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"Don't bring me down": Effects of priming secure and anxious attachment on body image

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Abstract

Ample evidence has shown that secure attachment is related to more positive body-related attitudes in women. However, existing studies are primarily correlational, leaving questions about causal direction unanswered. This article reports results of two experiments that tested the effects of a guided visualization priming procedure on body image. In Experiment 1, 87 female undergraduates completed a neutral prime at Time 1 and were randomly assigned to either a secure or anxious prime at Time 2. They completed a general measure of body image after each priming task. In Experiment 2, 49 female students and 51 male students completed a neutral prime, a secure prime, and an anxious prime, followed by a measure of body appreciation, at three different sessions 1 week apart. In both studies, women's body image worsened in response to the anxious attachment prime but was unaffected by the secure attachment prime. For women, the effect of the anxious prime was conditional upon body mass index and dispositional attachment anxiety. The primes had no effect on men's body image. Directions for future research, clinical implications, and limitations of the present studies are discussed.

Keywords

Attachment, body appreciation, security priming

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The way we feel about ourselves is intertwined with our relationships with other people. When we feel loved and accepted by another person, we tend to evaluate ourselves in a more positive way, a finding that has been repeatedly documented (Mikulincer & Shaver, 2016). More recently, researchers have found that relationship quality also plays a role in the way that women feel about their bodies (Cheng & Malinkcrodt, 2009; Frederick, Sandhu, Morse, & Swami, 2016). Although it is logically and theoretically plausible that loving, accepting relationships promote more positive feelings about the body, most of the extant research has relied on correlational studies. Consequently, the causal direction of these associations remains unclear. Accruing evidence has shown that it is possible to activate mental representations of specific relationships and that such activation can influence emotions, thoughts, and behaviors in ways that are congruent with global attachment styles (Mikulincer & Shaver, 2015). Thus, the purpose of the studies reported here was to experimentally test the effects of priming attachment security and anxiety on women's body satisfaction and body appreciation.

Overview of attachment theory

According to attachment theory (Bowlby, 1969/1982), mental representations of self and others (known as *internal working models*) are formed early in life through repeated interactions with primary caregivers. When interactions with attachment figures are generally positive (i.e., the attachment figure is available and responsive in times of need), the resultant internal working model is positive and secure. The individual internalizes a core sense of attachment security, including a view of the self as worthy of love and affection, and an expectation that important others will be available and supportive. In contrast, when attachment figures are inconsistent or rejecting, a fundamental sense of security is not attained and the resultant internal working model adopts a negative view of the self and others. These working models are believed to have a profound influence on interpersonal relationships and psychosocial well-being throughout the life span.

Over time, people develop a global attachment style, that is, a dispositional pattern of interpersonal perceptions, expectations, and behaviors that results from the individual's history of interactions with attachment figures (Collins & Read, 1994). In adulthood, these styles are assessed along two relatively independent, continuous dimensions (Brennan, Clark, & Shaver, 1998). The first dimension, attachment anxiety, reflects the extent to which a person harbors fears about rejection or abandonment. People who score high on this dimension have serious doubts about their own self-worth and anxiously seek confirmation of others' love and care. The second dimension, attachment avoidance, reflects the extent to which a person distrusts the goodwill of others. People with high attachment avoidance are uncomfortable with emotional closeness and strive to remain psychologically and emotionally independent from important others. In contrast, securely attached people (i.e., low scores on both of these dimensions) are confident about their own lovability, expect that relationship partners will respond to them, and are comfortable with closeness and interdependence. Such individuals are said to have a strong sense of security (Brennan et al., 1998).

In addition to a global attachment style, people also develop relationship-specific working models (Baldwin, Keelan, Fehr, Enns, & Koh Rangarajoo, 1996; Collins, Guichard, Ford, & Feeney, 2004). While an individual's global attachment orientation is chronically accessible, other internal working models may only be activated within the context of specific relationships. Importantly, these relationship-specific mental representations can be different from a person's dispositional attachment style. That is, an individual who is generally secure probably also holds mental representations that are anxious or avoidant and a person who is anxious may possess other attachment representations that are secure. These relationship-specific working models can be contextually activated by actual or imagined interactions with others who exemplify warmth and support (security-enhancing mental representations) or rejection and lack of support (anxiety-activating mental representations). Once a specific relationship schema is primed, it is likely that the corresponding attachment style is also engaged via spreading activation (Baldwin et al., 1996).

Several techniques have been developed and validated for priming attachment. Subliminal techniques include momentary presentation of pictures that imply availability of attachment figures, attachment-related words, or the names of actual attachment figures provided by the participants. Supraliminal techniques include reading a narrative that describes a prototypical episode of an attachment figure's responsiveness and support or guided imagery intended to help the participant visualize and reflect upon an attachment figure (Bartz & Lydon, 2004; Mikulincer et al., 2001; Mikulincer & Shaver, 2007).

