (ideal or natural) affects advertising performance (decomposed into attitude towards the ad, attitude towards the brand, and purchase intention) through two channels (body anxiety and repulsion toward model), in a way that depends on respondent's BMI, after controlling for the effect of product, involvement in the product category (IP), and general attitude toward advertising (AA).

owned by the company, in order to participate in polls and market research surveys. They provided demographic information (including gender and age) at registration, and this demographic information was controlled again each time they participated in a survey, including telephone and face-to-face surveys. Many participants in our sample had presumably participated in other surveys beforehand, up to five surveys of similar length in the past year. They were blind to the purpose of the current experiment, which was referred to by the name 'Magazine'.

2.2. Procedure

The experiment was conducted online in June and July 2012. Participants logged into the experiment at their convenience and were randomly assigned to one of the four conditions,

Table 1. Characteristics of the sample, after random allocation to one of four conditions. The four subsamples do not significantly differ from each other.

	<i>N</i>	Age	BMI	Socio-professional group			College education %	Single %
				Lower %	Higher %	Inactive %		
Cream								
Natural model	100	27.1 ± 4.9	24.4 ± 5.3	41	17	42	65	28
Ideal model	100	26.5 ± 4.7	23.1 ± 4.4	39	14	47	58	34
Oil								
Natural model	100	26.8 ± 4.8	24.0 ± 5.3	38	16	46	64	34
Ideal model	100	27.0 ± 4.8	23.9 ± 5.5	40	17	43	55	27

hence limiting time-of-day biases. In order to increase the external validity of the study, the procedure simulated as much as possible the real experience of being exposed to an advertisement in the media. In the first phase of the experiment, participants were invited to browse through a six-page online flipbook that imitated the contents and layout of a real magazine, including a full-page advertisement for a body-care product (see Section 2.3 for details). The editorial contents of the flipbook addressed fashion and lifestyle, but not body-care. Furthermore, the model was the only individual photographed in the flipbook: articles were illustrated by objects such as shoes or stacks of books.

Participants were free to browse the flipbook back and forth as they wished, by clicking through the pages. Only when they had visualized all the magazine contents onscreen could they move on to the rest of the study. Once they did, they could not go back again to the flipbook. This was made clear in the instructions they received before seeing the flipbook (translated from French): ‘The following pages are extracted from a women’s magazine. Browse these pages at your own pace, as if you were really paging through a magazine. It is not mandatory to read the articles. When you are finished, respond to the questions, but please note that you will not be able to go back to the magazine.’

At this stage, participants first answered a few attention and memory questions (not discussed further in this article), then the advertisement appeared again onscreen and they responded to the main set of questions intended to capture mediator, moderator, and outcome variables as well as covariates (see Section 2.4 for details).

2.3. Materials

The ads inserted in the flipbook featured either a natural model or an ideal model. Furthermore, in order to generalize findings to at least two different products, the product featured in the ad was either a cream or an oil, leading to four different versions of the ad. These four versions correspond to the cells of a 2 × 2 between-participant design.

The model shots were extracted from real advertising materials to stick to current advertising strategies. The natural model thus resembles those chosen by cosmetics companies like Dove, down to her relaxed and friendly composure. Shots were chosen so that models wore similar attire and adopted broadly comparable postures, while differing in their fit with current media stereotypes of ideal beauty. A pretest (135 women, age range

18–35) confirmed that this perceived fit was higher for the ideal model (5.7 on a 7-point scale) than for the natural model (2.6 on a 7-point scale), $t(133) = 13.9, p < .001$, and that the ideal model was perceived as more attractive than the natural model (5.4 vs. 3.9, $t(133) = 7.2, p < .001$). A professional graphic designer created the ads by matching the bathing suit colors, removing backgrounds, positioning the models, and adding brand logo, product, and slogan. The brand name *Ella SkinCare* was selected among 12 fictitious names based on a pretest, so that it would not be reminiscent of any existing brand, and perceived as equally appropriate for a cream and for an oil.²

