



# The Association Between Weight-Based Teasing from Peers and Family in Childhood and Depressive Symptoms in Childhood and Adulthood: A Systematic Review

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## Abstract

**Recent Findings** Depressive symptoms may be a psychological correlate of weight-based teasing from peers and/or family. However, it is unclear whether the association of weight-based teasing with depressive symptoms differs by time (short term vs. long term), sex (males vs. females), or source (family vs. peers).

**Purpose** The purpose of this systematic review was to (1) examine whether the frequency of weight-based teasing differs according to sex and source and; (2) examine whether the association of weight-based teasing with depressive symptoms varies according to time, sex, and source.

**Methods** On February 16, 2018, a combination of keywords within three concepts, (i) children and adults, (ii) weight-based teasing source, and (iii) mental health outcomes, were searched in four databases (PubMed, PsycINFO, Scopus, and Web of Science) for relevant articles. Cross-sectional and longitudinal original research articles were included, and studies were excluded if the relationship between weight-based teasing and depressive symptoms was not explicitly measured.

**Results** The search yielded 3572 articles, and nineteen studies were included in the final analysis. Experiences of weight-based teasing occurred significantly more among girls than boys. Weight-based teasing was significantly associated with depressive symptoms in both short and long term. Weight-based teasing exhibited a greater association with depressive symptoms in girls vs. boys and when it came from multiple sources than from either source alone. However, it remains uncertain whether one source of teasing is more common than the other, since only two studies found peers to be a more common source of weight-based teasing compared to family.

**Summary** Weight-based teasing from peers and family is associated with depressive symptoms, and girls are more psychologically vulnerable than boys. Interventions are required to reduce weight-based teasing and its harmful psychological effects.

**Keywords** Weight bias · Weight stigma · Weight discrimination · Child · Adult · Depression

## Introduction

Children living with overweight or obesity may be subjected to weight-based teasing, which has been defined as the negative communication from an agent regarding the weight of a target person, in which elements of humor, aggressiveness, and ambiguity are present [1, 2]. Weight-based teasing in interpersonal relationships, such as from family members and peers, is widespread [3]. Approximately 30–40% of children report experiences of weight-based teasing [4], and 25–60% of children with overweight or obesity experience weight-based teasing from family members specifically [5–9]. Previous research suggested that one-third of girls and one-fourth of boys reported weight-based teasing from peers and the frequency of teasing increased to approximately 60%

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among children with higher body mass indexes (BMIs) [8]. This is concerning due to the adverse association weight-based teasing can have with important mental health indicators, such as depressive symptoms [10]. Depressive symptoms are critical health outcomes to focus on because if symptoms are sufficiently abundant, severe, and persistent, then they may lead to depression [11]. Depression is the most prevalent mental health disorder [12, 13], has peak onset in adolescence [14, 15] and young adulthood [15], and is one of the leading causes of disability, morbidity, and mortality [16]. It also poses a serious economic [17] and societal burden [18, 19]. Considering the pervasiveness of weight-based teasing and depressive symptoms, it is necessary to better understand their conceivable relationship.

The current literature has begun to explore this association. For example, a study by Eisenberg et al. found that the total proportion of respondents who reported depressive symptoms was higher among those who experienced weight-based teasing from family and peers (97.1%) compared to those who were not teased (47.1%) [20]. Weight-based teasing from family and peers in childhood may have immediate effects on rates of depressive symptoms [20], yet the negative psychological consequences could also emerge or last into adulthood [21]. A prospective study by Eisenberg et al. proposed that participants who were teased about their weight in high school reported depressive symptoms in young adulthood, suggesting that weight-based teasing in childhood is associated with the development of depressive symptoms in adulthood [22]. However, the current body of literature presents conflicting results regarding crucial factors that influence this relationship. It is unclear whether the frequency of weight-based teasing differs according to sex (males vs. females) and source (family vs. peers) [23]. In addition, it is unclear whether depressive symptoms in response to weight-based teasing differ according to time (short term vs. long term), sex (males vs. females), and source (family vs. peers) [24], information that is important to optimally inform weight-based teasing prevention programs. We use the word “time” to signify the effects of teasing over time, with effects in childhood (short term) or in adulthood (long term). To our knowledge, no systematic review has examined these relationships or summarized the effects of familial and peer weight-based teasing in childhood and depressive symptoms in childhood and adulthood. Therefore, the objectives of this systematic review were to (1) examine whether the frequency of weight-based teasing differs according to sex (males vs. females) and source (family vs. peers) and (2) examine whether the association of weight-based teasing with depressive symptoms varies according to time (short term vs. long term), sex (males vs. females), and source (family vs. peers).