Substantial evidence has shown that priming security (or insecurity) can make attachment styles temporarily accessible such that they influence emotions, thoughts, and behaviors in ways consistent with global attachment orientations (Mikulincer & Shaver, 2003; Rowe & Carnelley, 2003). For example, security priming has consistently been shown to elevate mood, and this effect is more reliable and powerful than other positive stimuli (such as a funny television character or a picture of wealth and money; Carnelley & Rowe, 2010; Mikulincer, Hirschberger, Nachmias, & Gillath, 2001). In contrast, priming attachment anxiety produced elevated depressed mood relative to a secure-primed condition, and both anxiety and avoidance primes produced increases in anxiety relative to a secure-primed condition (Carnelley, Otway, & Rowe, 2016). Security priming has been shown to produce a wide range of positive psychological outcomes relative to a neutral prime or an anxiety-prime condition, including more positive views of self and more favorable expectations for a partner's behavior, increased empathetic concern for a stranger, increased self-compassion, and elevated endorsement of prosocial values (Carnelley & Rowe, 2010; Mikulincer et al., 2001; Pepping, Davis, O'Donovan, & Pal, 2015; Rowe & Carnelley, 2003). These and other studies (e.g., see Mikulincer & Shaver, 2015) provide convincing evidence that it is possible to activate mental representations of security and insecurity and that these transient experiences affect psychological and interpersonal functioning in theoretically consistent ways. Furthermore, once activated, the primed style appears to take precedence over the global attachment style (Rowe & Carnelley, 2003).

Attachment and body image

One of the most consistent findings in the attachment literature is that securely attached people have higher self-esteem than insecurely attached individuals (Mikulincer &

Shaver, 2016). Specifically, there is an inverse correlation between attachment anxiety and self-esteem, and this relationship holds true cross-culturally (e.g., Schmitt & Allik, 2005). Findings in regard to avoidance are less consistent, with many studies reporting no relationship between attachment avoidance and positive evaluations of the self (e.g., Schmitt & Allik, 2005; Wongpakaran, Wongpakaran, & Wedding, 2012). In regard to feelings about the body, attachment anxiety has consistently shown positive associations with a variety of markers of disturbed body image such as body surveillance, body shame, or body dissatisfaction (Cash, Theriault, & Annis, 2004; Cheng & Malinkcrodt, 2009; DeVille, Ellmo, Horton, & Erchull, 2015; McKinley & Randa, 2005) and inverse relationships with measures of positive body image such as body esteem or body appreciation (Brink, Smeets, Hessen, & Woertman, 2016; Frederick et al., 2016; Keating, Tasca, & Hill, 2013). Similar to the findings regarding general self-esteem, attachment avoidance has demonstrated inconsistent associations with body image, with most studies reporting weak or nonexistent relationships between avoidance and body-related attitudes (Cash et al., 2004; DeVille et al., 2015; Lev-Ari, Baumgarten-Katz, & Zohar, 2014).

An important construct in the emerging area of positive body image is *body appreciation*. Consistent with the basic premise of positive psychology, body appreciation involves more than the absence of problematic attitudes. Instead, it includes the presence of healthy and self-affirming attitudes such as approving one's body regardless of its size or deviations from cultural ideals, respecting the body by engaging in health-promoting behavior, and protecting the body by rejecting or filtering unrealistic media ideals (Avalos, Tylka, & Wood-Barcalow, 2005). To date, only limited research has explored the relationship between attachment style and body appreciation (Brink et al., 2016; Iannantuno & Tylka, 2012). Both of these studies tested the roles of the attachment dimensions within the context of a more complex structural model; consistent with findings regarding other measures of body image, there were significant pathways from attachment anxiety to body appreciation but not from avoidance of closeness to body appreciation.

Attachment theory offers a coherent explanation for these results. When a person feels loved, valued, and accepted by another, the resultant sense of security brings about a confident sense of self-worth. Presumably, these positive feelings of self-worth and self-acceptance extend to feelings about one's body and appearance. In contrast, when a person's disposition is to feel unsure about the affection of important others and to worry about rejection, that person is likely to question his/her own self-worth. For women, this doubt is likely to include increased concern about the acceptability of their bodies and physical appearance because in many cultures (especially in developed countries), women are socialized to base their self-esteem on appearance (Fredrickson & Roberts, 1997). Although it is true that most people evaluate themselves based on their appearance at least to some extent, it has been shown that men stake their self-worth on appearance to a lesser degree than women do (Crocker, Luhtanen, Cooper, & Bouvrette, 2003). Finally, the absence of consistent links between avoidance and body image could be attributed to a decreased likelihood to orient toward socially relevant cues (such as appearance) for persons who are uncomfortable with closeness (McKinley & Randa, 2005).

Although the studies described earlier support these ideas, they are correlational and consequently do not address the causal relationship between attachment and body image. It is also possible that some third variable accounts for the relationship. A more stringent test of this association would involve experimentally priming security or anxiety. Thinking about a relationship in which one feels loved and accepted should activate a secure internal working model, which would include a positive view of self. In contrast, thinking about a relationship in which one feels insecure about the acceptance of another should threaten one's sense of self-worth, which for women, would include feelings about one's own body and appearance. The two experiments described here were intended to test these ideas.

Experiment 1

The purpose of Experiment 1 was to activate either secure or anxious attachment representations in order to test their effect on body image. We used a technique that involved visualizing and writing about either a secure relationship partner or an anxious relationship partner (Bartz & Lydon, 2004). We did not include an attachment avoidance prime because only the anxious attachment dimension has consistently shown associations with body image. We used a measure of state body image that was designed to capture momentary changes in the way people feel about their bodies and appearance. Finally, because body image tends to play a greater role in women's self-worth than men's, Experiment 1 was restricted to female participants. Based on the empirical and theoretical premises described previously, we hypothesized that when participants were primed to reflect upon and visualize a supportive and accepting relationship partner, they would show an increase in favorable attitudes toward their own bodies. We also hypothesized that reflecting upon and visualizing an uncertain relationship partner (i.e., the anxious prime) would result in a decrease in body-related attitudes.

