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ORIGINAL ARTICLE

Coping with weight stigma: development and validation of a Brief Coping Responses Inventory

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Summary

People who are overweight or obese are frequently stigmatized because of their weight, but there has been limited exploration of how people cope with these experiences. The Coping Responses Inventory (CRI) assesses a wide range of coping strategies in response to weight stigma; however, its length (99 items) may have prevented it from being widely used. The aim of the current research (four studies; total N = 1,391) was to develop and validate a Brief CRI. This 10-item measure consists of two subscales that assess core coping responses to weight stigma: *reappraisal* and *disengagement* coping. Reappraisal coping is an adaptive form of coping that is associated with greater well-being, whereas disengagement coping reflects a maladaptive form of coping that is associated with poorer well-being. The Brief CRI provides a quick and effective way to assess coping with weight stigma, and its use has the potential to advance an understanding of the consequences of weight stigma.

Keywords: Coping, obesity, scale, weight stigma.

Weight bias is a pervasive problem in Western society; people who are overweight and obese face significant disadvantage in areas of employment, health care, education and interpersonal relationships (1). Experiences with weight stigma are as common as experiences with stigma based on race (2), and recent evidence suggests that weight stigma is experienced almost daily among individuals who are overweight or obese (3,4). These stigmatizing experiences are stressful for the targets of weight stigma and produce harmful psychological and behavioural consequences (5). For example, frequently experiencing weight stigma is associated with greater psychological distress (6,7), unhealthy behaviours, such as binge eating (8,9) and exercise avoidance (10), and increases in cortisol, a hormone involved in the stress response (11,12). Moreover, weight-based discrimination is associated with an almost 60% increase in mortality risk, even after controlling for body mass index (BMI) and indicators of physical and psychological health (13).

There is consistent evidence pointing to weight stigma as a stressful experience (12), but little is known about how people cope with these stigmatizing experiences. A number of potential coping responses have been put forward; however, empirical research on their use and effectiveness is limited. Puhl and Brownell (14) reviewed the theoretical and empirical literature and identified several potential coping responses to weight stigma. People who experience weight stigma may respond by conforming to weight-based stereotypes, engaging in self-protection strategies such as attributing negative feedback to the prejudiced views of others, compensating for weight-related negativity by becoming skilled in other activities (e.g. enhancing their social skills to become more likeable), publicly attributing their obesity and weight-related behaviours to factors outside of their control (e.g. medication), negotiating their identity (e.g. denying their weight-based identity or decreasing its importance in threatening situations), confronting the perpetrator of the stigma, engaging in social activism, using avoidance or disengagement strategies (e.g. avoiding places where stigma is more likely to occur), engaging in communal coping or attempting to lose weight. These responses may manifest in a variety of ways, and the extent to which these responses are used is likely to depend on a range of individual and situational factors. Empirical evidence regarding these responses and others is limited.

There is only one measure currently available to assess coping responses to weight stigma. Myers and Rosen devised a 99-item Coping Responses Inventory (CRI) as a companion measure to their Stigmatizing Situations Inventory (SSI) (7). The CRI comprises 21 subscales and assesses a wide range of coping strategies in response to weight stigma. Some of the responses identified are cognitive in nature (self-talk, reappraisal), and others are behavioural (seeking social support, confronting the

perpetrator); some are, on face value, positive (self-love), and others are negative (negative self-talk, isolating oneself). Studies utilizing this measure have shown that people engage in a wide range of coping behaviours in response to weight stigma, but these studies have not consistently identified subscales that can be categorized as 'adaptive' or 'maladaptive' (7,15). Myers and Rosen identified three CRI subscales that were associated with negative psychological outcomes: negative self-talk, cry/isolate myself and avoid or leave situation. They did not identify any 'adaptive' coping responses that correlated with better psychological outcomes. Puhl and Brownell (14) used a modified version of the CRI (with an adapted response scale) to examine coping responses among men and women recruited through a weight loss support organization. Contrary to Myers and Rosen, Puhl and Brownell did find some evidence of 'adaptive' coping styles (seeking social support, positive self-talk) but did not find any evidence of 'maladaptive' coping responses. Further research is needed to determine the types of coping that are consistently adaptive or maladaptive in nature.

Given the length of the CRI, its use may not be practical for many researchers, and this might be one of the reasons why there has been relatively little research examining how people cope with weight stigma. Thus, the aim of the current paper is to develop and validate a brief version of the CRI (7). In study 1, the full 99-item measure was subjected to factor analysis in an attempt to identify a smaller number of core coping responses. These coping responses were then correlated with a range of psychological outcomes and with measures of general coping strategies. Study 2 attempted to replicate the findings from study 1; study 3 examined the convergent validity of the Brief CRI; and study 4 validated the Brief CRI with an alternative response scale.