## Methods

Suggestions from the Cochrane Handbook [25] were used to develop the research questions and criteria for including studies. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol [26] was used to direct the search process. On May 16, 2018, this systematic review was registered on PROSPERO (CRD42018093004), an international database of registered systematic reviews.

On February 16, 2018, with the assistance of a research librarian (K.H.), a combination of keywords within three concepts, (i) children and adults, (ii) weight-based teasing source, and (iii) mental health outcomes, were searched in four databases (PubMed, PsycINFO, Scopus, and Web of Science) for relevant articles. Other sources, such as references from previous reviews or relevant papers, were searched as well. Inclusion criteria consisted of cross-sectional and longitudinal studies published in English or French from 1961 onwards. Only original, peer-reviewed published research studies were included. Studies were only included if participants *first* experienced weight-based teasing from family and/or peers in childhood (i.e., between the ages of 3–18 years inclusively). Studies were also included if weight-based teasing and depressive symptoms were explicitly measured and/or reported as the primary outcomes. Studies were excluded if the source of weight-based teasing was not family and/or peers or if weight-based teasing only occurred in adulthood. Finally, studies were excluded if weight-based teasing and depressive symptoms were measured, but the association between these variables was not reported and/or assessed. Authors were contacted in circumstances when weight-based teasing and/or depressive symptoms were not explicitly measured or reported to see if additional data was available to answer our research questions. On March 29, 2019, a second search using the same original search strategy was conducted to verify if any additional studies were published within the past year which met the inclusion criteria. This updated search looked for studies that were published after February 1, 2018. The updated search did not yield any additional studies that met the inclusion criteria.

The quality assessment tool from the National Heart, Lung, and Blood Institute (NHLBI) for Observational Cohort and Cross-Sectional Studies was used to assess the risk of bias in each study included in the systematic review [27]. This assessment tool was chosen because this systematic review included observational prospective cohort studies ( $n=4$ ) and cross-sectional studies ( $n=15$ ). The NHLBI assessment tool included a checklist of 14 questions that focused on key concepts for evaluating the internal validity of the studies. Two independent researchers (E.S. and F.M.) evaluated each criterion by answering “Yes,” “NO,” or “Other (cannot determine, not

reported, or not applicable)” in response to the 14 questions (Table 1). Moreover, we ran a series of chi-square tests for the studies included in our review that did not conduct these statistical tests in their own publications.

These tests were run in order to address the first objective of our review, which was to determine if the mean difference in frequency of weight-based teasing was significantly different according to sex and source. Lastly, we

