REVIEW

Is Fat Talking a Causal Risk Factor for Body Dissatisfaction? A Systematic Review and Meta-Analysis

Ms. Helen Sharpe, MSc*
Ms. Ulrike Naumann, MSc
Prof. Janet Treasure, MD, PhD, FAED
Prof. Ulrike Schmidt, MD, PhD, FAED

ABSTRACT

Objective: Fat talking has been assumed to be a causal risk factor for body dissatisfaction in a number of prevention programs and body confidence campaigns. The aim of this paper was to assess whether fat talking meets three criteria necessary for causal risk factors, namely whether fat talking is: (a) cross-sectionally associated with body dissatisfaction; (b) prospectively associated with changes in body dissatisfaction; and (c) associated with changes in body dissatisfaction in experimental studies.

Method: A systematic literature review was conducted using electronic databases and hand searching of relevant journals. Meta-analyses provided pooled effect size estimates, and meta-regressions were used to determine whether age, gender or risk of bias were effect modifiers of the relationship.

Results: Searches revealed 24 studies. There was a significant cross-sectional association (r = 0.297, 95% CI = 0.225–0.349), which differed in strength between age groups and genders. There was a prospective association between fat talking and changes in body dissatisfaction in long term (r = 0.144, 95% CI = 0.050–0.234), but not in short-term studies (r = 0.022, 95% CI = −0.131–0.174). One study showed that experimental exposure to fat talking was associated with increases in body dissatisfaction (d = 0.124).

Discussion: As such, there is good evidence that fat talking is a correlate of body dissatisfaction. The few prospective and experimental studies give an initial indication that fat talking is a causal risk factor for body dissatisfaction. Further work is needed to support this position.

Keywords: body dissatisfaction; risk factor; peer influences; fat talk

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Body dissatisfaction is emerging as a central public health concern because of its role in the development of eating disorders,[1,2] as well as its association with a range of other negative outcomes, including low mood, low self-esteem, over- and under-exercising, obesity, and unhealthy weight control practices, such as smoking.[3–6] An understanding of the etiological pathways driving body dissatisfaction is essential for the development of theoretically and empirically informed preventative interventions.

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Correspondence to: Helen Sharpe, Section of Eating Disorders, Institute of Psychiatry, King's College London, De Crespigny Park, London, SE5 8AF, United Kingdom.
E-mail: helen.sharpe@kcl.ac.uk

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Body dissatisfaction is typically conceptualized as arising from sociocultural pressures promoting thinness from a range of sources, such as mass media, family members, and peers.[7–9] Sociocultural pressure can be conceptualized in many different ways: the extent of appearance-related media viewing[10]; modeling of parental body dissatisfaction[11]; peer teasing regarding weight and shape,[12] and so forth.

One potential element of this sociocultural pressure, which has received increasing attention, is known as appearance conversations, or *fat talking*. First introduced by Nichter and Vuckovic in the mid-1990s, fat talk was defined as a form of ritualized derogatory talk focusing on weight and shape frequently undertaken by girls and women.[13] Ousley et al.[14] assessed transcripts of undergraduate students talking about eating and body image and revealed five common fat talking topics: (a) self-comparison to ideal eating and exercise habits; (b) fears of becoming overweight; (c) how eating and exercise habits compare to others; (d) evaluation of others' appearances, and (e) meal-replacements and muscle-building strategies.

Studies of fat talking suggest that experiencing and participating in fat talk is a common phenomenon for women and that responding to weight- and shape-related talk with self-derogatory comments (e.g. "You are

not fat, look at *my* thighs") is considered to be normative.[15–18] Further assessments have shown that fat talking is found in both adolescent[19] and adult populations,[20] and a similar form of interaction involving discussion of muscularity is reported by men.[21]

The theoretical link between fat talking and body dissatisfaction has been the driving force behind inclusions of sessions addressing fat talking in preventative interventions for body dissatisfaction and eating disorders.[22,23] In addition, several campaigns have aimed to promote body confidence through targeting fat talking. For example, the Tri-Delta Sorority, began an international *End Fat Talk* campaign,[24] which encourages young women to recognize and resist fat talking in themselves and those around them.

The existence of campaigns, interventions, and models of body dissatisfaction incorporating fat talk suggest that there is an accepted understanding that fat talking is very important for, and perhaps causally associated with, body dissatisfaction. However, to date there has been no systematic review of literature concerning fat talking, which may provide substantial evidence in favor of this position. This review attempts to resolve this lack of synthesis and to provide definitive answers to the question of whether fat talking is a causal risk factor for body dissatisfaction.

