The protective role of self-compassion for women's positive body image: an open replication and extension

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ABSTRACT

The development and maintenance of positive body image in women may be disrupted by sociocultural appearance-related pressures. Therefore, it is critical to explore factors that may safeguard women's positive body image. A recent study by Homan and Tylka (2015) found that in a large sample (N = 263) of female MTurk workers and university-aged women, both appearance-contingent self-worth and body-based social comparisons were linked to less positive body image, but these links were attenuated in the face of high self-compassion. This research, an independent direct replication of the original study, supported the original findings. In a new, larger sample (N = 363 female-identified MTurk workers), signals were detected that were similar in size and magnitude to the original study. Specifically, while appearance-contingent self-worth and body-based social comparisons were negatively linked to body appreciation, those who endorsed higher levels of self-compassion reported a more positive body image, even in the presence of these potential threats. Findings are extended to eating- and exercise-based social comparisons. All materials, including the replication protocol, data management plan, dataset, SPSS syntax, and output are publicly available on the Open Science Framework at: https://osf.io/r274y/. Implications for research and practice are discussed.

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1 Introduction

Body image is an important component of women’s self-concept (Cash, 2004). Although individuals across the gender spectrum can be dissatisfied with their bodies (Frederick et al., 2007; Jones, Haycraft, Murjan, & Arcelus, 2016; Tabbaa, Perrin, & Benotsch, 2019), the presence of some degree of body discontent is so prevalent in women (of all ages and ethnicities) that it is considered to be “normative” (Pruis & Janowsky, 2010; Rodin, Silberstein, & Striegel-Moore, 1984; Runfola et al., 2013). Sociocultural theorists propose that the pervasiveness of women’s body dissatisfaction can be explained, in part, by a desire to adhere to societal-imposed beauty ideals for women (see Calogero, Boroughs, & Thompson, 2007). These standards and expectations are perpetuated by mainstream and social media, in which images of thin and lean girls and women are routinely displayed (Anixiadis, Wertheim, Rodgers, & Caruana, 2019; Groesz, Levine, & Murnen, 2002; Hogue & Mills, 2019; Northup & Liebler, 2010; Tod, Edwards, & Hall, 2013; Watson & Murnen, 2019) even in animated programming geared toward children (Harriger, Serier, Luedke, Robertson, & Bojorguez, 2018).

Beauty ideals, while constantly in flux (Betz, Sabik, & Ramsey, 2019; Howard, 2018), are unrealistic or unattainable for most women (Calogero et al., 2007; Grogan, 2008; Jeffreys, 2005). Nevertheless, the relentless pursuit of beauty is a common feature of life for many women (see Engeln, 2017; Wolf, 1991). A recent survey conducted by SkinStore revealed that women, on average, spend $8 per day on their makeup, or up to $300,000 throughout their lives (SkinStore, 2017). This finding is unsurprising in light of the fact that some women perceive beauty to function as a form of social currency (Calogero, Tylka, Donnelly, McGetrick, & Leger, 2017), so the objective cost may be seen as a small price to pay for the potential social benefits of being “beautiful.” Indeed, for some women, appearance is a critical component of their overall sense of self-worth (Crocker & Wolfe, 2001; Crocker, Luhtanen, Cooper, & Bouvrette, 2003). However, having a sense of self-worth that is dependent on appearance (i.e., appearance-contingent self-worth) has been linked to negative outcomes such as self-objectification, appearance anxiety, low self-esteem, low body appreciation, and disordered eating in women (Adams, Tyler, Calogero, & Lee, 2017;...

Many women also compare their own appearance to images of women they see in the media and in their everyday lives. Research across cultures has revealed that, when exposed to images of women who appear to embody beauty and thinness ideals, female participants report higher levels of body dissatisfaction compared to women who view neutral images (Anixiadis et al., 2019; Betz et al., 2019; Brown & Tiggemann, 2016; Hamilton, Mintz, & Kashubeck-West, 2007; Nagar & Virk, 2017). Although the bulk of these images have been digitally altered to create the illusion of bodily perfection, research suggests that mere awareness that these photos have been photoshopped does not mitigate their influence on body dissatisfaction (Frederick, Sandhu, Scott, & Akbari, 2016). While the insidious influence of body-related comparisons is robust (Myers & Crowther, 2009), engaging in social comparisons about appearance-related behaviors, such as eating and exercise, can have the same detrimental effect on women’s attitudes about their bodies (Fitzsimmons-Craft et al., 2015). Indeed, in university-aged women, eating- and exercise-related social comparisons have been shown to influence dietary restraint (Polivy & Piner, 2015; Saunders, Eaton, & Fitzsimmons-Craft, 2019) and body dissatisfaction (Fitzsimmons-Craft et al., 2015; Fitzsimmons-Craft, Ciao, & Accurso, 2016), making eating- and exercise-based social comparisons another important area for exploration.