**Table 1** NHLBI Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies

Reference	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Subjective quality rating (good, fair, poor) tallied by the researchers*
Bang et al. 2012 [28]	Yes	Yes	NR	Yes	No	No	No	Yes	Yes	No	Yes	NR	NA	Yes	Good
Bucchianeri et al. 2014 [29]	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	No	Yes	NR	NA	Yes	Good
Eisenberg et al. 2003 [20]	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	No	Yes	NR	NA	Yes	Good
Eisenberg et al. 2006 [22]	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	NR	No	Yes	Good
Fulkerson et al. 2007 [30]	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	No	Yes	NR	NA	Yes	Good
Goldfield et al. 2010 [10]	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	No	Yes	Yes	NA	Yes	Good
Goldschmidt et al. 2016 [21•]	Yes	Yes	NR	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	NR	No	Yes	Good
Greenleaf et al. 2014 [31]	Yes	Yes	NR	Yes	No	No	No	Yes	Yes	No	Yes	NR	NA	Yes	Good
Greenleaf et al. 2017 [32]	Yes	Yes	NR	Yes	No	No	No	Yes	Yes	No	Yes	NR	NA	Yes	Good
Keery et al. 2005 [5]	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	No	Yes	NR	NA	Yes	Good
Lampard et al. 2014 [33]	Yes	Yes	Yes	Yes	NR	No	No	Yes	Yes	No	Yes	NR	NA	Yes	Good
Libbey et al. 2008 [34]	Yes	Yes	NR	Yes	No	No	No	Yes	Yes	NR	Yes	NR	NA	NR	Fair
Madowitz et al. 2012 [35]	Yes	Yes	NR	Yes	No	No	No	Yes	NR	No	NR	NR	NA	Yes	Fair
Mustillo et al. 2013 [36]	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	NR	Yes	Yes	NR	NA	Yes	Fair
Phares et al. 2004 [37]	Yes	Yes	Yes	Yes	Yes	No	No	Yes	NR	No	NR	NR	NA	NR	Poor
Porter et al. 2013 [38]	Yes	Yes	NR	Yes	No	No	No	Yes	Yes	No	Yes	NR	NA	NR	Fair
Quick et al. 2013 [39]	Yes	Yes	NR	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	NA	No	Yes	Good
Quinlan et al. 2009 [40]	Yes	Yes	NR	Yes	No	No	No	Yes	Yes	No	Yes	NR	NA	Yes	Good
Young-Hyman et al. 2006 [41]	Yes	Yes	NR	Yes	No	No	No	Yes	Yes	No	Yes	NR	NA	Yes	Good

Abbreviations: *NHLBI* National Heart, Lung, and Blood Institute; *NR* not reported; *NA* not applicable

Note: According to the NHLBI Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies [27], the following numbers apply to the following questions:

- (1) Was the research question or objective in this paper clearly stated?
- (2) Was the study population clearly specified and defined?
- (3) Was the participation rate of eligible persons at least 50%?
- (4) Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study pre-specified and applied uniformly to all participants?
- (5) Was a sample size justification, power description, or variance and effect estimates provided?
- (6) For the analyses in this paper, were the exposure(s) of interest measured prior to the outcome(s) being measured?
- (7) Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?
- (8) For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure or exposure measured as continuous variable)?
- (9) Were the exposure measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?
- (10) Was the exposure(s) assessed more than once over time?
- (11) Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?
- (12) Were the outcome assessors blinded to the exposure status of participants?
- (13) Was loss to follow-up after baseline 20% or less?
- (14) Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)?

\*The NHLBI tool was not designed to create a final tally for the overall quality rating score [27]. This subjective quality rating score reported herein was determined by the researchers themselves to create their own overall quality rating score for the studies included in this systematic review

performed a narrative analysis to synthesize the results of our systematic review [42].

## Results

### Quality and Characteristics of Included Studies

The search strategy yielded a total of 5431 studies, of which 1859 were duplicates. Two authors (E.S. and F.M.) simultaneously reviewed 3572 abstracts, and any disagreement was

resolved through consensus. The full texts of the remaining 274 studies were reviewed, resulting in 19 studies included in the final narrative analysis. Figure 1 illustrates the PRISMA flow diagram showing the procedure for the selection of studies. Overall, the subjective quality rating of the included studies, which was determined by the researchers (E.S. and F.M.), was poor ( $n = 1$ ) [37], fair ( $n = 4$ ) [34–36, 38], and good ( $n = 14$ ) [5, 10, 20, 21, 22, 28–33, 39–41] (Table 1). Table 2 presents the characteristics of the included studies. In the majority of studies ( $n = 14$ ), there was a greater percentage of female participants compared to males [10, 21, 22, 29–31, 33–35,