Defining Causal Risk Factors

A clear definition of risk factor terminology has been provided by Kraemer et al.,[25] and we will use this definition throughout this paper. Kraemer et al. make a distinction between the following terms: *correlate,* a factor associated with a particular outcome (e.g. body dissatisfaction); *risk factor,* a correlate that precedes the outcome; and *causal risk factor,* a risk factor which, when manipulated, alters the outcome.

These terms give us guidelines as to the results expected across different study designs.[2,26] Fat talking can be considered a correlate of body dissatisfaction if cross-sectional studies show associations between fat talking and body dissatisfaction. Fat talking can be considered a risk factor for body dissatisfaction if longitudinal studies show that fat talking prospectively predicts changes in body dissatisfaction. And, finally, fat talking can be considered a causal risk factor if experimental studies show that a manipulation of fat talking is associated with a change in body dissatisfaction.

Objectives

In line with this, the objective of this review is to answer the following questions:

- Is fat talking cross-sectionally associated with increases in body dissatisfaction?
- Is fat talking prospectively associated with increases in body dissatisfaction?
- Is experimental manipulation of fat talking associated with increases in body dissatisfaction?

Method

Eligibility Criteria

Studies were eligible for inclusion in the review if they met the following criteria:

- Studies published in English between January 1990 and January 2013.
- Cross-sectional studies that included at least one measure of fat talking and at least one measure of body dissatisfaction.
- Prospective studies that included at least one measure of fat talking, assessed at baseline, and at least one measure of body dissatisfaction, assessed at baseline and at least one follow-up point.
- Experimental studies that randomly manipulated exposure to fat talking and included at least one measure of body dissatisfaction, which was assessed prior to and post exposure.

The rationales behind these criteria were as follows. Setting the earliest start date as 1990 was based on the fact that the primary text introducing the concept of fat talking was published in 1994,[13] and so it is highly unlikely that studies assessing this phenomenon would occur many years prior to this point. Cross-sectional studies without a measure of fat talking and body dissatisfaction would not allow us to assess the association between these variables. Prospective studies that did not report body dissatisfaction at both time points would not allow us to conclude that fat talking preceded changes in body dissatisfaction. Similarly, experimental studies were required to have measures of body dissatisfaction prior to and postexposure to fat talking to ensure that group differences at follow-up were not because of baseline differences. Random allocation to exposure was necessary to determine that change in body dissatisfaction was because of exposure to fat talking rather than an unmeasured variable. Only then could causality be assumed.

Information Sources and Search

Three electronic databases—Psychinfo, Web of Science and SCOPUS—were searched using the following search terms: "fat talk" OR "appearance conversations". The publication year was limited to 1990–2013. The search was conducted on 9th January 2013. In addition, reference checking of located articles was conducted, as were hand searches (years 1990-2012) the following relevant journals:

- Body Image
- Sex Roles
- Journal of Youth and Adolescence
- Eating Disorders: The Journal of Treatment and Prevention.

Study Selection and Data Collection Process

Study selection was conducted by one researcher (HS). Studies were screened in three stages: title, abstract, and full text. Data extraction for eligible studies was conducted by one researcher (HS). Data collection was performed with a standardized form with the following categories: author; date of publication; journal; study design; sample size; gender of participants (% female); age of participants (mean, standard deviation); country where study was performed; measure of fat talking; measure of body dissatisfaction, summary measure (see below); and, where relevant: length of follow-up; experimental paradigm. If papers did not report required summary measures (outlined below), this information was requested from the authors. Studies for which authors did not provide required data following two email requests were excluded from the review.

Risk of Bias within Studies

Risk of bias was based on a checklist provided by Fowkes and Fulton[27] for the critical appraisal of studies, using the following eight criteria: (a) use of nonrandom sampling; (b) percentage of nonresponders greater than 65%; (c) use of nonvalidated measure of fat talking; (d) use of nonvalidated measure of body dissatisfaction; (e) missing data not missing at random; (f) participant attrition not random; (g) significant differences between experimental groups at baseline; and (h) participants not blinded to experimental condition. Criterion (f) was of relevance for prospective studies only, and criteria (g) and (h) were of relevance for experimental studies only.

Summary Measures

For cross-sectional data, the sample size and an unadjusted value of the correlation coefficient, *r*, of the association between fat talking and body dissatisfaction was extracted. Data were taken from all cross-sectional studies as well as baseline cross-sectional associations from longitudinal studies. Where possible values of *r* were extracted separately for males and females. A Fisher z–transformation was then applied to these estimates. A similar approach was used for prospective studies, with values of *r* assessing the association between fat talking at baseline and body dissatisfaction at follow-up, controlling for the level of body dissatisfaction at baseline. For experimental studies, a standardized mean difference (*d*) was computed using the recommendations by Morris[28] for pretest posttest control-group designs. This measure is based on the difference between intervention and control group in mean pretest posttest change, divided by the pooled standard deviation of both groups at pretest.

