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A randomized controlled trial of a brief self-compassion intervention designed to improve the body image of sexual minority men

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ABSTRACT

Self-compassion involves reflecting on shared human experiences, expressing self-kindness, and responding to feelings in a kind and non-judgmental way. Self-compassion interventions seem to be effective for women's body dissatisfaction, however, such interventions have not been trialed with men, including sexual minority men, who are particularly vulnerable. We conducted a randomized controlled trial of a brief self-compassion intervention designed to reduce body dissatisfaction among sexual minority men (N = 605). We used a 3 (condition: self-compassion, self-esteem, and a benign recollection control) × 5 (time) repeated measures design, whereby participants completed a brief writing task and completed body image measures at multiple time-points. Participants in both the self-compassion and self-esteem conditions showed improved body image and self-compassion following the intervention whereas participants in the control condition did not. Increases in self-compassion mediated body image measures for participants in the self-compassion but not self-esteem or control conditions. Participants in the self-compassion condition also showed increased self-compassion at three-weeks follow-up. While several caveats to our results were noted, our overall interpretation is that self-compassion and self-esteem interventions might be effective for sexual minority men's body image, and more research is necessary. The challenge of inculcating a self-compassionate mindset among men is also discussed.

1. Introduction

1.1. Self-compassion

Self-compassion is an adaptive method of emotion regulation in response to perceived personal failures or inadequacies, distress, and suffering that emphasizes unconditional self-kindness, understanding one's negative experiences shared by others, and unbiased, mindful awareness of the present moment (Neff, 2003). As conceptualized by Neff et al. (2021), a self-compassionate mindset involves both the relative presence of self-kindness, common humanity, and mindfulness (compassionate self-responding) and the relative absence of self-judgment, isolation, and over-identification (uncompassionate self-responding).

Self-kindness refers to whether individuals react in a self-supportive, nurturing, and loving way to suffering. Common humanity refers to whether individuals see suffering as shared with others and understood as part of the human experience. Mindfulness is an individual's ability to remain balanced, aware of their perspective, and self-respond with equanimity. Conversely, self-judgment is an individual's tendency to chastise and critique their perceived inadequacies; isolation refers to how separate and alone individuals feel in their experiences of suffering; and over-identification refers to the extent individuals become preoccupied and attached to their experience and reactions to suffering. As a result, self-compassionate individuals exhibit greater compassionate self-responding and lower uncompassionate self-responding, and vice versa for self-uncompassionate individuals (Neff et al., 2019). Self-compassion-informed interventions thus seek to increase compassionate self-responding, and decrease uncompassionate self-responding.

1.1.1. Self-compassion as an intervention for body image

Self-compassion-based interventions have demonstrated efficacy at reducing body dissatisfaction (Ferrari et al., 2019; Turk and Waller, 2020). Prior intervention studies suggest self-compassion mediates the relationship between affective, cognitive, and behavioral predictors of body dissatisfaction (Linardon, 2021; Turk & Waller, 2020). Experimental data suggest that individuals who undertake self-compassion interventions report less body dissatisfaction, self-objectification, body surveillance and shame, internalized body ideals,

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disordered eating and exercise, upwards appearance comparisons, and increased body appreciation, improved mood and affect, and self-improvement motivation, relative to controls (Barbeau et al., 2021; Moffitt et al., 2018; Rodgers et al., 2018; Seekis et al., 2017; Turk & Waller, 2020; Voelker et al., 2019). Moreover, self-compassion interventions have a medium-to-large effect on disordered eating and a small-to-medium effect on body dissatisfaction (Turk & Waller, 2020).

As noted by Turk & Waller (2020), published self-compassion interventions are methodologically heterogenous. As such, a brief outline of existing self-compassion-based intervention research will help readers situate our study in the literature's broader trends. Briefly, previous example of self-compassion interventions includes one-on-one and group-based self-compassion informed psychotherapies (Turk & Waller, 2020), mobile phone-based training programs (Rodgers et al., 2018), social media-based support groups (Voelker et al., 2019), among others. Importantly, short interventions appear to be equally effective at reducing body dissatisfaction as longer interventions (Toole et al., 2021; Turk & Waller, 2020). These findings suggest that brief self-compassion interventions may provide a non-burdensome, pragmatic method by which to improve individuals' body image.

1.1.2. Brief self-compassion writing tasks as an intervention for body image

Self-compassion writing tasks have emerged as a brief intervention for body dissatisfaction and related disturbances (Ferrari et al., 2019; Turk & Waller, 2020), with recent studies demonstrating a reduction in body dissatisfaction, and an increase in body appreciation and compassionate self-responding (Barbeau et al., 2021; Moffitt et al., 2018; Neff et al., 2021; Seekis et al., 2017; Ziemer et al., 2019). Writing task interventions offer two notable advantages over more complex self-compassion interventions. First, writing task interventions appear to be relatively non-burdensome to participants and do not require lengthy time commitments. For example, Moffitt et al. (2018) found a significant reduction in body dissatisfaction following three minutes of self-compassion-focused writing. Second, writing tasks are presumed to be relatively accessible and intuitive. Participants likely do not require instruction from trained clinicians to understand the requirements of a writing task.

Two gaps in the literature on self-compassion writing tasks informed the rationale for our study: the absence of samples of men and relatively limited post-intervention follow-up data. To date, there has been no randomized controlled trial of a self-compassion writing task for body image with men, including sexual minority men (Turk & Waller, 2020). Sexual minority men, as compared to heterosexual men, are at a higher risk for the development of body dissatisfaction and related disorders (Austen & Griffiths, 2021; Dahlenburg et al., 2020). As such, development and validation of a brief and effective intervention may help address the substantial mental and physical health burden body image poses for sexual minority men. And, to our knowledge, there has been no follow-up data collected to test whether self-compassion writing tasks have an enduring effect on body image. As noted by Barbeau et al. (2021), previous studies assess body image before and immediately after participants complete a self-compassion writing task. It is unknown whether self-compassion writing tasks produce an enduring change in self-compassion and body image beyond the intervention.

1.1.3. Self-compassion versus self-esteem

Self-esteem is frequently used as a comparison group in self-compassion interventions (Barbeau et al., 2021; Moffitt et al., 2018; Seekis et al., 2017). While correlated with self-compassion, self-esteem is a distinct construct that has received some evidence as a protective factor against body dissatisfaction (Barbeau et al., 2021; Wollast et al., 2020). Self-esteem is contingent upon individuals' positive self-appraisal and is typically reliant upon favorable (i.e., downwards) social and appearance comparisons (Vaughan-Johnston et al., 2021). In comparison, self-compassion is thought to induce a detachment from both positive and negative appraisals by encouraging one to see themselves as worthwhile and deserving of self-love and -kindness despite self- or other-perceived 'failures'. Thus, while both constructs aim to improve self-image, self-esteem accomplishes this by driving an individual's positive self-appraisal compared to others while self-compassion asks the individual to focus on their inherent self-worth. Self-esteem is used as a comparison in the present study for two reasons: (i) to determine whether self-compassion and self-esteem, two related but distinct constructs, have different effects on body image among sexual minority men, and (ii) to facilitate comparison with previous work (Turk & Waller, 2020).

1.2. Body image in sexual minority men

Sexual minority men (including gay, bisexual, or otherwise queer men) report greater body dissatisfaction than heterosexual men (Brewster et al., 2017; Dahlenburg et al., 2020). A meta-analysis by Dahlenburg et al. (2020) found gay men experience significantly less global appearance satisfaction, greater weight and muscularity dissatisfaction, and were more affected by idealized appearance standards. Gay and bisexual men experience greater weight-based discrimination, internalized weight bias (shame regarding one's weight), and overall lower wellbeing than heterosexual men (Austen et al., 2020). Finally, sexual minority men typically experience greater social pressure to conform to idealized appearance standards and are more likely to have their appearance discussed by other sexual minority men which predicts greater internalization of athletic appearance standards, muscularity dissatisfaction, and low quality of life (Matera et al., 2019).

Objectification theory (Fredrickson & Roberts, 1997) and the tripartite influence model (Thompson et al., 1999) have been used to explain the greater body dissatisfaction seen in sexual minority men (Brewster et al., 2017; Maher et al., 2021). Objectification theory suggests that experiences of sexualization lead individuals to internalize others' viewpoints of their bodies, with body satisfaction contingent upon self-perceived sexual attractiveness (Fredrickson & Roberts, 1997). The tripartite influence model suggests media, peers, and parents as sources of body image pressures which precipitate the internalization of unhelpful body ideals and comparison with individuals perceived to have 'better appearances' (i.e., upwards appearance comparisons). Sexual minority men are more likely to be sexualized by other men, predicting self-objectification and thus body surveillance, shame, and dissatisfaction (Brewster et al., 2017; Wollast et al., 2020). Peer and media influences play a significant role in sexual minority men's body image with social media, dating applications (such as Grindr), and gay pornography featuring professional (i.e., idealized) actors exposing them to highly idealized and sexualized male bodies (Griffiths et al., 2018; Griffiths et al., 2019; Matera et al., 2019). Consequently, sexual minority men are at greater risk of internalization of idealized appearance standards, upwards appearance comparisons, and self-objectification – all of which lead to greater body dissatisfaction (Maher et al., 2021; Matera et al., 2019; Yee et al., 2020).

1.3. Interventions for sexual minority men's body image

There is scant intervention research on sexual minority men's body image. To our knowledge, only two papers investigate such interventions: Brown & Keel (2015) and Feldman et al. (2011). Brown & Keel (2015) evaluated a two-session dissonance-based eating disorder prevention program on a sample of 87 sexual minority men (n = 47 were assigned to the intervention, and n = 40 were assigned

to a waitlist control). The intervention aimed to challenge participants' harmful idealized appearance standards, with results indicating it was an effective preventative intervention for eating disorders in sexual minority men. Feldman et al. (2011) described a 14-session group-therapy intervention for improving the nutrition and body image in sexual minority men living with HIV/AIDS. To our knowledge, however, the intervention has not been empirically evaluated. Thus, the present study is well placed to contribute much needed intervention research on sexual minority men's body image and extend the literature of brief self-compassion writing tasks.

The literature reviewed above suggests that self-compassion may be an effective intervention for sexual minority men. Considering the effectiveness of self-compassion as an intervention for women's body image concerns, and that sexual minority men similarly experience pronounced body image pressures and body dissatisfaction, self-compassion may be well placed to bring about more positive body image outcomes for sexual minority men.

