Media Psychology

Virtually Perfect: Image Retouching and Adolescent Body Image

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Virtually Perfect: Image Retouching and Adolescent Body Image

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Most studies of ideal-body media effects on body image focus on the extreme thinness of the models, not their idealness. In modern media, this idealness is often created or maximized via digital image editing. This experiment tested the effects of image editing outside the research-typical context of exclusive thinness. Original unretouched photographs were manipulated by a professional retoucher to produce unretouched and retouched image conditions. In a third condition (retouched-aware), the retouched images were explicitly labeled as retouched. Adolescents (N = 393, average age 15.43) were randomly assigned to one of these conditions or a no-exposure control, and they completed a questionnaire following exposure. Objectified body consciousness increased and physical self-esteem decreased among male and female adolescents in the retouched-aware condition only. This boomerang effect of retouching awareness is explored in the discussion.

Airbrushing, Photoshopping, retouching, photo manipulation, photo tampering, digital forgery, image editing: These are all terms used to describe the practice of altering photographs to change elements of composition. As Farid (2009) wrote about the ease of doctoring digital photographs, "Altering digital imagery is now ubiquitous. People have come to expect it in the fashion and entertainment world, where airbrushing blemishes and wrinkles away is routine" (p. 42). Image editing has become so commonplace that ordinary people use it on social networking and online dating sites (Hancock & Toma, 2009). In spite of public acknowledgment of image editing, humans

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are unskilled at detecting photo manipulation based on visual inspection alone (Farid & Bravo, 2010). Thus, media audiences are aware that most commercial images have been altered but have trouble identifying the altered elements.

THE "IDEAL" IN IDEAL-BODY MEDIA

In its early years, image editing was used primarily for political purposes like propaganda (King, 1997). In the digital age, image editing has become a requirement in the production of commercial images used to promote products and services for the fashion, health, entertainment, and beauty industries. In his book on the ethics of image editing, Wheeler (2002) argued, "In fashion, drastically manipulated photography is taken for granted by art directors and editors, and editorial layouts are sometimes barely distinguishable from advertising spreads" (p. 121). Research on the extremely thin media body ideal (e.g., Harrison, 2009) is founded on the assumption that media images of thin models and celebrities are thin and ideal, inasmuch as they are perfected through the use of appearance-enhancing devices like makeup, styling, lighting, and image editing, which is a uniquely effective tool for manufacturing idealness because it creates outcomes (e.g., removal of pores) that cannot be achieved through natural means.

The problem with the persistent confounding of thinness and idealness in research is that it problematizes efforts to determine the unique impact of idealness outside the context of extreme thinness. A recent, comprehensive meta-analysis of ideal-body media effects on body image (Grabe, Ward, & Hyde, 2008) comprised 141 studies and 15,047 participants. Effect sizes for body dissatisfaction, thin-ideal internalization, and eating behaviors and beliefs about eating ranged from Cohen's $d = -.28$ to $-.39$, representing decreased satisfaction with the body and increased eating pathology. For some outcomes (e.g., thin-ideal internalization), effect sizes were larger for adolescents ($d = -.42$) than for adults ($d = -.31$). Unfortunately, it remains a mystery how the visual features of the research stimuli produced these effects, as none of the studies in this meta-analysis investigated idealness outside the context of exclusive thinness. Most researchers assume that the models' thinness is the chief visual element encouraging excessive dieting, perhaps with good reason: Thinness itself is considered by many to be an essential element of physical attractiveness (Harrison, 2006). However, social cognitive theories of media effects (e.g., Bandura, 2002) hold that a particular character attribute becomes most worthy of emulation when it is cast in a highly flattering light. Since Western commercial media overwhelmingly cast thinness as ideal (Greenberg, Eastin, Hofschire, Lachlan, & Brownell, 2003), there is a need for research exploring the unique impact of idealness in visual media applied to a range of body types, not just model thinness.

Given the paucity of research in this area, the purpose of this study was to manipulate the idealness construct via an image-editing treatment that transformed unretouched photos to retouched photos, and measure the effects of this manipulation on teens' perceptions of their own bodies. The unretouched photos represent ordinary people with a variety of body types; the retouched photos represent the same people, digitally edited to make them more ideal. This study also manipulated participants' awareness of the retouching process with an additional condition pairing the retouched photos with a statement informing participants that the photos were retouched. All three image conditions were compared to a no-images control to provide a baseline for teen body perceptions. Thus, this study contributes uniquely to the literature on ideal-body media effects by exploring the effects of digitally produced idealness untethered to the exclusively thin body type, and testing the potential for awareness of digital manipulation to mitigate teens' responses to manipulated images.

THEORETICAL RATIONALE

Adolescents are exposed to a great deal of visual media altered by image editing. According to Rideout, Roberts, and Foehr (2010), in 2009, 8–18-year-olds in the United States spent more than three hours per day with media that are frequently image edited: 38 minutes with print media, 25 minutes with movies, an hour and 25 minutes with computers, and an hour and 13 minutes with video games. This level of exposure is cause for concern because even though teens are developmentally capable of distinguishing fantasy from reality in media (Dorr, 1983), image-editing technologies have become so sophisticated that even adults cannot accurately identify sites of retouching (Farid & Bravo, 2010). Developmental gains cannot compensate for technology that is capable of outsmarting human perception.