Synthesis of Results

If scales had been reverse scored (e.g. low score = high body dissatisfaction), this was amended such that scoring was consistent between studies. Estimates for pooled effect sizes and 95% confidence intervals were produced using meta-analyses procedures in STATA, Version 12.[29] The proportion of variation in estimates that was due to heterogeneity was assessed using I^2. When significant heterogeneity was found, we conducted metaregression assessing potential effect modification of the following factors: age (child, <11 years vs. adolescent, 11–18 years vs. adult, >18 years), gender (male vs. female), and risk of bias within studies (factors outlined above).

Risk of Bias Across Studies

Potential for small study effects was assessed using visual inspection of funnel plots (study estimate against standard error). As it can be difficult to assess asymmetry visually,[30] the Egger tests was also used. It should be noted, however, that both approaches are problematic when working with fewer than ten studies.[31]

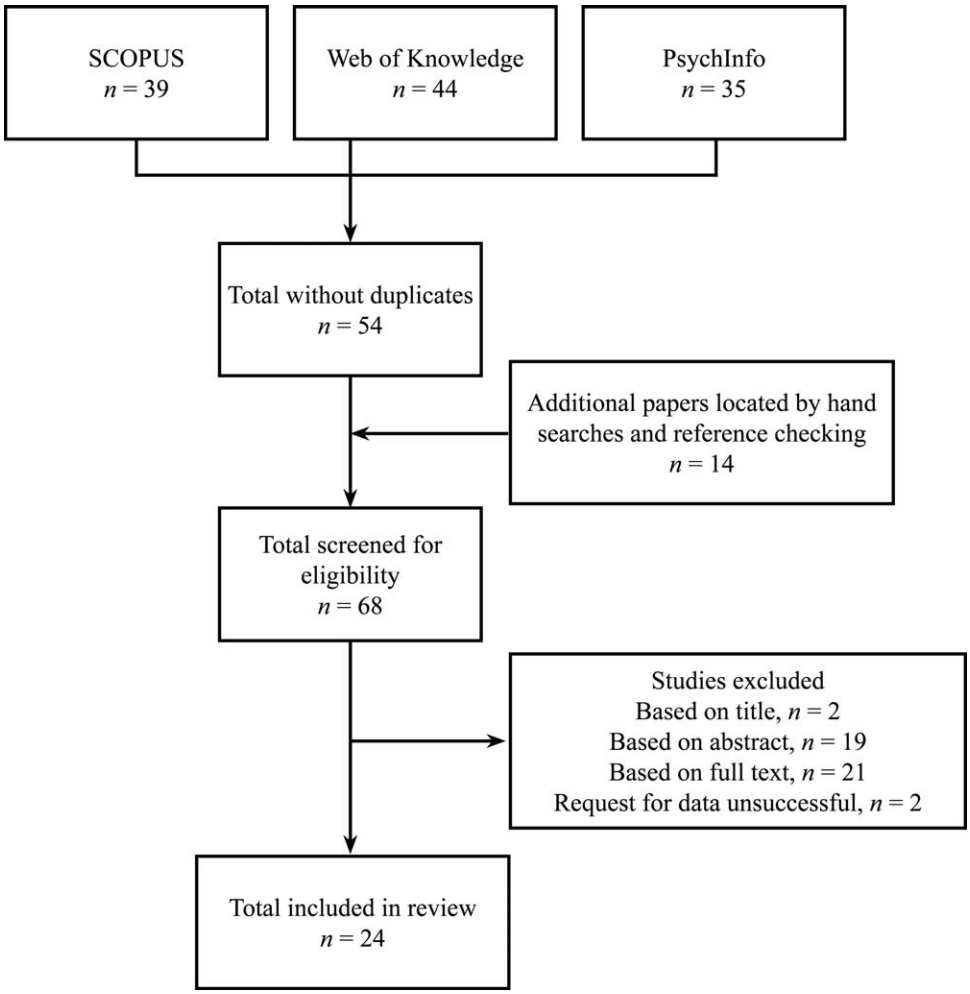
Results

Electronic and hand searching revealed 68 studies to be screened for eligibility (Figure **1**). Two papers were excluded based on the title. A further 19 papers were excluded following review of the abstract: 12 were book reviews; two were literature reviews; two were unpublished dissertations; two did not address body dissatisfaction; and one was a qualitative study.

The full texts of 47 papers were then assessed. Twenty-one papers were excluded at this point for the following reasons: eight studies did not include a measure of body dissatisfaction; eight studies did not include a measure of fat talk; two were experimental studies with no pre-exposure measure of body dissatisfaction; one study reported on a sample already included in the review; one was an experimental study with no exposure to fat talking; and one was a conference proceedings.