2.4. Measures

Appendix displays all measurement scales and their constituent items, together with their grand means and standard deviations. All responses were scored on 7-point Likert scales. Since the study was conducted in French, all items were translated in French (the quality of this translation being checked by having another translator back-translate the French items in English). The French items were pretested among 135 women – exploratory and confirmatory analyses suggested to drop some of the original items, which resulted in scales showing good reliability, with Cronbach α coefficients between .91 and .97. The congruence of the model with sociocultural ideal was measured with three items developed for this article. In addition, for exploratory purposes, the congruence of the model with ideal and real self was measured with items from Sirgy et al. (1997). Body anxiety was measured with items from the Physical Appearance State and Trait Anxiety Scale of Reed et al. (1991), focusing on lower-body corpulence items (legs, buttocks, thighs, hips, etc.). We focused on lower-body corpulence because the French translation of the other dimensions had unsatisfying psychometric properties. Note that lower body parts tend to generate the most anxiety in women, being primarily associated to weigh gain (Monteath and McCabe 1997). Attitude toward the ad was measured with items from Holbrook and Batra (1987), while attitude toward the brand and intention to buy were measured with items from Spears and Singh (2004). The covariates (involvement in the product category and general attitude toward advertisement) were taken from Strazzieri (1994) and MacKenzie, Lutz, and Belch (1986), respectively. Finally, participants indicated their height and weight, from which their BMI was computed. Note in that regard that we did not take participants' measurements, but relied on self-reports instead. Although this creates the possibility that some participants might have been insincere about their height and weight, we believe this risk to be acceptably low in the context of an anonymous survey.

3. Results

3.1. Manipulation checks

The ideal model was perceived as fitting sociocultural ideals of beauty better than the natural model (5.9 vs. 3.5), $t(398) = 13.8, p < .001$. She was also perceived as closer to the participants' ideal self (4.5 vs. 3.7), $t(398) = 4.3, p < .001$, and farther from their real self (2.0 vs. 2.6), $t(398) = -3.7, p < .001$.

3.2. Correlational structure and descriptive statistics

Table 2 displays the correlation matrix of all experimental measures. The correlation matrix already suggests that our two candidate mediators are significantly correlated to

Table 2. Correlation matrix of the mediators, moderator, outcomes and covariates. Correlations greater than .10, .13, and .17 are significant at the .05, .01, and .001 levels, respectively ($N = 400$, $df = 398$).

	1	2	3	4	5	6	7
1 BMI							
2 Body anxiety	+.28						
3 Repulsion	+.02	+.01					
4 Attitude ad	+.04	+.18	-.19				
5 Attitude brand	+.05	+.23	-.11	+.77			
6 Purchase intention	+.01	+.29	-.10	+.64	+.64		
7 Product involvement	-.05	+.21	-.02	+.43	+.46	+.62	
8 Attitude advertising	+.01	+.17	-.01	+.58	+.56	+.43	+.42

advertising performance. Repulsion toward the model is negatively linked to the three measures of performance, whereas the body anxiety of respondents is positively linked to the three measures of performance. Our two covariates (product involvement and attitude toward advertising) also show strong correlations with all measures of performance, which confirms the importance of including them in our analyses.

Table 3 displays the mean and standard deviation of all experimental measures in the four conditions. These summary statistics do not show large variations in the four conditions – the reason for this, as we will now see, is that BMI plays an important moderating role in our data.

3.3. Conditional process analysis

To estimate the moderated mediation frameworks depicted in Figure 1, we first want to test the direct effects of the female model (ideal vs. natural) on the two affective mediating variables (body anxiety and repulsion) as well as on the appropriate component of ad performance (attitudes toward the ad, toward the brand and purchase intention), while taking into account BMI as a moderator. Furthermore, we want to test in each case whether the two affective variables mediate the conditional effect of the model on ad performance. Because we hypothesize that the influence of the model on performance is determined by the interaction between the mediating and moderating variables, we need to test for relationships of moderated mediation, also known as conditional indirect effects.