Study 1: item selection

Method

Participants

In all four studies, participants were adults from the USA who identified as overweight or obese and were recruited via Amazon's Mechanical Turk. The advertisement indicated that the research sought individuals who were overweight or obese for an online study about their life experiences but did not mention weight stigma. A separate sample was used for each of the four studies. Because the studies were conducted online, two *a priori* exclusion criteria were implemented to ensure quality control. Participants were excluded if they failed any of the attention checks (between 1.2% and 5.3% of respondents in each sample) or if they had a BMI < 25 (or incomplete data for height and weight; between 2.8% and 5.6% of the remaining samples). Including these individuals in the analyses does not change the overall pattern of results. In study 1, valid data were available for 455 participants (55.6% women; 78.9% White; M_{age} = 36.78, SD_{age} = 10.84; M_{BMI} = 36.44, SD_{BMI} = 7.55).

Measures

Coping with weight stigma. Participants completed the full 99-item CRI (7). Participants indicated how often they used a number of strategies to cope with negative situations related to their weight. Example items include the following: 'I feel really bad about myself' (negative self-talk subscale); 'I do something nice for myself to make me feel better' (self-love, self-acceptance subscale); and 'I get support from my spouse/partner' (social support from non-fat people subscale). Response options are as follows: 0 = Never; 1 = Once in your life; 2 = Several times in your life; 3 = About once a year; 4 = Several times per year; 5 = About once a month; 6 = Several times per month; 7 = About once a week; 8 = Several times per week; and 9 = Daily. The overall mean coping frequency score was 3.09 (SD = 1.18; α = 0.96), similar to the mean of 2.83 (α = 0.95) found by Myers and Rosen (7).

Additional measures. Participants also completed the Brief SSI (16) to assess frequency of weight stigma experiences; the Brief COPE (17) as a measure of coping in response to general stress; and the following measures of psychological well-being: Body Shape Questionnaire (8-item version) (18); modified Weight Bias Internalization Scale (19,20); Depression Anxiety Stress Scale-21 (DASS-21) (21); and Rosenberg Self-Esteem Scale (22) (all αs > 0.82).

Procedure

After providing informed consent, participants completed the Brief SSI. Next, participants completed the full CRI, the measure of general coping styles and measures of psychological well-being (presented in random order). Finally, participants reported their age, sex, ethnicity, height and weight and read a debriefing statement.

Results and discussion

Factor analyses and item selection

First, an exploratory factor analysis was conducted on the 99 coping items using extraction and rotation methods that allow for correlated factors (principal axis factoring

with direct oblimin). Using Kaiser's Criterion (eigenvalues greater than 1) (23), 20 potential factors were identified. However, a scree plot revealed that only three factors should be retained (eigenvalues: 20.5, 9.8 and 5.7, respectively). Together, these three factors explained 36.26% of the total variance. The factor analysis was performed again, this time constraining the solution to three factors, and the factor loadings were examined for all items on each subscale. To select items for the brief scale, items that loaded $>|.5|$ on each factor were identified, resulting in a total of 23 items for factor 1, 21 items for factor 2 and seven items for factor 3. In order to keep the measure brief and ensure that each factor included the same number of items, the five items with the highest factor loadings were retained for each factor, with two additional restrictions. First, in order to maintain some breadth of coverage in the shortened measure (i.e. so that any given subscale was not dominated by a particular coping strategy), no more than two items from any one CRI subscale were retained for the new subscales. Second, because some coping items were rarely endorsed (i.e. a mean close to 0 [*Never*]), items were required to have a mean frequency greater than 1 (i.e. *Once in your life*). The resulting factors were as follows: factor 1 (*active coping*) reflects acting proactively in some way to reduce the likelihood of experiencing weight stigma in the future or to better cope with those experiences; factor 2 (*reappraisal coping*) measures positive thinking in response to stigma and reappraising the experience as the other person's problem; and factor 3 (*disengagement coping*) assesses negative self-talk, withdrawal and avoidance responses. Table 1 shows the items for each subscale, along with their factor loadings, mean (SD), Cronbach's alpha and the CRI subscale to which they originally belonged (7).

One item on the *reappraisal coping* factor ('I love myself, even when it seems like other people don't'; from the self-love subscale of the CRI) loaded positively onto factor 2 at 0.60 but also cross-loaded negatively onto factor 3 at -0.38. The item was retained because it fit conceptually with the final *reappraisal coping* subscale, and it had a stronger loading onto factor 2 than it did on factor 3. The item with the next highest loading on factor 2 (0.59) that met the additional criteria and did not cross-load was 'I just say hello and am friendly'. This item, from the positive response subscale of the CRI, reflects a behavioural coping strategy that does not cohere with the cognitive strategies represented by the other four items on the *reappraisal* scale. Thus, conceptual clarity was prioritized and the self-love item was retained. An exploratory factor analysis was conducted on the final 15 items to ensure that the cross-loading did not persist with the brief measure. Three factors were identified using Kaiser's criterion and scree plot (eigenvalues were 3.67 for the *disengagement* factor, 3.10 for *reappraisal* and 2.12 for *active*). All items loaded cleanly onto their