1.1. Positive body image and self-compassion

In light of the prevalence of body dissatisfaction among women, it is understandable that most research on body image in this population has focused on negative body image attitudes (Cash & Smolak, 2011). However, this focus on negative body image has led researchers to largely overlook the positive aspects of women’s body image attitudes (Tylka & Cash, 2011; Tylka, 2019). Positive body image is conceptually related to, but also distinct from, negative body image. Specifically, the absence of negative body image does not necessarily indicate positive body image is present (Tylka & Van Diest, 2015; Tylka & Wood-Barcalow, 2015), which renders positive body image an important area for independent exploration. One of the most comprehensive assessments of positive body image is body appreciation, a construct that comprises affirming (rather than stigmatizing) opinions about the body and its appearance, accepting one’s bodily imperfections, respecting one's bodily needs by participating in healthy behaviors that enhance well-being, and rejecting unreasonable and unattainable beauty ideals (Avalos, Tylka, & Wood-Barcalow, 2005; Tylka & Wood-Barcalow, 2015). Body appreciation has been positively linked to body- and self-esteem, proactive coping, and life satisfaction, and negatively linked to body surveillance, body shame, disordered eating, body preoccupation, and weight concern (Avalos et al., 2005), and accounts for unique variance in disordered eating and intuitive eating above and beyond contributions by body dissatisfaction (Tylka & Wood-Barcalow, 2015).

A growing body of research highlights protective factors that may help cultivate and safeguard positive body image amid the sociocultural threats that women routinely experience (see Tylka, 2019). Among other skills, strengths, and resources, this research consistently points to self-compassion as a psychological trait that can be honed to help women appreciate and respect their bodies under even the most challenging circumstances (Kelly, Miller, Vimalakanthan, Dupasquier, & Waring, 2019; Vimalakanthan, Kelly, & Trac, 2018). For example, in a recent study of 120 female undergraduate students, adopting a “caregiving” perspective (i.e., remembering that we are all human beings, generating kind and caring thoughts) when engaging in appearance related comparisons was effective in reducing body dissatisfaction, restrained eating, and eating-disorder related social comparisons for women who regularly engaged in social comparisons (Vimalakanthan et al., 2018). Indeed, this and other research suggest that being compassionate toward oneself and others, and engaging in self-compassionate practices (e.g., yoga, mindfulness, writing) can dampen the impact of social, physical, and psychological experiences that may threaten the development and maintenance of positive body image (Kelly, Vimalakanthan, & Miller, 2014; Liss & Erchull, 2015; Sherman, Woon, French, & Elder, 2017), particularly for those who regularly experience these threats.

Conceptually, self-compassion involves self-kindness, a non-judgmental and mindful stance towards all emotions, and a recognition that distress is a common part of the human experience (Neff, 2003a). This self-compassionate stance starkly contrasts the harsh self-criticism that accompanies negative body image experiences (Ferreira, Dias, & Oliveira, 2019). Tylka and Van Diest (2015) have specifically proposed four distinct ways that self-compassion may disrupt the link between body image threats and negative downstream outcomes. First, self-compassion may buffer against negative body image on its own. Second, high levels of self-compassion may make it unlikely that body image “threats” are perceived as “threatening.” Third, self-compassion may interrupt the mediated links between perceived body image threats and body dissatisfaction, and fourth, and important for this research, self-compassion may moderate the relation between threats and negative outcomes, such that those with higher levels of self-compassion are less susceptible to the potential negative outcomes of those threats (Tylka & Van Diest, 2015; see also Braun, Park, & Gorin, 2016).

A meta-analysis across 28 studies examining the links between self-compassion, body image, and disordered eating (Braun et al., 2016) concluded that there was substantial evidence for self-compassion as a protective factor against negative body- and eating-related outcomes. One notable paper cited within Braun et al. (2016) review was a study by Homan and Tylka (2015), which explored the links between body-related threats, self-compassion, and body appreciation. The results suggested that adopting a compassionate self-perspective may help protect women’s body appreciation, even in the face of body-related threats. Specifically, within their sample of 263 predominantly straight, white women recruited from both a private U.S. college and Amazon’s Mechanical Turk (MTurk), maintaining an appearance-contingent sense of self-worth and engaging in body-related social comparisons were negatively associated with body appreciation. Yet, these links were moderated by self-compassion; when women maintained a self-compassionate self-perspective, the inverse relations between appearance-contingent self-worth and body appreciation, and body-related social comparisons and body appreciation, attenuated to the point of statistical nonsignificance (Homan & Tylka, 2015).

