Journal of Behavior Therapy and Experimental Psychiatry 62 (2019) 7–14

Contents lists available at ScienceDirect

Journal of Behavior Therapy and Experimental Psychiatry

journal homepage: www.elsevier.com/locate/jbtep

Do thoughts about dieting matter? Testing the relationship between thoughts about dieting, body shape concerns, and state self-esteem

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ARTICLE INFO

Keywords:
Dieting
Global self-esteem
Weight-based self-esteem
Body shape

ABSTRACT

Background and objectives: Dieters are likely primed to think about their diet throughout the day (e.g., as they feel hungry). However, prior research has not tested whether and how thinking about dieting might have negative effects, like poor self-esteem and body shape concerns.
Methods: We experimentally primed dieters' thoughts about their diets and tested whether: 1) dieting thoughts are related to poor state self-esteem through body shape concerns; and 2) dieting thoughts are related to body shape concerns through poor state self-esteem. Dieting participants (N = 225) were randomly assigned to complete a dieting or neutral prime.
Results: Unexpectedly, there was a different pattern of results across male (n = 72) and female (n = 144) dieters. When accounting for body shape concerns, males primed to think about dieting (vs. neutral condition) reported greater state self-esteem. Further, the dieting prime indirectly led to lower body shape concerns through greater state global self-esteem. However, for females, the dieting prime indirectly led to poorer state self-esteem through its effects on body shape concerns.
Limitations: The sample was collected online and was predominantly female and Caucasian. Other limitations include self-report of dieting status and body mass index.
Conclusions: The findings suggest that for males, thoughts about dieting may actually be associated with greater state self-esteem, which may indirectly predict lower body shape concerns. In contrast, for females, when thoughts about dieting activate body shape concerns, poorer state self-esteem may follow. These results highlight important, potentially gender-specific relationships between thoughts about dieting, body shape concerns, and state self-esteem.

1. Introduction

Dieting is highly prevalent in the United States, with an estimated $33 billion spent on weight loss programs each year (Kruger, Galuska, Serdula, & Jones, 2004). Studies using national samples estimate that 24.3–32.8% of men and 37.6–46.3% of women are trying to lose weight, the majority of whom use dieting to do so (Bish et al., 2005; Kruger et al., 2004). This appears fairly consistent across samples of Hispanic, African American, and Caucasian participants (Cachelin & Regan, 2006). Dieting behaviors can be associated with a host of negative psychological correlates (e.g., Cachelin & Regan, 2006), including low self-esteem (Ackard, Croll, & Kearney-Cook, 2002; McFarlane, McCabe, Jarry, Olmsted, & Polivy, 2001; Utter, Neumark-Sztainer, Wall, & Story, 2003). Given the prevalence of dieting behaviors (Kruger et al., 2004) and the protective and predictive roles of self-esteem in psychological health (e.g., Collin et al., 2016; Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004), it is critical to clarify *how* dieting may be related to poor self-esteem.

Dieters are inundated with diet-related stimuli on a daily basis, from deciding what to eat for lunch, to comparing dieting tips with friends, to scrolling through images of fit celebrities on social media. Dieters are thus repeatedly primed to think about their diets. Unfortunately, these dieting thoughts may trigger negative body-focused thoughts, such as "I am so fat" or "I hate my body." In turn, these negative body-focused thoughts may lead to poor self-esteem and concerns about body shape, potentially then leading to more dieting attempts in a reciprocal cycle. However, while prior research has established associations between dieting behaviors, body shape concerns, and poor self-esteem, no one has yet tested whether and how *thoughts* about dieting predict poor self-esteem and body shape concerns, which may help to clarify *why* dieting

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https://doi.org/10.1016/j.jbtep.2018.08.005
Received 2 May 2018; Received in revised form 14 August 2018; Accepted 19 August 2018
Available online 21 August 2018
0005-7916/

can be associated with negative effects.

The present study used an experimental design to prime thoughts about dieting among individuals who reported that they were currently on a diet and tested the impact of the prime on state self-esteem and concerns about body shape. Two mediation models were examined: 1) whether thinking about one's diet was related to poor state self-esteem through concerns about body shape; and 2) whether thinking about one's diet was related to concerns about body shape through low state self-esteem.

1.1. Dieting, self-esteem, and concerns about body shape

There is compelling evidence that dieting practices can be linked to low self-esteem (e.g., Ackard, Croll, & Kearney-Cooke, 2002; Blechert, Ansorge, Beckmann, & Tuschen-Caffier, 2010; Cachelin & Regan, 2006; McFarlane et al., 2001; Utter et al., 2003; Wilksch & Wade, 2004), although a recent review demonstrated that different measures of dieting may be differentially associated with various facets of self-esteem (Mills, Weinheimer, Polivy, & Herman, 2018). For example, the Restraint Scale (Herman & Polivy, 1980) may capture generally unsuccessful, or "yo-yo dieting" that is arguably typical of most real-world dieters. This measure appears to be associated with low appearance-related self-esteem and, although somewhat less consistently, low trait global self-esteem (Mills et al., 2018). Unless otherwise noted, the studies reviewed within our literature review used the Restraint Scale to assess dieting and the classic Rosenberg Self-Esteem Scale (Rosenberg, 1965) to assess trait global self-esteem.