Haye's bootstrapping procedure (Hayes 2013) provides us with a reliable estimation of direct effects as well as conditional indirect effects. This procedure delivers a complete and detailed analysis of (a) main effects and interaction effects of model and BMI on the mediating and dependent variables, as well as (b) indirect effects of model on performance, as mediated by each of the two affective variables, for various values of the BMI variable – specifically, for values lower, between, and higher than one standard deviation from the mean. The procedure delivers in each case a bootstrap 95%-confidence interval for the indirect effect, which is detected as significant if the confidence interval does not include zero. This procedure is robust to non-normal distributions, and simultaneously rather than independently estimates mediation and moderation effects (Preacher, Rucker, and Hayes 2007). Accordingly, we performed three moderated mediation analyses following the procedure implemented by Hayes (2013) in the PROCESS SPSS macro (specifically, model 7 with 5000 bootstrapped samples). All analyses included product type, product involvement, and general attitude toward advertising as control variables.

Table 3. Means and standard deviations of all experimental measures as a function of product and model, for the whole sample, for participants with BMI one standard deviation below the mean or lower, and for participants with BMI one standard deviation above the mean or higher.

	Anxiety	Repulsion	Attitude ad	Brand	Purchase	Involvement	Attitude advertising
<i>Whole sample</i>							
<i>Cream</i>							
Natural model	3.6 ± 1.8	2.3 ± 1.5	3.9 ± 1.6	3.7 ± 1.3	2.9 ± 1.8	2.6 ± 1.6	3.7 ± 1.5
Ideal model	3.5 ± 1.9	2.0 ± 1.3	3.3 ± 1.6	3.5 ± 1.5	2.8 ± 1.8	2.7 ± 1.7	3.6 ± 1.5
<i>Oil</i>							
Natural model	3.6 ± 2.1	2.0 ± 1.4	4.0 ± 1.7	3.9 ± 1.5	3.0 ± 1.6	3.3 ± 1.8	3.7 ± 1.5
Ideal model	3.6 ± 2.0	1.8 ± 1.2	3.8 ± 1.6	3.9 ± 1.6	3.0 ± 1.8	3.2 ± 1.8	3.8 ± 1.6
<i>BMI lower than 1 SD from the mean</i>							
<i>Cream</i>							
Natural model	3.4 ± 1.6	1.7 ± 1.1	4.9 ± 1.6	4.4 ± 1.0	2.9 ± 1.8	3.0 ± 1.5	3.4 ± 1.2
Ideal model	2.3 ± 1.7	2.0 ± 1.2	3.6 ± 1.9	3.7 ± 1.6	2.4 ± 1.7	2.9 ± 2.1	3.7 ± 1.4
<i>Oil</i>							
Natural model	2.0 ± 1.3	1.7 ± 1.4	4.1 ± 1.8	4.4 ± 1.7	3.4 ± 1.8	3.9 ± 2.2	4.6 ± 1.5
Ideal model	2.3 ± 1.7	2.5 ± 1.5	3.6 ± 1.5	4.3 ± 0.8	3.3 ± 1.6	2.8 ± 1.5	3.8 ± 1.1
<i>BMI higher than 1 SD from the mean</i>							
<i>Cream</i>							
Natural model	4.7 ± 1.5	2.6 ± 1.5	4.0 ± 1.7	4.0 ± 1.3	2.7 ± 1.7	2.2 ± 1.8	3.8 ± 1.7
Ideal model	4.7 ± 1.4	1.9 ± 1.3	4.2 ± 1.3	4.3 ± 1.2	3.3 ± 1.7	3.1 ± 1.8	4.2 ± 1.5
<i>Oil</i>							
Natural model	3.9 ± 2.2	1.7 ± 1.2	4.5 ± 1.9	4.3 ± 1.5	3.2 ± 1.9	3.2 ± 1.5	3.6 ± 1.4
Ideal model	4.1 ± 2.3	1.2 ± 0.4	3.8 ± 1.7	4.1 ± 1.4	2.8 ± 2.1	3.3 ± 2.0	4.4 ± 1.7