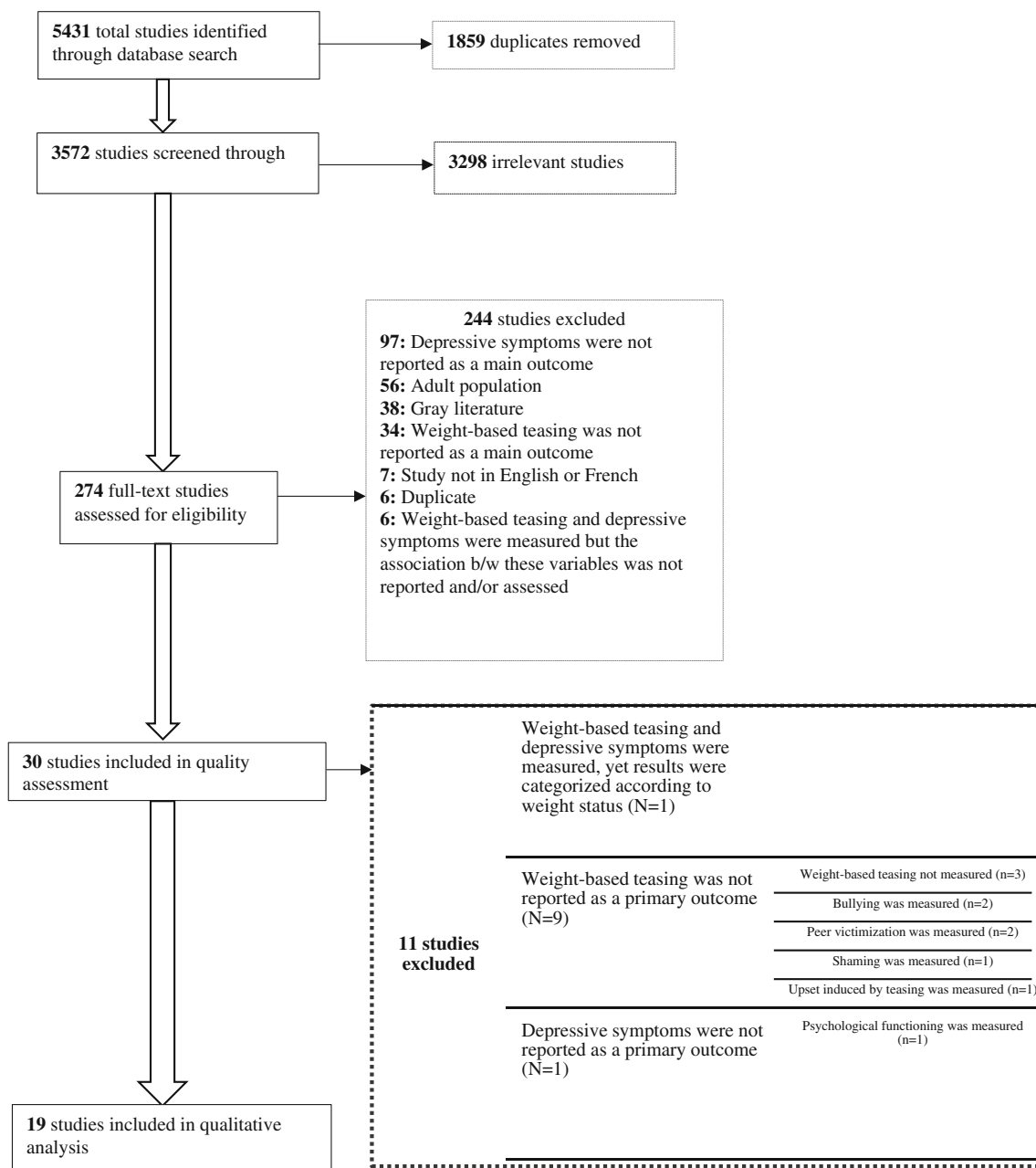


Fig. 1 PRISMA diagram showing the procedure for selection of studies

**Table 2** Characteristics of studies

Reference	Study design	Sample size	Sex	Ethnicity	Measure of depressive symptoms	Measure of weight-based teasing	Source of weight-based teasing
Bang et al. 2012 [28]	Cross-sectional	455	Girls (n = 232) Boys (n = 223)	Asian	Children's depression inventory	Perceptions of Teasing Scale	Family (parents)
Bucchianeri et al. 2014 [29]	Cross-sectional	2793	Girls (53.2%) Boys (46.8%)	African American (29%) Asian American (19.9%) Caucasian (18.9%) Hispanic (16.9%) Native American (3.7%) Mixed or other (11.6%)	Kandel and Davies (1982) 6-item scale	Perceived harassment was measured using a series of items. Four types of perceived harassment were assessed with the questions: "How often do any of the following things happen?"; (1) "You are teased or harassed about your race"; (2) "You are teased or harassed about your weight"; (3) "You are teased or harassed about your family's financial situation"; or (4) "You are teased or harassed in a sexual way (e.g., grabbing/pinching, sexual comments, unwanted touching)"	Not reported
Eisenberg et al. 2003 [20]	Cross-sectional	4734	Girls (n = 2357) Boys (n = 2377)	Caucasian (48.5%) African American (19%) Hispanic (5.8%) Asian (19.2%) Native American (3.5%) Mixed or other (4.0%)	Kandel and Davies (1982) 6-item scale	"Have you ever been teased or made fun of by other [kids/family members] because of your weight?"	Peers and family
Eisenberg et al. 2006 [22]	Longitudinal Time 1: 1998–1999 Time 2: 2003–2004	2516	Women (n = 1386) Men (n = 1130)	Caucasian (61.9%) African American (11.1%) Hispanic (4.5%) Asian (17.8%) Native American (1.9%) Mixed or other (2.7%)	Kandel and Davies (1982) 6-item scale	"How often do any of the following things happen to you" followed by a list of 5 types of harassment including "You are teased about your weight"	Not reported
Fulkerson et al. 2007 [30]	Cross-sectional	1351	Girls (n = 684) Boys (n = 667)	Caucasian (47%) African American (20%) Asian American (16%) Hispanic/Latino (8%) Native American (5%) Other or multiracial (4%)	Kandel and Davies (1982) 6-item scale	"Have you ever been teased or made fun of by family members because of your weight?"	Family
Goldfield et al. 2010 [10]	Cross-sectional	1491	Girls (n = 851) Boys (n = 640)	North American (54.4%) European (23.1%) Asian (5.2%) Middle Eastern (3.7%) African (3.3%) Central or South American (1.9%) Caribbean (1.5%) Aboriginal (1.1%)	Children's Depression Inventory	McKnight Risk Factor Survey-III	Peers and family (parents)

**Table 2** (continued)

Reference	Study design	Sample size	Sex	Ethnicity	Measure of depressive symptoms	Measure of weight-based teasing	Source of weight-based teasing