In one representative study that tested the relation between dieting practices and self-esteem, female college students were categorized by dieting history (i.e., never dieted, dieted 1–5 times, dieted 6 or more times) and by asking participants "Have you ever dieted to lose weight" (Ackard et al., 2002). Participants were matched on body mass index (BMI) across dieting categories and completed measures of self-esteem, eating disorder symptoms, and body image. Dieting frequency was inversely related to trait global self-esteem, even while controlling for BMI.

In a related cross-sectional study, dieters reported significantly lower self-esteem than non-dieters across measures of trait global self-esteem, state global self-esteem (assessed by the State Self-Esteem Scale; Heatherton & Polivy, 1991), and appearance-related self-esteem (assessed by the Shape and Weight-Based Self-Esteem Inventory and the experimenter-created Multidimensional Weight-Related Self-Evaluation Inventory; Geller, Johnston, & Madsen, 1997; McFarlane et al., 2001). Similar patterns of findings have been replicated among samples with diverse racial and ethnic identities (Cachelin & Regan, 2006). Importantly, these findings support a relation between dieting, as assessed by measures that arguably capture "real world" dieting attempts (e.g., asking participants how frequently they have dieted or using the Restraint Scale) and low global self-esteem and appearance-related self-esteem. However, the findings raise questions about how and why dieters may experience low self-esteem and whether specific facets of dieting, such as thoughts about dieting, contribute to low self-esteem.

Empirical findings also suggest that dieters (vs. non-dieters) may, not surprisingly, have heightened concerns about body shape. For instance, one study found that dieting female college students (vs. non-dieting female college students, identified by the Dutch Eating Behaviour Questionnaire; van Strien, Frijters, Bergers, & Defares, 1986) had greater body shape concerns, lower appearance-related self-esteem, and lower global self-esteem (the latter two assessed by the Self-Perception Profile for Adolescents; Harter, 1988; Wilksch & Wade, 2004). In another study, dieters (vs. non-dieters) had significantly higher body shape concerns, as indicated by their agreement ratings with sentences designed to elicit body shape concerns (e.g., "When I gain weight, I feel *unpopular*") (Blechert et al., 2010).

In turn, there are several reasons to expect that concerns about body shape would contribute to lower self-esteem (e.g., McFarlane et al., 2001; Meijboom, Jansen, Kampman, & Schouten, 1999). For example, in their cross-sectional study, McFarlane et al. (2001) found that imagined weight-gain negatively impacted weight-based self-esteem, a type of appearance-related self-esteem representing the importance placed on weight in determining self-worth (assessed by the Multidimensional Weight-Related Self-Evaluation Inventory; McFarlane et al., 2001). These negative effects were similar across samples of eating disorder-diagnosed participants and dieters. Assuming that imagined weight-gain is a proxy for body dissatisfaction (a reasonably safe assumption in Western cultures; Pike & Borovoy, 2004), this suggests that concerns about one's body shape may lead to greater weight-based self-esteem (i.e., self-esteem that is more dependent on weight). In another study, a body image prime was used to increase salience of body shape concerns. For the prime, female dieters were asked to wear a revealing tank top, weighed, then asked to look at themselves in a mirror (Hoffmeister, Teige-Mocigemba, Blechert, Klauer, & Tuschen-Caffier, 2010). Following the prime, dieters experienced a nonsignificant decrease in implicit self-esteem, suggesting that among dieters, particularly Restraint Scale-identified dieters who may not be "successful" in terms of sustained weight loss, concerns about body image may contribute to low state self-esteem.

Although the theory and evidence above suggests that concerns about body shape may lead to low global and appearance-related self-esteem among dieters, other research suggests alternatives: the reverse may (also) be true—that low self-esteem leads to greater concerns about body shape—or the relationship between body shape concerns and low self-esteem may be reciprocal. For example, one longitudinal study of college females found that lower trait global self-esteem at the start of freshman year predicted greater concerns about shape at the end of the year (Delinsky & Wilson, 2008). The reverse pathway was not tested, so it is unclear whether greater concerns about body shape would have also contributed to lower trait global self-esteem. As a different example, Meijboom et al. (1999) recruited participants who endorsed high and low levels of eating restraint (conceptually similar to dieting). Half of each group was randomly assigned to a low self-esteem prime in which they were asked to think about a time they failed. After, all participants completed a lexical decision task, requiring them to identify jumbled letters as non-words or words, most of which were related to shape or weight. Highly restrained eaters who were given the low self-esteem prime correctly classified more shape- and weight-related words than unprimed restrained eaters or primed low restrained eaters. The authors interpreted this finding to mean that restrained eaters' thoughts about body shape are directly influenced by their state self-esteem. Finally, a longitudinal study followed a cohort of Norwegian adolescents through young adulthood, administering measures of body image concerns and global and appearance-related self-esteem (assessed with the Self-Perception Profile for Adolescents; Harter, 1988; Wichstrøm, 1995a) across four time points (Wichstrøm & von Soest; 2016). Cross-lagged analyses suggested that, with the exception of the final time point taken during early adulthood (ages 26–32 years), self-esteem and body image concerns bidirectionally influenced one another.