1.4. Study aim and hypothesis

Self-compassion interventions may be useful tools for reducing body dissatisfaction among sexual minority men. Therefore, we aimed to evaluate the efficacy of a brief self-compassion writing task in a sample of sexual minority men. We hypothesized that participants in the self-compassion condition would report a greater decrease in body dissatisfaction and increase in body appreciation and self-compassion than participants in both the self-esteem and control conditions. Further, we predicted that participants in the self-compassion group would experience sustained improvements to both body image and self-compassion at both the one-week and three-week follow-ups.

2. Method

2.1. Open science commitment and ethics approval

The study was preregistered with the Open Science Framework and all data, code, and materials are publicly available at: https://osf.io/hqb4d/. Ethics approval was granted by the University of Melbourne's Office of Research Ethics and Integrity (ethics ID: 21772).

2.2. Sample

2.2.1. Statistical power

An a priori power analysis was conducted using the 'powerlmm' package for RStudio version 1.4.1106 (Magnusson, 2018). Sample size was estimated for a three-level linear mixed-effects model (level-one = timepoint, level-two = person, level-three = sample source).[1] To achieve 80 % power to detect a medium interaction effect (Cohen's d = 0.5; (Cohen, 1988) between intervention group (with two levels, treatment and control) and time for an alpha level of.05, a total sample size of 324 was required. The estimated effect size was based on findings from a recent meta-analysis (Turk & Waller, 2020). This power estimate assumed an unbalanced design (i.e., uneven *n*s between conditions) and 20 % attrition in the treatment group and 30 % attrition in the control group between baseline and 21-days follow-up. The control condition was assumed to have greater attrition rates as receiving no intervention following the body dissatisfaction induction (explained later in the methods) may decrease motivation to continue with the study. The reason that we have only specified a treatment and control group to calculate power was due to a limitation of the R package we used: powerlmm only allows for two levels of treatment conditions. Whilst not an exact match, we believe our two-level powerlmm power analysis is proximal enough to still be useful.

2.2.2. Participants

Participants were recruited via Prolific and were eligible if they were cisgender or transgender sexual minority men, fluent in English, and residing in Australia, the United Kingdom, or the United States. The final sample comprised 605 participants at baseline, with 499 participants returning at one-week and 423 at three-weeks follow-up. Participants were predominately White (76.2 %), cisgender men (87.9 %) residing in either the United Kingdom (UK; 49.4 %) or United States (US; 47.3 %) who identified as either gay (46.3 %) or bisexual (39.3 %). Baseline characteristics and descriptive statistics by experimental condition with inferential tests of between-condition differences are presented in Table 1. Despite prescreening, a small number (n = 33) of participants reported their sexuality as straight/heterosexual (5.5 %). These participants were retained as their responses varied between sexual identity, history, and attraction questions indicating that while they did not identify as gay, bisexual, or queer, they had experienced same-gender attraction or had previously had sex with someone of the same gender (Mustanski et al., 2014).

2.3. Procedure

Fig. 1 provides an outline of our study procedure including the sequence of experimental material presented to participants. Participant flow through the study including randomization and attrition is presented in Fig. 2. The design of the study was a 3 (intervention condition: control, self-esteem, and self-compassion) × 5 (timepoints: baseline, timepoint 2, timepoint 3, timepoint 4, and timepoint 5) repeated measures parallel randomized controlled trial completed via three online Qualtrics surveys. Participants were paid £ 1.8 for the first part of the study (baseline to timepoint 3), and £ 0.8 for parts 2 and 3 (timepoints 4 and 5, respectively). Participants took a median of 19 min to complete the first part and 3 min for the second and third parts of the study. Recruitment began on August 6th, 2021, with data collection ceasing on August 31st, 2021.

2.3.1. Baseline

Participants were presented with a plain language statement and consent form prior to baseline demographics, anthropometrics, and outcome measures (see measures below). The presentation order of demographic, anthropometric, and outcome measures was randomized. Outcome measure item order was also randomized.

2.3.2. Body dissatisfaction induction

Following baseline, all participants underwent a body dissatisfaction induction. The goal of the induction was two-fold: (i) to potentiate body dissatisfaction, and (ii) ensure the relevance of the intervention materials. The procedure was based on previous similar experimental manipulations used with samples of women (Atkinson & Wade, 2012; Moffitt et al., 2018; Wade et al., 2009) and involved participants viewing magazine covers from DNA, a popular Australian magazine marketed towards sexual minority men. The covers depicted muscular, lean, and conventionally attractive men in sexualized clothing and positions. The 12 most recent magazine covers were selected (i.e., covers published on the DNA website between May 2020 and May 2021). The models depicted were predominately White (83.3%) with the remainder being models of color (16.6 %). Participants viewed a random subset of four magazine covers from

[1] The study was originally planned to recruit samples from three sources: Prolific, a first-year undergraduate sample via the university's research experience program, and a community sample. Recruitment was restricted to Prolific due to time concerns to reduce study complexity and because this platform provided a sufficient sample size.

Table 1
Baseline characteristics of participants by experimental condition with inferential tests of between-group differences.

		Condition			*F*-test (*df1*, *df2*) or χ^2 (*df*, *N*)	*p*
		Control *n* = 220 *M*(*SD*)	SE *n* = 197 *M*(*SD*)	SC *n* = 188 *M*(*SD*)		
SSCS-L		3.1 (0.7)	3.2 (0.7)	3.1 (0.8)	0.34 (2, 602)	.713
	SK	3.0 (1.0)	3.1 (1.0)	3.0 (1.0)	0.80 (2, 602)	.448
	CH	3.5 (0.8)	3.5 (0.7)	3.6 (0.8)	0.62 (2, 602)	.538
	M	3.3 (0.9)	3.4 (0.8)	3.4 (0.9)	0.21 (2, 602)	.814
	SJ	2.8 (1.0)	2.9 (1.0)	2.8 (1.0)	0.40 (2, 602)	.678
	ISO	3.1 (1.1)	3.2 (1.2)	3.1 (1.2)	0.33 (2, 602)	.721
	OI	3.0 (1.0)	3.1 (0.9)	3.0 (1.0)	0.24 (2, 602)	.784
SMBAS-R		3.1 (0.7)	3.0 (0.8)	3.0 (0.7)	0.49 (2, 601)	.610
	MUS	3.4 (0.8)	3.4 (0.9)	3.6 (0.8)	2.58 (2, 602)	.077
	BF	3.4 (1.1)	3.2 (1.2)	3.2 (1.1)	2.35 (2, 601)	.097
	HT	2.4 (1.0)	2.5 (1.1)	2.4 (1.0)	0.53 (2, 602)	.638
SBAS-2		2.9 (1.0)	3.1 (0.9)	3.0 (1.0)	1.31 (2, 602)	.271
Age		30.9 (12.6)	31.6 (11.7)	30.9 (10.4)	0.86 (2, 599)	.423
SES		5.4 (6.6)	5.2 (1.8)	5.0 (1.7)	0.64 (2, 602)	.530
BMI		27.5 (8.3)	26.4 (6.8)	26.4 (7.3)	1.38 (2, 574)	.252
Gender		*n* (%)	*n* (%)	*n* (%)	7.88 (8, 605)	.445
	Cisgender	187 (85 %)	173 (87.8 %)	172 (91.5 %)		
	Non-binary	4 (1.8 %)	3 (1.5 %)	1 (0.5 %)		
	Transgender	23 (10.5 %)	19 (9.6 %)	14 (7.4 %)		
	Non-binary and transgender	4 (1.8 %)	2 (1.0 %)	1 (0.5 %)		
Country					4.11 (4, 605)	.392
	Australia	5 (2.3 %)	6 (3.0 %)	9 (4.8 %)		
	UK	103 (46.8 %)	105 (53.5 %)	91 (48.4 %)		
	USA	112 (50.9 %)	86 (43.7 %)	88 (46.8 %)		
Race					4.82 (12, 605)	.963
	White	165 (75.0 %)	157 (79.7 %)	139 (73.9 %)		
	Black	9 (4.1 %)	10 (5.1 %)	9 (4.8 %)		
	Asian	19 (8.6 %)	12 (6.1 %)	13 (6.9 %)		
	Latino	4 (1.8 %)	3 (1.5 %)	6 (3.2 %)		
	Mixed Race	16 (7.3 %)	10 (5.1 %)	15 (8.0 %)		
	Other	5 (2.3 %)	4 (2.0 %)	4 (2.1 %)		
	Prefer not to say	2 (0.9 %)	1 (0.5 %)	2 (2.1 %)		
Sexual identity					14.03 (12, 605)	.299
	Gay	92 (41.8 %)	87 (44.2 %)	101 (53.7 %)		
	Bisexual	96 (43.6 %)	83 (42.1 %)	59 (31.4 %)		
	Pansexual	12 (5.5 %)	9 (4.6 %)	10 (5.3 %)		
	Questioning	2 (0.9 %)	4 (2.0 %)	3 (5.3 %)		
	Straight	13 (5.9 %)	7 (3.6 %)	13 (6.9 %)		
	Other	3 (1.4 %)	3 (1.5 %)	1 (0.5 %)		
	Prefer not to say	2 (0.9 %)	4 (2.0 %)	1 (0.5 %)		
Sexual attraction					18.08 (14, 605)	.203
	Only males	72 (32.7 %)	61 (31.0 %)	72 (38.3 %)		
	Mostly males	32 (14.5 %)	41 (20.8 %)	43 (22.3 %)		
	Equally	36 (16.4 %)	31 (15.7 %)	24 (12.8 %)		
	Mostly females	67 (30.5 %)	47 (24.4 %)	38 (20.2 %)		
	Only females	7 (3.2 %)	11 (5.6 %)	10 (5.3 %)		
	Non-sexually attracted	0 (0.0 %)	2 (1.0 %)	1 (0.5 %)		
	Other	3 (1.4 %)	1 (0.5 %)	0 (0.0 %)		
	Prefer not to say	3 (1.4 %)	2 (1.0 %)	1 (0.5 %)		
Sexual history					14.70 (14, 605)	.399
	Only with males	55 (25.0 %)	59 (29.9 %)	57 (30.3 %)		
	More often with males	46 (20.9 %)	38 (19.3 %)	54 (28.2 %)		
	Equally often with males and females	20 (9.1 %)	18 (9.1 %)	12 (6.4 %)		
	More often with females	44 (20.0 %)	38 (19.3 %)	21 (11.2 %)		
	Only with females	33 (15.0 %)	26 (13.2 %)	28 (14.9 %)		
	No sexual experiences	18 (8.2 %)	13 (6.6 %)	13 (6.9 %)		
	Other	1 (0.5 %)	3 (1.5 %)	3 (1.6 %)		
	Prefer not to say	3 (1.4 %)	2 (1.0 %)	1 (0.5 %)		

Note. SE = self-esteem; SC = self-compassion; SSCS-L = State Self-compassion Scale Long Form, SK = Self-Kindness, CH = Common Humanity, M = Mindfulness, SJ = Self-Judgment, ISO = Isolation, OI = Over-Identification;, SMBAS-R = State Male Body Attitudes Scale Revised, MUS = Muscularity, BF = Body Fat, HT = Height; SBAS-2 = State Body Appreciation Scale – 2; *M* = mean and *SD* = standard deviation; df1 = between-group degrees of freedom, df2 = within-groups degrees of freedom, *n* = within-condition sample size; df = group degrees of freedom, *N* = total sample, *n* = within-condition sample size. Percentages denote within-condition proportions.

the total pool of 12. Participants were instructed to look at each magazine cover for 30 s and then respond to two items, "*This man is more attractive than me*," and "*I wish I looked more like this man.*" Participants rated items using a 5-point Likert scale where 1 is "strongly disagree" and 5 is "strongly agree". Both items were presented to prompt participants to engage in upwards appearance comparisons. As with previous work (e.g., Moffitt et al., 2018), we did not use data collected via these items in our analyses: these items were to prompt participants to compare themselves to the men represented. However, we computed average appearance comparison scores and provide descriptive data for these in the Supplementary materials. Following completion of the body dissatisfaction induction, participants were asked to complete the three outcome measures a second time.