Three eligible cross-sectional studies and three eligible longitudinal studies did not report the required effect sizes. When contacted, authors of three studies provided data. Of the three studies for which additional data were not obtained,[32–34] one prospective study reported relevant cross-sectional data and so was included in the review as a cross-sectional study.[34] In two further studies, it was not possible to obtain effect sizes separately by gender (Ref. 35, Study 1 & 2). These were included in the review, but excluded from the metaregression for gender.

FIGURE 1 Flow diagram of study search and selection.



Overall, this resulted in 24 studies, being deemed eligible for inclusion.

Study Characteristics

The review included 24 studies: 19 cross-sectional studies; four prospective studies; and one experimental study (Tables (2–4)). In addition, three of the prospective studies provided cross-sectional data. The studies were published between 2003 and 2013. Five studies had child samples, 11 studies had adolescent samples, and eight studies had adult samples. The majority of studies had exclusively female samples (n = 14), eight studies included mixed-gender samples, and two focused specifically on males. Most studies were conducted in USA (n = 13), five were conducted in Australia, three in China, and one in each of Canada, the Republic of Ireland, and Italy.

Measurement of Fat Talking

The majority of studies (n = 13) measured fat talking with the *Appearance Conversations with Friends Scale*.[36] The five items of this scale are designed to assess "how often students talked with their friends about expectations for their bodies and for appearance enhancements (p. 329)"[36] and take the form of statements such as "my friends and I talk about the size and shape of our bodies" with which participants have to agree or disagree on a five-point Likert scale. Two studies used the *Fat Talk Scale*.[37] This scale presents participants with nine fat talk scenarios, such as: "Naomi is having a bad day. She just does not feel herself and she is kind of down. While walking to class one of her friends says that she looks nice today. She replies, 'No, I'm having a fat day'." Participants are asked to rate how frequently they have similar experiences. One study used the 14 item *Fat Talk Questionnaire*,[38] in which participants have to rate the frequency of fat talk behaviors, such as: "When I'm with one or several close female friends, I complain that my arms are too flabby" on a five-point Likert scale. One study used the *Negative Body Talk Scale*,[39] in which participants have to rate the frequency of saying 13 fat talk statements, such as "I need to start watching what I eat" on a seven-point Likert scale. The remainder of studies (n =

6) used an unvalidated item(s), such as "Do you ever talk about the way your bodies look with your friends?" to assess fat talking.

One study had two measures of fat talking, one of which assessed saying fat talking, and the other of which assessed hearing fat talking. Saying fat talking was chosen as the main outcome for the study as this measure was conceptually most similar to the most commonly used outcome, the *Appearance Conversations with Friends Scale*. All analyses were also repeated using the hearing fat talking measure from this study (not presented here) and no differences in results were found.

Measurement of Body Dissatisfaction

A wide variety of measures were used to assess body dissatisfaction. The most commonly used scales were as follows: nine studies used the *Body Dissatisfaction* subscale of the *Eating Disorder Inventory*[40]; seven studies used the *Body Esteem Scale*[41]; three studies used the *Satisfaction and Dissatisfaction with Body Parts Scale*[42]; two studies used the *Children's Figure Rating Scale*.[43] The remaining study used the *Contour Drawing Rating Scale*.[44]

In three studies, two separate measures of body dissatisfaction were used. One measure was chosen from each study for inclusion in the review. This decision was based on, in the first instance, the measure that was better validated, and, second, on the measure that was conceptually broader (e.g. body dissatisfaction over weight concern).

Risk of Bias within Studies

Results for individual studies from the checklist assessing risk of bias are shown in Table 1. Overall, studies were similar. None of the studies used random sampling techniques, raising the possibility that the samples were not representative of the population. For several items, nonreporting was a problem: only seven studies (29%) reported the percentage of nonrespondents, and only one study (4%) reported on whether data were considered to be missing at random. For those studies that did report percentage of non-respondents, four (57%) were deemed at higher risk of bias because of a high rate of nonresponse (>65%). Three studies (13%) did not use a validated measure of body dissatisfaction. In each instance, this was because of altering individual items from validated scales. Nine studies (39%) did not use a validated measure of fat talking.