Method

Participants

This study was approved by the institutional review board and all participants were treated according to ethical guidelines established by the American Psychological Association. A sample of 87 female students were recruited from undergraduate psychology courses. They were offered extra course credit in exchange for participation. Average age was 20 years ($SD = 1.15$) and average body mass index (BMI) was 22.33 ($SD = 3.12$) which is within the normal range. Most of the sample was White (90%), with 5% African American and 5% Asian. Most of the sample reported middle class status (50.6%), with 42.5% upper middle class, 4.6% working class, and 2.3% upper class. We did not screen for previously diagnosed eating disorders or body dysmorphia, and as a result, no participants were excluded.

Measures

Questionnaire measure. The 6-item Body Image States Scale (BISS; Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002) was used to assess participants' affective and

evaluative feelings about their bodies and physical appearance (e.g., "Right now I feel satisfied with my body size and shape"). Each item was rated on a 9-point scale, ranging from *extremely positive* to *extremely negative*, and semantically anchored at each point. This scale has shown construct validity via correlations with body image trait measures such as body satisfaction, preoccupation with weight, body shame, and body surveillance and has demonstrated sensitivity to situational contexts (Cash et al., 2002). Cronbach's α for the present study was .84 at Time 1 and .87 at Time 2.

Priming tasks. All priming materials were presented in writing and participants were told that they would have about 10 min to reflect and write their response. For all conditions, participants were told that for privacy, and to encourage honest responding, their written response would not be collected. The neutral prime presented a list of values (e.g., education, experiencing music, or having a sense of humor) and participants were instructed to choose the value that was least important to them and write about why that value might be important to someone else (based on Logel & Cohen, 2011). Secure and anxious attachment were primed by providing participants with a brief description of either a secure or an anxious relationship (based on Bartz & Lydon, 2004). They were asked to think about a close relationship that they have had fitting the description, visualize that person, and write down thoughts and feelings about the relationship. Specifically, in the secure-prime condition, they were to think of a relationship:

> in which you have found that it was easy to be emotionally close to the other person. In this relationship, you felt comfortable depending on the other person and having them depend on you. In this relationship you didn't particularly worry about being abandoned or about the other person not accepting you.

In the anxious-prime condition, they were instructed to think of a relationship:

> in which you have felt like you wanted to be completely emotionally intimate with the other person but felt that the other person was reluctant to get as emotionally close as you would have liked. In this relationship you worried about being abandoned and you worried that the other person didn't value you as much as you valued them.

Procedure

We used a two-way mixed experimental design with one within-subject factor (time) and one between-subject factor (condition). All participants completed a neutral prime at Time 1 and then were randomly assigned to either the secure-prime condition or the anxiety-prime condition at Time 2. Sessions were held 1 week apart, in rooms large enough to allow an empty seat between each participant. The number of participants attending each session ranged from 5 to 30.

At each session, large envelopes containing the study materials were placed at alternating seats before participants arrived. Participants were free to choose any seat in the room. Following informed consent, participants were instructed to remove the writing prompt from the envelope. Following the priming task, participants completed

the BISS. Finally, in order to disguise the true intent of the study (recall that participants were to return a second time), participants completed a distractor task that involved viewing photographs of six different faces, then rating each face for its friendliness, attractiveness, and the participant's own desire to start a conversation with the individual. This task was loosely but plausibly related to the stated purpose of the study (exploring attitudes toward well-being) and if participants discussed the study, they were likely to remember this task.

For the Time 2 assessment, half of the envelopes contained the security priming writing prompt and half of the envelopes contained the anxiety priming writing prompt. Envelopes were randomly ordered and were placed at alternating seats before the participants arrived. This procedure ensured random assignment to the two experimental conditions. Following the priming task, participants completed the BISS and the distractor task.

At the end of the second session, participants were asked what they thought the study was about. The most common responses mentioned something regarding relationships and/or perceptions of other people. Only about 15% of the responses mentioned anything about body image. Two weeks after data collection was complete, all participants were completely debriefed.

Results and discussion

Three participants did not complete the second session and so were dropped from the analyses. The final sample consisted of 40 women in the security-priming condition and 44 women in the anxiety-priming condition. As a preliminary analysis, we compared the Time 1 BISS scores and BMI between the secure and anxious-prime groups. There were no significant differences for either variable, $t_{BISS}(82) = 0.32$, $p = .753$; $t_{BMI}(57) = -0.17$, $p = .863$, supporting the randomization procedure. Mean BMI for the secure-prime group was 22.22 ($SD = 2.40$); mean BMI for the anxious-prime group was 22.10 ($SD = 2.81$). Mean and standard deviations for the BISS in the secure condition were as follows: Time 1 (neutral prime) $M = 33.78$, $SD = 8.01$ and Time 2 (security prime) $M = 35.10$, $SD = 8.20$. Mean and standard deviations for the BISS in the anxiety-prime condition were as follows: Time 1 (neutral prime) $M = 34.29$, $SD = 7.06$ and Time 2 (anxiety prime) $M = 32.07$, $SD = 8.76$. These means are presented in Figure 1. A mixed design two-way analysis of variance showed that (a) the main effect for time was not significant, $F(1, 82) = 0.46$, $p = .50$, (b) the main effect for condition was not significant, $F(1, 82) = 0.60$, $p = .44$, and (c) there was a significant interaction, $F(1, 82) = 7.09$, $p = .009$, partial $\eta^2 = .08$. This significant interaction indicated that the change in body image from Time 1 to Time 2 depended upon experimental condition, and it was a small to medium effect based on Cohen's benchmarks (1988). Follow-up paired-samples t tests indicated that there was a significant difference between Time 1 and Time 2 for the anxiety-prime condition, $t(43) = 2.28$, $p = .028$, $d = 0.27$, but this difference was not significant for the secure-prime condition, $t(39) = -1.48$, $p = .147$, $d = -0.16$. In other words, thinking about a relationship in which one feels insecure about the acceptance of another produced a significant decline in body image but reflecting on a secure