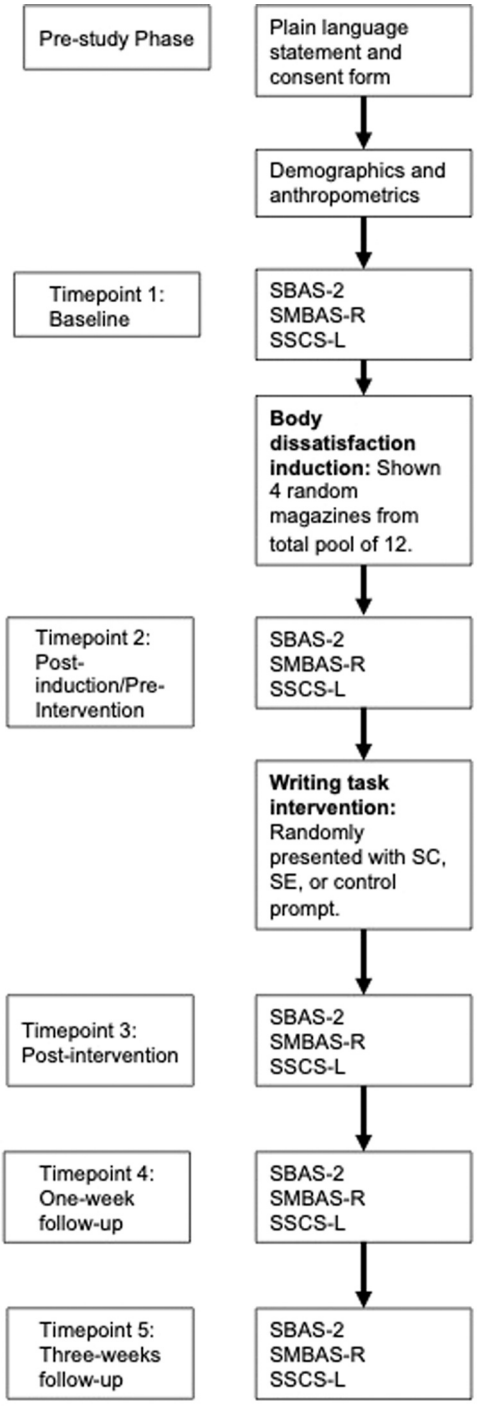

Fig. 1. Study Design Flowchart Indicating Experimental Sequence and Collection of Anthropometrics, Demographics, and Repeated Measures. *Note.* SBAS-2 = State Body Appreciation Scale – 2; SMBAS-R = State Male Body Attitudes Scale Revised; SSCS-L = State Self-compassion Scale Long Form; SC = self-compassion; SE = self-esteem.

We designed our own body dissatisfaction induction rather than reproduce published inductions. For example, Seekis et al. (2017) had participants imagine they were viewing unflattering pictures of themselves, while Barbeau et al. (2021) had participants recall an event in the past 24 h when they felt self-conscious. Our induction accounts for two important sources of variance/noise: inter-stimulus variation (e.g., if magazine covers are randomized a significant effect is attributable to the task rather than a unique feature of any specific cover shown) and inter-participant variation (e.g., whether participants differ in their ability to imagine themselves in hypothetical scenarios or recall events in sufficient detail).

2.3.3. Writing task intervention

Following the body dissatisfaction induction and timepoint 2 measures, participants were randomized to either a self-compassion, self-esteem, or control condition using the Qualtrics randomization function. In the self-compassion and self-esteem conditions, participants were first prompted to recall how the body dissatisfaction induction procedure made them feel about their bodies. Participants in the control condition were asked to recall what they had done since waking up. Following this, participants were instructed to write a paragraph between 100 and 200 words in length based on condition-specific prompts. An exemplar participant response is provided in the Supplementary material for each condition.

In the self-compassion condition, participants were prompted with the following: "1. *How common do you think your feelings about your body are among other men?*; 2. *What would you say to yourself in order to express self-acceptance, kindness, understanding, and concern regarding your appearance? Try talking to yourself as if you would talk to a friend experiencing similar feelings about their body*; 3. *Describe the feelings you're experiencing about your body in an objective way, trying not to downplay or exaggerate how you feel. Keep in mind that thoughts and feelings are temporary – they can come and go*". Prompts were intended to reflect common humanity, self-kindness, and mindfulness, respectively, and were based on similar prompts used by Barbeau et al. (2021) and Neff et al. (2021).

In the self-esteem condition, participants were given the following three prompts: "1. *What aspects of your appearance do you like and why? This might include aspects of your appearance you think are better than someone else's, that make you stand out, or make you feel proud of your body*; 2. *What are some aspects of your appearance that you've received compliments on from others?*; 3. *Which aspects of your appearance make you feel worthwhile, confident, and empowered as a person*?". The self-esteem prompts were based on work by Barbeau et al. (2021), Moffit et al. (2018), and Seekis et al. (2017) and were designed to stimulate positive self-appraisal, downwards appearance comparisons, and feelings of self-worth, respectively.

Finally, participants in the control condition were prompted to recall any activities they had undertaken that day: "1. *What activities did you do this morning?*; 2. *What kinds of activities do you plan to do after completing this part of our study?*; and 3. *So far today you might have had breakfast, commuted to work, university/college, or met up with family or friends. What kinds of activities will you do tomorrow?*".

After completion of the writing task, participants were presented with outcome measures for a third time followed by a partial debriefing statement.

2.3.4. Follow-ups

Participants were contacted one week and three weeks following completion of the first part of the study (baseline to timepoint 3). A plain language statement and consent form were presented at each follow-up prior to participants completing outcome measures. Participants were given partial debriefing following the first follow-up, and a complete debriefing of the methods and research rationale after the second follow-up.

2.3.5. Piloting of materials

The full study procedure (including repeated measures) was piloted on four occasions to ensure appropriateness of the body dissatisfaction induction and intervention writing prompts. Sample sizes for the pilots ranged from 50 to 51 and were recruited via Prolific. Data from pilot 1 were mistakenly collected from countries outside the scope of ethics approval. In pilot 2, data collection was restricted to approved countries. A comprehension check was performed on prompt responses based on preset guidelines (see

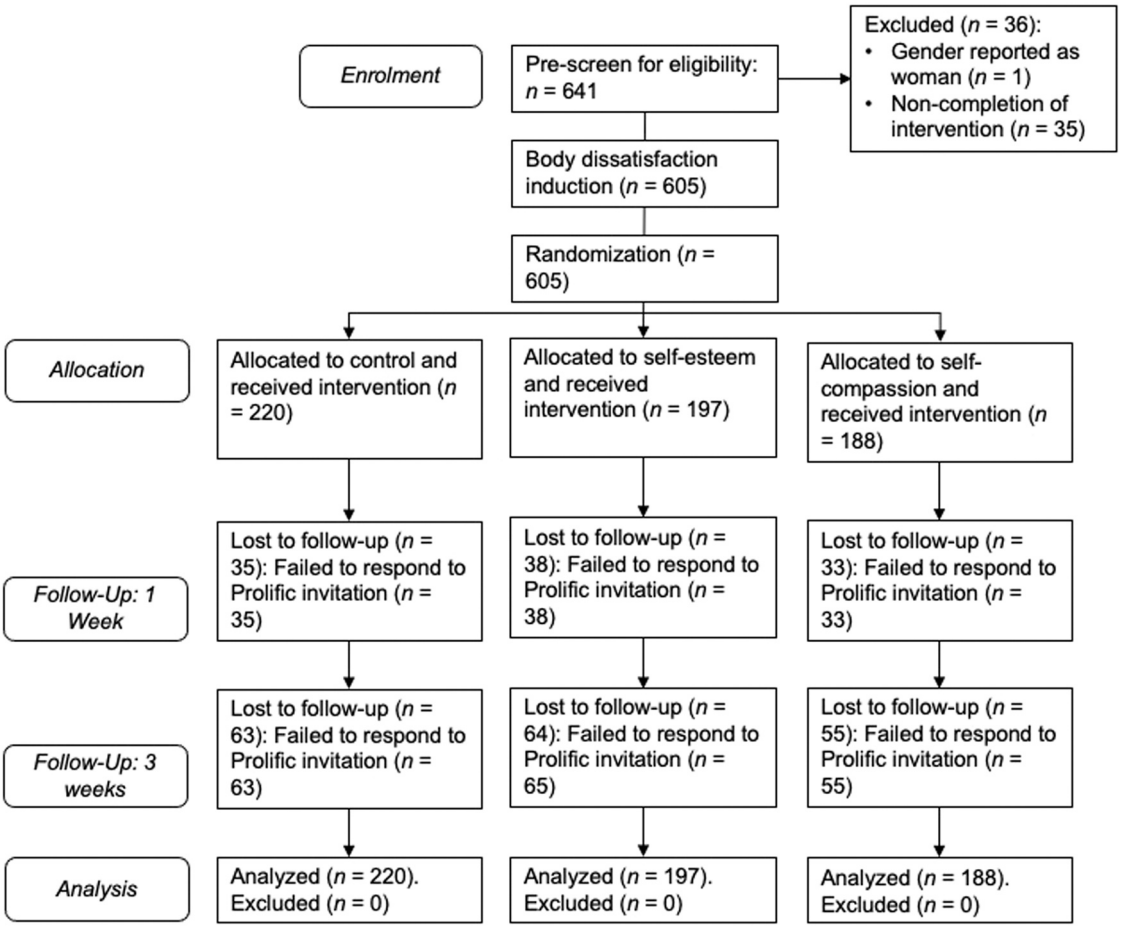

Fig. 2. CONSORT participant flow diagram including randomization, attrition, and final within-condition sample sizes.