As of this writing, published social scientific research on the effects of image editing outside the context of model thinness could not be located; however, indirect evidence of the impact of idealized media might be derived from statistics representing the popularity of appearance-altering surgery among teens. The American Society for Aesthetic Plastic Surgery (2011) reported that in 1997, the number of Americans having surgical and nonsurgical cosmetic procedures was 1.68 million; by 2011, that number had grown to 9.19 million. In 2011 alone, 131,877 procedures were performed on U.S. children and teens under 18. The most common procedures were laser hair removal, microdermabrasion, rhinoplasty (surgical nose reshaping), and otoplasty (surgical ear reshaping). Hair, skin, noses, and ears are all routinely refined by image editors in visual media. While these data do not prove that teen interest in cosmetic procedures is driven by media images of perfection, the data justify a call for research investigating the link between exposure to

retouched images and teens' perceptions of their own appearance and their critical assessment of its adequacy.

The self-enhancement motive identified within social comparison theory and research (Suls, Martin, & Wheeler, 2002; Wills, 1981) has been described as a drive to compare the self to less fortunate or endowed others to reap the benefits of contrast. This view implies that downward social comparison is beneficial to the self-concept, whereas upward social comparison is detrimental. Exposure to perfected human images should be processed by the average viewer in an upward-comparison fashion, increasing appearance-related self-consciousness (i.e., objectified body consciousness; Lindberg, Hyde, & McKinley, 2006) and decreasing physical self-esteem via critical assessment of personal appearance (Marsh, Richards, Johnson, Roche, & Tremayne, 1994).

Research findings support such a pattern. In a study of late adolescent women's body image following exposure to idealized images of models, Tiggemann and Polivy (2010) asked participants to compare themselves to the models on the basis of intelligence or appearance. Exposure to the models increased body dissatisfaction only among women comparing on the basis of appearance. Women comparing on the basis of intelligence actually reported less body dissatisfaction. These findings suggest that the women who compared on the basis of appearance were comparing upwardly. Since image editing is an appearance-enhancing manipulation, it follows that upward comparison should be more common than downward comparison among teens viewing retouched imagery. Although some upward comparison could certainly occur with unretouched images if the people in those images are deemed attractive, more should occur with retouched images of the same people given the attractiveness-enhancing function of image editing. It was, therefore, predicted that upward social comparison would be more likely to occur among participants exposed to retouched images, resulting in more objectified body consciousness and lower physical self-esteem, than among participants exposed to unretouched images or no images.

H1: Adolescents exposed to retouched images will report greater objectified body consciousness and lower physical self-esteem than those exposed to no images.

H2: Adolescents exposed to retouched images will report greater objectified body consciousness and lower physical self-esteem than those exposed to unretouched images.

KNOWLEDGE OF RETOUCHING AS VISUAL LITERACY

Visual literacy has been defined broadly as "the ability to 'read,' interpret, and understand information presented in pictorial or graphic images" (Wileman,

1993, p. 114). Sinatra (1986) emphasized the role of viewer schemas in this process by defining visual literacy as "the active reconstruction of past visual experience with incoming visual messages to obtain meaning" (p. 5). Viewer familiarity with retouching conventions is one such schema. The web is loaded with sites dedicated to parodying amateurish, overdone image editing in commercial mass media (see psdisasters.com for examples), suggesting that viewers recognize obvious and ham-fisted image editing for what it is. However, high-end commercial media typically use professional, virtually undetectable retouching techniques. This is why humans are unskilled at spotting subtle image editing (Farid & Bravo, 2010) and may not have developed a schematic filter for processing fake imagery.

However, being told that an image has been retouched forces the application of such a filter, and may thereby discourage upward social comparison by encouraging the viewer to discount the photographed subject as a suitable comparison target (Suls, 1977). Halliwell, Easun, and Harcourt (2011) conducted an intervention with adolescent girls and found that viewing a video discussing the artificial nature of media images immediately before viewing idealized images of thin models eliminated the negative effect on body esteem that was observed among a comparable sample of girls who had not viewed the video. The idea that awareness of retouching should mitigate problematic effects of exposure to retouched imagery is widely accepted and reflected in public outreach efforts such as Dove's "Real Beauty" campaign (used by Halliwell et al. [2011] in their intervention), which relied on social media to distribute online videos deconstructing the process of digital editing to educate viewers about the steps involved in transforming a real woman into a billboard model. (Notably, the images of plus-size women used throughout the campaign were also retouched; see Collins, 2008.)

Following the rationale that awareness of retouching should facilitate critical processing of idealized media images, Bissell (2006) devised an experiment to test whether knowledge of image editing reduced effects of thin-ideal media exposure among 124 college women. Exposure to thin-ideal images was compared with exposure to the same images plus a visual literacy intervention, or no exposure. Bissell's intervention provided a definition of digital retouching and tagged images of swimsuit models with the following disclaimer: "The image below has been digitally manipulated to enhance the model's appearance" (Bissell, 2006, p. 6). Bissell had expected women in the intervention condition to report a reduced desire to look like the models in the photographs. However, the manipulation had the opposite effect: Women in that condition reported a greater desire to look like the models and evaluated the models as thinner and more attractive than did women who saw the same photographs without the disclaimers.

This outcome is both puzzling and compelling. Bissell (2006) reasoned that perhaps the visual literacy manipulation was too weak or had been overlooked by participants. However, if that were the case, both groups

of women who had seen the photographs should have rated the models as similarly thin and attractive and reported similar levels of desire to look like the models. The fact that the group that was told about the retouching idealized the models even more calls into question the value of retouching awareness in conferring protection against idealized images, and introduces the possibility that this awareness produces a boomerang effect by somehow enhancing the desirability of the depicted images.