The analyses of direct effects are displayed in Table 4. The analyses detected a direct, positive effect of natural models on one measure of performance, the attitude towards the ad. We will defer the interpretation of this direct, unmediated effect until after we have a full picture of indirect effects in our data. As shown in the three first rows of Table 4, the model variable had no effect on anxiety – anxiety was only driven by the BMI of the participants. In parallel, and in line with our expectations, the model variable impacted repulsion in interaction with BMI. These results are easier to interpret when visually depicted in Figure 2. Participants with higher BMI scored higher on body anxiety, regardless of the model they were exposed to. In contrast, participants with higher BMI showed increased repulsion toward the natural model, but not toward the ideal model. Finally, our two mediators had a significant effect on measures of ad performance. Somewhat surprisingly, anxiety had a positive impact on the attitude towards the brand as well as on purchase intention. In line with our expectations, repulsion had a significant negative effect on all three measures of performance.

We now turn to the analysis of conditional indirect effects, that is, the effect of the model variable as mediated by anxiety and repulsion, and moderated by BMI. Table 5 displays the bootstrap 95% confidence intervals for the indirect effects of the model variable, for lower, moderate, and higher values of BMI (respectively lower than, between, and greater than one standard deviation from the mean). As shown in Table 5, anxiety did not

Table 4. Direct effects in the moderated mediation analysis.

	Anxiety		Repulsion		Attitude ad		Attitude brand		Purchase	
	<i>b</i>	<i>t</i> (393)	<i>b</i>	<i>t</i> (393)	<i>b</i>	<i>t</i> (393)	<i>b</i>	<i>t</i> (393)	<i>b</i>	<i>t</i> (393)
Model	-0.03	-0.17	0.30	2.15*	0.49	3.84***	0.14	1.26	0.09	0.71
BMI	0.11	6.28***	0.01	0.16						
Model × BMI	-0.02	-0.68	0.06	2.09*						
Anxiety					0.05	1.50	0.08	2.55*	0.13	3.82***
Repulsion					-0.23	-4.97***	-0.11	-2.61**	-0.12	-2.51*
Product	-0.14	-0.76	-0.21	-1.49	0.08	0.59	0.10	0.82	-0.16	-1.23
IP	0.23	3.84***	0.01	0.10	0.20	4.83***	0.21	5.61***	0.52	12.22***
AA	0.10	1.49	-0.01	-0.07	0.51	11.33***	0.42	10.17***	0.23	4.86***

p* < .05, *p* < .01, ****p* < .001.

mediate any effect of model on any measure of performance, for any level of BMI (all confidence intervals include zero). In contrast, repulsion mediated a negative effect of natural models on all measures of performance, for participants of moderate and higher BMI (confidence intervals do not include zero), but not for participants of lower BMI (confidence intervals include zero).

In sum, our findings validate the hypothesis that natural models decrease advertising performance by eliciting repulsion in viewers of moderate or higher BMI. In contrast, we

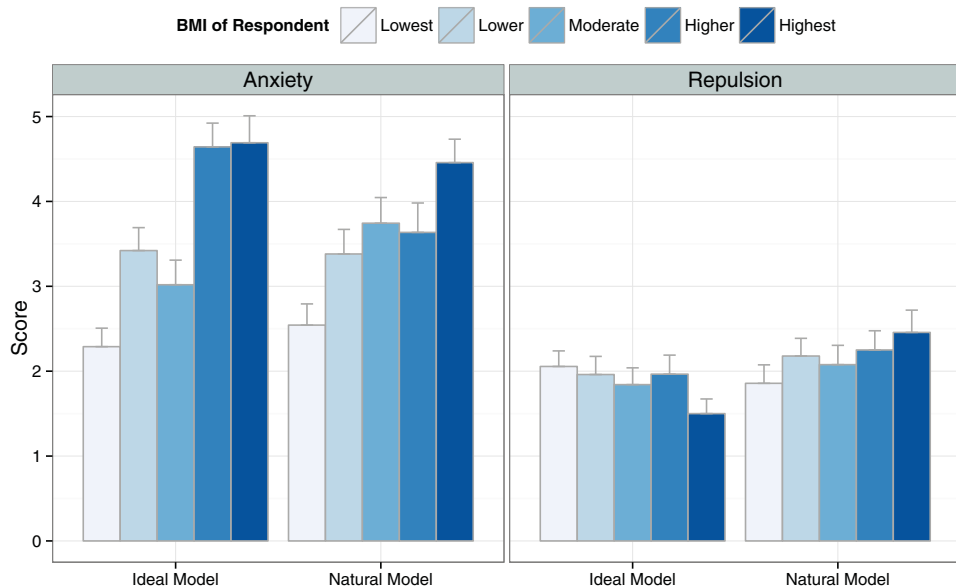


Figure 2. Effect of Model and BMI on anxiety and repulsion. Anxiety is solely driven by BMI, whereas repulsion is driven by an interaction between model and BMI.