Supplementary materials) which showed self-compassion and self-esteem responses were generally negatively valenced and those that were positively valenced were not sufficiently distinguishable between conditions (e.g., responses from both intervention conditions reflected contingent self-esteem). The prompts were amended for each condition and repiloted in pilot 3 with ethics approval. A minor amendment was made to the second self-compassion prompt as participants responses tended to reflect self-kindness focused on *others* rather than self-kindness focused on the self. Finally, the materials were repiloted in pilot 4, and were found to elicit theoretically and empirically consistent responses. Data from pilots 1, 2, and 3 were excluded from the final analyses. Pilot 4 data were included in the final sample and analyses.

2.4. Measures

2.4.1. Demographics and anthropometrics

Participants were asked about their age, gender, country of residence, and race and ethnicity. The latter question was presented based on the participant's country. For example, participants in Australia were presented with the Australian Standard Classification of Cultural and Ethnic Groups (Australian Bureau of Statistics, 2019). Participants indicated their subjective socioeconomic status (SES) using the SES ladder, a 10-point scale with 1 representing the lowest possible and 10 representing the highest possible SES (Adler et al., 2000). Sexuality was measured with three Kinsey-like scales with participants indicating their sexual identity (from homosexual to heterosexual), past sexual behavior (from exclusively with females to exclusively with males), and sexual attraction (from exclusively attracted to females to exclusively attracted to males; see Mustanski et al., 2014). Finally, participants' BMI were calculated via self-reported height and weight.

2.4.2. Outcome measures

Outcome measure reliability is reported as McDonald's omega (ω) with a bootstrapped 95 % confidence interval (CI) and was calculated in SPSS version 28 using the omega macro provided by Hayes and Coutts (2021) using the Hancock and An (2020) method. Total and subscale outcome variables were computed as the mean of all relevant items/factors.

2.4.2.1. Body appreciation. Body appreciation was measured using the state version of the revised Body Appreciation Scale (SBAS-2; (Homan, 2016), a state version of the previous revised Body Appreciation Scale-2 (Tylka & Wood-Barclow, 2015). The SBAS-2 comprises 10 items measuring participants' positive body image. Sample items are "Right now, I respect my body" and "At this moment, I feel love for my body". Participants were instructed "for each of the items below, choose the option that best describes how [they] feel right now, at this very moment", with items rated on a 5-point Likert scale where 1 is "strongly disagree" and 5 is "strongly agree". Reliability was found to be excellent, ranging between $\omega = .95$ (95 % CI [.95,.96]) and .97 (95 % CI [.97,.97]).

2.4.2.2. Body dissatisfaction. An existing trait measure of male body dissatisfaction, the Revised Male Body Attitudes Scale (MBAS-R; (Ryan et al., 2011), was adapted for use as a state measure of body dissatisfaction (hereafter, the SMBAS-R). The SMBAS-R is a higher-

order measure comprised of 15 items assessing a second-order factor Body Dissatisfaction (mean of mean scale scores) and three first-order factors Muscularity (seven items), Body Fat (five items), and Height dissatisfaction (three items). Responses were rated on a 5-point Likert scale where 1 is “strong disagree” and 5 is “strongly agree”. Participants were instructed “for each of the items below, choose the option that best describes how [they] feel right now, at this very moment”. Example items include “My chest should be more muscular” (Muscularity), “I feel excessively fat” (Body Fat), and “I wish I was taller” (Height). Reliability was good for Height, ranging $\omega = 0.84$ (95 % CI [.81,.87]) to $\omega = 0.89$ (95 % CI [.87,.90]), between good and excellent for Muscularity, $\omega = 0.89$ (95 % CI [.87,.90]), and excellent for Body Fat, $\omega = 0.91$ (95 % CI [.90,.92]) to $\omega = 0.93$ (95 % CI [.90,.92]). As the SMBAS-R was modeled as a higher-order factor model, the reliability of the total scale is unable to be estimated using straightforward coefficients such as ω. However, confirmatory factor analysis (performed in the 'lavaan' package for RStudio; (Rosseel, 2012) demonstrated consistent evidence that the high-order factor structure represented a good fit to the data (see Supplementary material). As a result, the total scale score is argued to be a reliable measure of men’s global state body dissatisfaction.

2.4.2.3. Self-compassion. Self-compassion was measured using the State Self-compassion Scale – Long form (SSCS-L; (Neff et al., 2021). The SSCS-L is a bi-factor measure of global Self-compassion and six 3 item subscales measuring Self-kindness, Common Humanity, Mindfulness, Self-judgment, Isolation, and Over-identification. All items on Self-judgment, Isolation, and Over-identification were reverse scored (Neff et al., 2021). Thus, higher global Self-compassion and Self-kindness, Common Humanity, and Mindfulness subscale scores indicated greater compassionate self-responding while higher Self-judgment, Isolation, and Over-identification subscales score indicated lower uncompassionate self-responding. Participants were instructed to “think about [their] body for a moment. In particular, think about the size and shape of [their] body. Now, with these thoughts in mind, indicate how well each statement applies to how [they are] are currently feeling toward [themselves]”. These instructions were adapted to ensure responses were salient to participants' body image. We used a 5-point Likert-type response scale where 1 is “Not at all true for me” and 5 is “Very true for me”. Sample items include, “I'm giving myself the caring and tenderness I need” (Self-kindness), “I see my difficulties as part of life that everyone goes through” (Common Humanity), “I'm keeping my emotions in balanced perspective” (Mindfulness), “I'm being pretty tough on myself” (Self-judgment), “I'm feeling all alone right now” (Isolation), and “I'm getting carried away with my feelings” (Over-identification). Reliability was excellent for the total scale, $\omega = 0.92$, (95 % CI [.91,.93]) to $\omega = 0.93$ (95 % CI [.91,.94]), good-to-excellent for Self-kindness, $\omega = 0.88$ (95 % CI [.86,.90]) to $\omega = 0.92$ (95 % CI [.91,.94]) and Mindfulness, $\omega = 0.84$ (95 % CI [.80,.87]) to $\omega = 0.90$ (95 % CI [.88,.82]), good for Self-judgment, $\omega = 0.81$ (95 % CI [.77,.83]) to $\omega = 0.87$ (95 % CI [.85,.89]) and Isolation, $\omega = 0.81$ (95 % CI [.77,.83]) to $\omega = 0.87$ (95 % CI [.85,.89]), and acceptable-to-good for Common Humanity, $\omega = 0.70$ (95 % CI [.65,.75]) to $\omega = 0.89$ (95 % CI [.87,.91]) and Over-identification, $\omega = 0.75$ (95 % CI [.71,.79]) to $\omega = 0.81$ (95 % CI [.78,.84]).

Two items from the original SSCS-L were adapted for the present study: “I’m taking a balanced view of this painful situation” and “I’m blowing this painful incident out of proportion” were amended to “I'm taking a balanced view of my negative feelings” and “I'm blowing these negative feelings out of proportion”, respectively. These amendments sought to reduce the risk of participant confusion and to ensure items were context-relevant to the present study.

2.5. Data analysis

Analyses were run in SPSS version 28 and RStudio version 1.4.1106. Assumption checking and preliminary analyses were performed in SPSS and RStudio, while linear mixed-effects modeling was performed in RStudio using the ‘lme4’ (Bates et al., 2016) package. The analysis of variance (ANOVA) function from the ‘stats’ package (R Core Team, 2013) and the emmip function from the ‘emmeans’ package (Lenth et al., 2018) were used to summarize findings from the linear mixed-effects models and extract within-condition pairwise comparisons between timepoints. Results are reported based on ANOVA output.

which take into account the nesting of multiple responses within individuals. Bonferroni-corrected multiple comparisons were used to control our Type 1 error rate. Summaries of the linear mixed-effects models are provided in the Supplementary materials.

2.5.1. Assumption checks

Assumption checks were performed for univariate normality, homoscedasticity, multicollinearity, data missingness, and intraclass correlations (ICC).

2.5.2. Main analyses

Our study involved two distinct phases: (1) the body dissatisfaction induction, followed by (2) the body image interventions. We analyzed data related to the body dissatisfaction induction and intervention plus follow-ups separately for two reasons. First, as all participants completed the induction prior to randomization to intervention condition, a main effect of time but not group was expected. Thus, analyzing changes in outcome measures pre- and post-induction was a parsimonious way to check the manipulation’s efficacy. Second, since we were primarily interested in the effectiveness of the interventions, we focus on comparing responses immediately pre-intervention (Time 2) and responses post-intervention (Times 3, 4, and 5). In this context, including pre-induction baseline data would have needlessly complicated our models and reduced our statistical power. We therefore conducted our analyses in two separate stages.

2.5.2.1. Stage 1: Body dissatisfaction induction. The efficacy of the body dissatisfaction induction procedure on all outcome measures (including subscales) was assessed using repeated measures ANOVA[2] between baseline and timepoint 2.

2.5.2.2. Stage 2: Intervention and follow-ups. Intervention efficacy was analyzed using two-level linear mixed-effects models with random intercepts and slopes where level-one was ‘timepoint’ (timepoint 2, timepoint 3, timepoint 4, and timepoint 5) and level-two was ‘person’. Dependent variables were total scores for the SMBAS-R, SBAS-2, and SSCS-L, and subscale scores for the SMBAS-R and SSCS-L.

We used linear mixed-effects models to analyze changes in body image and self-compassion to account for the dependency inherent in repeated measures designs, and because they provide accurate estimates of treatment effects and are robust to missing data (Snijders & Bosker, 2012; Twisk & de Vente, 2008).

[2] We also checked the results of the body dissatisfaction induction using linear mixed-effects models. As the results of these models agreed with the results from the simpler ANOVAs, only the latter are reported here.