The reasons for this boomerang effect are unclear. Bissell (2006) maximized ecological validity by using commercial media images and manipulated participants' awareness that image editing had occurred but did not manipulate the images themselves. As such, her visual literacy manipulation may have worked through priming more than learning because thin-ideal images culled from publications are almost always retouched and assumed to be so by adolescent and adult audiences (Wheeler, 2002). Bissell (2006) also used invariantly thin images (swimsuit models), so idealness was tethered to thinness in her experiment. Her work represents an essential first step toward understanding the effects of thinking about image editing while processing thin-ideal images. Still, questions remain about the effects of image editing outside the context of exclusive thinness. Following social comparison theory and supporting research, awareness of retouching might lead adolescents to discount the photographed subjects as suitable comparison targets, resulting in diminished upward social comparison (Halliwell et al., 2011; Suls, 1977). On the other hand, the "boomerang effect" observed by Bissell (2006) may occur, for reasons still unknown. Thus, a research question was posed for the present study:

RQ1: Among adolescents exposed to retouched images, will those made aware of the retouching report different levels of objectified body consciousness and physical self-esteem than those not made aware of the retouching?

Finally, we know that not all young people are affected equally by idealized images (Harrison, 2009). Those who consider the media an important source of information about being attractive, who compare their own appearance to media images, and who feel pressured by the media to improve their appearance are particularly vulnerable to decrements in body satisfaction following exposure to idealized images (Wilksch, Tiggemann, & Wade, 2006). The Sociocultural Attitudes Toward Appearance Questionnaire (SATAQ-3; Thompson et al., 2004) measures these tendencies. Research on appearance-specific media literacy interventions aimed at reducing body dissatisfaction among teen girls and boys points to the importance of determining vulnerability to ideal-body media influence via SATAQ-3 scores (Wilksch et al., 2006). Less approving sociocultural attitudes toward appearance may render appearance-ideal visual media less potent as factors

influencing viewers' evaluations of their own bodies. Thus, a second research question was posed:

RQ2: Will sociocultural attitudes toward appearance moderate the effect of exposure to retouched (and retouched-aware) images?

METHOD

Overview and Participants

This study consisted of a survey and experiment involving the same participants: $N = 463$ adolescents (304 female, 159 male) completed the survey. Due to absences, a smaller number ($N = 393$; 263 female and 130 male) were available to participate in the experiment, which occurred on a separate visit one week later. Data reported here are for the 393 participants with complete survey and experiment data. All participants attended a lower- to middle-class public high school in a small city in the U.S. Midwest. They were recruited through school health classes and received bookstore gift cards in exchange for participation. The average age of participants was 15.46 years ($SD = 1.32$, range = 14–18). Informed parental consent and personal assent were obtained for participants under 18, as well as informed personal consent for 18-year-olds. Participants' average body mass index (BMI) was 23.67, which falls within the optimal health range of 18.5 to 25 (World Health Organization, 2003). Just over half (50.1%) identified as White, followed by African American (38.0%), Latina and Latino (5.9%), Asian American (1.6%), Native American Indian (1.3%), and other racial and ethnic groups (3.1%).

Design and Procedure

The experiment followed a 2 (gender) × 2 (sociocultural attitudes toward appearance) × 4 (retouching manipulation) between-subjects design. Gender and sociocultural attitudes toward appearance (median-split) were determined via the survey. For the experiment, participants were randomly assigned to the unretouched condition (62 girls and 38 boys), the retouched condition (59 girls and 30 boys), the retouched-aware condition (71 girls and 35 boys), or a no-exposure control condition (71 girls and 27 boys). Participants viewing photographs were asked to sit in different sections of their school auditorium according to gender, in every other seat to maximize personal privacy. Control participants sat in their own section and completed questionnaires without looking at photographs.

During the survey, participants completed a brief questionnaire consisting of measures of sociocultural attitudes toward appearance and demographic variables. During the experiment, all participants, except those in the

control condition, were given booklets of 10 photographs of same-gender young adults. The booklets stated, "The photographs in the accompanying booklet were created for a portraiture course at (the local university)." The booklets read by participants in the retouched-aware condition continued, "After students were photographed, a professional photo retoucher refined the images using a computer photo retouching program." Participants in the three image conditions had 10 minutes to look at the photographs and rate each photo's attractiveness before moving on to post-experimental questionnaires, which included measures of objectified body consciousness and body esteem. When finished, participants handed in their questionnaires, received their gift cards, and returned to class.

Stimulus Materials

The booklets consisted of ten 8-×-10-inch glossy full-color photographs of same-gender college-age students in a variety of non-sexual poses, one subject to a photograph and one photograph to a page. Because retouching is so commonplace in commercial media, it was necessary to create a set of unretouched photos for the present study to guarantee that they would be unretouched. The principal investigator set up a makeshift photography studio with a large white paper backdrop and umbrella lighting to mimic the background and lighting typical of model portfolio shoots. Volunteers were recruited from the undergraduate student body and asked to pose for photographs wearing tank tops and non-revealing shorts. Digital photos were taken of 20 women and 20 men in various poses, under the art direction of a volunteer who worked as a professional model. The final 10 photographs for each gender were selected by the research team on the basis of variability in body size (relatively thin to relatively heavy) and uniformity of photograph quality (e.g., adequate lighting, sharp focus). Five of the subjects in each booklet were African American, and 5 were White.