Table 1 Subscale items and their factor loadings, frequencies and original subscale label, study 1

Item	Factor loading	Mean (SD) frequency	Myers and Rosen (7) subscale
Active subscale (αs from 0.79 to 0.84 across all studies)			
I change doctors in order to find one who is more sensitive about my weight.	0.702	1.05 (1.99)	Avoid/leave situation
I participate in a treatment programme in order to help me lose weight.	0.655	1.04 (2.17)	Diet
I do something to promote size acceptance (e.g. join in a demonstration or protest).	0.641	1.19 (2.25)	Respond positively
I go to therapy to get help dealing with these situations.	0.641	1.12 (1.98)	Seek therapy
I quit jobs where I encounter stigma or discrimination.	0.622	1.06 (1.98)	Avoid/leave situation
Reappraisal subscale (αs 0.82 to 0.88)			
I try to think about good things that have happened to me.	0.751	5.08 (3.00)	Positive self-talk
I remind myself that I am a good person and people like me just the way I am.	0.741	4.96 (2.90)	Positive self-talk
If someone has a problem with how I look, I see it as their problem, not mine.	0.655	3.82 (3.10)	Others problem
If people do not like me because of my size, I see it as their loss, not mine.	0.630	3.83 (3.00)	Others problem
I love myself, even when it seems like other people don't.	0.596	4.88 (3.10)	Self-love, self-acceptance
Disengagement subscale (αs 0.83 to 0.87)			
I feel really bad about myself.	0.804	4.87 (2.90)	Negative self-talk
I get depressed and isolate myself.	0.803	3.86 (3.10)	Cry/isolate myself
I avoid looking in the mirror so that I don't have to think about my weight.	0.638	4.61 (3.30)	Avoid/leave situation
I think that no one will ever love me because of my weight.	0.632	3.07 (3.00)	Negative self-talk
I avoid going out in public because I am afraid people will make comments about my size.	0.556	2.51 (2.90)	Avoid/leave situation

respective subscales (>0.54 on primary factor and <0.28 on all other factors).

The *reappraisal* and *disengagement* subscales are face valid and cohesive, whereas the *active* subscale is less conceptually clear. Although the items all reflect some form of actively responding to stigma, the nature of those responses varies from promoting size-acceptance to attempting to lose weight. Furthermore, two items on our active coping scale were originally from the 'avoid or leave situation' subscale of the CRI. However, these avoidance items appear to reflect actively changing one's situation to address the problem of weight stigma (changing doctors and quitting jobs in response to stigma), which is conceptually different from the type of 'avoidance' items that load onto our disengagement subscale (avoiding looking in the mirror and avoiding going out in public). Overall, the active coping subscale may be more difficult to interpret than the other two subscales. In fact, it is possible that the items in factor 1 are grouped together more by their rarity than by their content. In support of this suggestion, all 23 items that were originally identified on factor 1 had low mean frequencies. The overall average frequency was 1.09 (*once in your life*), with even the most frequently endorsed item from this group ('I tell people it's not right to make remarks about my size') having a mean frequency of only 2.17 (*several times in your life*). The items that loaded onto factors 2 and 3 were much more frequent (average frequencies across each factor: 4.57 or more than *several times per year* and 3.51 or more than *about once per year*, respectively).

Table 2 reports the association between scores on the Brief CRI subscales and demographic variables (BMI, age and sex), controlling for stigma frequency. Age was negatively correlated with 'active' coping across all samples, but there were no other consistent findings regarding any other demographic variable. Because 75–80% of the samples were White and a diverse range of ethnicities was represented in the 20–25% of participants who did not identify as White, this study was limited in its capacity to investigate meaningful differences in coping style between different ethnic groups. Analyses with ethnicity are therefore not reported.

Convergent validity

First, correlations were conducted between the three coping subscales and subscales of the Brief COPE (Table 3). Only subscales that were conceptually related to the subscales identified in the Brief CRI were examined: an active coping subscale ('I've been concentrating my efforts on doing something about the situation I'm in'), a positive reframing subscale ('I've been trying to see it in a different light, to make it seem more positive'), a self-blame subscale ('I've been blaming myself for things that happened') and a behavioural disengagement subscale ('I've been giving up trying to deal with it'). Surprisingly, the *active coping* scale was not significantly correlated with the 'active' subscale of the Brief COPE but instead was correlated with disengagement and (to a lesser extent) positive reframing. This pattern further supports the argument that the active subscale is

Table 2 Association between Brief CRI subscale scores and demographic characteristics (controlling for stigma frequency)