1.2. Overview of present study

In sum, these findings highlight that, among arguably more "real-world" dieters (e.g., as assessed by the Restraint Scale or broad questions about dieting status): 1) dieters (vs. non-dieters) may have greater concerns about body shape and lower global and appearance-related self-esteem; and 2) among dieters, concerns about body shape and global and appearance-related self-esteem may be linked, although the direction of this relationship is unclear. The present study used a priming paradigm to activate thoughts about dieting and tested two mediation models: 1) whether concerns about body shape mediated the relation between thoughts about dieting and poor self-esteem, and 2) whether poor self-esteem mediated the relation between thoughts about

dieting and concerns about body shape. Importantly, past studies have identified both global self-esteem and weight-based self-esteem, a type of appearance-related self-esteem representing the importance placed on weight in determining self-worth, as separate factors that impact well-being (McFarlane et al., 2001; Putterman & Linden, 2006; Trottier, McFarlane, Olmsted, & McCabe, 2013). Therefore, both conceptualizations of self-esteem were included in the present study. Further, due to our priming paradigm, the present study sought to test the impact of dieting thoughts on state self-esteem, rather than trait self-esteem. Thus, together, we hypothesized that priming dieting participants to think about their diets would lead to greater concerns about body shape (e.g., McFarlane et al., 2001), which in turn would predict worse state global self-esteem (e.g., Ackard et al., 2002) and higher state weight-based self-esteem (i.e., self-esteem that is more dependent on weight; Trottier et al., 2013). However, given additional evidence that self-esteem may predict body shape concerns (e.g., Delinsky & Wilson, 2008; Meijboom et al., 1999), we also tested the reverse; whether priming thoughts about dieting indirectly predicted body shape concerns via worse state global self-esteem and higher state weight-based self-esteem.

2. Materials and methods

2.1. Participants

Participants consisted of individuals who were currently dieting, recruited from Amazon's Mechanical Turk (MTurk; www.mturk.com). Participants dieting to lose or maintain weight were specifically recruited to effectively capture the impact of dieting thoughts on individuals actively engaged in dieting behaviors. MTurk has been identified as the dominant platform for crowdsourcing research participants and a reliable resource for collecting high quality data (see review by Chandler & Shapiro, 2016). Further, previous studies have used MTurk to successfully prime participants (e.g., priming religious beliefs; Fergus & Rowatt, 2015).

Consistent with prior MTurk recommendations (e.g., Chandler & Shapiro, 2016), data for the present study were collected in two waves, and the purpose of the study was not disclosed until debriefing. Wave 1 participants ($N = 1063$) completed a demographics questionnaire in which they reported their age, gender, sex, ethnicity, race, height, weight, education, employment, and income (no other demographic variables reported). They also completed a survey about risk-taking (slightly modified from Weber, Blais, & Betz, 2002) that was included to prevent participants from identifying variables of interest. To assess dieting status, participants were asked whether they had dieted in the past year. If participants indicated that they had dieted within the past year, they were invited to participate in Wave 2. Wave 2 of the study ($N = 293$) consisted of the tasks and materials listed below. Thirty participants were eliminated from Wave 2, because they indicated that they had dieted in the past year but were not dieting to lose or maintain weight at the time of the study. Further, attention checks were included throughout the surveys to ensure that participants were reading carefully. Eighteen participants failed two out of the three attention checks and were removed from the analyses. All remaining participants had complete data for dieting status and body shape concerns, but 20 were missing data on both measures of self-esteem. Removing these 20 participants resulted in a final sample of 225. Our sample consisted of mostly female, Caucasian participants who were employed full-time and had a bachelor's degree. Per recommendations (Chandler & Shapiro, 2016), the present sample was restricted to MTurk users in the United States. See Table 1 for sample characteristics.

Table 1
Demographic and sample characteristics for dieting and neutral prime conditions.

	Neutral Prime (n = 108)		Diet Prime (n = 117)	
	M or %	SD or N	M or %	SD or N
Age	34.66	11.17	35.62	12.18
BMI	30.12	7.31	30.62	7.63
Gender Identity				
Female	60.2%	65	67.5%	79
Gender Queer	2.8%	3	3.4%	4
Male	35.2%	38	29.1%	34
Transgender (female to male)	0.9%	1	0.0%	0
Transgender (male to female)	0.0%	0	0.0%	0
Other	0.9%	1	0.0%	0
Race				
African American	8.3%	9	6.0%	7
American Indian/Alaskan Native	0.0%	0	0.9%	1
Asian	2.8%	3	11.1%	13
Caucasian	88.0%	95	74.4%	87
Hawaiian/Other Pacific Islander	0.0%	0	0.0%	0
Other	0.9%	1	7.7%	9
Ethnicity				
Non-Hispanic/Latino	94.4%	102	95.7%	112
Hispanic/Latino	5.6%	6	4.3%	5
Employment History				
Employed-Full Time	51.9%	56	51.3%	60
Employed-Part Time	13.0%	14	15.4%	18
Student	16.7%	18	9.4%	12
Unemployed	12.0%	13	13.3%	17
Other	6.5%	7	10.2%	13
Education Level				
Master's/Professional/Doctoral Degree	17.6%	19	21.4%	25
Bachelor's Degree	36.1%	39	29.9%	35
Associate's Degree	11.1%	12	6.8%	8
Trade/Technical/Vocational Training	1.9%	2	4.3%	5
Some College	29.6%	32	26.5%	31
High School Degree/GED	2.8%	3	11.1%	13
Some High School	0.9%	1	0.0%	0
Income				
Over $100,000	5.6%	6	3.4%	4
$90,000 – $100,000	.9%	1	1.7%	2
$80,000 – $90,000	1.9%	2	1.7%	2
$70,000 – $80,000	3.7%	4	2.6%	3
$60,000 – $70,000	3.7%	4	9.4%	11
$50,000 – $60,000	5.6%	6	7.7%	9
$40,000 – $50,000	14.8%	16	8.5%	10
$30,000 – $40,000	13.0%	14	17.9%	21
$20,000 – $30,000	14.8%	16	16.2%	19
$10,000 – $20,000	7.4%	8	10.3%	12
Under $10,000	28.7%	31	20.5%	24

Note. BMI = body mass index.