The final 20 photographs were sent to a professional image editor specializing in model portfolios. The image editor was instructed to retouch all aspects of the photographs that he would routinely alter for images of models suitable for publishing in color print media such as fashion magazines. He was asked to keep constant macrolevel features like body position, hair and clothing color, and general body size; in particular, he was asked not to make plus-size models thin, and to keep his changes subtle enough that the casual viewer would not perceive the retouching. His alterations consisted primarily of subtle changes to superficial features (e.g., blemishes) and body outlines, as is routine in his profession. Body-shape changes were limited to subtly smoothing contours to enhance the hourglass shape of women's bodies and the V-taper shape of men's bodies. The editor also subtly brightened the teeth of all photograph subjects and the skin tone of darker-skinned photograph subjects, while still leaving their skin brown; this too is routine

practice in portfolio editing.[1] The resulting photographs were identical to the unretouched photos in content (i.e., same poses, same clothes, same faces, and facial expressions) but more refined. Figure 1 displays sample images.[2]

Measures

The survey included demographic measures (gender, age, race and ethnicity, and BMI tabulated on the basis of height and weight) and the 30-item SATAQ-3 (Thompson et al., 2004). This scale includes items measuring acceptance of the media as a source of information about appearance (e.g., "Magazine articles are an important source of information about fashion and 'being attractive'"); perceived pressure to conform to media ideals (e.g., "I've felt pressure from TV or magazines to have a perfect body"); and internalization of the media-depicted ideal (e.g., "I compare my appearance to the appearance of people in magazines"). Response options ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). Internal consistency estimated by Cronbach's α was .96.

During the experiment, participants who viewed the photograph booklets were instructed to rate each photo according to how attractive they thought it was, on a scale from 1 (*not at all attractive*) to 7 (*extremely attractive*). Reliability estimates indicated high consistency for the 10 photographs: for girls viewing women, $\alpha = .90$; for boys viewing men, $\alpha = .91$. Following exposure to the photos, participants completed the 14-item Objectified Body Consciousness Scale (OBCS; Lindberg et al., 2006). Sample items include "I often worry about how I look to other people," "I think I could look as good as I wanted to if I worked at it," and "I feel like I must be a bad person when I don't look as good as I could." Response options ranged from 1 (*strongly disagree*) to 7 (*strongly agree*); $\alpha = .85$. Physical self-esteem was then measured with the 12-item Physical Self-Description Questionnaire (PSDQ; Marsh et al., 1994). Sample items include "I feel good about who I am physically," "I have a nice looking face," and "I am ugly" (reverse-coded). Response options ranged from 1 (false) to 6 (true); $\alpha = .94$.

RESULTS

Descriptive Statistics

Table 1 displays means for sociocultural attitudes toward appearance, average ratings of photograph attractiveness, objectified body consciousness, and physical self-esteem. Girls reported more concern with appearance and pressure to meet the media's ideals (SATAQ-3) as well as greater objectified body consciousness (OBCS). Girls also rated the women as more attractive than boys rated the men.

Unretouched Female

Retouched Female

Unretouched Male

Retouched Male

FIGURE 1 Sample unretouched and retouched stimulus images (color figure available online).

TABLE 1 Descriptive Statistics for Key Measures, by Gender

	Girls		Boys			
Measure	M	SD	M	SD	t (df)	p
SATAQ-3	3.34	1.39	2.83	1.21	3.57 (391)	.001
Attractiveness of photos	3.41	1.33	1.52	0.84	13.17 (293)	.001
OBCS	3.78	1.04	3.10	1.11	5.92 (389)	.001
PSDQ	4.52	1.18	4.63	1.19	−0.78 (373)	.493

Note. SATAQ-3 = Sociocultural Attitudes Toward Appearance Questionnaire. OBCS = Objectified Body Consciousness Scale. PSDQ = Physical Self-Description Questionnaire. Attractiveness of photos refers to the average attractiveness rating of all 10 photos. Response options for SATAQ-3, attractiveness of photos, and OBCS items ranged from 1 to 7; response options for PSDQ items ranged from 1 to 6.

Manipulation Check

The purpose of the image editing manipulation was to increase estimates of the attractiveness of the edited images. For girls, attractiveness ratings (on a scale of 1 to 7) differed between the three image conditions, $F(2, 222) = 3.07$, $p < .05$. By the post-hoc Tukey procedure ($p < .05$), the retouched photos ($M = 3.74$) were deemed more attractive than the unretouched photos ($M = 3.16$), with the retouched-aware photos ($M = 3.37$) in between. For boys, there were no differences, $F(2, 132) = 0.10$, n.s., and all ratings were low: for unretouched photos, $M = 1.49$; for retouched photos, $M = 1.48$; and for retouched-aware photos, $M = 1.58$. For girls, the retouching manipulation increased perceived attractiveness. For boys, the failure of the manipulation to increase perceived attractiveness could have resulted from a manipulation flaw, but given how low the means were across conditions, it more likely reflects social pressure on boys to minimize public expression of attraction to other males.

Analytical Overview

The hypotheses and research questions were addressed with separate analyses of covariance (ANCOVAs) for objectified body consciousness and physical self-esteem. In each ANCOVA, race, BMI, and age were entered as covariates.[3] Gender was a de facto moderator because the stimulus images were different for girls and boys. SATAQ-3 score (split at the median) was included as a moderator to answer Research Question 2. The resulting 2 × 2 × 4 ANCOVA models featured age, race, and BMI as covariates; and gender (2), SATAQ-3 (2), and experimental condition (4) as main-effect variables. All two- and three-way interactions were tested for evidence of moderation.