The results from Homan and Tylka’s (2015) study revealed a potential protective role of self-compassion on body appreciation, and several studies have built upon and bolstered this finding. For example, one recent study by Schmidt, Raque-Bogdan, and Hollern (2019) found that, in a sample of college women, self-compassion accounted for 39% of the variance in participants’ overall body appreciation. In another study that investigated daily and weekly levels of self-compassion and body image, results suggested that fluctuations in self-compassion uniquely contributed to levels of body appreciation such that higher daily self-compassion positively predicted daily body appreciation (Kelly & Stephen, 2016).

However, research on the protective effect of self-compassion has recently been scrutinized (Muris, 2015; Muris, Otaaar, & Petrocchi, 2016), and some studies have revealed inconsistencies
in the protective role of self-compassion for women’s body image in relation to threats similar to those described in Homan and Tylka’s (2015) article (i.e., body-related comparisons, appearance self-worth). For example, in a study by Rodgers et al. (2017), the data supported a direct link between perceived body size and appearance esteem in adolescent girls. The individual components of self-compassion (i.e., self-kindness, mindfulness, and common humanity), however, did not moderate this relation. Additionally, in an examination of Facebook appearance-comparisons and positive body image, self-compassion did not moderate the links between social media appearance comparisons and appearance esteem for young women; however, this nonsignificant finding could have been due to inadequate power (Modica, 2019). Body appreciation and appearance esteem are conceptually similar: appearance esteem is one aspect of positive body image that encompasses positive self-evaluations of appearance (Avalos et al., 2005; Mendelson, Mendelson, & White, 2001). The robustness of the effect of self-compassion on indicators of positive body image is therefore unclear. In order to clarify these links, it is important to examine when and for whom self-compassion can protect positive body image. One way to elucidate these links is through direct and open replication of the initial findings from which this hypothesis is derived (Nosek & Errington, 2019).

1.2. The importance of replication studies

Replication studies are vital to the understanding and confidence of psychological findings as a whole (Zwaan, Etz, Lucas, & Donnellan, 2018) and are regarded as fundamental for the development of science (Martin & Clarke, 2017). Although replication has begun to permeate the field of psychology in general (Makel, Plucker, & Hegarty, 2012; Zwaan et al., 2018), body image research lags behind in this regard. There is no one-size-fits-all approach to replication research (Nosek & Errington, 2017), but a few key standards have been set (LeBel, Vanpaemel, Cheung, & Campbell, 2019). Specifically, direct replications should follow the procedures and methods as closely as possible to the original study, and any methodological deviations from the original protocol should be noted and explained. Additionally, replication research is more reliable and trustworthy when the original authors are not included on the research team (LeBel et al., 2019). Using these guidelines, we attempted a direct, close, and open replication of Homan and Tylka’s (2015) study on body image threats, self-compassion, and body appreciation. We sought the advice of the original authors to ensure the veracity of our approach, but they were not involved in the data collection or analyses.¹

At the time of this writing, according to Google Scholar, Homan and Tylka’s (2015) article has been cited 70 times, and PsyCINFO suggests that the article has been referenced in 31 additional studies. It has clearly caught the attention of body image researchers. However, the specific findings from this study have not yet been subjected to a direct replication attempt, and any effect that is real, reliable, and robust should emerge using the same procedures and study design as the original study in a similar sample (Simons, 2014). Thus, in the present study we conducted an open and very close replication of Homan and Tylka’s (2015) original findings with a larger sample to retest their original hypotheses. We also performed exploratory analyses on the relations between other conceptually-related threats (exercise- and eating-based social comparisons), self-compassion, and body appreciation, given that engaging in these various social comparisons may similarly negatively influence women’s body (dis)satisfaction (Fitzsimmons-Craft et al., 2014; Fitzsimmons-Craft, 2015). While a more nuanced understanding of the effects of exercise- and eating-based social comparisons is needed in the body image literature (Saunders et al., 2015), based on the scant extant research, we tested the following hypotheses:

Hypothesis 1 (H1). Body comparison and appearance contingent self-worth will be inversely related to body appreciation.