2.2. Procedure

Wave 1 took less than 5 min to complete, and participants were compensated US$0.10. Wave 2 took approximately 30 min, and participants were compensated US$1.50. Participants in Wave 2 were randomly assigned to the dieting prime or neutral prime (see description below). Directly after, they completed a measure of concerns about body shape. Subsequently, they completed an online working memory task that was not included in the present analyses (Operation Span Task; Turner & Engle, 1989). Next, participants were re-administered the demographics survey to help ensure that participants were answering consistently (all were). Participants then completed two questionnaires, neither of which was included in the present analyses, to assess their reasons for dieting (modified from Markland & Ingledew, 1997 to assess dieting rather than exercise) and their perception of how normative dieting is among individuals of their gender (Cruwys, Haslam, Fox, & McMahon, 2015). Finally, participants completed measures of global self-esteem and weight-based self-esteem. Only surveys relevant to the present hypotheses are described in detail below. Note, the decision about which measures to include in this paper

were made prior to conducting the analyses. All materials and procedures were approved by the university's Institutional Review Board.

2.3. Materials

Once invited to Wave 2, participants completed the measures listed below.

2.3.1. Dieting status

Participants were again asked whether they had dieted within the past year. If they endorsed dieting within the past year, they were asked whether they were currently: 1) dieting to lose weight, 2) dieting to maintain weight, or 3) not currently dieting (Lattimore & Halford, 2003).

2.3.2. Prime

Participants were randomly assigned to a diet prime (n = 117) or a neutral prime (n = 108). In the diet prime, participants were asked, "Please describe your most recent diet. Please also describe your motivations and goals for going on this diet." This prime was informed by previous research showing that asking participants to consider higher-order dieting goals, such as motivation for dieting, successfully leads to thoughts about dieting (Van Koningsbruggen, Stroebe, Papies, & Aarts, 2011). Further, it was designed to activate thoughts similar to those someone on a diet might experience on a daily basis (e.g., *What can I order from this menu to stick to my diet?* or *I should eat those carrots instead of chips to keep my weight down*) to capture the downstream effects of dieting thoughts on body shape concerns and self-esteem. To control for cognitive effort, the neutral prime asked participants to "Please describe your typical route to the grocery store. Please also describe your motivations and goals for using this route." In both conditions, participants were asked to think about and type their response for at least 3 min, and they were not able to advance to the next part of the study until the 3 min expired.

2.3.3. Concerns about body shape

Concerns about body shape were measured using the 13-item Body Shape Preoccupation Subscale of the *Preoccupying Cognitions* questionnaire (Vreugdenburg, Bryan, & Kemps, 2003). This subscale typically assesses the extent to which individuals have experienced concerns about body shape over the past month. It was slightly modified by phrasing items such that participants rated the extent to which they were *presently* experiencing concerns about their body shape at the time of the study. One item that could not be modified to apply to state cognitions was removed. The final subscale consisted of twelve items rated on a scale from 1 (not at all) to 6 (extremely). Example items from the modified scale include, *I am preoccupied with thoughts about the shape of my body* and *Thinking about my shape is interfering with my ability to concentrate*. The original subscale has shown excellent internal reliability and factor analyses have identified this subscale as a single factor (Vreugdenberg et al., 2003). Reliability in the current study was very good (α = 0.90).

2.3.4. Self-esteem

Global self-esteem was measured using the 10-item *Rosenberg Self-Esteem Scale* (RSES; Rosenberg, 1965). This measure has been widely used and has been termed a "standard inventory measure" of self-esteem (e.g., Greenwald et al., 2002, p. 12). Participants are asked to rate general feelings about themselves on a scale from 1 (strongly disagree) to 4 (strongly disagree). Reliability in the current study was very good (α = 0.92).

Weight-based self-esteem was measured using the *Weight Influenced Self-Esteem Questionnaire* (WISE-Q; Trottier et al., 2013). This measure was developed to assess the influence of participants' body image on weight-based self-esteem. Participants are asked to imagine that they unexpectedly gained five pounds and then to rate the extent that this weight gain would negatively impact aspects of self-esteem. The measure includes 25 items that are rated on a scale from 0 (not at all) to 4 (extremely) and has shown strong internal consistency, test-retest reliability, and concurrent validity with constructs such as body dissatisfaction and drive for thinness (Trottier et al., 2013). Higher scores on this scale indicate that self-esteem is more dependent on weight. Reliability in the present study was excellent (α = 0.96).

2.3.5. Body mass index

Participants were asked to enter their weight in pounds and height in inches. BMI was calculated by dividing weight by height squared and multiplying the result by 703, as recommended by the Center for Disease Control and Prevention (Center for Disease Control and Prevention [CDC], 2014). While some findings suggest that self-report of height and weight tend to be biased (Stommel & Schoenborn, 2009), other findings suggest that BMI measurements collected online demonstrate moderate to high agreement with in-person, objective measurements (Pursey, Burrows, Stanwell, & Collins, 2014). Thus, BMI was used to help ensure that objective differences in body shape (based on participant report) did not account for relations between key variables.