Hypothesis Testing

For objectified body consciousness, the ANCOVA tests yielded significant

main effects for gender, $F(1, 332) = 5.62$, $p < .05$, $\eta^2 = .03$; SATAQ-3, $F(1, 332) = 4.99$, $p < .05$, $\eta^2 = .02$; and experimental condition, $F(3, 332) = 16.94$, $p < .01$, $\eta^2 = .06$. Beyond these main effects, there were no significant interactions. For physical self-esteem, there was no effect of gender, $F(1, 317) = 0.20$, n.s., or SATAQ-3, $F(1, 317) = 0.94$, n.s., but the effect of experimental condition was significant, $F(3, 317) = 18.24$, $p < .01$, $\eta^2 = .05$. Again, there were no significant interactions. Means for objectified body consciousness and physical self-esteem by experimental condition appear in Table 2, with results of post-hoc tests. Based on the ANCOVAs, Hypotheses 1 and 2 were rejected. Exposure to retouched images resulted in no increase in objectified body consciousness or decrease in physical self-esteem compared to no images or unretouched images.

Research Question 1 asked whether objectified body consciousness and physical self-esteem would differ between the retouched and retouched-aware conditions. As indicated in Table 2, objectified body consciousness was higher in the retouched-aware condition than the other conditions. At the same time, physical self-esteem was lower in the retouched-aware condition than the control and retouched conditions (with the unretouched condition in between). These results are consistent with the boomerang effect reported by Bissell (2006) in the sense that awareness of image editing appears to have heightened potentially harmful effects on body image rather than mitigating them.

Research Question 2 asked whether sociocultural attitudes toward appearance would moderate the effects of image editing. Based on the ANCOVAs, the answer is no: SATAQ-3 did not interact with experimental condition for either outcome variable. In other words, observed effects did not depend on the extent to which participants were already concerned with their appearance and sensitive to media pressure to improve it. The observed outcomes held regardless of participants' gender and sociocultural attitudes toward appearance.

TABLE 2 Objectified Body Consciousness and Physical Self-Esteem by Experimental Condition

	Experimental condition			
	Control	Unretouched	Retouched	Retouched-aware
Outcome	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)
Objectified body consciousness	3.37_a (1.15)	3.38_a (1.01)	3.29_a (1.15)	3.65_b (1.10)
Physical self-esteem	4.76_b (1.23)	4.65_{ab} (1.05)	4.72_b (1.16)	4.31_a (1.26)

Note. Means are adjusted for differences across groups on the covariates. Post-hoc tests were conducted to compare the four treatment means for each dependent variable. Means in the same row that do not share a common subscript differ at $p < .05$ by the Tukey procedure.

Supplemental Analyses

The origin of the boomerang effect is uncertain, but it may be linked with adolescents' judgments of the attractiveness of the photos. The correlation between perceived attractiveness and objectified body consciousness was $r = .21$ ($p < .05$) in the unretouched condition; $r = .31$ ($p < .001$) in the retouched condition; and $r = .40$ ($p < .001$) in the retouched-aware condition. Using the Fisher r-to-z transformation to calculate z values reflecting significance of the difference between correlation coefficients in independent samples, the correlation in the retouched-aware condition was marginally greater than the correlation in the unretouched condition, $p = .06$. (There were no significant correlations between perceived attractiveness and physical self-esteem.) The marginally greater strength of the attractiveness-objectification correlation for participants in the retouched-aware condition compared to those in the unretouched condition suggests that the retouching statement may have subtly urged participants in the retouched-aware condition to process the photos in terms of attractiveness and then connect those appraisals with judgments of their own attractiveness.

DISCUSSION

Relative to the no-images control condition, significant increases in objectified body consciousness and decreases in body self-esteem were observed only for adolescents who viewed images that had been explicitly identified as retouched. The unretouched and retouched (non-aware) conditions did not differ from the control. These results collectively answer Research Question 1 (outcomes differed between the retouched and retouched-aware conditions) and reject Hypotheses 1 and 2. In answer to Research Question 2, sociocultural attitudes toward appearance did not moderate the results, suggesting that adolescents did not need to be sensitive to ideal-appearance media content for the retouched-aware condition to influence objectified body consciousness and physical self-esteem.

   The findings for the retouched-aware condition replicate the boomerang effect described by Bissell (2006) and extend her findings from college women to adolescent girls and boys. Further, the correlation between perceived attractiveness of the photographic subjects and objectified body consciousness was marginally larger in the retouched-aware condition than the unretouched condition. This suggests that an increase in objectified body consciousness following exposure to images identified as retouched may depend in part on the degree to which the photos are deemed attractive. In other words, in the retouched-aware condition, greater upward comparison may have occurred among participants who found the photographic subjects attractive (Wills, 1981) than among those who did not. Considering the

objectified body consciousness measure used here, this is to be expected. The scale includes items measuring concern with looking one's best in a social setting. Appraising the appearance of others likely primes thoughts about one's own appearance as others might appraise it. In contrast, since judgments of attractiveness were unrelated to physical self-esteem, no portion of the drop in physical self-esteem in the retouched-aware condition can be explained by perceived attractiveness. A more plausible explanation may be that the mere mention of retouching primes cognitions about physical imperfections in general and one's own imperfections specifically, which could lead to a temporary drop in overall physical self-esteem. This possibility also applies to objectified body consciousness, of course, and may help explain why it was higher in the retouched-aware condition than the other conditions.

Other explanations for the observed findings include the possibility that showing adolescents retouched photos while identifying them as retouched primed thoughts of status or prestige, because retouching lends an air of legitimacy to photographic subjects. Outside the context of social media, photos taken by a photographer and professionally retouched by a third party are comparatively formal and intended to reflect people at their best for some legitimate purpose. Thoughts of photo subjects' potential prestige may have increased objectified body consciousness and decreased physical self-esteem among adolescents who judged themselves as less prestigious than the photographic subjects.