Goldschmidt et al. 2016 [21]	Longitudinal Time 1: 1998–1999 Time 2: 2003–2004 Time 3: 2008–2009	1902	Women (56.9%)	Oceanian (0.5%) Other (3.3%) Caucasian (66.5%) Asian (15.4%) African American (8.9%) Hispanic (3.4%) Other (5.8%)	Kandel and Davies (1982) 6-item scale	“How often did any of the following happen to you”: (a) you were teased about your weight (b) you were teased about your appearance	Not reported
			Men (43.1%)				
Greenleaf et al. 2014 [31]	Cross-sectional	1419	Girls ( <i>n</i> = 782)	Caucasian (58.8%) Hispanic/Latino (26.3%) African American (11.6%) Others (3.4%)	Center for Epidemiologic Studies Depression Scale for Children	Participants responded to items that assessed whether they had been teased for (1) weighing too much (2) for not being strong enough (3) because of their appearance by 3 different sources (family members, female friends, male friends)	Peers and family
			Boys ( <i>n</i> = 637)				
Greenleaf et al. 2017 [32]	Cross-sectional	343	Girls ( <i>n</i> = 143)	Caucasian (50.7%) Hispanic/Latino (31.5%) African American (14.3%) American Indian or Alaska Native (3%) Asian (2.6%) Other (6%)	Center for Epidemiologic Studies Depression Scale for Children	Weight/Size Teasing subscale of the Physical Appearance Related Teasing Scale	Peers
			Boys ( <i>n</i> = 200)				
Keery et al. 2005 [5]	Cross-sectional	372	All girls	Caucasian (85%) Hispanic (5%) African American (2%) Native American (2%) Asian (1%) Other (4%)	Center for Epidemiologic Studies Depression Scale for Children	Perceptions of Teasing Scale-Weight Teasing Frequency subscale Sibling teasing: Participants were asked to rate their agreement about whether a sibling “says or does things that make me feel bad about the way I look”	Family
Lampard et al. 2014 [33]	Cross-sectional	2793	Girls (53.2%) Boys (46.8%)	African American (29%) Asian American (19.9%) Caucasian (18.9%) Hispanic (16.9%) Native American (3.7%) Mixed or other (11.6%)	Kandel and Davies (1982) 6-item scale	Individual: “Have you ever been teased or made fun of by other kids because of your weight?” School level: The proportion of participants at each school reporting individual-level weight-related teasing	Peers
Libbey et al. 2008 [34]	Cross-sectional	130	Girls (65.5%) Boys (34.5%)	Caucasian (58.4%) African American (13.6%) Hispanic (0.8%) Asian (2.4%) American Indian (7.2%) Other (3.2%) Mixed (14.4%)	Center for Epidemiologic Studies Depression Scale	Frequency: “How often are you teased about your weight?” Have you been teased about your weight by [peers/family] and, if so, to what extent were you bothered by it?	Peers and family
Madowitz et al. 2012 [35]	Cross-sectional	79	Girls (58.8%) Boys (41.2%)	Caucasian (76%) Hispanic or Latino (17.5%) African American (10%)	Center for Epidemiologic Studies	(1) “Have you been teased or made fun of about your weight by other kids your age?”; (2) “if you have been teased or made fun of about your weight by	Peers and family