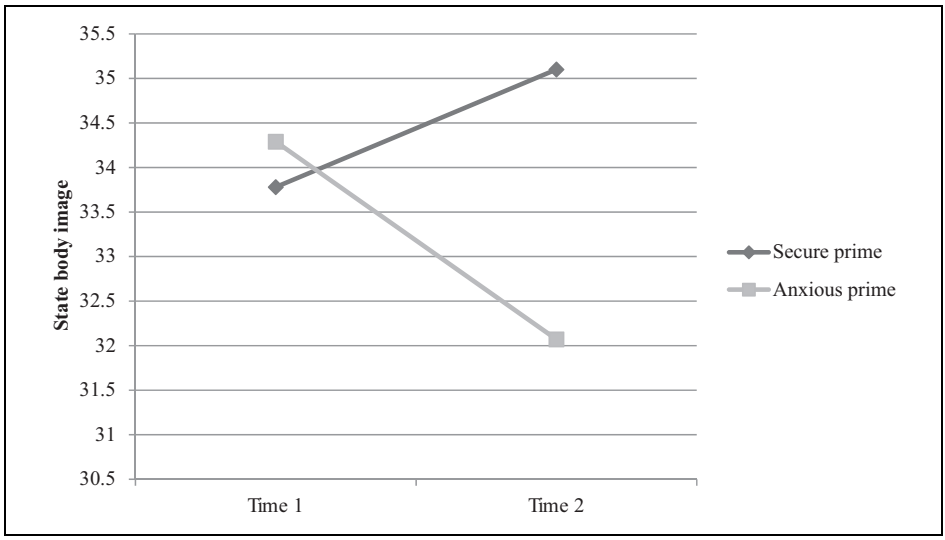

Figure 1. Mean body image scores by condition for Experiment 1. All participants completed the neutral prime at Time 1. The change in state body image from Time 1 to Time 2 was significant only for those in the anxious prime condition.

relationship did not produce a significant increase in body image. The effect size for the anxiety prime was small based on Cohen's guidelines (1988).

Some research has reported significant associations between attachment anxiety and BMI (Wilkinson, Rowe, Bishop, & Brunstrom, 2010) and it is widely recognized that most measures of body image are related to BMI. For this reason, the statistical analyses were repeated including BMI as a covariate. Unfortunately, due to an oversight, our first 26 participants were not asked to provide their height and weight. Thus, BMI was available for only a subset of our sample. Nevertheless, to determine whether BMI moderated the effects of the two primes, the three-way interaction between time, condition, and BMI was tested. This interaction was not significant, $F(1, 55) = 0.70, p = .41$, indicating that the effects of the primes were not conditional upon BMI.

These results partially supported our hypotheses. When participants reflected on and visualized a relationship partner with whom they desired closeness but did not perceive acceptance, they reported more negative feelings about their body and appearance. This result supports a causal link between attachment anxiety and body image. However, we predicted that reflecting upon a secure and accepting relationship partner would elevate body image, and we did not find this effect.

Experiment 2

The goal of Experiment 2 was to retest the effects of priming attachment on body image, incorporating four changes. First, we used a different measure of body image (body appreciation) as our dependent variable. Body appreciation is considered an important aspect of positive body image as it represents an ideal to strive for, rather than an attitude

to avoid. Second, we used a slightly different experimental design. All participants completed each of three conditions, including a neutral prime that served as a baseline, a security-priming condition, and an anxiety-priming condition. Like Experiment 1, we did not attempt to prime attachment avoidance because previous work using structural equation modeling showed nonsignificant paths between avoidance and body appreciation (Brink et al., 2016; Iannantuno & Tylka, 2012). Third, we included men in order to explore any sex differences associated with the priming tasks. Finally, in Experiment 2, we also measured dispositional attachment style in order to test the moderating effect of attachment anxiety. Our attachment primes were intended to activate either secure or anxious relationship-specific working models, regardless of the participant's global attachment style. However, for persons high on the anxiety dimension (i.e., who generally fear rejection and feel insecure about their own self-worth), we expected that bringing to mind an uncertain relationship would have a particularly detrimental effect on feelings about the self.

There were three hypotheses for Experiment 2. First, we hypothesized that visualizing and reflecting upon a secure and accepting relationship partner would produce an increase in body appreciation, but visualizing and reflecting upon an uncertain relationship partner would produce a decrease in body appreciation. Second, based on evidence that appearance does not play as central a role in the self-esteem of men as it does in women (Crocker et al., 2003; Fredrickson & Roberts, 1997), we hypothesized that the effects of priming attachment on body appreciation would be weaker for men than women. Third, we expected that the effect of the anxious prime on body appreciation would be amplified for persons with higher dispositional attachment anxiety. Although we also tested the moderating effect of dispositional attachment avoidance, no hypotheses were stated due to lack of previous empirical findings regarding this construct.