Another explanation may be that adolescents' perceptions of photo retouching differ from those of an older generation (including the principal investigator), who may be suspicious of image editing because they did not grow up in a world where retouching was taken for granted in visual media production. If retouching is generally assumed to have occurred, being told that retouching has occurred would have little or no effect compared to simply viewing the retouched photos without the discounting information. To avoid sensitizing participants to the topic of image editing by asking about it formally—which would have increased the risk of polluting other conditions involving participants who had not yet participated—we omitted any mention of retouching from the post-exposure questionnaire. Unfortunately, this decision left little information about exactly how adolescents in the retouched-aware condition interpreted the retouching statement. Deeper, more probing research, perhaps employing focus-group methods, would help provide detailed answers to the question of how adolescents in the modern age think about photographic retouching.

Social comparison theory provided the theoretical framework for this study. In spite of a large body of research demonstrating that adolescents engage in upward social comparison with models and actors in commercial media (and thus feel worse about their bodies; see Grabe et al., 2008), there was no evidence of upward social comparison with the retouched

ordinary people in the present study. This raises the question of whether the legitimacy of commercial mass media acts as a social comparison facilitator, inasmuch as young people judge these media to be credible sources in the determination of current appearance ideals. Anyone can get into a college portraiture course, but only those deemed special by the industry's power brokers can appear on the pages of a fashion magazine. If the presumed source of the imagery somehow legitimizes that imagery, then it makes sense that upward comparison would occur only within the retouched-aware condition, because mention of retouching likely enhanced the prestige of the images.

For girls, ratings of perceived attractiveness were higher in the retouched condition than in the unretouched condition, verifying the efficacy of the manipulation. However, attractiveness ratings were relatively low overall, and very low for boys rating men. The girls' ratings show that the attractiveness manipulation worked to increase perceived attractiveness, but perhaps not to the point where participants deemed the non-model photographic subjects more attractive than themselves, precluding significant upward social comparison. In this light, the retouched-aware condition becomes especially interesting. The retouching statement was only paired with retouched photos. Would adding a retouching statement to unretouched photos, perceived as less attractive, legitimize the photos in a way that encourages viewers to criticize their own appearance? Unfortunately, this study did not employ a full-factorial design. Although an experimental condition in which unretouched photos are identified as retouched has questionable ecological validity, its inclusion would have supplied information about the impact of the retouching statement independent of the type of photos with which it was paired. To further establish the link between the research presented here and actual commercial media—which feature models widely regarded as exceptionally attractive even without retouching—an experimental comparison of the retouching manipulation with photos of more versus less attractive people would allow researchers to determine whether retouching and awareness thereof function the same way with highly attractive professional models as they do with non-models rated average in attractiveness.

Implications for Interventions

Now that at least two studies have demonstrated a boomerang effect, it seems safe to conclude that interventions notifying young people that the media images they are viewing have been digitally perfected could be risky. Bissell's (2006) study and the present experiment have in common the fact that participants only saw the finished, altered picture, and did not see the transformation in progress. Perhaps interventions that show the process by which image editing renders an ordinary image extraordinary would discourage a boomerang effect, because audience members would have the

benefit of seeing both the before and after images. A body-image-specific media literacy intervention that showed teen girls such a transformation and then exposed them to a variety of thin-ideal images prevented the reductions in body satisfaction evident among a comparison group who saw the thin-ideal images with no preceding intervention (Halliwell et al., 2011). Thus, media literacy efforts that reveal the process of image editing can be effective in the short term, but there is no evidence that singular interventions continue to work over the long term. When adolescents view media images, they rarely get the benefit of seeing what specific images looked like before retouching. It is not feasible to locate unretouched versions of all retouched imagery in commercial visual media to provide real-time before-after comparisons, so even if adolescents know conceptually that most images they see have been retouched, they can only guess what was added or removed on an image-by-image basis. As indicated above, there is clearly some value to educational interventions comparing before and after imagery to teach youth about the nature and extent of image editing, but these interventions should be augmented by practical exercises teens can do during real-time media exposure to activate schematic filters relevant to photo retouching in commercial media.

Limitations and Future Directions

One key limitation of this study is that the effect sizes were relatively small. This outcome was likely fated by the necessary subtlety of the manipulation. The images needed to be retouched enough to seem more attractive, but not so much that they would be identifiably retouched. This would have destroyed the contrast between the retouched and retouched-aware conditions. The fact that retouched images were rated as more attractive than unretouched images (at least by girls) suggests that the retouching manipulation was successful. Further, the fact that the retouched-aware condition produced different results than the retouched condition for both genders suggests that the manipulation was subtle enough to go undetected by most participants in the retouched condition. Such a delicate manipulation was necessary to maximize internal validity, but it was destined to produce modest effects.

Continuing with issues of validity, a truly comprehensive, full-factorial design would have incorporated not only an aware-unretouched condition but also conditions in which participants saw retouched and unretouched images and were told that the images had not been retouched. Such a design would provide the full complement of information, both visual and verbal, about the status of unmanipulated and manipulated stimulus images. Although the external validity of such conditions is debatable, the ease with which young people can retouch their own photographs on social media sites could make the concept of false manipulation status meaningful, as

when a teen posts a retouched photo of herself online and claims that it is natural. Survey research with college students documents a positive relationship ($\beta = .24$) between appearance-based contingencies of self-worth and frequency of photo sharing (Stefanone, Lackaff, & Rosen, 2011). It is not a stretch to suppose that people whose self-worth is contingent upon appearance would choose the most attractive photos of themselves to post, or digitally alter existing photos to maximize attractiveness. Thus, there is likely great potential for teens' digitally altered photos to influence other teens' perceptions of themselves, and this potential is worthy of further study.