Table 5. Bootstrap 95% confidence intervals for the indirect effects of the model variable, as mediated by anxiety and repulsion, for three levels of BMI.

Mediator	Attitude ad	Attitude brand	Purchase intention
Anxiety			
Lower BMI	[-.02, +.05]	[-.03, +.06]	[-.06, +.08]
Moderate BMI	[-.03, +.02]	[-.03, +.03]	[-.05, +.05]
Higher BMI	[-.08, +.02]	[-.08, +.04]	[-.12, +.07]
Repulsion			
Lower BMI	[-.09, +.08]	[-.05, +.04]	[-.05, +.05]
Moderate BMI	[-.15, -.01]	[-.09, -.01]	[-.10, -.01]
Higher BMI	[-.26, -.05]	[-.15, -.01]	[-.17, -.01]

did not find any evidence that natural models may increase performance by lowering viewers' body anxiety. Not only did natural models fail to lower viewers' body anxiety, but body anxiety had, in any case, a positive effect on attitude towards the brand and purchase intention. Finally, we note that natural models had a positive effect on attitude toward the ad, which was not mediated by either anxiety or repulsion. It seems plausible that for reasons of social desirability, participants may have expressed a greater liking of the natural model, without at the same time feeling more positively disposed toward the brand or ready to buy the product.

4. Conclusion

Given the nefarious health effects of ads featuring digitally altered, ideal female models, research must be conducted that identifies healthier and economically sensible alternatives to using these ideal models (Pollay 1986). One such alternative is to use natural, unaltered models whose body size, complexion, and general attractiveness all pertain to a realistic range. The effectiveness of featuring natural (as opposed to ideal) female bodies in advertisements is contentious, with different studies having reached different conclusions (Diedrichs and Lee 2011; Hüttl and Gierl 2012; Sohn and Youn 2013). This paper argued that such inconsistent findings may result from complex effects of natural models, which may affect performance through separate channels (mediators), whose impact may depend on specific contexts (moderators). The article described and tested such a causal framework (depicted in Figure 1), in which natural models impact advertising performance through two affective mediators (body anxiety and repulsion), while allowing moderation by the viewer's own BMI.

The data validated this causal framework for the repulsion mediator, but not for the anxiety mediator. Participants expressed greater levels of repulsion towards the natural model, when they themselves were of higher BMI, and this repulsion mediated a negative impact of natural models on three measures of advertising performance. Past research did not explore the idea that natural models could generate negative affects in viewers. Our results not only proved that they could, but also that such negative affects impaired advertising performance – which is an important step in understanding why some previous studies found that natural models could have an adverse effect on purchase intentions (Hüttl and Gierl 2012).

This novel finding calls for further investigation, in order to better understand the nature and the causes of repulsion toward the natural model. One possibility is that greater repulsion toward the natural model was mostly a reflection of this model being perceived as less attractive. This explanation may not seem entirely plausible: even though unattractive faces do trigger experiences of disgust (Connor and Langlois 2011), the natural model in our study was far from being unattractive or homely – and participants never saw her picture side-by-side with that of the ideal model, a direct comparison which could have amplified her lesser attractiveness. A second possibility might be that viewers who were unsatisfied with their own body, to the degree of being repulsed to some extent by their own physical appearance, projected this feeling of repulsion onto the natural model. In this case, repulsion toward the model may actually be rooted in repulsion toward oneself, as reflected in the natural model (Dalley and Buunk 2009). While there is no easy way to evaluate the merits of this explanation with our current data-set, future research may afford a direct test of its predictions.