Demographic characteristic	CRI subscale		Study 1	Study 2	Study 3	Study 4
BMI	Active		−0.07	−0.02	0.02	−0.16*
	Reappraisal		0.03	−0.02	−0.09	−0.03
	Disengagement		0.09	0.05	0.14*	0.04
Age	Active		−0.14**	−0.16**	−0.18**	−0.17**
	Reappraisal		0.07	0.06	0.10	0.18**
	Disengagement		0.04	0.04	−0.13	−0.10
Sex	Active	Women	1.12	1.13	1.32	0.69
		Men	1.06	1.04	1.73*	0.70
	Reappraisal	Women	4.58	4.84**	5.02	2.07
		Men	4.42	4.25	4.55	1.99
	Disengagement	Women	4.07**	3.91***	4.10	1.78
		Men	3.43	3.22	3.75	1.63

Note. All relationships control for stigma frequency. For BMI and age, partial correlations are reported. For sex, adjusted means are reported with significant differences denoted with asterisks.

*$p < 0.05$.

**$p < 0.01$.

***$p < 0.001$.

BMI, body mass index; CRI, Coping Responses Inventory.

Table 3 Bivariate correlations between Brief CRI subscales and general measures of coping

General coping measure	CRI subscale	Study 1	Study 2	Study 3	Study 4
Brief COPE					
Active	Active	−0.06	0.02	−0.03	0.004
	Reappraisal	0.32***	0.37***	0.40***	0.42***
	Disengagement	−0.23***	−0.35***	−0.19**	−0.33***
Positive reframing	Active	0.12*	0.13**	0.12	0.09
	Reappraisal	0.40***	0.47***	0.40***	0.56***
	Disengagement	−0.16***	−0.30***	−0.10	−0.36***
Self-blame	Active	0.03	0.03	0.21**	0.09
	Reappraisal	−0.09*	−0.27***	−0.25***	−0.37***
	Disengagement	0.57***	0.58***	0.51***	0.65***
Behavioural disengagement	Active	0.30***	0.28***	0.43***	0.35***
	Reappraisal	−0.17***	−0.23***	−0.22**	−0.25***
	Disengagement	0.47***	0.55***	0.43***	0.47***
Ways of coping					
Confrontive	Active	—	—	0.47***	0.27***
	Reappraisal	—	—	0.11	0.29***
	Disengagement	—	—	0.16*	−0.04
Positive reappraisal	Active	—	—	0.34***	0.34***
	Reappraisal	—	—	0.29***	0.34***
	Disengagement	—	—	−0.10	0.19**
Accepting responsibility	Active	—	—	0.27***	0.23***
	Reappraisal	—	—	−0.02	−0.09
	Disengagement	—	—	0.27***	0.34***
Escape-avoidance	Active	—	—	0.39***	0.34***
	Reappraisal	—	—	−0.06	−0.20**
	Disengagement	—	—	0.46***	.56***

Note. Listed are relevant subscales of the Brief COPE (12) and the Ways of Coping (revised) questionnaire (20,21).
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.
CRI, Coping Responses Inventory.

conceptually muddy. *Reappraisal coping* was positively correlated with positive reframing and with active coping but was negatively correlated with self-blame and behavioural disengagement. Finally, *disengagement coping* was positively correlated with self-blame and behavioural disengagement and was negatively correlated with positive reframing and active coping.

Next, bivariate correlations were conducted between the Brief CRI subscales and the well-being measures. Because coping frequency is related to how frequently one experiences weight stigma (7) (in the current study, each coping subscale was positively correlated with SSI scores, with *active* and *disengagement coping* showing strong correlations) and because frequency of weight stigma itself is associated with well-being (6), partial correlations between coping and well-being, controlling for Brief SSI scores, were also examined (Table 4). Unexpectedly, *active coping* was associated with *greater* body shape concerns, depression, anxiety and stress, and with *lower* self-esteem. However, these relationships changed when controlling for Brief SSI scores: the correlation with body shape concerns changed from positive to negative; the negative correlation with weight bias internalization became significant; and the correlations with depression, stress and self-esteem were no longer significant. The correlation with anxiety, however, remained significant and positive. Overall, the partial correlations revealed that active coping was associated with body-related outcomes in the predicted direction but was not consistently correlated with well-being. These findings reinforce the notion that the *active coping* subscale is not a cohesive entity.

Reappraisal coping was significantly associated with lower weight bias internalization, lower depression and greater self-esteem. These relationships held when controlling for Brief SSI scores. *Disengagement coping* was correlated with higher body shape concerns, internalized weight bias, depression, anxiety and stress, and with lower self-esteem. These relationships held when controlling for Brief SSI scores. Overall, these

Table 4 Bivariate and partial correlations between coping measures and psychological outcomes