2.4. Missing data and sample characteristics

As noted earlier, 20 participants did not complete either self-esteem measure so were removed from analyses (missing RSES: 8.2%; missing WISE-Q: 8.6%). The 20 participants removed from analyses (vs. those retained for our final sample) were not significantly different on age, gender, sex, ethnicity, race, height, weight, education, employment, and income (all $ps > .05$).

Given the low amount of missing data in our final sample, pairwise deletion was used to account for missing data in the correlation analyses, and listwise deletion was used to account for missing data in mediation analyses. Participants did not significantly differ by priming condition in terms of gender, ethnicity, education level, employment status, income, or age (all $ps > .10$). Chi-squared analyses indicated that there was a significant group difference in race (Fisher's exact test, $p < .05$) such that the dieting prime (vs. neutral prime) included more individuals who identified Asian and Other.

2.5. Data analysis plan

Mediation models were conducted following recent recommendations that emphasize hypothesized indirect effects versus individual pathways (Hayes, 2013). These models tested whether concerns about body shape mediated the relations between the dieting prime and lower state global self-esteem and higher state weight-based self-esteem (see Table 2A–D for unstandardized coefficients and Fig. 1A–D for standardized coefficients). In addition, we conducted two reverse mediation models to test whether state global and state weight-based self-esteem mediated the relation between the dieting prime and concerns about body shape. In mediation analyses, the neutral prime was coded as 0, and the dieting prime was coded as 1. Indirect effects and individual pathways were tested using Model 4 of the SPSS PROCESS macro. Individual pathways are reported as unstandardized coefficients. Statistical significance of indirect effects was determined by 95% confidence intervals with 10,000 bootstrap samples that did not cross zero (e.g., Hayes, 2013). The reported effect size is the partially standardized indirect effect (ab_{ps}; Hayes, 2013; Preacher & Kelley, 2011).

Although we had no *a priori* hypotheses regarding gender differences, thanks to a suggestion from an anonymous reviewer, we reanalyzed findings separately for participants who identified as female versus male. Unexpectedly, the pattern of findings was quite different across these two groups. Thus, we subsequently report and discuss findings separately across female-versus male-identified participants. Very small sample sizes prohibited testing mediation models with participants who identified with a gender other than male or female. All

Table 2
Unstandardized regression coefficients, standard errors, and indirect effects of models indicating mediation for females and males.

A. Body Shape Concerns Mediating Prime and Global Self-esteem for Females—95% Bias Corrected Bootstrap Confidence Intervals

		Concerns About Body Shape				Global Self-esteem		
		b	SE	*p*		*b*	SE	*p*
Prime	*a*	.54	.18	.004	*c′*	.08	.10	.43
Concerns About Body Shape		–	–	–	*b*	−.24	.05	≤.001

	Indirect Effect	Boot SE	Boot LLCI	Boot ULCI
Prime → CBS → Global	−.13	.05	−.25	−.05

B. Body Shape Concerns Mediating Prime and Weight-based Self-esteem for Females—95% Bias Corrected Bootstrap Confidence Intervals

		Concerns About Body Shape				Weight-based Self-esteem		
		b	*SE*	*p*		*b*	*SE*	*p*
Prime	*a*	.54	.18	.004	*c′*	−.12	.14	.38
Concerns About Body Shape		–	–	–	*b*	.59	.06	≤.001

	Indirect Effect	Boot SE	Boot LLCI	Boot ULCI
Prime → CBS → Weight-based	.32	.12	.11	.57

C. Global Self-esteem Mediating Prime and Body Shape Concerns for Males—95% Bias Corrected Bootstrap Confidence Intervals

		Global Self-esteem				Concerns About Body Shape		
		b	*SE*	*p*		*b*	*SE*	*p*
Prime	*a*	.30	.15	.04	*c′*	.47	.23	.04
Global Self-esteem		–	–	–	*b*	−.50	.18	.009

	Indirect Effect	Boot SE	Boot LLCI	Boot ULCI
Prime → Global → CBS	−.15	.10	−.43	−.02

D. Weight-based Self-esteem Mediating Prime and Body Shape Concerns for Males—95% Bias Corrected Bootstrap Confidence Intervals

		Weight-based Self-esteem				Concerns About Body Shape		
		b	*SE*	*p*		*b*	*SE*	*p*
Prime	*a*	−.32	.21	.13	*c′*	.50	.19	.01
Weight-based Self-esteem		–	–	–	*b*	.65	.11	≤.001

	Indirect Effect	Boot SE	Boot LLCI	Boot ULCI
Prime → Weight-based → CBS	−.21	.14	−.52	.04

Note. All analyses controlled for age, body mass index (BMI), and gender. CBS = *concerns about body shape*; Global = *global self-esteem;* Weight-based = *weight-based self-esteem;* Neutral Prime = 0; Dieting Prime = 1.

analyses were conducted controlling for age, given variability in the present sample, and BMI, given its ties to outcomes related to dieting (Ackard et al., 2002). It should also be noted that the pattern of key findings was the same when we did not control for these variables.