In contrast to previous studies (e.g., Diedrichs and Lee 2011; Halliwell and Dittmar 2004), we did not find that natural models had any beneficial effects on viewer's body anxiety. What we found instead is that body anxiety was mostly driven by the BMI covariate. This result calls for the careful control of BMI when studying exposure to ideal models: not only can random variations in BMI contaminate between-group comparisons, but floor or ceiling effects may compromise findings when the sampled population is significantly low or high in BMI.

Still contrary to expectations, body anxiety was *positively* correlated with two measures of advertising performance, and it did not mediate any effect of natural models. To interpret this effect, it is useful to distinguish trait body anxiety (viewers' stable level of body anxiety) from state body anxiety (viewers' transient level of body anxiety generated by the experimental manipulation). Our data presumably show that body-care ads are especially effective for viewers with high trait anxiety about their own body, an effect whose strength washes away that of the smaller, transient changes in state body anxiety resulting from exposure to an ideal model.

This analysis helps to clarify the theoretical implications of the positive effect of body anxiety on advertising performance. Indeed, prior research has shown that, in most cases, advertising should be more effective (i.e., create more favorable attitudes towards the ad and the brand and higher purchase intention) if it elicits upbeat, positive, and happy emotions (Edell and Burke 1987). Although there are exceptions to this pattern (Bagozzi and Moore 1994; Goldsmith, Cho, and Dhar 2012), an ad that triggers negative feelings should perform less well than an ad that triggers positive feelings. Our findings that body anxiety is positively correlated with ad performance would seem to contradict this pattern. However, our mediation analysis suggests that the positive correlation between body anxiety and performance is not driven by the changes in anxiety *triggered* by the ad, but rather by the stable level of anxiety experienced by the viewers over and beyond any exposure to the ad. In other words, our mediation analysis guards us against the conclusion that triggering body anxiety might improve the performance of an ad.

We now consider the applied implications of our findings. First, we observed that using natural models generated repulsion toward the model, with a negative impact on advertising performance. Additionally, there were concerns that the positive unmediated effects of natural models on advertising performance might be a social desirability artifact – viewers' positive reaction to natural models was limited to expressing a greater liking of the ad itself, without positive results for brand likability or purchase intentions. As a result, the current findings are not much encouraging regarding the tension between public policies

promoting the use of natural models, and advertising professionals worried about the economic effectiveness of doing so.

In parallel, we observed that even though the ad (whatever the model it featured) performed well on viewers with high body anxiety, local fluctuations in body anxiety due to the ad did not impact performance. Accordingly, even though higher levels of body anxiety in viewers are good for body-care advertising performance, it is useless (in addition to be ethically challenging) to try to increase body anxiety through the ad itself, since this increase would be too small to have a sizable impact, when compared to the effect of stable trait anxiety.

This also suggests that even if natural models could somehow decrease viewer's body anxiety, this beneficial effect would not translate into better ad performance. Overall, not only the (hypothetical) beneficial effects of natural models on body anxiety may not improve performance, but natural models also trigger repulsion in (overweight) viewers, which detectably hurt performance. If economic performance does find itself at odds with public health, progress in the use of natural models will surely be slow and difficult. One way forward, if the advertising industry continues to resist the use of natural models, could be to develop interventions promoting a positive body image, which can protect against negative media impact (Halliwell 2015; Halliwell and Diedrichs 2014). Even in this case, though, our results point to a conflict with ad performance, since performance was lower for viewers with a lower level of body anxiety.

Further progress can be achieved by addressing several limitations of the current study. First, our investigation was limited to beauty care products. Many other products are advertised in campaigns that depict partially clothed female models, and future research may identify product categories for which natural models do not have the same impact as for beauty care products. Second, our investigation was limited to caucasian models – future research may focus on natural models from other ethnic groups, as well as their perception in an intercultural context (D'Alessandro and Chitty 2011). Third, we focused on affective variables in the advertising process, but we did not explore other cognitive pathways such as the credibility assigned to the model.