Method

Participants

The study was approved by the institutional review board and all participants were treated in accordance with ethical guidelines established by the American Psychological Association. The final sample for this study consisted of 49 female students and 51 male students who were recruited from undergraduate courses. Students were offered extra course credit in exchange for participation. Average age was 18.58 years ($SD = 0.87$) and average BMI was 22.26 ($SD = 4.10$) for women and 24.99 ($SD = 4.59$) for men, both of which are within the normal range. Most of the sample was White (90%), with 5% African American and 5% Asian. Most of the sample reported middle class status (48.6%), with 45.9% upper middle class, 2.8% working class, and 2.8% upper class. No exclusionary criteria were used.

Materials

Questionnaire measures. The State Body Appreciation Scale-2 (SBAS-2) was used to assess body appreciation (Homan, 2016). This measure was adapted from the Body

Appreciation Scale-2 (BAS-2; Tylka & Wood-Barcalow, 2015), with the goal of assessing transient feelings about the body. Participants rate each of 10 items (e.g., "Right now, I take a positive attitude toward my body") on a scale ranging from 1 (*strongly disagree*) to 5 (*agree*). Like the BAS-2, the SBAS-2 has a unidimensional factor structure, and its validity was supported by correlations with self-esteem and life satisfaction, controlling for general state body image. It was shown to be sensitive to situational fluctuations in body appreciation. Cronbach's α for the present study was .94 for women and .88 for men in the neutral-prime condition, .93 for both women and men in the secure-prime condition, and .93 for women and .91 for men in the anxious-prime condition.

We used a short form of the Experiences in Close Relationships (ECR) questionnaire (ECR-12; Lafontaine et al., 2015) to assess global attachment style. The original 36-item ECR (Brennan et al., 1998) has two subscales measuring attachment anxiety ("I worry about being rejected or abandoned") and attachment avoidance ("I don't feel comfortable opening up to others") that are rated on a 7-point scale ranging from *disagree strongly* to *agree strongly*. Higher scores indicate greater insecurity. The ECR has been used in hundreds of studies worldwide and has high reliability and validity (e.g., Brennan et al., 1998). The ECR-12 correlates strongly with the original ECR and maintains the high reliability and validity of the original scale (Lafontaine et al., 2015). The present study used an adapted version of the ECR-12 that focused on relationships in general (rather than just on romantic relationships; Rowe & Carnelley, 2003). Cronbach's α for the present study was .84 for women and .89 for men for the anxiety subscale and .82 (women) and .70 (men) for the avoidance subscale.

The Life Satisfaction Scale (LSS; Diener, Emmons, Larsen, & Griffin, 1985) was administered to make the purpose of the study less transparent. This 5-item measure taps general satisfaction with life and was not used in any analysis.

Priming tasks. The neutral, secure, and anxious primes were identical to those used in Experiment 1.

Procedure

All participants completed all three experimental conditions on three different days, 1 week apart. We used a Latin Square to counterbalance the order of conditions and participants were randomly assigned to each of the three orders of administration. An envelope was prepared for each participant labeled with his or her name and a code for the assigned order. The research team used this code to prepare an envelope for each participant before each session with the appropriate materials.

Before students arrived at the experimental session, the envelopes for students who had signed up for that particular session were placed on alternating desks in a large classroom in alphabetical order. Upon arrival, students were instructed to find the envelope with their name and have a seat. When all participants were seated, and following informed consent at the first assessment, they were instructed to remove the writing prompt from their packet. In order to encourage participants' honest engagement with the priming task, they were told that they would keep what they had written in all

priming conditions. Following the priming task, participants completed the BISS and the LSS. At Time 1, they also completed a demographic questionnaire and the ECR. Finally, participants completed an unrelated distractor task to help disguise the true purpose of the study. This task involved viewing a brief slideshow of images of either poverty, middle class living, or wealth, then answering four questions about their willingness to help a homeless individual.

At the end of the final session, we asked participants what they thought the study was about. The most common responses made reference to class differences, prosocial behavior, or how external factors influence behavior. Only 18 participants mentioned body image and most of those thought it had to do with how body image influences the way people treat others. Two weeks after data collection was completed, all participants received an e-mail that fully explained the purpose of the study and the results.

Results and discussion

A total of 121 individuals completed at least one assessment. Three participants did not report their sex and one woman did not report her height and weight, so these data were not included in analyses. Ten students did not complete all three assessments and were not included in statistical analyses. Data for seven individuals were deleted because they did not write at all during at least one writing prime but instead appeared to be interacting with their cell phones. Accordingly, the final sample consisted of 49 women and 51 men.

We used a general linear model with one within-subject factor (condition), one between-subject factor (sex), and BMI as a covariate to analyze the effect of the experimental primes on body appreciation. Mauchly's test of sphericity indicated that the assumption of sphericity had been violated, $\chi^2(2) = 13.34$, $p = .001$, and therefore, a Greenhouse–Geisser correction was used. Results are presented in Table 1. There was a significant main effect for condition and those mean body appreciation scores were as follows: $M_{\text{neutral}} = 3.92$ ($SD = 0.65$), $M_{\text{secure}} = 3.95$ ($SD = 0.67$), and $M_{\text{anxious}} = 3.82$ ($SD = 0.71$). Post hoc pairwise comparisons using the least significant difference test showed that only the secure and anxious conditions were significantly different (mean difference $= 0.13$, $p = .005$). There was a significant main effect for BMI, and its parameter estimate was $B = -.03$ ($SE = .02$) for all conditions, indicating that in general, higher BMI was associated with lower body appreciation. However, there was a significant three-way interaction between condition, sex, and BMI, and significant two-way interactions between condition and sex and between condition and BMI. In light of these higher order interactions, subsequent analyses were done separately by sex.