Hypothesis 2 (H2). Self-compassion will be positively associated with body appreciation.

Hypotheses 3 (H3) and 4 (H4). Self-compassion will moderate these relations by diminishing the inverse associations between body comparison and body appreciation (H3), and appearance contingent self-worth and body appreciation (H4).

Hypotheses 5 (H5) and 6 (H6) (exploratory). Self-compassion will moderate the negative relation between eating-based social comparisons (H5) and exercise-based social comparisons (H6).

2. Method

2.1. Participants

The original study sample included 263 participants (221 from MTurk and 42 from an undergraduate institution). For this replication, we increased the sample size based on an a priori power analysis using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007). Assuming power of 80 % and an alpha of .05, we estimated how many participants would be required to detect small to medium effects. We determined that we would have 80 % power to detect an $f^2$ of .02 (small $f^2$ is considered to be .01) with 367 participants. We recruited more than this number, anticipating the removal of some participants due to attrition and failure to comply with study instructions. Overall, 591 participants began the survey, but only 415 participants completed the Qualtrics study through MTurk. Only complete datasets were included in our final sample, meaning that data from those who began the study but did not proceed through to the end of the survey were not included in our analyses. Eighteen participants were immediately removed from the study for failing the screening questionnaire (responding that their gender was “male”). Another five were eliminated for responding “men” or “prefer not to say” to the question asking about gender in the demographics survey. One additional participant suggested that we should not use their data based on how much they paid attention and, thus, was removed. Twenty-eight additional participants were eliminated for failing at least one of three attention checks. Also, one participant had responded that their age was “0.” Given that our analyses were contingent on age, the “0” was deleted from that participant’s response data. Altogether, our final dataset included 363 female-identified participants. Participants in this study were largely White (75.2 %; $n = 273$), as well as African American (10.2 %; $n = 37$), and Asian American (5.0 %; $n = 18$). Most of the participants were married (43.5 %; $n = 158$), 25.6 % were single ($n = 93$), and 15.7 % were involved in a long-term relationship ($n = 57$). They were primarily straight (85.4 %; $n = 310$) and bisexual (8.8 %; $n = 32$), with a few identifying as lesbian (3 %; $n = 11$), asexual (1.9 %; $n = 7$), or pansexual (0.6 %; $n = 2$). Most (43.5 %; $n = 158$) had attained a bachelor’s degree, “some college” (31.4 %; $n = 114$) or were high school graduates (11 %; $n = 40$).

2.2. Procedure

In this study, we followed a replication protocol designed to test these associations using the same measures and following nearly

¹ It is worth noting, however, that the second author on the original paper, Dr. Tracy Tylka, is the editor of Body Image and did suggest minor revisions to our initial manuscript (e.g., updated articles for the literature review). We do not feel that this compromised the integrity of this research.
the same procedure as the original study (Homan & Tylka, 2015) in a larger and more diverse sample. Before we began the study, we first contacted the original authors of the paper to review the details of the procedure and methods. In this initial correspondence, we provided our replication plan and requested any additional materials to make our replication as direct as possible. The authors were generous with their time and willingness to help us with our project. They provided not only the materials for the reported results, but also the full battery of questionnaires and suggestions for obtaining the highest possible quality data through MTurk. The authors were contacted once again during data analyses to inquire about their use of the Malahanobis distance test, and Drs. Homan and Tylka were again supportive in providing us with additional information regarding the analysis.

Participants were recruited through Amazon’s Mechanical Turk (MTurk; Buhrmester, Kwang, & Gosling, 2011). Only those who had completed over 10,000 Human Intelligence Tasks (HITs), had a HIT acceptance rate of 98% or higher, and were U.S. citizens were eligible to participate in the study. All qualified participants were directed to a Qualtrics survey, where they first answered a pre-screen questionnaire and Captcha verification. Participants read the letter of information and were then presented with the scales in a counterbalanced order, followed by a standard demographic questionnaire and debriefing form. We included three attention checks throughout the study, all of which needed to be answered correctly in order to be included in the analyses. Participants received $1.00 USD as compensation.