		Study 1		Study 2		Study 3		Study 4	
Outcome	CRI subscale	Bivariate	Partial	Bivariate	Partial	Bivariate	Partial	Bivariate	Partial
Brief SSI	Active	0.54***	—	0.61***	—	0.65***	—	0.53***	—
	Reappraisal	0.15**	—	0.16**	—	0.01	—	−0.18**	—
	Disengagement	0.46***	—	0.48***	—	0.50***	—	0.57***	—
WBIS	Active	−0.04	−0.20***	0.01	−0.21***	0.04	−0.20**	0.04	−0.34***
	Reappraisal	−0.19***	−0.24***	−0.35***	−0.42***	−0.39***	−0.38***	−0.58***	−0.57***
	Disengagement	0.70***	0.68***	0.71***	0.69***	0.68***	0.64***	0.75***	0.68***
BSQ	Active	0.10*	−0.10*	0.12*	−0.12*	0.19**	−0.12	0.18**	−0.10
	Reappraisal	−0.02	−0.07	−0.13**	−0.20***	−0.16*	−0.18**	−0.26***	−0.21**
	Disengagement	0.62***	0.56***	0.66***	0.60***	0.66***	0.57***	0.66***	0.54***
EDI-BD	Active	—	—	—	—	−0.19**	−0.26***	−0.12	−0.31***
	Reappraisal	—	—	—	—	−0.09	−0.09	−0.32***	−0.29***
	Disengagement	—	—	—	—	0.37***	0.43***	0.48***	0.42***
Depression	Active	0.23***	0.05	0.25***	−0.003	0.33***	0.07	0.25***	0.04
	Reappraisal	−0.19***	−0.27***	−0.23***	−0.33***	−0.39***	−0.44***	−0.46***	−0.43***
	Disengagement	0.62***	0.55***	0.65***	0.57***	0.68***	0.58***	0.69***	0.60***
Anxiety	Active	0.42***	0.23***	0.45***	0.20***	0.49***	0.21**	0.49***	0.33***
	Reappraisal	−0.05	−0.13**	−0.003	−0.10*	−0.15*	−0.18**	−0.22**	−0.16*
	Disengagement	0.46***	0.32***	0.48***	0.31***	0.56***	0.40***	0.49***	0.32***
Stress	Active	0.15***	0.07	0.31***	0.08	0.36***	0.11	0.34***	0.15*
	Reappraisal	−0.06	−0.13**	−0.05	−0.13**	−0.27***	−0.31***	−0.30***	−0.25***
	Disengagement	0.51***	0.41***	0.51***	0.39***	0.63***	0.52***	0.55***	0.42***
Self-esteem	Active	−0.11*	0.05	−0.14**	0.06	−0.27***	−0.04	−0.18**	0.04
	Reappraisal	0.33***	0.39***	0.38***	0.46***	0.50***	0.55***	0.63***	0.62***
	Disengagement	−0.63***	−0.58***	−0.67***	−0.63***	−0.62***	−0.55***	−0.73***	−0.66***

Note. Brief SSI, Brief Stigmatizing Situations Inventory (11); BSQ, Body Shape Questionnaire – 8-item version (13); Depression, Anxiety, Stress, subscales from the DASS-21 (16); EDI-BD, Body Dissatisfaction subscale of the Eating Disorder Inventory (22); Partial, controlling for scores on the Brief SSI; Self-esteem, Rosenberg Self-Esteem Scale (17); WBIS, modified Weight Bias Internalization Scale (15).
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

findings indicate that reappraisal coping is associated with greater well-being, whereas disengagement coping is associated with poorer well-being.

Distribution of data

The *active coping* subscale was significantly positively skewed (15.44) and suffered from substantial kurtosis issues (11.20). An inverse transformation vastly reduced the skew (2.54) and changed the kurtosis (−6.19); the pattern of results, however, did not substantively change. The *reappraisal* and *disengagement coping* scales did not suffer from skewness (0.69 and 1.82, respectively) but had mild kurtosis issues (−3.13 and −3.79). Some level of non-normality is unsurprising given that the measures assess specific coping responses that are not always likely to be frequent occurrences (e.g. changing doctors, quitting jobs) and that vary widely in nature.

Study 2: replication

Study 2 aimed to replicate the factor structure found in study 1. The final sample consisted of 463 participants (54.2% women; 81.4% White; M_{age} = 37.87, SD_{age} = 11.19; M_{BMI} = 36.41, SD_{BMI} = 7.25). Participants completed the same measures as in study 1, except for one item of the full CRI that was inadvertently omitted ('I try to be with someone who makes me feel attractive'). This item was not included in the Brief CRI of study 1; thus, its omission had no bearing on results. A factor analysis was conducted on the full CRI, constraining the number of factors *a priori* to three. The same factors were identified: all items on the *active* subscale loaded highly onto factor 1 (loadings 0.63–0.75); all items from the *reappraisal* subscale loaded onto factor 2 (0.69–0.79); and all items from the *disengagement* subscale loaded highly onto factor 3 (0.65–0.78). As in study 1, the item 'I love myself, even when it seems like other people don't' from

the *reappraisal* subscale also cross-loaded onto factor 3 at −0.37. However, this cross-loading was no longer observed when only the 15 Brief CRI items were entered into a factor analysis. This analysis revealed a three-factor solution with all items loading strongly onto their respective factors (>0.57) and weakly on all other factors (<0.28). The three subscales again showed good reliability (αs > 0.84), and the pattern of correlations with the measure of general coping and with the measures of psychological well-being largely paralleled those in study 1 (Tables 3, 4).