Outcomes

Criterion 1: Cross-Sectional Association. Twenty-two studies provided 30 cross-sectional estimates, shown in Table 2. There was significant heterogeneity between the effect size estimates (I^2 = 89.6%, χ^2 (29) = 280.03, $p < 0.001$). Meta-regression revealed a significant effect modification for age ($F(2,27) = 13.56$, $p < 0.001$), a significant effect modification for gender ($t(26) = 2.33$, $p = 0.028$), but no effect modification for risk of bias from using an unvalidated measure of fat talking ($t(28) = 0.32$, $p = 0.753$). The lack of variation between studies precluded meta-regression on other measures of risk of bias. There was a significant association between fat talking and body dissatisfaction in adolescents ($r = 0.224$, 95% CI = 0.166–0.281, $p < 0.001$) and adults ($r = 0.553$, 95% CI = 0.426–0.658, $p < 0.001$), but not children ($r = 0.102$, 95% CI = -0.078–0.275, $p = 0.267$). According to recommendations by Cohen,[45] the effect size was small in adolescents and large in adults. There were significant effects for both genders, with effect sizes being medium for females ($r = 0.331$, 95% CI = 0.244–0.413, $p < 0.001$) and small for males ($r = 0.122$, 95% CI = 0.091–0.155, $p < 0.001$).

The Egger test for small study effects was significant ($t(28) = 4.000$, $p < 0.001$), providing potential evidence for publication bias. Visual inspection of funnel plots confirmed an absence of small studies with small effects. Adjusted meta-analyses using the trim and fill method[46] produced the same overall pattern of results reported above: children, $r = 0.102$, 95% CI = -0.078–0.267, $p = 0.267$); adolescents, $r = 0.132$ (95% CI = 0.063–0.203, $p < 0.001$); adults, $r = 0.553$ (95% CI = 0.426–0.658, $p < 0.001$); females, $r = 0.225$ (95% CI = 0.123–0.327, $p < 0.001$); and males, $r = 0.114$, (95% CI = 0.084–0.146, $p = 0.001$).

Criterion 2: Temporal Precedence. The five estimates of the prospective association between fat talking and body dissatisfaction are show in Table 3. The follow-up lengths in the longitudinal studies varied greatly (2 weeks to 1 year). Because the change over time depends on the amount of time between baseline and follow-up measurements, and this change is not likely to follow a linear pattern, two meta-analyses were conducted, looking separately at the studies that measured short-term change and long-term change.

There was a significant prospective association between fat talking and body dissatisfaction in long-term studies ($r = 0.144$, 95% CI = 0.050–0.234, $p = 0.002$), but not short-term studies ($r = 0.022$, 95% CI = −0.131–0.174, $p = 0.78$). The effect size for long-term studies was small. In both cases there was no heterogeneity between the effect size estimates ($I^2 = 0\%$, $p \geq 0.24$). The Egger test for small study effects in long-term studies was nonsignificant ($t(1) = -0.33$, $p = 0.79$). The small number of short-term studies precluded assessing small study effects.

Criterion 3: Experimental Manipulation. There was a single study which assessed the effect of being exposed to fat talking on body dissatisfaction. Results are shown in Table 4. The study assessed adult, female participants before and after witnessing confederates fat talking during a sham task. There were immediate increases in body dissatisfaction following exposure to fat talking. The value

TABLE 1. Assessment of risk of bias within individual studies

Ref	First author	Date	Study type	Sampling method	Non-response	Measure of BD	Measure of FT	Missing Data	Attrition	Success of Randomization	Blindness
[35]	Arroyo - Study 1	2012	P	+	?	-	+	?	?		
[35]	Arroyo - Study 2	2012	P	+	?	-	+	?	?		
[50]	Chen	2012	C	+	?	-	-	?			
[51]	Clark	2006	C	+	+	-	+	?			
[52]	Clark	2007	C	+	+	-	+	?			
[53]	Clark	2008	P	+	+	-	+	?	-		
[54]	Corning	2012	C	+	?	-	-	?			
[55]	Dohnt	2005	C	+	+	-	+	?			
[47]	Dohnt	2006	C	+	?	-	+	?			
[39]	Engeln-Maddox	2012	C	+	?	-	-	?			
[56]	Jackson	2010	C	+	-	-	-	?			
[34]	Jackson	2011	C	+	?	-	-	-	-		
[57]	Jones	2004	P	+	-	+	-	?	-		
[36]	Jones	2004	C	+	?	+	-	?			
[21]	Jones	2005	C	+	?	+	-	?			
[58]	Jones	2006	C	+	?	-	-	?			
[59]	Lawler	2011	C	+	?	-	-	?			
[37]	MacDonald Clark	2010	C	+	?	-	-	?			
[60]	Matera	2012	C	+	-	-	-	?			
[38]	Royal	2013	C	+	?	-	-	?			
[20]	Salk	2011	C	+	?	-	+	?			
[61]	Shroff	2006	C	+	?	-	-	?			
[62]	Stice	2003	E	+	?	-		?		-	-
[63]	Warren	2012	C	+	?	-	+	?			