Notably, we deviated from the original procedure in minor ways. First, although body mass index (BMI) was associated with body appreciation in the original study, we deliberately chose to omit BMI from our study design (Tomiyama et al., 2018), a decision that was supported by the original authors. Given the potential discomfort it may cause participants to respond to questions about their body weight, and the stigmatizing implications of perpetuating the use of this metric within psychological research (see Calogero, Tylka, & Mensinger, 2016), we decided that the costs to the participants outweighed the potential benefits to the study. Also, the original sample was conducted with some undergraduates, but we included only female-identified MTurk workers in our sample. Finally, in the original study, various other unreported questionnaires were included, justifying a compensation rate of $2.50. We chose to include only those instruments relevant for replicating the findings in the original study, so we reduced compensation to $1.00 USD. Our replication attempt took place in late March 2019. Prior to data collection, all study materials were uploaded to the Open Science Framework2 (OSF) and are publicly available (https://osf.io/r274y/).

23 Code availability

All study materials, including the initial correspondence with the authors, the replication protocol, the analytic plan, the data and syntax files, and the SPSS output were uploaded to the OSF. All components of our study are fully available and accessible to the public via the link above. All analyses were conducted using the statistical software IBM SPSS Statistics (26) and PROCESS (Hayes, 2013). All data and syntax files are in .sav and .sps file formats and can be accessed through the Open Science Framework.

24 Materials

24.1 Social comparisons

We included the full 18-item Body, Eating, and Exercise Comparison Orientation Measure (BEECOM; Fitzsimmons-Craft, Bardone-Cone, & Harney, 2012) which asks individuals about the frequency with which they engage in social comparisons regarding bodies (e.g., “I compare my body shape to that of my peers”), eating (e.g., “I look at the amount of food my peers leave on their plate in comparison to me when they are finished eating”), and exercise (e.g., “When I work out around other people, I think about how many calories I am burning in comparison to my peers”). Items are rated on a seven-point Likert-style scale from never (scored at 1) to always (7). Convergent validity has been demonstrated through links with eating disorder symptomology and body dissatisfaction in college samples, and the full scale and subscales have demonstrated acceptable internal consistency (Fitzsimmons-Craft et al., 2012, 2014). In the original paper, the full scale demonstrated high internal consistency (α = .96), as did the body, eating, and exercise comparisons subscales (α = .93-.94, .94-.95, .93-94, respectively). See Table 1 for means, standard deviations, and alphas in this sample.

24.2 Body appreciation

As per the original study, we assessed body appreciation using the original Body Appreciation Scale (Avalos et al., 2005). The scale contains 13 items that focus on taking a positive attitude toward the body (e.g., “I respect my body”) and its functions (e.g., “I am attentive to my body’s needs”). Responses are scored on a 5-point Likert-style scale anchored at never (scored at 1) and always (5). The BAS has demonstrated a unidimensional factor structure in U.S. women and has demonstrated acceptable internal consistency and 3-week test-retest reliability. Convergent validity has been established through positive links with self-esteem and negative links with disordered and negative body image variables (Avalos et al., 2005). Cronbach’s alpha in this study was .96.

24.3 Appearance self-worth

Appearance-contingent self-worth was assessed using the 5-item Appearance subscale of the Contingencies of Self-Worth Scale (Crocker et al., 2003). Items are rated on a 7-point scale ranging from strongly disagree (scored at 1) to strongly agree (7). An example item is, “My sense of self-worth suffers whenever I think I don’t look good.” In the original study, Cronbach’s alpha for the appearance subscale was .83, and scores on this subscale have been positively linked to body surveillance and body shame, and negatively linked to appearance and global self-esteem (Noser & Zeigler-Hill, 2014). Cronbach’s alpha in this sample was .81.

24.4 Self-compassion

The Self-Compassion Scale – Short Form (Raes, Pommier, Neff, & Van Gucht, 2011) was used to assess participants’ trait-level self-compassion. The scale consists of 12 items that tap into the tendency to adopt a compassionate self-perspective (e.g., “When I’m going through a very hard time, I give myself the caring and tenderness I need”). Items are rated on a five-point scale from almost never (scored at 1) to almost always (5). In the original study, Cronbach’s alpha was .87 in a Dutch sample and .86 in a U.S. sample (Raes et al., 2011). In this study, α = .92.

3 Results

3.1 Preliminary analyses

We first determined if there were missing data, and the percentage of missing data points was low (M = 0.66%). Similar to the
original study, because of the small percentage of missing data and evidence of scale reliability, we used listwise deletion to handle missing data, rather than imputing missing data (Parent, 2013). Tests of skew and kurtosis revealed that all variables were within the acceptable range, as per the guidelines of George and Mallery (2010; less than 3.00 for skew and less than 10.00 for kurtosis).