**Table 2** (continued)

Reference	Study design	Sample size	Sex	Ethnicity	Measure of depressive symptoms	Measure of weight-based teasing	Source of weight-based teasing
Mustillo et al. 2013 [36]	Longitudinal Time 1: 1987 Time 2: 1997 Participants were assessed annually for approximately 10 years	2123	All women	Asian (5%) Hawaiian (2.5%) Pacific Islander (2.5%) Other (7.5%)	Depression Scale for Children	other kids your age, how much did this make you mad, sad or worried?"; (3)"Have you been teased or made fun of about your weight by family members?"; (4)"If you have been teased or made fun of about your weight by family members, how much did this make you mad, sad or worried?"	Peers and family (parents)
Phares et al. 2004 [37]	Cross-sectional	141	Girls (n = 77) Boys (n = 64)	Caucasian (63.1%) African American (21.3%) Hispanic/Latino/Latina (12.8%) Asian American (0.7%) Other (2.1%) African American	Perceived Stress Scale at ages 10–15 Center for Epidemiologic Studies Depression Scale 18–21 Children's Depression Inventory	Perception of Teasing Scale and Weight Teasing Scale	Family
Porter et al. 2013 [38]	Cross-sectional	119	Girls (72.2%) Boys (27.8%)	Girls (72.2%) Boys (27.8%)	Children's Depression Inventory	Perceptions of Teasing Scale	Not reported
Quick et al. 2013 [39]	Longitudinal Time 1: 1998–1999 Time 2: 2008–2009	1655	Women (n = 891) Men (n = 764)	Caucasian (48%) African American (20%) Asian (18%) Hispanic (5%) Native American (3%) Mixed or other race/ethnicity (5%)	Kandel and Davies (1982) 6-item scale	"Have you ever been teased or made fun of by other [kids/family members] because of your weight?"	Peers and family
Quinlan et al. 2009 [40]	Cross-sectional	96	Girls (n = 70) Boys (n = 26)	Caucasian (76%) African American (11.5%) Hispanic (7.3%)	Center for Epidemiological Studies Depression Scale Children's Depression Inventory	Perception of Teasing Scale	Peers
Young-Hyman et al. 2006 [41]	Cross-sectional	164	Girls (n = 83) Boys (n = 81)	Caucasian (N = 106) African American (N = 58)	Children's Depression Inventory	Perception of Teasing Scale	Peers

37–41], and some studies ( $n = 2$ ) only included female participants [5, 36]. The majority of studies were cross-sectional in design ( $n = 15$ ) [5, 10, 20, 28–35, 37, 38, 40, 41], and only four studies were longitudinal [21•, 22, 36, 39]. Some studies only included peers ( $n = 4$ ) [32, 33, 40, 41] or family ( $n = 4$ ) [5, 28, 30, 37] as a source of weight-based teasing, while seven studies reported both peers and family [10, 20, 31, 34–36, 39]; four studies did not report the source of weight-based teasing [21•, 22, 29, 38].

### Measures of Weight-Based Teasing

The most common measure of weight-based teasing was the Perceptions of Teasing Scale ( $n = 6$ ) [5, 28, 37, 38, 40, 41]. Weight-based teasing was also often measured by asking participants, “Have you ever been teased or made fun of by [other kids/family members] because of your weight?” ( $n = 6$ ) [20, 30, 33–35, 39].