3. Results

3.1. Mediation analyses

3.1.1. Full sample

When analyses were conducted with participants of all reported genders ($N = 225$), the direct effects of the dieting prime on state global self-esteem, c' = 0.16, $p = .04$, and state weight-based self-esteem, c' = −0.23, $p = .03$, were statistically significant, though not in the predicted direction. Unexpectedly, when accounting for the mediator (concerns about body shape), individuals primed to think about dieting (vs. those in the neutral condition) reported greater state self-esteem. However, consistent with hypotheses, the dieting prime indirectly influenced state global self-esteem, indirect effect = −0.13, 95% CI [−0.21, −0.06], $ab_{ps} = -0.19$, and state weight-based self-esteem, indirect effect = 0.31, 95% CI [0.15, 0.49], $ab_{ps} = .32$, through its effects on concerns about body shape. For state global self-esteem, the dieting prime predicted more concerns about body shape, pathway $a = .53$, $p \leq .001$, and more concerns about body shape predicted lower state global self-esteem, pathway $b = -0.24$, $p \leq .001$. For state weight-based self-esteem, again the dieting prime predicted more concerns about body shape, $a = 0.52$, $p \leq .001$, and more concerns about body shape predicted greater state weight-based self-esteem, $b = 0.59$, $p \leq .001$. Finally, the reverse mediation models did not support statistically significant mediation with either state global self-esteem, indirect effect = −0.02, 95% CI [−0.14, 0.08], $ab_{ps} = -0.02$, or state weight-based self-esteem, 0.05, 95% CI [−0.12, 0.22]; $ab_{ps} = .05$, operating as mediators between the prime and concerns about body shape.

3.1.2. Female participants

When analyses were conducted only with participants who identified as female ($n = 144$), findings were very similar to findings conducted with the full sample. The only exception was that the direct effects of the dieting prime on state global self-esteem, c' = 0.08, $p = .43$, and state weight-based self-esteem, c' = −0.12, $p = .38$, were not statistically significant. Using the female only sample, the dieting prime indirectly influenced state global self-esteem, indirect effect = −0.13, 95% CI [−0.25, −0.05], $ab_{ps} = -0.20$, and state weight-based self-esteem, indirect effect = 0.32, 95% CI [0.11, 0.57], $ab_{ps} = .32$, through its effects on concerns about body shape. As expected, the dieting prime predicted more concerns about body shape, pathway $a = .54$, $p = .004$, and more concerns about body shape predicted lower state global self-esteem, pathway b = −0.24, $p \leq .001$, and greater state weight-based self-esteem, $b = 0.59$, $p \leq .001$. Finally, the reverse mediation models did not support statistically significant mediation with either state global self-esteem, indirect effect = 0.03, 95% CI [−0.11, 0.19], $ab_{ps} = .03$, or state weight-based self-esteem, indirect effect = 0.14, 95% CI [−0.08, 0.37]; $ab_{ps} = .12$, operating as mediators between the prime and concerns about body shape.

3.1.3. Male participants

When analyses were conducted only with participants who identified as male ($n = 72$), the pattern of findings were considerably different than findings conducted using the full sample and female only sample. Most notably, and in contrast to hypotheses, the dieting prime did not indirectly influence state global self-esteem, indirect effect = −0.07, 95% CI [−0.22, 0.01], $ab_{ps} = -0.10$, or state weight-based self-esteem, indirect effect = 0.15, 95% CI [−0.07, 0.42], $ab_{ps} = .18$, through its effects on concerns about body shape. Unexpectedly, the direct effects of the dieting prime on state global self-