### 3.2. Hypotheses

#### 3.2.1. Tests of H1 and H2

Consistent with H1 and H2, both body comparisons and appearance contingent self-worth were inversely associated with body appreciation, and self-compassion was positively associated with body appreciation. Self-compassion was also negatively associated with appearance contingent self-worth and body comparisons. Age was positively associated with self-compassion, appearance self-worth, body comparisons, but not body appreciation. As age was correlated with other study variables, we controlled for age in the regression analyses. We also explored the relations among exercise and eating social comparisons in relation to other study variables (see Table 1).

#### 3.2.2. Test of H3

Two hierarchical moderated linear regressions were performed using SPSS to test our main study hypotheses. Ten participants did not report age and were not included in analyses. On the basis of Mahalanobis distance, two additional participants were excluded ($\chi^2 < .01$), resulting in 351 participants in Models 1 and 2. All variables were mean-centered prior conducting analyses.

In Model 1, we tested if self-compassion moderated the relation between body comparisons and body appreciation. Self-compassion showed a significant positive relationship with body appreciation, $b = .62$ (95 % CI = .54, .70), $SE = .04$, $t(351) = 15.43$, $p < .001$, and body comparisons showed a significant negative relationship with body appreciation, $b = -.13$ (95 % CI = -.18, -.09), $SE = .02$, $t(351) = -6.05$, $p < .001$. This latter association was conditional upon self-compassion, as evidenced by the significant coefficient for the interaction term at Step 3 (see Table 2). When self-compassion was low (one SD below the mean), body comparison was strongly and inversely related to body appreciation $b = -.17$ (95 % CI = -.22, -.12) $SE = .03$, $t(351) = -6.41$, $p < .001$. However, consistent with the original study, this relation was attenuated at higher levels of self-compassion, $b = -.09$ (95 % CI = -.14, .03) $SE = .03$, $p = .004$. As per Homan and TyIka (2015), we also probed for a significant interaction using the Johnson-Neyman technique (Johnson & Neyman, 1936) in PROCESS (Hayes, 2013), which indicated that body comparisons were no longer related to body appreciation when self-compassion was 4.42 (on a 1–5 scale) or greater, $b = -.07$ (95 % CI = -.14, .00), $SE = .03$, $t(351) = -1.97$, $p = .05$. Therefore, H3 was supported: the negative link between body-based social comparisons and body appreciation was moderated by trait-level self-compassion.

#### 3.2.3. Test of H4

Model 2 tested self-compassion as a potential moderator of the inverse link between appearance contingent self-worth and body appreciation. Self-compassion showed a significant positive relation with body appreciation, $b = .66$ (95 % CI = .58, .74), $SE = .04$, $t(351) = 16.39$, $p < .001$. Appearance-contingent self-worth also showed a negative relationship with body appreciation, $b = -.12$ (95 % CI = -.18, -.07) $SE = .03$, $t(351) = -4.21$, $p < .001$. This relation was moderated by self-compassion, as seen in the significant interaction at Step 3 (see Table 2). At low levels of self-compassion, appearance-contingent self-worth was strongly negatively related to body appreciation, $b = -.19$ (95 % CI = -.26, -.11), $SE = .04$, $t(351) = -4.90$, $p < .001$. Yet, at higher levels of self-compassion, the relation between body appreciation and appearance-contingent self-worth was dampened, rendering it nonsignificant, $b = -.07$ (95 % CI = -.14, .01), $SE = .04$, $t(351) = -1.81$, $p = .071$, a pattern of findings similar to the original study. The Johnson-Neyman technique indicated that appearance contingent self-worth was no longer related to body appreciation when self-compassion was equal to or greater than 4.00 or greater, $b = -.07$ (95 % CI = -.14, .00), $SE = .04$, $t(351) = -1.97$, $p = .05$. H4 was also supported by the data: self-compassion moderated the inverse relation between appearance contingent self-worth and body appreciation.

### 3.3. Exploratory tests

#### 3.3.1. Preliminary analyses

Four participants were eliminated based on a second Mahalanobis distance score we computed for the exploratory analyses ($\chi^2 < .01$), and one additional participant was identified as a univariate outlier (standardized residual > 4.00). Therefore, Models 3 and 4 were tested on samples of 348 participants. All variables were mean-centered prior to analyses.