3. Results

3.1. Assumption checks

All assumption checks indicated the data were suitable for the planned analyses (see Supplementary materials). We found no evidence of univariate non-normality, heteroscedasticity, or multicollinearity (see Supplementary material). A Little's test found data were missing completely at random, χ^2 (320) = 237.64, p = .999. Linear mixed-effects models were deemed appropriate as ICCs were.90,.86, and.85 for body dissatisfaction, body appreciation and self-compassion, respectively. These ICCs suggest, however, that our outcomes measures are relatively stable at level two (between-persons) level, at least over a three-week time period.

3.2. Main analyses

3.2.1. Stage 1: Body dissatisfaction induction

The repeated measures ANOVAs showed no significant main effect by condition or interaction effect between condition and time between baseline and timepoint 2 any of our outcomes measures (ps > 0.05). A significant main effect of time between baseline and timepoint 2 was found for body dissatisfaction, $F(1, 601) = 30.21$, $p < .001$ partial $\eta^2 = .05$, body appreciation, $F(1, 601) = 24.77$, $p < .001$ partial $\eta^2 = .04$, and self-compassion, $F(1, 601) = 13.00$, $p < .001$ partial $\eta^2 = .02$. Thus, the body dissatisfaction induction caused an increase in state body dissatisfaction, and decrease in state body appreciation and state self-compassion, with a small-to-medium effect sizes for each (Cohen, 1988).

Similarly, there were no significant main effect of condition and interaction effect of condition by time for SMBAS-R and SSCS-L scores (ps > 0.05). For brevity, we only report significant main effects of time for subscale scores here. For SMBAS-R subscales, the body dissatisfaction induction caused a medium increase in muscularity dissatisfaction, $F(1, 601) = 42.68$, $p < .001$, partial $\eta^2 = .07$, and a small-to-medium increase in body fat dissatisfaction, $F(1, 601) = 15.86$, $p < .001$, partial $\eta^2 = .03$. For SSCS-L subscales, the body dissatisfaction induction significantly decreased self-kindness, $F(1, 601) = 13.40$, $p < .001$, partial $\eta^2 = .02$, and mindfulness, $F(1, 601) = 15.24$, $p < .001$, partial $\eta^2 = .03$, with a small-to-medium effect for both.

3.2.2. Stage 2: Writing task intervention and follow-ups

3.2.2.1. Body dissatisfaction. Results for body dissatisfaction are shown in Fig. 3. While there was a significant main effect for time ($p < .001$), whereby body dissatisfaction decreased over time, there was no significant main effect of condition ($p = .259$) or the interaction between time and condition ($p = .124$; see Table 2). We conducted pairwise comparisons to assess changes in our outcome measures within conditions, over time. For participants in the self-compassion and self-esteem conditions, there was a significant decrease in body dissatisfaction following the intervention. Among participants in the control condition, body dissatisfaction remained significantly higher post-intervention, appearing to return to baseline levels at one-week follow-up. No further significant within-conditions effects were found.

3.2.2.2. Body appreciation. Results for body appreciation are shown in Fig. 3. There was a significant main effect of time ($p < .001$) whereby body appreciation increased over time, but no significant main effect of condition ($p = .191$) or interaction between condition and time ($p = .054$; see Table 3). Pairwise comparisons revealed significant within-condition effects for the self-compassion and self-esteem conditions following the intervention, with body appreciation returning to baseline. For participants in the control condition, there was no significant change in body appreciation from timepoint 2 to timepoint 3 (i.e., following the intervention), with body appreciation appearing to return to baseline levels at one-week follow-up (between timepoints 3 and 4). No further significant within-condition effects were found.

3.2.2.3. Self-compassion. Results for self-compassion are shown in Fig. 3. Although there was no significant main effect for condition ($p = .542$), a significant effect was found for the main effect of time ($p < .001$) and the interaction between time and condition ($p = .026$) whereby self-compassion increased over time for participants in the self-compassion and self-esteem conditions (see Table 4). Pairwise comparisons revealed self-compassion returned to baseline for participants in the self-compassion and self-esteem conditions following the intervention, but not for participants in the control condition. There was a significant increase in self-compassion for participants in the self-compassion condition at three weeks (between timepoints 4 and 5) but not for participants in the self-esteem or control conditions.

3.3. Follow-up analyses

The following analyses were exploratory in nature and were not part of the pre-registered analysis plans. We conducted them to better understand the patterns in the data and the mechanisms by which the interventions operated.

3.3.1. Linear mixed-effects models for subscale variables

To assess the effect of the interventions on a more granular level, we used linear mixed-effects models to investigate intervention effects on each subfactor of body dissatisfaction and self-compassion (with model summaries reported in the Supplementary materials). For body dissatisfaction, muscularity dissatisfaction decreased immediately following the intervention for participants in the self-compassion, $\beta = -0.11$, $t(1534) = -3.09$, $p = .006$, and self-esteem conditions, $\beta = -0.14$, $t(1535) = -4.01$, $p < .001$, and at one-week follow-up for participants in the control condition, $\beta = -0.09$, $t(1541) = -2.41$, $p = .048$. Body fat dissatisfaction decreased for participants in the self-compassion condition immediately following the intervention, $\beta = -0.09$, $t(1534) = -3.15$, $p = .005$, but not for participants in the self-esteem condition, $\beta = -0.05$, $t(1535) = -1.81$, $p = .212$. Body fat dissatisfaction decreased at one-week follow-up for participants in the control condition, $\beta = -0.08$, $t(1538) = -2.83$, $p = .014$. No significant effects were found for height dissatisfaction.

For self-compassion subscales, common humanity decreased for participants in the self-esteem condition at three-weeks follow-up relative to timepoint 4, $\beta = -0.17$, $t(1556) = -2.62$, $p = .027$. Participants in the self-compassion condition showed an increase in mindfulness and decrease in self-judgment, $\beta = 0.13$, $t(1532) = 2.58$, $p = .029$ following the intervention, and isolation at three-weeks follow-up, $\beta = .15$, $t(1546) = 2.81$, $p = .015$, while participants in the control and self-esteem conditions did not.

3.3.2. Repeated measures mediation analyses

To determine whether the interventions were associated with improved body image as a function of increased self-compassion, we ran two mediation analyses in SPSS using the PROCESS macro version 4.0 (see Fig. 4); (Hayes, 2018). First, we tested the indirect effect of condition on body dissatisfaction via state self-compassion. We then tested a second model assessing body appreciation as the outcome. Since condition has three levels, we treated the control condition as the reference category, whereby we tested the effects of the self-compassion intervention relative to control, and the effects of the self-esteem condition relative to control. As per the recommendations made in Hayes (2018), timepoint 2 measures of our mediating and outcome measures were included as lagged covariates (see Fig. 4). Summaries of the process analysis models are

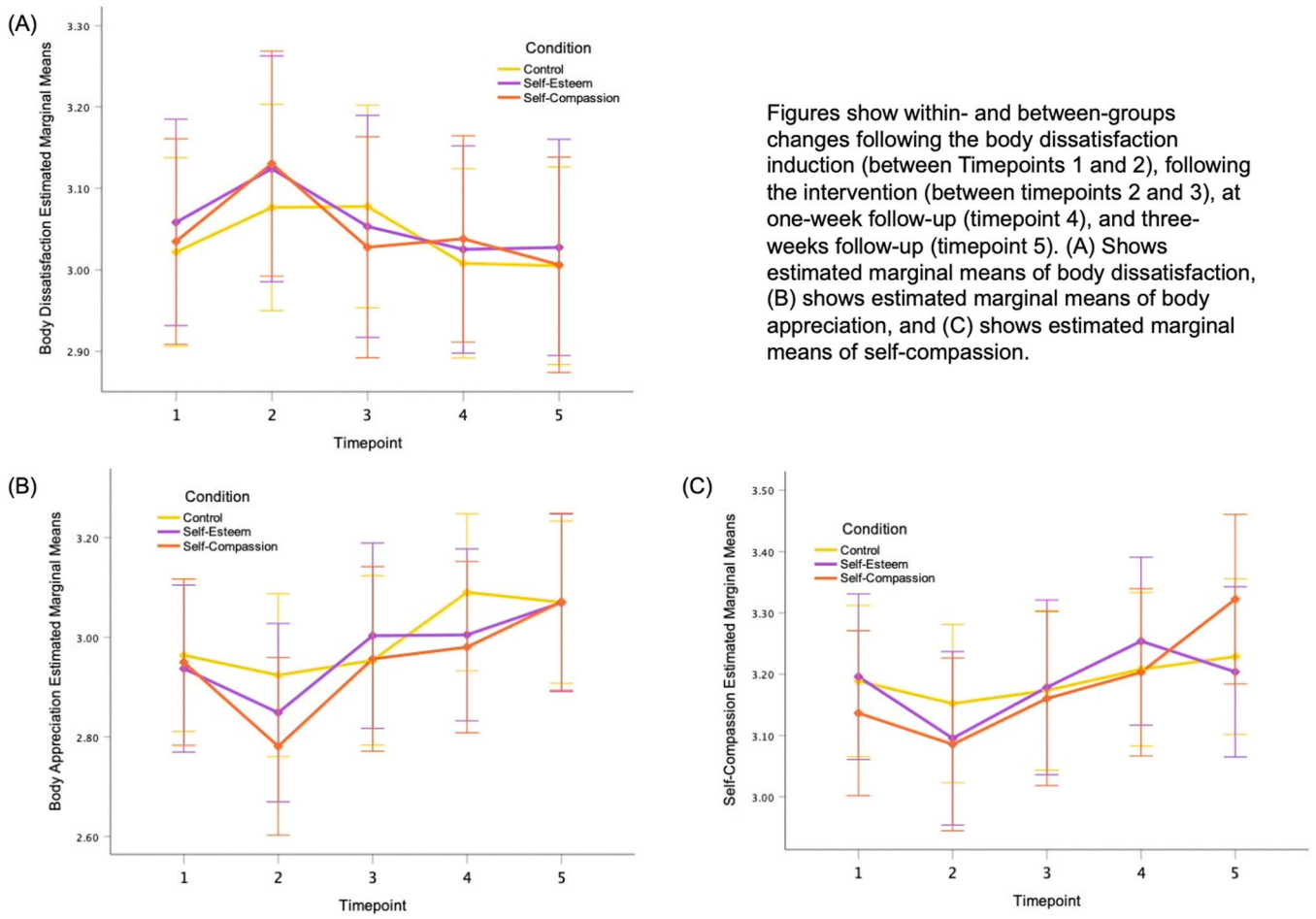

Fig. 3. *Estimated Marginal Means for All Outcome Measures Across All Study Timepoints by Intervention Condition.*

provided in. Indirect effects were significant if the 5000 bootstrapped sample CI did not include zero.