For women, means and standard deviations for the SBAS-2 in each of the experimental conditions were as follows: neutral prime $M = 3.74$, $SD = 0.70$; secure prime $M = 3.76$, $SD = 0.65$; and anxious prime $M = 3.59$, $SD = 0.75$. There was a significant difference among these means, $F(1.58, 74.35) = 7.56$, $p = .001$, partial $\eta^2 = .14$. Post hoc pairwise comparisons using the least significant difference test showed a significant difference between the secure and anxious-prime conditions (mean difference $= 0.164$, $p = .003$), a significant difference between the neutral and anxious-prime conditions (mean difference $= 0.148$, $p = .048$), and a nonsignificant difference between the neutral

Table 1. Experiment 2: Summary of general linear model testing effects of condition, sex, BMI, and their interactions on state body appreciation.

Source	*df*	*F*	*p*	Partial η^2
Within-subject effects				
Condition	1.77	4.27	.02	.04
Condition × Sex	1.77	3.86	.03	.04
Condition × BMI	1.77	3.47	.04	.04
Condition × Sex × BMI	1.77	3.90	.02	.04
Error (condition)	169.74			
Between-subject effects				
Sex	1	0.12	.73	.00
BMI	1	11.32	.01	.11
Sex × BMI	1	1.37	.25	.01
Error	96			

Note. Degrees of freedom for the within-subject effects are based on a Greenhouse–Geisser correction. BMI = body mass index.

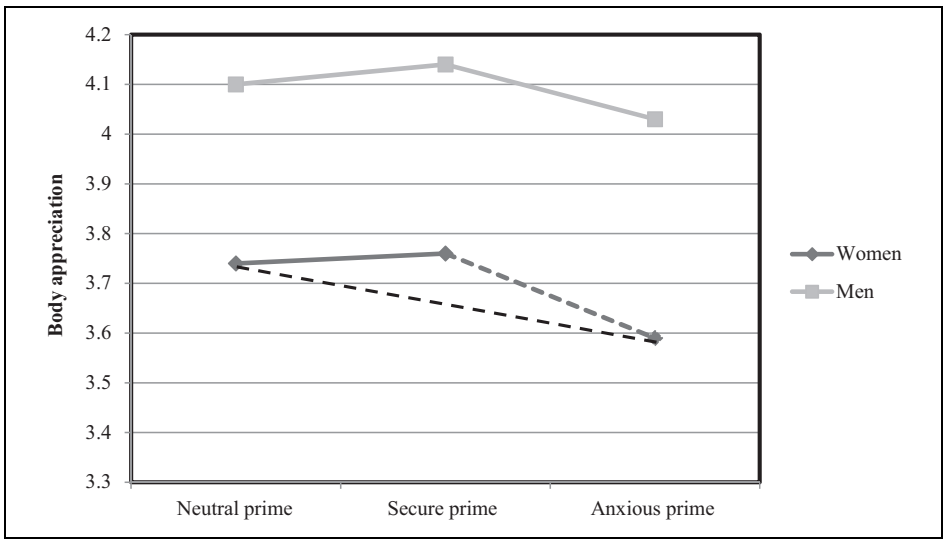

Figure 2. Mean body appreciation scores by condition and sex for Experiment 2. Significant mean differences are indicated by dashed lines.

and secure-prime conditions (mean difference = −0.020, $p = .747$). These means are depicted in Figure 2.

For women, there was a significant interaction between condition and BMI, $F(1.58, 74.35) = 6.35$, $p = .005$, partial $\eta^2 = .12$. There is not a clear consensus among quantitative psychologists regarding the best way to probe an interaction in a repeated-measures design. Based on a recommendation by an expert in statistical moderation (A. Hayes, personal communication, December 3, 2013), we computed difference scores

Table 2. Experiment 2: Summary of general linear model testing the effects of condition, sex, attachment anxiety, and their interactions on state body appreciation.

Source	*df*	*F*	*p*	Partial η^2
Within-subject effects				
Condition	1.85	2.65	.08	.03
Condition × Sex	1.85	3.19	.04	.03
Condition × Anxiety	1.85	3.46	.04	.04
Condition × Sex × Anxiety	1.85	3.56	.03	.04
Error (condition)	171.81			
Between-subject effects				
Sex	1	0.03	.85	.00
Anxiety	1	0.67	.41	.01
Sex × Anxiety	1	0.13	.72	.00
Error	93			

Note. Degrees of freedom for the within-subject effects are based on a Greenhouse–Geisser correction.

between the secure and neutral-prime conditions and regressed this difference on BMI. There was a significant coefficient for BMI, $\beta = .39$, $t = 2.95$, $p = .005$, indicating that the increase in body appreciation in the secure-prime condition was greater for women with higher BMIs. We regressed the difference scores between the anxious and neutral-prime conditions on BMI and again found a significant coefficient for BMI, $\beta = -.38$, $t = -2.91$, $p = .005$, indicating that the decrease in body appreciation in the anxious-prime condition was greater for women with higher BMIs.

For men, means and standard deviations for each of the experimental conditions were as follows: neutral prime $M = 4.10$, $SD = 0.55$; secure prime $M = 4.14$, $SD = 0.64$; and anxious prime $M = 4.03$, $SD = 0.60$. These means are depicted in Figure 2. There were no significant differences among the means for the three experimental conditions, $F(1.55, 75.86) = 0.44$, $p = .592$. The interaction between BMI and condition was not significant, $F(1.55, 75.86) = 0.21$, $p = .81$.