#### 3.3.2. Test of H5

In Model 3, we tested the links between eating-related social comparisons and body appreciation. Self-compassion was significantly linked to body appreciation, $b = .68$ (95 % CI = .60, .75), $SE = .04$, $t(348) = 16.84$, $p < .001$. Eating-based social comparisons also showed a negative relationship with body appreciation, $b = -.09$ (95 % CI = -.14, -.05) $SE = .02$, $t(348) = -3.85$, $p < .001$. This relation was moderated by self-compassion, as seen in the significant interaction at Step 3 (see Table 2). When self-compassion was low, eating-based social comparisons were strongly and inversely related to body appreciation, $b = -.13$ (95 % CI = -.19, -.07), $SE = .09$, $t(348) = -4.42$, $p < .001$. However, this relation was much weaker at higher levels of self-compassion, $b = -.04$ (95 % CI = -.11, .02) $SE = .03$, $t(348) = -1.26$, $p = .21$. As per the Johnson-Neyman technique, eating comparisons were no longer related to body appreciation when self-compassion was 3.74 or greater, $b = -.06$ (95 % CI = -.12, .00), $SE = .03$, $t(348) = -1.97$, $p = .05$. These results suggest that H5 was supported: self-compassion moderated the relation between eating-based social comparisons and body appreciation.

### Table 1

| Variable Means, Standard Deviations, and Intercorrelations. |
|---|---|---|---|---|---|---|---|---|
| n | α | M | SD | 1 | 2 | 3 | 4 | 5 |
| 1. Appearance self-worth | 363 | .81 | 4.82 | 1.27 | — | — | — | — |
| 2. Self-compassion | 363 | .92 | 3.18 | 0.94 | — | — | — | — |
| 3. Body comparisons | 362 | .96 | 3.72 | 1.67 | — | — | — | — |
| 4. Eating comparisons | 363 | .94 | 3.20 | 1.52 | — | — | — | — |
| 5. Exercise comparisons | 363 | .96 | 2.87 | 1.59 | — | — | — | — |
| 6. Body appreciation | 363 | .96 | 3.37 | 0.94 | — | — | — | — |
| 7. Age | 353 | 39.36 | 12.08 | — | 1.11 | — | — | — |

Note. *p < .05, **p < .001.
### 4. Discussion

Our replication study adds support to the main findings reported in Homan and Tykka’s (2015) original study. Specifically, for both main effects, the unstandardized regression coefficients were similar in magnitude and consistent in direction with the original sample. Appearance-contingent self-worth and body-based social comparisons were negatively associated with women’s body appearance. Consistent with the original study (Homan & Tykka, 2015), in the presence of high levels of self-compassion, the inverse relations between these threats and body appearance were attenuated. We also explored additional hypotheses, which revealed a similar pattern of results for eating-based social comparisons, but not exercise-based social comparisons.

Given that the original findings have proven to be robust in a second population, this research adds support to the development of interventions that aim to cultivate self-compassion, particularly for women in social environments in which appearance concerns may be more common (Want, 2009). One possible target of these interventions is social media users. Notably, appearance-based social comparisons on social media have been associated with more negative outcomes than appearance comparisons in the mainstream media and everyday life (Fardouly, Pinkus, & Vartanian, 2017). Alarming social media trends, such as “fitspo” (i.e., images that depict toned bodies and “clean” eating habits; Ghaznavi & Taylor, 2015; Griffiths & Stefanovski, 2019; Turner & Lefevre, 2017) have become popular in recent years. While this may seem like a positive change from the “thinspo” trend (i.e., images that depict a very thin ideal body and categorically unhealthy and restrictive eating habits), women who view fitspo images experience similar or worse rates of body dissatisfaction compared to those who view thinspo images (Mulgrew & Tiggemann, 2016). Similarly, social media users who follow “health food” accounts demonstrate higher levels of orthorexic tendencies than the general population (Turner & Lefevre, 2017). These trends are especially insidious because social media users may not have control over the images to which they are exposed and may therefore stumble across them inadvertently. Given that people who view fitspo images or follow health food blogs may find themselves engaging in body, eating, and/or exercise comparisons, they may particularly benefit from self-compassion exercises to counteract the negative impact of viewing them. In general, interventions geared toward fostering positive body image may be enhanced by integrating self-compassion exercises into their trainings in order to help participants build up their self-compassion reserves, regardless of their deliberate use of social media.