3.3.2.1. Body dissatisfaction. The model was significant overall, $F(5, 597) = 966.73$, $p < .001$, $R^2 = .89$. We found a significant indirect effect of the self-compassion condition, compared to control, on body dissatisfaction via self-compassion, $b = -0.014$, 95 % CI (−0.030, −0.002). Compared to the control condition, the self-compassion condition led to an increase in self-compassion ($b = 0.06$, $t = 2.18$, $p = .030$), which in turn predicted a decrease in body dissatisfaction ($b = -0.22$, $t = -6.17$, $p < .001$). However, the indirect effect of the self-esteem condition, compared to control, on body dissatisfaction via self-compassion was not significant, $b = -0.012$, 95 % CI (−0.026,.0001).

The total effect of the self-compassion condition, compared to control, on body dissatisfaction, was significant and negative, $b = -0.09$, $t = -3.31$, $p = .001$. Similarly, the total effect of the self-esteem condition, compared to control, on body dissatisfaction was significant and negative, $b = -0.08$, $t = -2.96$, $p = .003$. The direct effect was significant for the self-compassion, $b = -0.09$, $t = -2.85$, $p = .005$

Table 2
Analysis of variance table for body dissatisfaction comparing within-condition adjacent timepoints.

	Sum of Squares	Mean Squares	Between groups *df*	Within groups *df*	*F* value	*p*
Condition	0.22	0.11	2	606.03	1.08	.341
Time	**4.24**	**1.41**	**3**	**1530.00**	**13.92**	**< 0.001**
Condition x Time	1.02	0.17	6	1530.00	1.67	.124
Control	Estimate (β)	*SE*	*df*	*t*	*p*	
T2 – T3	0.00	0.00	1535	-0.08	.999	
T3 – T4	**-0.10**	**0.03**	**1541**	**-3.02**	**.008**	
T4 – T5	0.01	0.04	1540	0.33	.999	
Self-esteem						
T2 – T3	**-0.10**	**0.03**	**1534**	**-2.97**	**.009**	
T3 – T4	-0.03	0.03	1541	-0.73	.999	
T4 – T5	0.00	0.04	1540	0.04	.999	
Self-compassion						
T2 – T3	**-0.12**	**0.03**	**1534**	**-3.50**	**.001**	
T3 – T4	0.02	0.04	1540	0.63	.999	
T4 – T5	-0.05	0.04	1540	-1.25	.633	

Note. SE = standard error, *df* = degrees of freedom, estimates are standardized. Significant findings are in boldface.

Table 3
Analysis of variance table for body appreciation comparing within-condition adjacent timepoints.

	Sum of squares	Mean squares	Between groups *df*	Within groups *df*	*F* value	*p*
Condition	0.45	0.22	2	604.92	1.66	.191
Time	**12.63**	**4.21**	**3**	**1530.27**	**31.16**	**< 0.001**
Condition x Time	1.67	0.28	6	1530.25	2.07	.054
Control	Estimate (β)	*SE*	*df*	*t*	*p*	
T2 – T3	0.04	0.04	1535	1.06	.834	
T3 – T4	**0.15**	**0.04**	**1541**	**3.98**	**< 0.001**	
T4 – T5	-0.02	0.04	1542	-0.40	.999	
Self-esteem						
T2 – T3	**0.14**	**0.04**	**1534**	**3.76**	**.001**	
T3 – T4	0.00	0.04	1543	0.02	.999	
T4 – T5	0.00	0.04	1543	0.03	.626	
Self-compassion						
T2 – T3	**0.15**	**0.04**	**1533**	**4.08**	**< 0.001**	
T3 – T4	0.02	0.04	1541	0.53	.999	
T4 – T5	0.09	0.04	1541	2.10	.107	

Note. *SE* = standard error, *df* = degrees of freedom, estimates are standardized. Significant findings are in boldface.

Table 4
Analysis of variance table for self-compassion comparing within-condition adjacent timepoints.

	Sum of squares	Mean squares	Between groups *df*	Within groups *df*	*F* value	*p*
Condition	0.18	0.09	2	605.32	0.61	.542
Time	**9.86**	**3.29**	**3**	**1530.27**	**22.55**	**< 0.001**
Condition x Time	**2.10**	**0.35**	**6**	**1530.29**	**2.40**	**.026**
Control	Estimate (β)	*SE*	*df*	*t*	*p*	
T2 – T3	0.04	0.04	1533	0.99	.893	
T3 – T4	0.09	0.09	1540	2.34	.062	
T4 – T5	0.00	0.00	1540	-0.05	1.000	
Self-esteem						
T2 – T3	**0.11**	**0.44**	**1533**	**2.79**	**.019**	
T3 – T4	0.08	0.04	1542	1.99	.138	
T4 – T5	-0.05	0.05	1541	-1.18	.517	
Self-compassion						
T2 – T3	**0.11**	**0.04**	**1532**	**2.92**	**.010**	
T3 – T4	0.02	0.03	1541	0.61	.999	
T4 – T5	**0.15**	**0.05**	**1541**	**3.21**	**.004**	

Note. *SE* = standard error, *df* = degrees of freedom, estimates are standardized. Significant findings are in boldface.

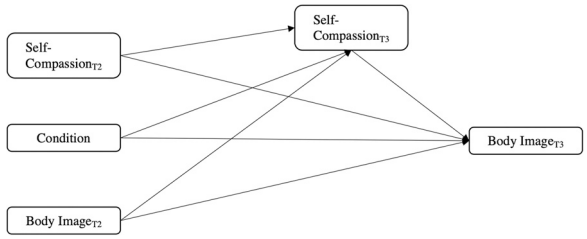

Fig. 4. Mediation Model for Experimental Condition Predicting Body Image at Timepoint 3, Mediated by Self-Compassion at Timepoint 3, with Body Image and Self-Compassion at Timepoint 2 As Lagged Covariates. Note. T2 = Timepoint 2, T3 = Timepoint 3. For clarity, we use Body Image to refer to both body dissatisfaction and body appreciation measures. However, two models were run independently to analyze body dissatisfaction and body appreciation across the intervention.

and self-esteem, $b = -0.08$, $t = -2.58$, $p = .010$, compared to control, on body dissatisfaction. These results indicate that both the self-compassion and self-esteem conditions reduced participants' body dissatisfaction relative to control. However, this association was mediated by state-self compassion only for participants in the self-compassion condition.

3.3.2.2. Body appreciation. The model was significant overall, $F(5, 597) = 867.21$, $p < .001$, $R^2 = .88$. We found a significant indirect effect of the self-compassion condition, compared to control, on body appreciation, via self-compassion, $b = 0.034$, 95 % CI (0.003,.072). Participants in the self-compassion condition, relative to control, reported higher state self-compassion, $b = 0.06$, $t = 2.23$, $p = .026$, which in turn predicted higher body appreciation, $b = 0.53$, $t = 9.91$, $p < .001$. However, the indirect effect of the self-esteem condition, compared to control, on body dissatisfaction via self-compassion was not significant, $b = 0.02$, 95 % CI (−0.004,.058).

The total effect of the self-compassion condition, compared to control, on body appreciation, was significant and positive, $b = 0.12$, $t = 3.04$, $p = .002$. Similarly, the total effect of the self-esteem condition, compared to control, on body appreciation was significant and positive, $b = 0.11$, $t = 2.82$, $p = .005$. Similarly, the direct effects of self-compassion versus control, $b = 0.09$, $t = 2.37$, $p = .018$, and self-esteem versus control, $b = 0.09$, $t = 2.36$, $p = .018$, on body appreciation were positive and significant. These results are consistent with our findings for body dissatisfaction. The results for body appreciation indicate that both the self-compassion and self-esteem conditions increased participants' body appreciation relative to control. However, this relationship was mediated by self-compassion only for participants in the self-compassion condition.

3.3.3. Per-protocol analysis

3.3.3.1. Inclusion and exclusion of participants. Despite efforts during the piloting process to ensure that prompt responses were consistent with the theoretical nature of self-compassion and self-esteem, analysis of participants' responses revealed some had trouble discussing their bodies in a self-compassionate or self-esteem-based way. To investigate the interventions' efficacy when they were completed as intended, we analyzed the content of the prompt responses for the self-compassion and self-esteem conditions against the coding tool used to assess prompts in the study's pilots (see Supplementary material). For each participant, the first author assessed response quality and excluded participants who

provided low quality responses (see Supplementary materials for details).

Overall, 61 (32.4%) participants were excluded from the self-compassion condition and 46 (23.4 %) were excluded from the self-esteem condition. A chi-squared test of independence was conducted to see if there was an association between condition and response quality. We found a significant small association, $\chi^2(1, N = 385) = 3.97$, $p = .046$, Cramer's $v = 0.10$, between condition and response quality with more participants in the self-compassion condition being excluded due to low response quality.

3.3.3.2. Linear mixed-effects models. We reran our linear mixed-effects models after excluding low-quality responses. Main and interaction effects for all per-protocol models are reported in the Supplementary material. Below we report the results for body dissatisfaction, body appreciation, and self-compassion (in that order).

There was a significant main effect of condition ($p = .025$) and time ($p < .001$), but not for the interaction between condition and time ($p = .059$). As with the previous analyses, there was a within-condition effect following the intervention for participants in the self-compassion, $\beta = -0.14$, $t(1264) = -3.28$, $p = .003$ and self-esteem conditions, $\beta = -0.11$, $t(1265) = -2.94$, $p = .010$, but not the control condition, $\beta = 0.00$, $t(1265) = -0.08$, $p = .999$. There was a significant decrease in body dissatisfaction for participants in the control condition at one-week follow-up compared to post-intervention, $\beta = -0.10$, $t(1269) = -2.94$, $p = .010$. There were no further significant within-group effects.

There was a significant main effect for Condition ($p = .001$), Time ($p < .001$), and their interaction ($p = .017$). Again, in line with the previous analyses, there was a significant within-condition effect for participants in the self-compassion, $\beta = 0.21$, $t(1264) = 4.38$, $p < .001$ and self-esteem conditions, $\beta = 0.17$, $t(1264) = 3.91$, $p < .001$, but not for the control condition, $\beta = 0.04$, $t(1265) = 1.09$, $p = .828$. There was a significant increase at one-week follow-up compared to post-intervention for participants in the control condition, $\beta = 0.15$, $t(1270) = 3.90$, $p < .001$. There were no further significant within-group effects.