In order to test whether the effects of the anxious prime were conditional upon dispositional attachment style, we repeated the general linear model analysis but added attachment anxiety as a covariate. Again, the within-subject factor was condition and the between-subject factor was sex. BMI was retained as a covariate. Results are summarized in Table 2. There was a significant three-way interaction between attachment anxiety, sex, and condition. There were also significant two-way interactions between condition and sex and between condition and anxiety. In order to clarify these interactions, subsequent analyses were performed separately by sex. For women, there was a significant interaction between condition and attachment anxiety, $F(1.58, 74.31) = 5.05$, $p = .01$, partial $\eta^2 = .13$. We used the same strategy described previously to probe this interaction; specifically, the difference scores between the neutral and secure-prime conditions were regressed on anxiety. There was a nonsignificant coefficient for attachment anxiety, $\beta = -.203$, $t = -1.46$, $p = .152$, indicating that the increase in body appreciation following the secure prime did not depend upon dispositional attachment anxiety. We also regressed difference scores between the anxiety condition and the

neutral-prime condition on attachment anxiety. The significant coefficient, $\beta = -.364$, $t = -2.76$, $p = .008$, indicated that the magnitude of the decline in body appreciation following the anxious prime (relative to the neutral prime) increased as a function of dispositional attachment anxiety. For men, the interaction between condition and attachment anxiety was not significant, $F(1.77, 81.25) = 0.34$, $p = .68$; for this reason, no subsequent analyses were performed.

Finally, the general linear model was used to explore the moderating effect of attachment avoidance on the experimental primes. As in previous analyses, the within-subject factor was condition, the between-subject factor was sex, and BMI was included as a covariate. The three-way interaction between condition, sex, and avoidance was not significant, $F(1.78, 165.79) = 0.84$, $p = .42$, indicating that it was appropriate to examine the interaction between condition and avoidance for the entire sample. This two-way interaction was not significant, $F(1.78, 165.79) = 2.52$, $p = .09$. No further analyses were performed using attachment avoidance.

These results partially support the experimental hypotheses. Although body appreciation did not significantly increase when female participants were primed to think about a secure and accepting relationship, body appreciation showed a significant decrease when female participants were primed to think about an anxious, insecure relationship. This decrease was amplified for women with larger BMIs. Dispositional attachment anxiety moderated this effect such that women who generally worried about the acceptance of relationship partners were more influenced by thinking about an anxious and uncertain relationship. Attachment avoidance did not moderate the effects of the primes, and experimental manipulations had no effect for male participants.

General discussion

The purpose of this study was to test the effects of primed attachment representations on body image. Both of our experiments found that for women, priming an anxious relationship reduced positive body-related attitudes, but priming a secure and accepting relationship had little or no effect. The effect of the anxious prime was moderated by dispositional attachment anxiety such that those who were generally high in attachment anxiety experienced a greater decline in body appreciation relative to a neutral prime. Effect sizes were generally small to medium. Finally, this study found that priming attachment had no effect on body image for men. Each of these results will be discussed in further detail.

Substantial evidence has demonstrated that priming security-related mental representations has many desirable effects, including elevated positive mood, enhanced views of self, more positive expectations for others in relationships, and greater felt security (Carnelley & Rowe, 2010; Mikulincer et al., 2001; Rowe & Carnelley, 2003). Hence, it is important to consider why this study did not find that security priming had a beneficial effect on body image. One possibility is that for some people, security priming does not have soothing, encouraging effects. Specifically, when persons with high dispositional attachment anxiety are asked to think about a supportive and accepting relationship, they may be reminded that for the most part, they lack this type of relationship (Mallinckrodt, 2007). Instead of inducing a sense of felt security, the prime might actually activate fears

of rejection and questions about self-worth. However, we tested the moderating effect of attachment anxiety in the secure-prime condition and did not find a significant interaction. Another possibility is that our procedure did not activate the attachment system for all participants. Although participants were instructed to think about a close relationship, not all close relationships accomplish attachment functions. If participants chose to think about a close person who was not actually an attachment figure, imagining that person would be unlikely to activate secure attachment schemas and the accompanying enhanced sense of security and self-worth. Some researchers have incorporated an additional step in their procedure to ensure that participants choose close persons who meet criteria for attachment figures for the priming procedure (e.g., Carnelley & Rowe, 2007); future work should include this step in order to clarify this issue. Finally, a third possible explanation for our results is that the priming task was effective, but body image is resistant to upward changes. In support of this interpretation, dozens of studies have shown that it is possible to increase women's negative evaluations of their bodies through exposure to images of thin models, celebrities, and even peers, but exposure to heavier bodies does not produce an upward "rebound" effect in feelings about the body (Groesz, Levine, & Murnen, 2002). Therefore, although previous research has shown that security priming leads to more positive self-evaluation (Baldwin, 1994; Carnelley & Rowe, 2007), perhaps this effect is global and diffuse and does not specifically extend to body image.

Although our secure prime did not elevate women's feelings about their bodies, the anxious prime diminished those feelings. This result supports the idea that activating anxious attachment representations arouses fears of rejection and more negative evaluations of the self. However, as with our secure prime, it is possible that some participants chose to reflect upon a close relationship that was not necessarily a true attachment relationship. Consequently, our results suggest that for women, any close relationship that communicates uncertainty creates self-doubt and more negative evaluations of the body and appearance. It is also logical that women with high dispositional attachment anxiety experienced a greater reduction in body appreciation following the anxious prime. Theoretically, anxious attachment style is associated with vigilance for signs of possible rejection (Mikulincer & Shaver, 2003); hence, thinking about any close relationship characterized by uncertainty regarding the partner's affection or esteem would confirm those fears.