Our study also revealed a similar pattern of results for eating comparisons, which are also common in college-aged women (Fitzsimmons-Craft, 2017). Eating-based social comparisons can uniquely complicate women’s eating disorder recovery (Saunders et al., 2019), so self-compassion may also be a specific target for eating disorder treatment and intervention (see also Kelly, Carter, & Borairi, 2013). That this link did not hold for exercise-based social comparisons is interesting, but should be interpreted with caution, given that type or amount of exercise in which participants typically engage was not specifically assessed in this study. Additionally, due to the fact that the negative relationships between exercise comparisons, self-compassion, and body appreciation were not as strong as the links for eating- and body-based social comparisons, these relations may be less conceptually related to one another compared to eating- and body-based social comparison. Another possible explanation for these weaker negative relationships is the use of the short-form version (Raes et al., 2011) of the Self-Compassion Scale (SCS; Neff, 2003b). The SCS-SF does not reliably allow researchers to examine the individual components of self-compassion that are related to outcomes of interest (Raes et al., 2011). Given that the SCS-SF and the SCS have a near perfect correlation on total scores of self-compassion (Raes et al., 2011), it is possible that some of the individual components of self-compassion may be more strongly linked to exercise-based social comparisons. Exercise-based social comparisons can influence negative body-related outcomes such as body satisfaction and
disordered eating (Fitzsimmons-Craft et al., 2016), so we encourage future researchers to analyze the six subscales separately using the full SCS and explore other potential moderators of this relation.

4.1. Limitations and future directions

There were some limitations to this study that future research should address. First, we did not examine whether these links would hold up in male-identified and gender-diverse people. Notably, transgender people can experience high levels of body image dissatisfaction (Tabaă et al., 2019), so future research should explore the role of self-compassion in relation to body image for gender expansive individuals and those who are at different stages of gender transition. Similarly, it is unclear whether these effects are relevant for those experiencing clinical levels of body disturbance, such as those with eating disorders or body dysmorphic disorder, so researchers may wish to test these findings in clinical samples. Additionally, we chose to conduct a direct replication of Homan and Tylla’s (2015) original paper, so we employed the original versions of the Body Appreciation Scale (Avalos et al., 2005) and BEECOM (Fitzsimmons-Craft et al., 2012), which have since been revised and updated (Saunders et al., 2019; Tylla & Wood-Barcalow, 2015). Finally, we cannot rule out that BMI may have accounted for some of the variance within our study findings. We encourage future research to include a proxy for BMI, such as internalized weight bias, to examine this possibility more closely.

Since threats to positive body image are a common part of the cultural landscape for women, increased research attention should be given to interventions and mindsets that protect women from psychological harm. Self-compassion appears to represent a psychological variable that can be cultivated to help women overcome day-to-day threats to their positive body image. Indeed, in recent years, various mindfulness interventions have provided preliminary support to the suggestion that a kinder self-perspective can be developed through brief meditation (Boellinghaus, Jones, & Hutton, 2013) and more systematic training programs (Neff & Germer, 2013). Of course, interventions to improve women’s psychological functioning in the face of harm do not directly tackle the broader sociocultural pressures women face regularly, and we support continued examination of programs that encourage women to directly challenge harmful sociocultural messages about their bodies (Becker & Stice, 2017). Future research should assess the role of self-compassion on other body-related threats, such as experiences of sexual objectification, personal safety anxiety, sex as power attitudes, and beauty as currency beliefs, all of which have been linked to negative body image (Calogero et al., 2017; Calogero, Tylla, & Siegel, 2019; Erchull & Liss, 2013; Köze, Tylla, Augustus-Horvath, & Denchik, 2007). Overall, until threats to women’s positive body image are no longer a common aspect of life for women, significant research attention should be paid to interventions and factors that may help to shield women from the insidious downstream effects of these and other body-related threats.

4.2. Conclusion

By conducting a direct, close, and open replication of Homan and Tylla’s (2015) popular paper, we hope to encourage other body image researchers to begin to adopt open research practices. Body image concerns influence people of all ages, genders, weights, and ethnicities (Grabe & Hyde, 2006; Runfola et al., 2013), so it is especially important that research on this topic, particularly that which highlights potential interventions or protective mindsets, is clear, reproducible, and effective across time and populations. Even within the literature surrounding this study, we identified contradictory findings and effects that were not consistent across populations. Increased transparency in body image research may therefore help to “increase confidence in the veracity of findings” in this area (Zwaan et al., 2018, p. 1–2) and, ultimately, to assist in creating a world in which body appreciation, rather than dissatisfaction, is “normative.”

Credit authorship contribution statement

Jaclyn A. Siegel: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Visualization, Writing – original draft, Writing – review & editing

Katarina L. Huellemann: Conceptualization, Formal analysis, Investigation, Methodology, Writing – original draft, Data curation, Visualization.

Courtney C. Hillier: Conceptualization, Writing – review & editing

Lorne Campbell: Funding acquisition, Project administration, Supervision, Validation.

References