Studies 3: further validation

In studies 1 and 2, participants completed the items comprising the Brief CRI as part of the full CRI. Following the suggestions of Smith *et al*. (24), study 3 tested the validity of the brief measure when it was completed without the parent measure.

Method

Valid and useable data were available for 236 participants (59.3% women; 75.8% White; M_{age} = 36.78, SD_{age} = 11.59; M_{BMI} = 35.73, SD_{BMI} = 7.29), who completed the same measures as in the previous studies with three differences. First, participants completed the Brief CRI instead of the full measure. Second, participants completed the revised Ways of Coping questionnaire (WOC) (25,26) as an additional measure of general coping style. The WOC comprises eight subscales, but only those that are most conceptually relevant to the Brief CRI subscales were examined: confrontive coping (e.g. 'I tried to get the person responsible to change his or her mind'), positive reappraisal (e.g. 'I came out of the experience better than when I went in'), accepting responsibility (a measure of self-blame; e.g. 'I realized I brought the problem on myself') and escape-avoidance (e.g. 'Avoided being with people in general'). Finally, participants completed the Body Dissatisfaction subscale of the Eating Disorder Inventory (27) as an additional measure of body image concerns.

Results and discussion

Factor structure

Entering the Brief CRI items into a factor analysis revealed a three-factor solution (as identified by a scree plot and eigenvalues >1) with all items loading cleanly onto their respective subscales (>0.63 on the target factor and <0.22 on all other factors).

Convergent validity

Measures of general coping style. As in studies 1 and 2, the *active coping* subscale of the Brief CRI was not correlated with the active subscale of the Brief COPE (Table 2). However, it was associated with the WOC confrontive coping subscale. It was also *positively* correlated with Brief COPE self-blame and behavioural disengagement and with WOC positive reappraisal, accepting responsibility and escape-avoidance coping. These somewhat conflicting findings provide further evidence that the Brief CRI *active coping* subscale is difficult to interpret.

Reappraisal coping was positively correlated with Brief COPE positive reframing and active coping and with WOC positive reappraisal and was negatively correlated with Brief COPE self-blame and behavioural disengagement. *Disengagement coping* was positively correlated with Brief COPE self-blame and behavioural disengagement and with WOC accepting responsibility and escape-avoidance coping. Disengagement coping was also negatively correlated with Brief COPE active coping.

Overall, although there are some minor inconsistencies across studies, the pattern of findings is consistent with the findings of studies 1 and 2: the reappraisal coping subscale of the Brief CRI correlates with reappraisal styles of coping, and the disengagement coping subscale is associated with avoidance and self-blame coping styles. The active coping measure, in contrast, does not appear to clearly reflect an active style of coping in response to a stressor, raising more doubts about its validity and utility.

Well-being outcomes. Consistent with studies 1 and 2, *active coping* was correlated with *greater* body shape concerns, depression, anxiety and stress, and with *lower* self-esteem; however, these correlations became non-significant after controlling for Brief SSI scores (with the exception of anxiety, which remained significant and positive). *Reappraisal coping* was associated with lower body shape concerns, internalized weight bias, depression, anxiety and stress, and with greater self-esteem (all associations held when controlling for SSI scores). Interestingly, reappraisal coping was not significantly associated with body dissatisfaction. *Disengagement coping* was associated with higher weight bias internalization, body shape concerns, body dissatisfaction, depression, anxiety and stress, and with lower self-esteem, and these correlations remained after controlling for SSI scores. Overall, there is largely consistent evidence that reappraisal coping in response to stigma is associated with greater well-being, whereas disengagement coping is

associated with poorer well-being. The pattern for active coping is less consistent and not easily interpretable.