The applicability of this research to social media may even outweigh its applicability to commercial mass media, because the present study used ordinary people instead of professional models. This was necessary to guarantee that the unretouched photos were unretouched. Moreover, it does not eliminate the study's relevance for mass media, as professional models are technically real people and there is no guarantee that teens view all photos of professional models, even retouched ones, as more attractive than themselves. Nonetheless, the study design and stimuli would lend themselves well to investigations of the effects of peer digital photo manipulation and knowledge (or denial) thereof.

For those interested in replicating and extending these findings in the context of commercial media, the first order of business seems to be an exploration of the meaning of digital image editing among children and adolescents. The current generation of youth, raised in a retouched media world, may harbor little of the resentment and suspicion felt by their elders for a technology that has historically been regarded as duplicitous and manipulative. Indeed, an assessment of the current generation of teens' views of the ethics of retouching would add much to our understanding of its potential influence on them. It would be useful as part of this assessment to determine whether they are better (or worse) than adults at identifying when retouching has occurred. The knowledge gained would help researchers fine-tune future media literacy interventions to capitalize on the knowledge already possessed by young media users.

On an encouraging note, this study supplied no evidence that retouching alone has harmful effects on adolescents' physical self-perceptions, even though they judge such images to be more attractive than unretouched images of the same people. This study employed images of people with an array of body sizes, even after retouching. The retention of body-size variation through the retouching manipulation may have minimized effects of retouching alone on self-objectification and body esteem. In the commercial media world, almost all media photographs are retouched, and most actors and models are very thin (Greenberg et al., 2003). Poor body-image outcomes following exposure to media images that are both thin and ideal are well documented among adolescents, especially girls (Grabe et al., 2008), and the effect sizes in that literature tend to be larger than the modest ones

observed here. Thus, thinness and idealness together appear to produce more harmful outcomes than idealness alone.

The boomerang effect produced by the retouching intervention in the present study calls for continued research to identify ways to help young people block potentially harmful effects of unrealistic appearance ideals in commercial (and possibly social) media. The popular notion that telling children and adolescents that edited images are fake will fortify them has not withstood the test of experimentation. One lesson we have learned from media violence research is that perceived realism strengthens effects (Huesmann, Moise-Titus, Podolski, & Eron, 2003), so there is something to be said for the value of informing young people that what they see in the media is not always real. However, the data presented here clearly show that successful interventions will need to accomplish the goal of educating young viewers about visual media manipulation without unintentionally priming thoughts of their own physical imperfections or portraying as prestigious the refinement process involved in producing attractive media imagery.

NOTES

1. The decisions made by the image editor reflected both his personal assumptions about physical attractiveness and, more broadly, his knowledge of what makes an image marketable in U.S. media. The changes he made to the images were not in the service of some essentially attractive ideal, but in the service of what his expertise taught him will sell in modern media and what U.S. consumers of visual media seem to prefer based on the contract-booking success of the models whose portfolios he has retouched.

2. The sample images represent the female and male photographic subjects with the greatest degree of body-shape alteration in the booklets. None of the other subjects had as much hourglass-shape enhancement as the sample female or V-taper enhancement as the sample male, but they were all subtly enhanced in a similar way. The image editor verified that this type of enhancement is universal in model portfolio retouching. Thus, it may be impossible to apply an ecologically valid retouching manipulation that is 100% independent of thinness since the hourglass and V-taper shapes have slightly narrowed waists relative to shoulders. However, the final photographs still featured a range of body sizes (some significantly heavier than those shown here), so the stimuli for this study still represent appearance ideals well outside the context of exclusive thinness.

3. In exploratory ANCOVAs, age (dichotomized at the median); race (White vs. a second group composed of African Americans, Latinas and Latinos, and other racial designations); and BMI (dichotomized at the median) were tested as potential moderators of the retouching manipulation. None interacted significantly with the retouching manipulation, so they were retained as covariates (with age and BMI in non-dichotomized, continuous form) on the basis of significant zero-order correlations with the dependent variables. Specifically, physical self-esteem and Whiteness were negatively correlated for girls, $r = -.21, p < .001$, as were physical self-esteem and BMI for both girls, $r = -.25, p < .001$, and boys, $r = -.36, p < .001$. There were no significant correlations between objectified body consciousness and age, race, or BMI. In the ANCOVAs constructed to test the hypotheses, none of the covariates significantly predicted objectified body consciousness, although all three predicted physical self-esteem: BMI, $F(1, 317) = 31.26, p < .001, \eta^2 = .09$; race, $F(1, 317) = 31.26, p < .001, \eta^2 = .09$; and age, $F(1, 317) = 5.35, p < .05, \eta^2 = .02$.

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REFERENCES

American Society for Aesthetic Plastic Surgery. (2011). *Fifteenth annual cosmetic surgery national data bank statistics*. Retrieved from http://www.surgery.org/sites/default/files/ASAPS-2011-Stats.pdf

Bandura, A. (2002). Social cognitive theory of mass communication. In J. Bryant & D. Zillmann (Eds.), *Media effects: Advances in theory and research* (pp. 121–154). Mahwah, NJ: Erlbaum.