Clinicians are often interested in helping their clients to increase their body appreciation, and our results suggest that steering clear of relationships that do not offer acceptance is important for protecting positive body image. However, even though we found that priming accepting relationships did not significantly elevate body image, we are reluctant to conclude that investing in accepting relationships is unimportant. Indeed, a qualitative study found that individuals who exemplified the characteristics of positive body image stressed the importance of seeking out others who were both comfortable with themselves and communicated acceptance (Wood-Barcalow, Tylka, & Augustus-Horvath, 2010). In addition, quantitative research has confirmed that young women who perceive higher levels of acceptance and emotional support from others tend to have more positive attitudes about their bodies (Augustus-Horvath & Tylka, 2011; Cheng & Mallinckrodt, 2009). It has been found that perceived body acceptance by others

(i.e., feeling that friends, family, and romantic partners accept one's body as it is) is a powerful predictor of body appreciation (Augustus-Horvath & Tylka, 2011; Avalos & Tylka, 2006); perhaps this more specific and proximal form of acceptance is required for elevating positive body image. We also found that the effect of the priming tasks in Experiment 2 had more of an effect on women with higher BMIs, suggesting that these women's feelings about their bodies are particularly responsive to messages of acceptance or uncertainty from important others. Additional research is needed to clarify the details of these relationships.

Not surprisingly, attachment primes had no effect upon men's body appreciation. The most plausible explanation for this result is that men are not socialized to evaluate themselves based on their bodies and appearance to the same extent that women are (Crocker et al., 2003; Fredrickson & Roberts, 1997). Furthermore, cultural standards tend to be more flexible for men, and they tend to perceive less pressure to conform to specific appearance standards than women (Buote, Wilson, Strahan, Gazzola, & Papps, 2011). Probably as a result of these loosened standards, men tend to have higher body appreciation than women (Atari, 2016). Accordingly, while body image plays a central role in women's well-being (Grabe, Ward, & Hyde, 2008), it does not carry the same meaning for men and is unaffected by perceptions of supportiveness or lack of support from close relationship partners.

We emphasize the importance of our replication of findings from Experiment 1. There is growing awareness that many published psychological findings have not been reproduced. A recent collaborative effort carried out replications of 100 studies, both experimental and correlational, that had been published in three major psychological journals (Aarts et al., 2015). Overall, attempts at replication showed dismaying results, with only 36% of replications reporting significant results. Logically, scientific journals are more likely to publish studies that confirm hypotheses; yet, if a published result cannot be reproduced, it does little to advance scientific understanding. As the authors of the replication project noted, "innovation points out paths that are possible; replication points out paths that are likely; progress relies on both" (pp. 4716–4717). Thus, the fact that Experiment 2 reproduced the findings of Experiment 1 in an independent sample, using a somewhat different design and a different measure of body image, strengthens our confidence in our results.

A potential limitation of this study was that we did not include an explicit manipulation check asking participants about their thoughts and mood following the priming procedure. However, we used a common priming procedure that has been used in other published studies (e.g., Bartz & Lydon, 2004; Birnbaum, Simpson, Weisberg, Barnea, & Assulin-Simhon, 2012; Wilkinson, Rowe & Heath, 2013); notably, not all studies using this procedure have included a manipulation check (Birnbaum et al., 2012; Mikulincer, Shaver, & Rom, 2011). Although we did not ask participants to report their feelings, we did ask them what they thought the study was about. No participant clearly stated the true purpose of the study, suggesting that results were not due to hypothesis guessing. Another potential limitation was that the priming task took place in a room with others present. We attempted to maximize participants' privacy by leaving empty seats on both sides of each individual and by assuring them that we would not read their responses to the prime; nevertheless, it is possible that the presence of other people had some influence. Also in regard to the procedure, all participants completed the measure of

attachment style at their first session, after having completed the writing prime and several other questionnaires. Although attachment style is thought to be relatively stable, it is possible that the prime had some influence on the way participants responded to this measure. Finally, the study was limited by the sample, which was made up of college students who were mostly White, young, and middle to upper social class.

Results of this study provide possible directions for future research. First, we did not include an avoidance prime because most correlational studies showed no relationship between attachment avoidance and body image. However, in order to more fully explore the causal relationship between attachment and body-related attitudes, future research should include an avoidance priming condition. Second, we found that for women in Experiment 2, BMI moderated the effects of the attachment priming tasks, such that women with higher BMIs showed a greater change in body appreciation (either positive or negative) when primed. It is likely that there are additional factors that moderate the experimental effects, such as preexisting body concerns. That is, women with elevated concerns about their bodies are likely to be more susceptible to the effects of activating attachment style, and this possibility should be tested. Finally, any further work in this area should take steps to ensure that participants choose a bona fide attachment figure for the visualization tasks.

In conclusion, this study is the first to test the effects of priming attachment on body image. Although previous research has clearly shown a relationship between feeling loved and supported by others and women's appraisals of their bodies, our results suggest that the underlying causal pathway has more to do with anxious, uncertain relationships dampening feelings about the body than with secure, accepting relationships lifting them up. Secure attachment—both dispositional and contextually activated—promotes general feelings of self-liking and self-esteem, but feeling good about one's body appears to be more resistant to upward change.

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