Finally and most importantly, our study used actual campaign shots to construct the ideal and natural model stimuli. This strategy has benefits and costs. As we already argued, the advertising industry does not use a simple, unidimensional recipe to alter natural models into ideal models. Many physical characteristics are altered in an ideal model, of which body size and skin complexion are only the most striking. As a result, to only manipulate body size (but not, e.g., skin complexion, or reflectance of the hair, or all the other small changes that the advertising industry would actually apply) would not afford a genuine assessment of the performance of natural models, since it would bias the test against ideal models. Now that we have provided a fair assessment of the performance (or lack thereof) of natural models, a second step is to locate the source of each effect, by experimentally manipulating one dimension after the other of the difference between natural and ideal models. For example, is the repulsion toward the natural model driven by her imperfect skin complexion, or her body size? Is the more favorable attitude toward the 'natural' ad driven by the size of the model, or by her smile? We acknowledge that huge experimental efforts will be necessary to sort out these issues – but the practical implications are important enough.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes

1. BMI is a simple index of weight-for-height, highly correlated with total body fat. It is defined as the weight in kilograms divided by the square of the height in meters. International conventions define individuals with a BMI lower than 18.5, greater than 25, and greater than 30 as underweight, overweight, and obese, respectively.
2. A convenience sample of 29 consumers (all women, age range 25–35) was presented with 12 fictitious brand names. They were asked whether they recognized these brand names (yes/no), whether they liked these brand names (7-point scale), whether these brand names suited a beauty oil well (7-point scale), and whether these brand names suited a beauty cream well (7-point scale). Two brand names were eliminated because they elicited higher recognition rates than the other. Of the remaining brand names, eight were eliminated because they suited one of the product better than the others. Among the two remaining brand names, 'Ella SkinCare' was retained because it elicited a slightly lower recognition rate, and was liked slightly better.

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Appendix

Scales and items used in the experiment

Manipulation checks		Mean	SD
Model as sociocultural ideal	She looks like the models that are seen in most magazines	4.6	2.2
	She corresponds to the beauty ideals conveyed today by the media	4.8	2.2
	She looks like the models staged in advertisements	4.8	2.2
Congruence with ideal self	The physical appearance of the model in the ad fits the physical appearance I would like to have	4.1	2.1
	I would like my physical appearance to be similar to the model in the ad	4.2	2.1
	I would like to physically resemble the model in the ad	4.0	2.1
Congruence with real self	The physical appearance of the model in the ad matches my physical appearance	2.4	1.7
	My physical appearance is similar to the model in the ad	2.4	1.7
	I physically resemble the model in the ad	2.2	1.6
Mediators		Mean	SD
Body Anxiety	I'm anxious, stressed, anguished about my legs	3.2	2.1
	I'm anxious, stressed, anguished about my buttocks	3.6	2.2
	I'm anxious, stressed, anguished about my thighs	4.0	2.3
	I'm anxious, stressed, anguished about my hips	3.6	2.2
Repulsion toward model	Looking at the model in the ad, I felt disgusted	2.0	1.5
	Looking at the model in the ad, I felt unpleasantly surprised	2.1	1.5
Outcomes		Mean	SD
Attitude toward the ad	I respond favorably to this ad	3.8	1.8
	I like this ad	3.6	1.7
	I have a positive feeling towards this ad	3.8	1.8

(continued)

Attitude toward the brand	This ad is good	3.8	1.7
	This brand is attractive	3.9	1.6
	This brand is nice	3.8	1.6
	My opinion about this brand is good	3.9	1.5
	I appreciate this brand	3.5	1.5
Intention to buy	I have a strong interest in buying this product	3.1	1.9
	I plan to buy this product	2.8	1.7
Covariates		Mean	SD
Involvement in the product category	[Creams/Oils] are products to which I attach particular importance	2.9	1.8
	I particularly like to talk about [Creams/Oils]	2.6	1.7
	[Creams/Oils] are products that interest me	3.4	2.0
Attitude toward advertising	Usually, my attitude towards advertisement is favorable	3.7	1.6
	Usually, my attitude towards advertising is positive	3.7	1.6
	In general, I find that ads are pleasant to watch	3.8	1.6