There was a significant main effect for Condition ($p = .029$) and Time ($p < .001$), but not their interaction ($p = .059$). In line with previous analyses, there was a significant within-condition effect following the intervention for participants in the self-compassion, $\beta = 0.16$, $t(1263) = 3.34$, $p = .003$ and self-esteem condition, $\beta = 0.11$, $t(1264) = 2.59$, $p = .030$, but not for participants in the control condition, $\beta = 0.04$, $t(1264) = 1.07$, $p = .862$. Finally, as with the previous model, self-compassion increased for participants at three-weeks follow-up compared to one-week follow-up, $\beta = .14$, $t(1271) = 2.50$, $p = .038$.

3.3.4. Testing difference between baseline and post-intervention

In response to a reviewer comment, we assessed whether the intervention improved participants' body image and self-compassion compared to baseline (i.e., comparing outcome measures at baseline to timepoint 3) or simply 'repaired' the effect caused by the body dissatisfaction induction. To do so, we reran our linear mixed-effects models for body dissatisfaction, body appreciation, and self-compassion between baseline (timepoint 1) and post-intervention (timepoint 3).

3.3.4.1. Body dissatisfaction. There was no significant main effect for Time ($p = .259$) or Condition ($p = .299$) for body dissatisfaction between baseline and post-intervention, but there was a significant effect for their interaction ($p = .015$). Within-conditions effects revealed that there was a significant increase in body dissatisfaction for participants in the control condition, $\beta = 0.09$, $t(605) = 3.07$, $p = .002$, from timepoints 1 compared to timepoint 3 but not for the self-esteem, $\beta = -0.02$, $t(605) = -0.81$, $p = .416$, or self-compassion, $\beta = -0.01$, $t(605) = -0.16$, $p = .871$, conditions.

3.3.4.2. Body appreciation. For body appreciation there was no significant main effect for Time ($p = .123$), Condition ($p = .170$), or their interaction ($p = .086$) between baseline and post-intervention. Similar, the within-conditions effects for the control, $\beta = -0.03$, $t(607) = -1.02$, $p = .310$, self-esteem, $\beta = 0.06$, $t(607) = 1.79$, $p = .074$, and self-compassion, $\beta = 0.03$, $t(607) = 1.49$, $p = .136$, conditions from timepoint 1 to timepoint 3 were all non-significant.

3.3.4.3. Self-compassion. For self-compassion, there was no significant main effect for Time ($p = .560$), Condition ($p = .133$), or their interaction ($p = .215$) between timepoints 1 and 3. There was a significant pairwise comparison for participants in the self-compassion condition, $\beta = 0.07$, $t(606) = 2.05$, $p = .041$, that indicated there was an increase in self-compassion for these participants between baseline and post-intervention. However, there was no significant within-conditions effects for the control, $\beta = -0.01$, $t(606) = -0.37$, $p = .715$, or self-esteem, $\beta = 0.03$, $t(606) = 0.83$, $p = .410$, conditions.

4. Discussion

The current study aimed to evaluate the efficacy of a brief self-compassion-based writing task in a sample of men. The hypothesis that participants in the self-compassion condition would report a greater decrease in body dissatisfaction and increase in body appreciation and self-compassion than participants in the self-esteem or control conditions was only partially supported, with multiple caveats. Most notably, we did not find significant differences on body dissatisfaction and body appreciation between our treatment (self-compassion and self-esteem participants) and control groups. Significant between-groups effects were only found after participants with low response quality were excluded. Our results do suggest that participants in the self-compassion condition showed a within-groups decrease in body dissatisfaction and an increase in body appreciation and self-compassion following the intervention whereas participants in the control condition did not. Taken together, we suggest that self-compassion and self-esteem interventions may improve body image, but we have little evidence except from the per-protocol analyses to suggest it improves body image *compared to controls*.

Contrary to the hypothesis, there was no evidence that self-compassion out-performed self-esteem as an intervention for body image. Participants in the self-esteem condition showed the same pattern following the intervention, reporting a decrease in body dissatisfaction and an increase in body appreciation and self-compassion. However, participants in the self-compassion condition showed a continued increase in self-compassion at three-weeks follow-up whereas participants in the self-esteem and control conditions did not. Given the significant interaction between condition and time here, our results suggest that the self-compassion writing task significantly increased participants' self-compassion compared to controls. Moreover, conditional process analyses revealed that participants in the self-compassion condition reported improved body image as a function of increased state-self-compassion. However, the effect of the self-esteem condition on body image was not explained by changes in state-self-compassion. Although the self-compassion and self-esteem writing tasks were both effective interventions for body image, the self-compassion writing task had an enduring, positive effect on self-compassion. Further, the self-compassion intervention appears to be effective at increasing state-self-compassion, which in turn is associated with improved body image.

4.1. Interpretation of findings

4.1.1. Self-compassion performs better than control

Consistent with prior findings in women, the self-compassion writing task was found to improve men's body image (i.e., decrease body dissatisfaction and increase body appreciation) and self-compassion. This conclusion is, however, tentative: While the self-compassion intervention appears to have improved body image in sexual minority men, the change was not significant between-groups. Similarly, the self-compassion writing task repaired the effect of the body dissatisfaction induction on state body image. That is, body image improved between timepoints 2–3 (post-induction to post-intervention), but not timepoints 1 and 3 (from baseline to post-intervention). Additionally, body image was improved (at least partially) via self-compassion for participants in the self-compassion condition but not for participants in the self-esteem or control conditions. That is, self-compassion mediated the relationship between condition and both state body dissatisfaction and body appreciation but only for participants in the self-compassion condition. These results extend prior findings regarding the role of trait self-compassion in men, suggesting that self-compassion-based body image interventions disrupt momentary body dissatisfaction via self-compassion as well as encourage protective factors against further body image concerns, in particular state body appreciation and self-compassion (Maher et al., 2021).

4.1.2. Self-compassion and self-esteem both improve body image

Contrary to previous interventions in women, no evidence was found that the self-compassion intervention improved men's body image over and above the self-esteem intervention. Participants in both the self-compassion and self-esteem conditions exhibited a significant improvement on all outcome measures following the intervention. However, although we found significant within-conditions effects over the intervention, we did not find evidence to suggest a between-conditions effect except when we removed participants with poor response quality. Indeed, even after conducting a per-protocol analysis, we found little evidence that self-compassion outperformed self-esteem. Rather, our per-protocol analysis showed that self-compassion and self-esteem both perform significantly better as an intervention for body image and self-compassion as compared to the control group.

In line with similar findings from Ziemer et al. (2019), we found the indirect effect of condition on body image via self-compassion was significant for the self-compassion but not self-esteem condition. Said another way, the mechanisms by which our self-compassion intervention effect body image was partially attributable to its mobilization of self-compassion.

We consider two explanations for the discrepant finding that self-compassion and self-esteem writing tasks are equally effective interventions for body image. First, the self-compassion and self-esteem intervention materials may have been too similar to detect a difference. For example, participants in the self-compassion condition were asked to "express self-acceptance, kindness, understanding, and concern regarding [their] appearance" versus prompts to discuss "[which] aspects of [their] appearance make [them] feel worthwhile, confident, and empowered" given to the self-esteem condition. However, these writing prompts were based on prior validated interventions and amended following the study's pilot phase. Comprehension checks performed following the fourth pilot indicated that prompt responses were distinct between the self-compassion and self-esteem groups and in line with previous theoretical and empirical work.

Due to concerns regarding the quality of prompt responses, we checked for and removed poor quality responses, conducted a test of association between condition and participant response quality, and ran a per-protocol analysis. This contributed two important findings: first, although the association was small, more participants in the self-compassion condition provided responses that were lower in quality than participants in the self-esteem condition. This likely reflect the relative complexity of the self-compassion task, which asked participants to reflect on their experiences rather than simply reporting aspects of their body that they or others appraised positively. As with previous studies (e.g., Voelker et al., 2019), sexual minority men may require a self-compassion information session prior to intervention administration to ensure they achieve the benefits from our self-compassion intervention.

Finally, the self-compassion but not the self-esteem intervention continued to improve participants' self-compassion by three-weeks follow-up. And, as stated, the indirect effect of condition on body image via self-compassion was significant for participants in the self-compassion but not self-esteem condition. As such, our prompts were adequately different to elicit theoretically consistent differences between the active intervention groups on self-compassion.

Second, our study was the second self-compassion-based writing task to use a validated state measure for body dissatisfaction and body appreciation (the first being (Seekis et al., 2017) and the first to use a validated state self-compassion scale. Previous studies have used unvalidated visual analog scales to measure state body image (Atkinson & Wade, 2012; Moffitt et al., 2018) or trait measures of self-compassion and body image (Barbeau et al., 2021) limiting evidence of moment-to-moment changes in body image and self-compassion. Thus, the discrepancy between present and prior results may be attributable to the current study's use of more appropriate and thoroughly evaluated instruments.

4.1.3. Mechanisms of action for self-esteem and self-compassion

Follow-up analyses found that the self-compassion and self-esteem interventions differed in their effect on self-compassion. Consistent with theoretical differences between self-esteem and self-compassion, the self-esteem intervention decreased participants' experience of common humanity, while the self-compassion intervention decreased participants' experiences of self-judgment and isolation. Self-esteem is conceptualized as positive self-concept contingent on positive self-evaluation and favorable (i.e., downward) comparisons with others (Neff & Dahm, 2015). Thus, the self-esteem intervention may have decreased common humanity by increasing ego-centric positive self-concept and thus self-preoccupation (Neff, 2016). This result therefore contributes to our understanding of self-esteem as compared to self-compassion: Although self-esteem drives positive self-concept as demonstrated by its increase in overall self-compassion, it may promote self-preoccupation and so increase experiences of disconnection from others.

Although inconsistent with Neff (2020), the pattern of subscale results for the self-compassion condition is consistent with theory. The self-compassion condition decreased uncompassionate self-responding following the body dissatisfaction induction and at three-weeks follow-up. Importantly, we did not seek to train individuals to feel more self-compassionate. Rather, our intervention sought to induce a self-compassionate mindset and alter participants' *negative* perception of their body. Rather than improving compassionate self-responding (e.g., increasing participants' contentment with themselves), the intervention was targeted at reducing participants' negative cognitions about their bodies – a goal which it has achieved. Moreover, the different subscale results may account for why self-compassion mediated the effect of the self-compassion intervention but not self-esteem intervention on body image: Inducing a self-compassion mindset may have allowed participants to down-regulate uncompassionate self-responding following the body dissatisfaction induction. Namely, the self-compassion condition may have allowed participants to use "compassion turned in-wards" and improve "how [they] relate to [themselves] in instances of perceived failure, inadequacy, or personal suffering" such as those that we

sought to potentiate via the body dissatisfaction induction (Neff, 2016, p. 265).