Study 4: replication with modified response scale

Previous researchers (15) have indicated that some participants have difficulty estimating how frequently they have engaged in each coping strategy on the CRI when they were asked to respond using the original 10-point scale (7). Thus, study 4 used a response scale that is more 'user friendly'. A final sample of 237 participants (57.8% women; 78.9% White; M_{age} = 35.70, SD_{age} = 10.77; M_{BMI} = 35.47, SD_{BMI} = 7.19) completed the same measures as in study 3, except that the response scale used for the Brief SSI and the Brief CRI was altered to 0 = *Never*, 1 = *Rarely*, 2 = *Sometimes*, 3 = *Often*, and 4 = *Always*. A factor analysis revealed a three-factor solution with all items loading cleanly onto the expected subscales (loadings $>$ 0.60 on target factor and $<$0.22 on all other factors), except for one item on the active coping subscale ('I quit jobs where I encounter stigma or discrimination') that loaded moderately on both the active coping and disengagement coping factors. The patterns of correlations with the measure of general coping and with the measures of psychological well-being largely paralleled those in study 3 (Tables 3, 4). Furthermore, the distribution of scores of these modified measures was more normal than it was in the previous studies. Specifically, kurtosis levels were reduced in study 4 for the three coping scales and the SSI (all $<$ |2.04|). The SSI also showed vastly reduced skewness in study 4 (now 1.34, down from 8.27, 8.58 and 6.04 in studies 1–3, respectively). The *active coping* subscale still suffered from significant skew in study 4 (6.72), but this was substantially lower than in studies 1 and 2 ($>$15.42) and somewhat lower than in study 3 (8.99). Overall, changing the response scale for the Brief CRI and the Brief SSI to a 5-point frequency scale did not substantively affect the results and only served to enhance the normality of the distribution.

General discussion

The aim of the current paper was to develop and validate a brief version of Myers and Rosen's CRI, a measure that assesses strategies for dealing with experiences of weight stigma (7). In study 1 and study 2, the 99-item, 21-subscale measure was shortened into three 5-item subscales reflecting core coping strategies in response to weight stigma: an *active coping* subscale, a *reappraisal coping* subscale and a *disengagement coping* subscale. Across four studies, the reappraisal and disengagement subscales showed good reliability and face validity and demonstrated excellent convergent validity with a range of psychological outcomes and alternative measures of coping in response to general stress. The active coping subscale had consistently good reliability but lacked coherency and produced conflicting findings regarding its validity.

The items in the active coping scale all appear to reflect taking action in response to weight stigma, but some can also be conceptualized as behavioural avoidance (e.g. changing doctors). The strategies on this subscale are also very uncommon (even after initially excluding items with a mean frequency $<$ 1), with responses that are used, on average, only once in a person's life. The factor structure of the active coping subscale was also not replicated in study 4, with one item loading moderately onto the disengagement coping factor. In addition, the majority of the differences in results that were identified in ancillary analyses (i.e. when including all participants) involved the active coping subscale. This speaks to the instability of its relationships with the outcomes of interest. Furthermore, this 'active' subscale was *positively* correlated with the disengagement subscale of the Brief COPE and the escape-avoidance subscale of the WOC and did not correlate with the Brief COPE active subscale. Correlations with well-being outcomes were non-existent or inconsistent. For these reasons, the validity and interpretability of this 'active' subscale could not be demonstrated, and its use is therefore not recommended.

The items in the reappraisal coping scale all reflect reappraisal of stigmatizing situations in a positive light. This scale showed good convergent validity: it was positively correlated with the positive reframing subscale of the Brief COPE and the positive reappraisal subscale of the Ways of Coping measure and was negatively associated with self-blame, behavioural disengagement and escape-avoidance (in study 4 only). Furthermore, reappraisal coping was consistently associated with better psychological outcomes: lower internalized weight bias, body shape concerns, depression, anxiety and stress, and higher self-esteem. Overall, reappraisal coping, as measured with these five items, appears to be an adaptive strategy that is associated with better outcomes.

The items in the disengagement coping measure tap into several negative responses to weight stigma, including withdrawal, negative self-talk and avoidance of situations because of fear of experiencing further stigma. The disengagement coping measure showed excellent convergent validity across the four studies. Disengagement coping was positively associated with the avoidance, disengagement and self-blame subscales of general coping

measures and negatively correlated with the active coping and positive reframing subscales. Disengagement coping was also consistently associated with poorer psychological outcomes: greater internalized weight bias, body shape concerns, body dissatisfaction, depression, anxiety and stress, and lower self-esteem. Overall, then, disengagement coping appears to be a highly maladaptive coping strategy. Furthermore, given the strong association between stigma frequency and disengagement coping, people who experience frequent stigma may be particularly susceptible to adopting this maladaptive response style.

The subscales that were identified in this research showed consistent patterns of associations across four studies with over 1,300 participants who identified as overweight or obese. Each of the studies had approximately equal numbers of men and women, and ancillary analyses revealed that sex did not consistently moderate the relationships between coping and psychological outcomes. Thus, the findings reported in this paper are largely generalizable to both men and women. However, the vast majority of participants in these studies identified as White or Caucasian, and all were living in the USA; thus, it is not known how well these measures will generalize to other samples.