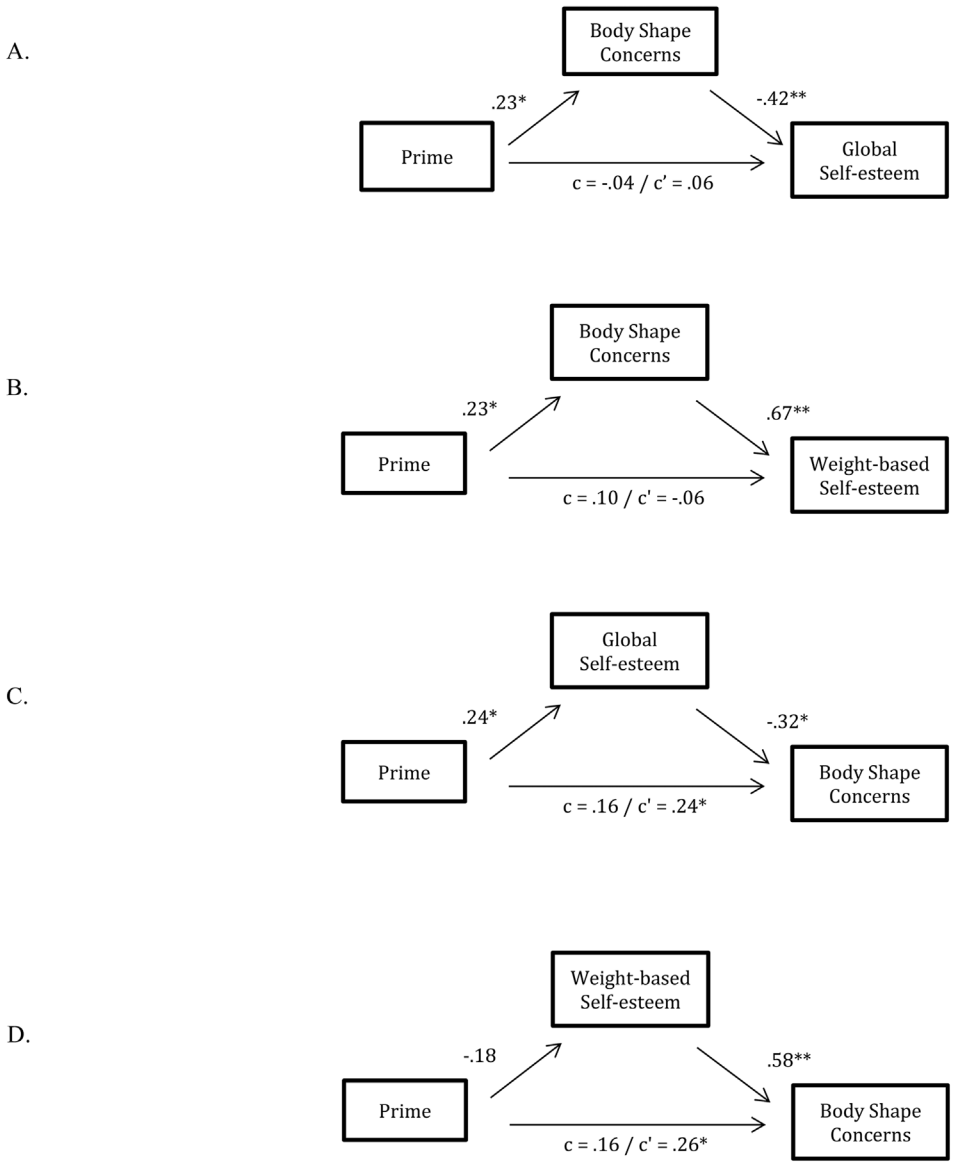

Fig. 1. Mediation models with standardized path coefficients. All analyses controlled for age, body mass index (BMI), and gender. A. Hypothesized mediation model for female participants with body shape concerns mediating the relation between the prime condition and global self-esteem. B. Hypothesized mediation model for female participants with body shape concerns mediating the relation between the prime condition and weight-based self-esteem. C. Hypothesized mediation model for male participants with global self-esteem mediating the relation between the prime condition and body shape concerns. D. Hypothesized mediation model for male participants with weight-based self-esteem mediating the relation between the prime condition and body shape concerns. $p < .05$*, < 0.001*.

esteem, $c' = 0.37$, $p = .01$, and state weight-based self-esteem, $c' = -0.47$, $p = .008$, were significant, but not in the predicted direction, suggesting that the dieting prime was actually associated with *better* self-esteem. In contrast, there was evidence for the reverse mediation models for males, although not in the predicted pattern. The direct effect of the dieting prime on body shape concerns was significant, $c' = 0.47$, $p = .04$. However, the dieting prime predicted *higher* state global self-esteem, $a = 0.30$, $p = .04$, and higher global self-esteem predicted lower body shape concerns, $b = -0.50$, $p = .009$. Providing evidence for statistical mediation, the bias-corrected bootstrap interval for the indirect effect was below zero, indirect effect = −.15, 95% CI [−0.43, −0.02], $ab_{ps} = -0.16$. The pattern for the reverse weight-based self-esteem model was similar but non-significant, as the indirect effect overlapped with zero, indirect effect = −0.21, 95% CI [−0.52, 0.04], $ab_{ps} = -0.22$.

4. Discussion

The present study tested concerns about body shape as a mediator of the relation between thinking about dieting and state self-esteem. Given inconclusive evidence regarding the directionality of these relations (e.g., Delinsky & Wilson, 2008; Meijboom et al., 1999), this study also tested state self-esteem as a mediator of the relation between thinking about dieting and concerns about body shape. Finally, we tested differences in the pattern of findings across participants who identified as male versus female. Because unexpected but meaningful differences across gender identities emerged, we discuss implications for groups separately. Note, outcomes for models using the full sample and models limited to female participants were very similar, which is not surprising, because the female sample constituted a considerably larger proportion of the full sample relative to the male sample.

For models limited to female participants, thoughts about dieting indirectly predicted worse state global self-esteem and more pathological state weight-based self-esteem via concerns about body shape. In other words, state self-esteem was negatively impacted when thoughts about dieting triggered body shape concerns. Importantly, reverse models indicated that state global and state weight-based self-esteem did not mediate the relation between thoughts about dieting and concerns about body shape. These findings were consistent with expectations and consistent with prior research supporting links between dieting, concerns about body shape, and global and weight-based self-esteem among women (e.g., Ackard et al., 2002; Wilksch & Wade, 2004). However, to our knowledge, this is the first study to support the role of body shape concerns as a mediator in the relation between

thoughts about dieting and poor state self-esteem. Given the prevalence of dieting behaviors (Cachelin & Regan, 2006; Kruger et al., 2004) and the significant role of self-esteem in mental health (e.g., Collin et al., 2016; Pyszczynski et al., 2004), these findings highlight a critical pathway by which thoughts about dieting may lead to body shape concerns for women, which in turn may contribute to both poorer state global self-esteem and more pathological state weight-based self-esteem.

For models limited to male participants, the pattern of findings was more surprising. Most notably, there was evidence that among males, the dieting prime predicted *higher* state global self-esteem, which in turn predicted *lower* body shape concerns. Together, our findings suggest that for males, thinking about one's diet may actually be *helpful* in certain contexts, and that the positive benefits may be driven by a boost in state global self-esteem. Although not anticipated, this finding is consistent with research indicating that some factors may mitigate the harmful effects of dieting on self-esteem (e.g., Bryan & Tiggemann, 2001; Lasikiewicz, Myrissa, Hoyland, & Lawton, 2014). For example, a recent review of dietary weight loss interventions among overweight and obese populations found significant improvements in trait global self-esteem (Lasikiewicz et al., 2014). Another review found similar results, in that dieting practices supported by behaviour therapy programs may actually improve well-being (French & Jeffery, 1994). Although speculative, thinking about dieting may lead men to also think about the benefits of their diet, which ultimately may lead to *greater* self-esteem. For instance, previous findings suggest that male dieters believe they diet for more “legitimate” reasons, such as for medical purposes, than female dieters, who men perceive to diet primarily for body image reasons (de Souza & Ciclitira, 2005).