Notes: FT, fat talk; BD, body dissatisfaction; C, cross-sectional; P, prospective; E, experimental; +, higher risk of bias; −, lower risk of bias; ?, information not reported; blank, not applicable.

TABLE 2. Cross–sectional data assessing the association between fat talking and Body Dissatisfaction

Study	Age	Gender	Fat talk measure	Body dissatisfaction measure	*n*	*r*	95% CI	
Arroyo and Harwood (2012)	Adult	Mixed	Six items	Body Esteem Scale	111	.530	.381	.652
Arroyo and Harwood (2012)	Adult	Mixed	18 items	Body Esteem Scale	57	.650	.469	.779
Chen and Jackson (2012)	Adol.	Female	ACWFS	Satisfaction and Dissatisfaction with Body Parts Scale	738	.153	.082	.223
		Male	ACWFS	Satisfaction and Dissatisfaction with Body Parts Scale	661	.088	.012	.163
Clark and Tiggemann (2006)	Child	Female	ACWFS*	Body Esteem Scale	100	.200	.004	.402
Clark and Tiggemann (2007)	Child	Female	ACWFS	Body Esteem Scale	265	.260	.144	.369
Corning and Gondoli (2012)	Adult	Female	Fat Talk Scale	EDI—Body Dissatisfaction	143	.640	.532	.758
Dohnt and Tiggemann (2005)	Child	Female	One item†	Children's Figure Rating Scale	81	.000	-.218	.218
Dohnt and Tiggemann (2006)	Child	Female	Three items‡	Children's Figure Rating Scale	128	-.090	-.259	.085
Engeln-Maddox, Salk & Miller (2012)	Adult	Female	Negative Body Talk	EDI—Body Dissatisfaction	135	.400	.248	.533
Jackson and Chen (2010)	Adol.	Male	ACWFS	Body Esteem Scale—Weight	749	.120	.049	.190
Jones, Vigfusdottir, and Lee (2004)	Adol.	Female	ACWFS	EDI—Body Dissatisfaction	430	.340	.253	.421
		Male	ACWFS	EDI—Body Dissatisfaction	364	.160	.058	.258
Jones and Crawford (2005b)	Adol.	Male	ACWFS	EDI—Body Dissatisfaction	128	.230	.059	.388
Jones and Crawford (2006)	Adol.	Female	ACWFS	EDI—Body Dissatisfaction	215	.300	.174	.417
		Male	ACWFS	EDI—Body Dissatisfaction	200	.190	.052	.320
Jones (2004)	Adol.	Female	ACWFS	EDI—Body Dissatisfaction	165	.370	.230	.494
		Male	ACWFS	EDI—Body Dissatisfaction	139	.180	.014	.336
Lawler and Nixon (2010)	Adol.	Female	ACWFS	Contour Drawing Rating Scale	129	.251	.081	.406
		Male	ACWFS	Contour Drawing Rating Scale	111	.077	-.111	.260
MacDonald Clarke, Murnen, and Smolak (2010)	Adult	Female	Fat Talk Scale	Body Esteem Scale	98	.560	.407	.683
Matera, Nerini & Stefanile (in press)	Adol.	Female	ACWFS	Body Shape Questionnaire -14	298	.400	.300	.492
Royal, MacDonald & Dionne (2013)	Adult	Female	FTQ	Body Shape Questionnaire	95	.790	.700	.855
Salk and Engeln-Maddox (2011a)	Adult	Female	One item§	EDI—Body Dissatisfaction	143	.410	.270	.538
Shroff and Thompson (2006)	Adol.	Female	ACWFS	EDI—Body Dissatisfaction	352	.320	.223	.411
Warren et al. (2012)	Adult	Female	Seven items††	EDI—Body Dissatisfaction	121	.450	.295	.582

Notes: Positive values of *r* indicate higher fat talking being associated with higher Body Dissatisfaction. ACWFS, Appearance Conversations With Friends Scale; FTQ, Fat Talk Questionnaire; Adol., adolescent.

*Two items added: "My friends and I talk about how we can look like our favourite pop stars" and "My friends and I talk about clothes and makeup that will make us look nice", and five point Likert scale reduced to three point Likert scale.

†"Do you ever talk about the way your bodies look with your friends?"

‡"Do you and your friends ever talk about: (1) the way pop stars look; (2) the way other girls in your class look, (3) clothes?"

§Based on provided definition of fat talking, participants rated how commonly they themselves engage in fat talk when they are with their female friends on a scale ranging from 1 (it's extremely rare) to 5 (it's extremely common).

††Based on provided definition of fat talking, participants rated how commonly they themselves engaged in fat talk on a scale from 1 (rarely/never) to 6 (more than once a day).