4.1.4. Self-compassion provides improvements beyond body image

Our findings suggest that, in practice, self-esteem and self-compassion may be effective intervention strategies for improving body image among sexual minority men. If selecting between the two, we argue that a self-compassion intervention may be preferable as it is associated with longer-term increases in self-compassion. Previous self-compassion randomized controlled trials have found that increased self-compassion elicits health-related benefits over and above controls including improvements in eating behaviors, stress, anxiety, depression, rumination, and self-criticism (Ferrari et al., 2019). Additionally, self-compassion has been found to elicit self-improvement motivation, the desire to develop adaptively in response to self-perceived failures (Breines and Chen, 2012), a finding corroborated in the body image literature (Moffitt et al., 2018). While present findings do not suggest self-compassion out-performs self-esteem as an intervention for men's body image, self-compassion interventions may improve men's self-compassion and thus stimulate cognitive and behavioral change conducive both to improved body image and more global mental wellbeing (such as decreased risk for comorbid mental illnesses such as anxiety and depression; (Ferrari et al., 2019).

4.1.5. Body dissatisfaction can be experimentally induced in men

Results from the body dissatisfaction induction evidence that situations promoting appearance comparisons increase men's vulnerability to state body dissatisfaction while decreasing protective factors such as state body appreciation and self-compassion (Linardon, 2021; Turk & Waller, 2020). These results extend those previously found in women by demonstrating that promoting appearance comparisons harms men's state body image and may be a risk factor for the development of chronic body image disturbances in men. Moreover, the present study was the first to demonstrate this effect using validated state outcome measures rather than visual analog scales (Atkinson & Wade, 2012; Moffitt et al., 2018; Wade et al., 2009). In line with recent findings from a prospective study of body appreciation and self-compassion in women's body image (Linardon, 2021), men who are encouraged to engage in upwards appearance comparisons show increased vulnerability (i.e., body dissatisfaction) and decreased protection (i.e., body appreciation and self-compassion) to body image-related pathologies.

Notably, the body dissatisfaction induction did not impact height dissatisfaction. Because materials featured visibly muscular men with low body fat, height may simply not have been a salient feature of the models depicted. Participants may not have compared their height to the men depicted simply because height was not a salient feature of the images. As the induction was found only to affect muscularity and body fat dissatisfaction, this may explain why the intervention appeared to decrease muscularity (in the self-compassion and self-esteem) and body fat (in the self-compassion group), but not height dissatisfaction.

This finding dovetails with prior work by Maher et al. (2021) who found self-compassion moderated the relationship between internalized lean ideals and body fat dissatisfaction wherein higher trait self-compassion was found to reduce the strength of the relationship between lean ideals and body fat dissatisfaction. Thus, state self-compassion may reduce the effect of lean ideals (potentiated via the body dissatisfaction induction) on state body fat dissatisfaction. Moreover, the non-significant difference over the intervention on body fat dissatisfaction in the self-esteem group may similarly corroborate past findings. Although self-esteem and self-compassion appear to ameliorate muscularity dissatisfaction following a body image threat, only self-compassion affected body fat dissatisfaction.

While the body dissatisfaction induction was developed as an ecologically valid experimental manipulation of body dissatisfaction, the results from the task are somewhat limited. While the use of magazine covers allows greater control of within-stimuli variation, the use of images may limit the validity of the task. Although upwards-based comparisons with images of idealized men's bodies have a robust association with body dissatisfaction (Yee et al., 2020), the effect of men engaging in upwards comparisons with other men in their immediate environment remains largely unknown. Thus, whether the interventions can reverse body dissatisfaction induced via upwards appearance comparisons with others who are physically present remains unclear. Finally, although we encouraged participants to engage in appearance comparisons, it is impossible to know whether they actually did engage in these comparisons.

4.2. Implications

4.2.1. Self-compassion is portable into existing interventions

The present self-compassion writing task may be efficacious additions to existing clinical intervention packages for body image and eating disorders in men barring further empirical testing. The present self-compassion intervention might provide a potential method to treat body dissatisfaction and related disorders in situ more effectively. Our results demonstrate promoting appearance comparisons lead to increased body dissatisfaction and reduced body appreciation and self-compassion, which previous research has highlighted as risk factors for body image-related disorders (Linardon, 2021; Yee et al., 2020). Our self-compassion writing task appears to reverse this effect. Taken together, the present findings suggest clinical psychologists may be able to increase the efficacy of existing treatments by deploying the present writing tasks as part of regular practice. Such interventions will be able to target both trait and state body image concerns. The current materials may allow clinicians to adopt a dual trait-state approach to treating body dissatisfaction in at-risk populations such as sexual minority men.

As above, however, this application must be tempered with consideration of the non-significant omnibus tests for both body dissatisfaction and body appreciation outcome measures. Before application in existing clinical treatment packages, future research must clarify whether the present interventions produce significant improvements in body image *compared to controls*. We suggest that, if this is the case, that the present self-compassion intervention would provide an innovative addition to the treatment of body dissatisfaction and related disorders. Importantly, as the underlying social and cognitive processes thought to underpin body dissatisfaction (such as those stipulated by objectification theory and the tripartite influence model) are relatively common in everyday life, an intervention targeting both chronic and situational experiences of body dissatisfaction is likely to be more helpful taken together than separately. Thus, future research must both seek to clarify whether self-compassion writing tasks improve body image compared to controls and assess its efficacy in concert with clinical therapeutic practice.

4.2.2. Self-compassion as a stand-alone just-in-time intervention

The present results are also supportive of burgeoning research trialing brief, scalable, single-session mental health interventions (e.g., see (Schleider et al., 2020). Typically, such interventions involve psychoeducation, mindfulness, or cognitive behavioral-informed materials delivered via smartphone applications or internet webpages (Stoll et al., 2020). Prior research has highlighted the psychosocial barriers men face seeking treatment or support for body dissatisfaction and related disorders (Austen & Griffiths, 2018) and the preference for men to seek out informal support and psychoeducation regarding body dissatisfaction (O'Gorman et al., 2020). As such, the present intervention could be incorporated into a single-

session intervention to treat and/or prevent body dissatisfaction and related disorders in men.

Moreover, the apparent reversal of the body dissatisfaction induction supports the present interventions' use as a just-in-time intervention for body dissatisfaction (Nahum-Shani et al., 2018). If the intervention materials were able to be delivered the present following in situ body image threat, they would be able to intercede and interrupt "transient precipitating influences" that give rise to chronic vulnerabilities to body image disorders (Nahum-Shani et al., 2018), p. 449). Recent advances in global positioning system software for hand-held devices have allowed just-in-time interventions to be administered for alcohol use disorder by presenting individual's with intervention materials when they are close to stores that sell alcohol (Nahum-Shani et al., 2018). The present intervention materials could be similarly presented to men after attending high-risk locations for body dissatisfaction both online (e.g., Instagram; (Yee et al., 2020) and/or offline (e.g., swimming pools; (Seekis et al., 2021). Future research is required to determine where and when just-in-time body dissatisfaction interventions would be most effective for men.

4.3. Limitations and future directions

The present study had two notable limitations: the lack of both a state self-esteem measure and repeated administrations of experimental manipulations. First, we did not measure state self-esteem. Although we found evidence that the self-compassion and self-esteem writing tasks increased self-compassion, it is unclear whether and to what extent the interventions mobilized self-esteem. Moreover, while it is clear the self-compassion intervention mobilized self-compassion more effectively than the self-esteem intervention, we are unable to determine whether the self-esteem intervention mobilized self-esteem more effectively than the self-compassion intervention. Thus, whether our self-esteem intervention uniquely induced a self-esteem-based mindset in participants is unknown. Second, our results do not indicate whether the intervention had an enduring positive impact on participants' body image. For example, it is unclear whether the interventions increased participants' body image resilience following future body image threats compared to control participants. As self-compassion is theorized to reduce contingent positive self-perception, self-compassion should increase individuals' resilience to body image threats (Barbeau et al., 2021) while self-esteem should either have no effect or decrease resilience. Consequently, self-compassion, as compared to self-esteem, is hypothesized to improve participants' present body image, and decrease the effect of future body dissatisfaction inductions. As intervention efficacy was only assessed following a single induction, it is unclear whether the self-compassion intervention had an impact on participants' resilience to further body image threats. Ecological momentary assessment should be used in future studies of self-compassion interventions to address this limitation (Shiffman et al., 2008). Ecological momentary assessment will be able to assess the present interventions improved body image resilience following repeat exposure to body image threats and their therapeutic 'half-life'.

Additionally, as discussed throughout, we ask readers to interpret conclusions regarding the efficacy of both self-compassion and self-esteem writing tasks with caution. While we have some evidence that these tasks improve body image in sexual minority men, the absence of a significant omnibus test for our measures of body dissatisfaction and body appreciation cast doubt on the robustness of our within-group findings. Further research is needed to assess whether self-compassion and self-esteem improve body image compared to controls – this will be a vital step in assessing whether these interventions can meaningfully improve sexual minority men's body image.

4.4. Conclusion

The present study was the first to conduct a randomized controlled trial of a brief self-compassion writing task in a sample of men. It contributes several novel findings to the body image and self-compassion literatures. First, it provides tentative evidence that self-compassion and self-esteem-based writing tasks may be effective interventions for body image in sexual minority men following a body dissatisfaction induction. Contrary to research in women, self-compassion did not out-perform self-esteem as an intervention for body image and was not found to improve body image compared to controls. However, the self-compassion writing task had an enduring, positive effect on self-compassion at three-weeks post-intervention. By exceeding the recommended minimum sample size required for 80 % power, the current study likely provides reliable estimates of the treatment effects of self-compassion in men. Future research is needed to assess whether self-compassion writing task interventions promote body image improvements *compared to controls* and to determine whether present interventions induced changes in state self-esteem and improve resilience to subsequent body image threats. Barring future research, we tentatively conclude that self-compassion shows some promise as an intervention for sexual minority men's body image by decreasing state vulnerabilities and increasing state protective factors against body dissatisfaction.

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CRediT authorship contribution statement

Wesley Gray: Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Validation, Visualization, Writing – original draft, Writing – review & editing, **Emily Harris**: Formal analysis, Supervision, Validation, Visualization, Writing – review & editing, **Scott Griffiths**: Conceptualization, Funding acquisition, Methodology, Supervision, Writing – review & editing.

Conflict of Interest

On behalf of all authors, the corresponding author would like to declare no potential conflict of interest.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.bodyim.2022.07.001.

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