In terms of the brief measure itself, the aim was to retain some of the breadth of the original measure by ensuring that at least three subscales from the original CRI were represented in each Brief CRI subscale. Thus, in the 10-item measure, six original subscales are represented: positive self-talk, others problem, self-love/self-acceptance, negative self-talk, cry/isolate myself and avoid/leave situation. However, these measures do not reflect the wide range of possible responses people make when they experience weight stigma. Many of the 15 omitted subscales are likely to have important consequences for well-being. For example, social support may buffer against the harmful effects of weight stigma on psychological distress (28); however, the Brief CRI does not include items reflecting social support as a potential coping strategy. Moreover, the subscales that were identified largely reflect a cognitive style of coping (the only exceptions being the two avoidance items of the disengagement coping subscale). The Brief CRI therefore does not adequately capture behavioural coping, such as responding verbally or physically to the perpetrator of the stigma, eating or dieting, educating others or seeking therapy. This is likely because behavioural forms of coping (such as those identified on the 'active' subscale) are less common responses and are thus somewhat difficult to assess in a general measure such as this one. Researchers who wish to use the Brief CRI should be aware of this limitation. If specific subscales are of interest to researchers, then those researchers would be better served to use the subscales of interest from the full CRI or find alternative measures of specific responses. The specific coping strategies of interest may depend on the type of stigma in question. For example, if the perpetrator of the stigma is close to the victim (e.g. spouse, friend), the coping responses utilized are likely to be different than if the perpetrator is a stranger and different again if the stigma is arising from the media or physical barriers in the environment. Researchers may therefore wish to use the Brief CRI in conjunction with additional specific subscales from the full CRI that are relevant to their specific research questions.

Finally, the self-report, retrospective nature of these brief measures may to some extent limit their utility. One important avenue for future research will be to examine how well these recalled coping responses correspond with people's actual coping behaviours in response to an episode of stigma. Although research in this area is currently lacking, there is some evidence from the stress and coping literature that people may not be able to accurately and reliably recall their coping responses. For example, a study using an ecological momentary assessment design found that participants' self-reported coping responses within 1 to 2 h of experiencing a stressful situation were only modestly associated with the coping responses that they retrospectively recalled 48 h later (29). This lack of correspondence may be due to errors in recall or to the fact that coping may continue after the immediate window has ended and the types of coping used after this time may differ. Both types of assessments – in the moment and retrospective – are crucial in understanding how people cope with weight stigma and whether these coping strategies predict psychological functioning and well-being.

Across four studies, the present research demonstrated the reliability and validity of a brief version of Myers and Rosen's CRI (7). The two core coping response subscales that are recommended for assessing coping with weight stigma are *reappraisal coping* and *disengagement coping* (see Appendix for the final measure). The reappraisal coping subscale reflects a positive, adaptive response to weight stigma that is consistently associated with improved psychological functioning. The disengagement coping subscale reflects a negative, maladaptive coping response that is strongly associated with poor psychological well-being. A third strategy, *active coping*, was also identified, but the use of this subscale cannot be recommended because its validity could not adequately be demonstrated. The final Brief CRI was validated with both the original 10-item response scale and a modified 5-item response scale that improved the

normality of the distribution. Although the brief 10-item measure does not encompass all of the possible ways people cope with weight stigma, it provides a quick and efficient way to assess core coping responses – one response that is associated with beneficial outcomes and one response that is associated with harmful outcomes. Future research using the Brief CRI will help to elucidate structural relationships between stigma experiences, coping and psychological well-being outcomes. The current studies found that stigma frequency is associated with more coping in general but appears to be more strongly associated with disengagement coping. Future studies should attempt to understand the mechanisms underlying these relationships and assess whether disengagement coping exacerbates the harmful effects of stigma on well-being and whether reappraisal coping mitigates them. Expanding this knowledge may open the door to potential interventions that assist people who are overweight and obese in coping with weight stigma. The present data suggest that any intervention is likely to need to *discourage* disengagement coping as much as encourage reappraisal coping. Overall, it is hoped that the Brief CRI measure will promote and facilitate future research on coping with weight stigma.

Conflict of Interest Statement

The authors declare no conflict of interest.

Author contributions

L. H. collected and analysed the data. All authors were involved in study conceptualization and design, interpreting the data and writing the paper and had final approval of the submitted article.

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Appendix

Brief Coping Responses Inventory

The following questionnaire describes some strategies people use in order to deal with negative situations related to their weight. For example, someone who hears an insult about her appearance may make herself feel better by insulting the person back. Using the following scale, please indicate whether, and how often, you have used each of the following strategies to cope with negative situations related to your weight.

0	1	2	3	4
Never	Rarely	Sometimes	Often	Always

Reappraisal coping subscale (calculate the mean score for the following five items):

1. I try to think about good things that have happened to me.
2. I remind myself that I am a good person and people like me just the way I am.
3. If someone has a problem with how I look, I see it as their problem, not mine.
4. If people do not like me because of my size, I see it as their loss, not mine.
5. I love myself, even when it seems like other people don't.

Disengagement coping subscale (calculate the mean score for the following five items):

1. I feel really bad about myself.
2. I get depressed and isolate myself.
3. I avoid looking in the mirror so that I don't have to think about my weight.
4. I think that no one will ever love me because of my weight.
5. I avoid going out in public because I am afraid people will make comments about my size.