TABLE 3. Prospective data assessing the association between fat talking and change in body dissatisfaction

Study	Age	Gender	Fat talk measure	Body dissatisfaction measure	Follow-up (weeks)	*n*	*r*	95% CI	
Arroyo and Harwood (2012)—Study 1	Adult	Mixed	18 items	Body Esteem Scale	3	57	.110	−.360	.155
Arroyo and Harwood (2012)—Study 2	Adult	Mixed	6 items	Body Esteem Scale	2	111	.044	−.144	.228
Clark and Tiggemann (2008)	Child	Female	ACWFS	Body Esteem Scale	52	150	.120	−.041	2.75
Jones (2004)	Adol.	Female	ACWFS	EDI—Body Dissatisfaction	52	164	.160	.007	.305
		Male	ACWFS	EDI—Body Dissatisfaction	52	139	.150	−.017	.309

Notes: ACWFS, Appearance Conversations With Friends Scale; EDI, Eating Disorder Inventory; Adol., adolescent.

of the standardized mean difference was small ($d = 0.124$).

Discussion

This systematic review aimed to determine whether fat talking is a causal risk factor for body dissatisfaction. Causal risk factors should fulfill three criteria[25]: (a) the factor should be associated with the outcome in cross-sectional studies; (b) changes in the factor should precede changes in the outcome in prospective studies; and (c) random manipulation of the factor should affect the outcome in experimental studies. Following this logic, the systematic review included cross-sectional, prospective and experimental studies that focused on the association between fat talking and body dissatisfaction.

Overview of the Results

Drawing together the findings, there is currently insufficient evidence from prospective and experimental studies to form firm conclusions about the causal role of fat talking. Preliminary findings demonstrate that fat talking is a correlate of body dissatisfaction and the minimal evidence from prospective and experimental studies is in line with the view that fat talking could be a causal risk factor. Cross-sectional studies show heterogeneity in the association between different populations. This demonstrates that many studies will be needed to be able to untangle the complex question of *for whom* fat talking is a causal risk factor for body dissatisfaction.

Criterion 1: Cross-Sectional Association. There was good evidence in favor of the first criterion from studies with cross-sectional data, although the effect was only found in certain populations. Meta-analyses revealed a significant positive relationship between fat talking and body dissatisfaction in both adolescents and adults. The effect size of the association was small for adolescents and large for adults. No relationship was found in child samples, suggesting that fat talking may not be a correlate of body dissatisfaction in younger children. One reason may be that very few young children report having these sorts of interactions with their friends (5–7% in those aged 5–8 years)[47], suggesting that fat talking is a less dominant of feature of young children's friendships. There were, however, very few studies with child-aged samples, and so the lack of association reported may reflect a lack of available data. Significant effects were found for both males and females, although the effect sizes were larger for females. This finding may reflect the focus on fat talking, which has been viewed as a predominantly female experience, rather than more male-focused interactions, such as muscle-building conversations.[21] It is also worth pointing out that all of the male samples were adolescents.

Criterion 2: Temporal Precedence. There was some evidence from prospective studies in favor of the criterion that changes in fat talking precede changes in body dissatisfaction. Although no significant association was found in studies with short-term follow-ups, there was a significant association in studies with follow-ups at one year. The effect size of this association was small. The differences between the long-term and short-term studies may show that the effect of fat talking on body dissatisfaction is that of a "slow burn", taking some time to set in. However, given the findings of the experimental studies (discussed in more detail below), that even a single exposure to fat talking can have immediate effects on body dissatisfaction, another explanation is more likely. It may be

TABLE 4. Experimental studies assessing the association between exposure to fat talking and change in body dissatisfaction

Study	Age	Gender	Experimental design	Outcome measure	*n*	Results	*d*
Stice, Maxfield, and Wells (2003)	Adult	Female	Participant watched neutral video clip and then was exposed to one condition of: 1. fat talk from confederate ('fat talk') 2. discussion of weekend plans from confederate ("control")	Satisfaction and Dissatisfaction with Body Parts Scale	Fat talk group: 60 Control group: 60	Fat talk group: $M_{pre}(SD_{pre}) = 29.37\ (7.91)$ $M_{post}(SD_{post}) = 30.11\ (8.20)$ Control group: $M_{pre}(SD_{pre}) = 28.10\ (7.93)$ $M_{post}(SD_{post}) = 27.85\ (8.54)$	0.124

of note that the two short-term studies used unvalidated measures of fat talking and so it is possible that these measures lacked construct validity. A limitation on the conclusions we can draw regarding the second criterion comes from the fact that there were very few prospective studies. As such, the findings may still provide a relatively imprecise estimate of the true effect sizes.