Bissell, K. L. (2006). Skinny like you: Visual literacy, digital manipulation and young women's drive to be thin. *Studies in Media & Information Literacy Education, 6*(1), 1–14. doi:10.3138/sim.6.1.002

Collins, L. (2008). Pixel perfect: Pascal Dangin's virtual reality. Retrieved from http://www.newyorker.com/reporting/2008/05/12/080512fa_fact_collins

Dorr, A. (1983). No shortcuts to judging reality. In J. Bryant & D. R. Anderson (Eds.), *Children's understanding of television* (pp. 199–220). New York, NY: Academic Press.

Farid, H. (2009). Seeing is not believing. *IEEE Spectrum, 46*(8), 42–48. doi:10.1109/MSPEC.2009.5186556

Farid, H., & Bravo, M. J. (2010, January). *Image forensic analyses that elude the human visual system*. Paper presented at the SPIE Symposium on Electronic Imaging, San Jose, CA.

Grabe, S., Ward, L. M., & Hyde, J. S. (2008). The role of the media in body image concerns among women: A meta-analysis of experimental and correlational studies. *Psychological Bulletin, 134*, 460–476. doi:10.1037/0033-2909.134.3.460

Greenberg, B. S., Eastin, M., Hofschire, L., Lachlan, K., & Brownell, K. D. (2003). Portrayals of overweight and obese individuals on commercial television. *American Journal of Public Health, 93*, 1342–1348.

Halliwell, E., Easun, A., & Harcourt, D. (2011). Body dissatisfaction: Can a short media literacy message reduce negative media exposure effects amongst adolescent girls? *British Journal of Health Psychology, 16*, 396–403. doi:10.1348/135910710X515714

Hancock, J. T., & Toma, C. L. (2009). Putting your best face forward: The accuracy of online dating photographs. *Journal of Communication, 59*, 367–386. doi:10.1111/j.1460-2466.2009.01420.x

Harrison, K. (2006). Scope of self: Toward a model of television's effects on self-complexity in adolescence. *Communication Theory, 16*, 251–279. doi:10.1111/j.1468-2885.2006.00270.x

Harrison, K. (2009). Media and the body. In R. L. Nabi & M. B. Oliver (Eds.), *Sage handbook of media processes and effects* (pp. 393–409). Thousand Oaks, CA: Sage.

Huesmann, L. R., Moise-Titus, J., Podolski, C., & Eron, L. D. (2003). Longitudinal relations between children's exposure to TV violence and their aggressive and

violent behavior in young adulthood: 1977–1992. *Developmental Psychology, 39*, 201–221.

King, D. (1997). *The Commissar vanishes: The falsification of photographs and art in Stalin's Russia*. New York, NY: Henry Holt.

Lindberg, S. M., Hyde, J. S., & McKinley, N. M. (2006). A measure of objectified body consciousness for preadolescent and adolescent youth. *Psychology of Women Quarterly, 30*, 65–76. doi:10.1111/j.1471-6402.2006.00263.x

Marsh, H. W., Richards, G. E., Johnson, S., Roche, L., & Tremayne, P. (1994). Physical Self-Description Questionnaire: Psychometric properties and a multitrait-multimethod analysis of relations to existing instruments. *Sport and Exercise Psychology, 16*, 270–305.

Rideout, V. J., Roberts, D. F., & Foehr, U. G. (2010). *Generation M^2: Media in the lives of 8–18-year-olds*. Menlo Park, CA: Kaiser Family Foundation.

Sinatra, R. (1986). *Visual literacy connections to thinking, reading and writing*. Springfield, IL: Charles C. Thomas.

Stefanone, M. A., Lackaff, D., & Rosen, D. (2011). Contingencies of self-worth and social-networking-site behavior. *Cyberpsychology, Behavior, and Social Networking, 14*(1/2), 41–49. doi:10.1089/cyber.2010.0049

Suls, J. M. (1977). Social comparison processes: Theoretical and empirical perspectives. In J. M. Suls & T. A. Wills (Eds.), *Social comparison theory and research* (pp. 1–19). Washington, DC: Hemisphere.

Suls, J., Martin, R., & Wheeler, L. (2002). Social comparison: Why, with whom, and with what effect? *Current Directions in Psychological Science, 11*(5), 159–163. doi:10.1111/1467-8721.00191

Thompson, J. K., van den Berg, P., Roehrig, M., Guarda, A. S., & Heinberg, L. J. (2004). The Sociocultural Attitudes Toward Appearance Questionnaire-3 (SATAQ-3): Development and validation. *International Journal of Eating Disorders, 35*, 293–304. doi:10.1002/eat.10257

Tiggemann, M., & Polivy, J. (2010). Upward and downward: Social comparison processing of thin idealized media images. *Psychology of Women Quarterly, 34*, 356–364. doi:10.1111/j.1471-6402.2010.01581.x

Wheeler, T. H. (2002). *Phototruth or photofiction?: Ethics and media imagery in the digital age*. Mahwah, NJ: Erlbaum.

Wileman, R. E. (1993). *Visual communicating*. Englewood Cliffs, NJ: Educational Technology Publications.

Wilksch, S. M., Tiggemann, M., & Wade, T. D. (2006). Impact of interactive school-based media literacy lessons for reducing internalization of media ideals in young adolescent girls and boys. *International Journal of Eating Disorders, 39*, 385–393. doi:10.1002/eat.20237

Wills, T. A. (1981). Downward comparison principles in social psychology. *Psychological Bulletin, 90*, 245–271.

World Health Organization. (2003). *Obesity and overweight*. Retrieved from http://www.who.int/hpr/NPH/docs/gs_obesity.pdf