That said, other studies that have included male dieters suggest men experience lower trait global self-esteem and greater body dissatisfaction, as compared to male non-dieters (e.g., Crow, Eisenberg, Story, & Neurmark-Sztainer, 2006). This is consistent with our finding that thinking about dieting directly predicted greater body shape concerns for men. Thus, it is possible that thoughts about dieting may also be related to negative correlates for men, perhaps through mediators working in the opposite direction of state global self-esteem that were not tested in the present study, an effect termed suppression (e.g., Rucker, Preacher, Tormala, & Petty, 2011). Importantly, there is a dearth of research focused on male dieters, self-esteem, and body shape concerns (e.g., Markey & Markey, 2005). Further, the present study is the first to use a dieting prime to test the effects of *thoughts about dieting* on concerns about body shape and self-esteem. Thus, it is possible that thoughts about dieting can trigger a specific sequence for male dieters, whereby greater state self-esteem is activated, followed by lower body shape concerns. It will be important to test this temporal sequence more fully in future studies given that the measures were obtained over a short time span in the current study (and only thoughts about dieting were directly manipulated). Further, because our sample size was reduced for our gender-specific analyses, particularly for men and gender identities other than female or male, our results should be replicated and extended with a larger sample size and across a broader range of gender identities.

In addition to gender, other factors may impact the relationship between dieting and state self-esteem. For example, the way in which dieters are identified may play an important role. Many of the studies reviewed in the introduction that demonstrated a negative association between dieting and self-esteem used the Restraint Scale (Herman & Polivy, 1980) to identify dieters. The Restraint Scale may identify dieters who experience generally “unsuccessful” dieting attempts in terms of sustained weight loss, perhaps leading dieting to be related to poorer self-esteem (see Mills et al., 2018). In contrast, other measures such as the Cognitive Restraint subscale of the Three Factor Eating Questionnaire (Stunkard & Messick, 1985) do not show a reliable relationship with self-esteem, perhaps because they capture different facets of dieting behaviors, such as successful restriction of food intake (Mills et al., 2018). Also, the studies reviewed that demonstrated a positive association between dieting and self-esteem generally assigned participants to a weight-loss intervention (e.g., Lasikiewicz et al., 2014). Together, this suggests that the way in which dieting is assessed and the way dieters are categorized may impact the relationships observed (Mills et al., 2018).

4.1. Limitations, future directions, and conclusions

Limitations of the present study highlight areas for further research. First, dieting in the present study was assessed by asking whether participants had dieted within the past year and whether they were currently dieting to lose weight or dieting to maintain weight (Lattimore & Halford, 2003). As noted by other researchers testing the effects of dieting (e.g., Ackard et al., 2002), it may be important for future studies to conduct more detailed assessments of dieting behaviors, and to use these assessments to understand the costs and benefits of dieting.

Second, though the present study used an experimental design and tested competing mediation models, our findings could not establish temporal primacy of whether concerns about body shape precede and predict self-esteem. Thus, it will be important for future research to replicate the present findings using a longitudinal design and to test whether the present findings related to state self-esteem operate similarly on a trait level. Third, although research suggests that Mechanical Turk is generally a reliable resource for collecting high quality data (see review by Chandler & Shapiro, 2016), our sample was collected online, and we did not control for the setting in which participants completed the study. Related, although past findings suggest that BMI assessed online demonstrates moderate to high agreement with objectively measured BMI (e.g., Pursey et al., 2014), we were not able to corroborate participants' BMI with in-person measurements. Fourth, given cultural differences related to body image (e.g., Pike & Borovoy, 2004; Swami et al., 2010), our results should be extended to samples that are more diverse, particularly with respect to race, ethnicity, gender, education, and socio-economic status. Fifth, it is possible that other variables administered prior to the self-esteem measures (e.g., reasons for dieting and/or gendered norms related to dieting) contributed to the priming effects of dieting thoughts on body shape concerns and self-esteem. Future research should parse apart whether specific thoughts about dieting (e.g., the reason for dieting) versus more general thoughts about dieting (e.g., our general diet prime) have differential effects on body shape concerns and state self-esteem.

In conclusion, although thinking about dieting is not necessarily problematic, our results suggest an important caveat to this finding. In particular, for women, when thoughts about dieting activate body shape concerns, lowered state self-esteem may follow. For men, thoughts about dieting may actually be associated with greater state self-esteem, which may indirectly predict lower body shape concerns. Thus, the present findings highlight important, potentially gender-specific relationships between thoughts about dieting, body shape concerns, and state self-esteem.

Funding

This work was supported by internal research funds.

Disclosure of interest

The authors report no conflicts of interest.

Acknowledgements

The authors would like to thank Caroline Brasch and Anne E. Lambert for their ideas that contributed to the initial iteration of this project. The authors would also like to thank Lisa Velkoff for her

valuable assistance with data collection and the authors' labs for their helpful feedback on drafts of this manuscript.

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