Criterion 3: Experimental Manipulation. Finally, there was preliminary evidence in favor of the final criterion from experimental studies. Only one study was located but this showed a significant, small-sized effect of being exposed to fat talking leading to immediate increases in body dissatisfaction. That said, the lack of follow-up period on this study means that we cannot say whether effects of fat talking on body dissatisfaction would be maintained in a way that is clinically meaningful. It is also perhaps surprising that a greater effect size was not observed given the immediacy of the exposure to fat talking. That said, the "dose" of fat talking in this study was low (just a few minutes). With this in mind, the small effect size observed from a single, short exposure to fat talking may actually underestimate the effect of persistent and repeated fat talking that is experienced in everyday interactions with friends. Given the necessarily contrived nature of the experimental paradigm, further work would be valuable in determining whether these effects are observed in intact friendship groups where experiences of fat talking may have become normalized. It is feasible that fat talking from close friends would have a different effect than that from a previously unknown peer. Similarly fat talking interactions within certain friendship groups are unlikely to be limited to a single instance, but rather be experienced repeatedly over a long period. Future prospective work with assessments at multiple times points would also give an indication of whether fat talking is a state or trait factor and so whether the "dose" of fat talking tends to be constant over time.

The Strength of the Association Between Fat Talking and Body Dissatisfaction. Of the significant associations found, effect sizes were generally small (one exception is the large cross-sectional association estimated in adults). When compared to a meta-analysis of other putative risk factors for body dissatisfaction and eating pathology, these effect sizes are in a similar range.[2] For example, Stice et al.[2] report an average effect size of $r = 0.18$ for the prospective association between internationalization of thin ideal and body dissatisfaction, and an average effect size of $r = 0.09$ for the prospective association between perceived pressure to be thin and body dissatisfaction. As such, whilst small, the associations found in this review for fat talking are on par with other risk factors. It is worth pointing out, however, that the small estimated effects sizes may well be trivial, and so the clinical significance of this association needs to be considered.

Limitations of the Review Methodology

There are several limitations of the way in which this review has been conducted that may have introduced bias into the results and limit the strength of the conclusions that can be drawn. First, the results are based solely on published studies. Tests of small study effects were significant for cross-sectional studies, but adjusted values taking into account this potential bias remained significant. This suggests that the findings are robust despite this limitation. Second, a single researcher conducted all of the study selection and data extraction for this review (HS). Compared with using two independent researchers, this method raises the possibility of systematic biases in study selection and of an increased number of errors in data extraction.[48]

Limits on the Conclusions

The robustness of the findings is severely limited by the numbers of prospective and experimental studies in this field. For example, there were only two short-term prospective studies, both of which were small, meaning the analyses may have lacked power to detect differences. The lack of heterogeneity between prospective studies, which is at odds with the cross-sectional findings, may also be an artefact of the limited numbers of studies. Future work that would benefit this field includes: studies with children and males; prospective studies in a range of populations including short- and long-term follow-up; and, if a prospective association is confirmed, randomized controlled trials assessing whether reducing fat talking is causally associated with reductions in body dissatisfaction.

The conclusions of the review are also limited in that we were only able to assess the direct relationship between fat talking and body dissatisfaction. This means that we cannot conclude that fat talking has a unique contribution to body dissatisfaction above and beyond other sociocultural factors. Guidelines have been developed to help researchers to explore how risk factors work in combination with each other, for example, being independent, overlapping, or proxy risk factors.[49] From a theoretical perspective, it is very likely that fat talking is not independent of other peer-related risk factors. Once greater numbers of studies have been completed, an examination of the nature of these interactions would be of interest, and may have implications for the use of these findings in prevention programs.

Implications for Prevention Research

Overall, this review demonstrates that there is support for the view that fat talking is a correlate of body dissatisfaction but insufficient data to make firm conclusions about whether fat talking is risk factor or causal risk factor for body dissatisfaction. There is plenty of evidence that fat talking is a correlate of body dissatisfaction in adult populations, and also, to a lesser extent, in

adolescents. There is also some evidence that fat talking is a risk factor, in that it prospectively predicts increases in body dissatisfaction. Finally, there is preliminary evidence that fat talking may be a causal risk factor, as exposure to fat talking causes an immediate increase in body dissatisfaction in female adults. A greater number of prospective and experimental studies would be helpful in building support for these initial findings, and in providing the necessary statistical power to assess potential moderators of this association.

The results from this review imply that fat talking may be a valuable avenue to explore in terms of prevention efforts, particularly in prevention programs working with adults. The effect sizes estimated are small, but are in a similar range to other risk factors.[2] As such, there is preliminary evidence on which to hypothesize that reducing fat talking with peers should lead to a decrease in body dissatisfaction. Targeting fat talking in prevention programs should reduce body dissatisfaction and therefore has the potential to have downstream effects on the incidence of eating disorders.

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