### Measures of Depressive Symptoms

The most common measure of depressive symptoms was the Center for Epidemiological Studies Depression Scale ( $n = 7$ ) [5, 31, 32, 34–36, 40] and the Kandell and Davies (1982) 6-item depressive mood scale ( $n = 7$ ) [20, 21•, 22, 29, 30, 33, 39]. The second most common measure was the Children’s Depression Inventory ( $n = 5$ ) [10, 28, 37, 38, 41].

### Frequency of Weight-Based Teasing

Fourteen studies reported findings on the frequency of weight-based teasing in relation to sex and source [5, 10, 20, 22, 29, 30, 32, 34–37, 39–41]. Only five of the fourteen studies conducted statistical tests to determine if the mean difference in the frequency of weight-based teasing was significantly different [10, 29, 37, 40, 41]. We ran chi-square tests for the remaining nine studies that did not conduct these statistical tests, and these findings are reported below [5, 20, 22, 30, 32, 34–36, 39]. However, we were unable to conduct the chi-square test for one of these studies due to insufficient data [30]. Among the remaining eight studies, two reported findings in relation to both sex and source [20, 39], four reported exclusively on source [5, 34–36], and two reported exclusively on sex [22, 32]. A study by Goldfield et al. conducted the chi-square tests in their publication in relation to sex. However, we conducted the statistical test to examine whether one source of teasing occurred more frequently than the other [10].

Among the studies where we ran chi-square tests to examine the frequency of teasing in relation to sex, in three studies, the chi-square tests revealed that girls were teased significantly more than boys [20, 22, 39], whereas in one study, there was no statistical difference [32]. Across the studies that ran statistical tests in their publications, three found that girls were

teased significantly more than boys [10, 29, 41] whereas two found no statistical difference [37, 40]. In total, six studies found that girls were teased significantly more than their male counterparts [10, 20, 22, 29, 39, 41], whereas three studies found no statistically significant difference in the frequency of weight-based teasing according to sex [32, 37, 40].

The following paragraph describes the results of the chi-square tests that we ran on studies with available data relating to source of weight-based teasing [5, 10, 20, 34–36, 39]. In two studies, the chi-square tests showed that peers were a significantly more common source of weight-based teasing compared to family [10, 35], yet in one study, the chi-square test suggested that this difference was not significant [20]. One study revealed that the combination of weight-based teasing from peers and family was significantly more common than either source of teasing on its own [34]. However, our chi-square test on data reported by Eisenberg et al. challenged this finding, revealing that either peer or parent teasing on its own was reported significantly more than the combination of sources [20]. In a study of only girls, our chi-square test revealed that family (parents) was a more common source of weight-based teasing than peers among African American girls, yet the opposite held true among Caucasian girls [36]. The last results of our chi-square test on data reported by Keery et al. found that siblings were a significantly more common source of teasing than parents, while fathers were a source of teasing significantly more than mothers [5]. Regardless of the weight-based teasing source, the range of teasing for girls was between 14 and 45% while the range for boys was between 10 and 35%.

### Cross-Sectional Associations of Weight-Based Teasing and Depressive Symptoms

Sixteen studies examined the cross-sectional association between weight-based teasing and depressive symptoms in relation to sex and source [5, 10, 20, 22, 28–38, 40]. Most of the studies ( $n = 15$ ) presented a significant positive association between weight-based teasing and depressive symptoms [5, 10, 20, 22, 28, 30–35, 37–40]. Among these studies, however, Madowitz et al. suggested that only peer weight-based teasing was significantly associated with depressive symptoms compared to family [35]. Libbey et al. suggested that in addition to being associated with depressive symptoms, more frequent weight-based teasing was related to higher odds of experiencing depressive symptoms [34].

Five studies found that there was a stronger, more positive association between weight-based teasing and depressive symptoms among girls compared to boys [10, 22, 29, 30, 37], yet none of these studies tested this statistically. Due to the greater correlation coefficient for peers, there appeared to be a stronger, more positive association when teasing came from peers than parents among girls [10]. In the overall sample of



this same study, there was a significant positive correlation between weight-based teasing from parents and peers with depressive symptoms, and again, it appeared that there was a stronger association between peer teasing and depressive symptoms compared to parent [10]. However, after conducting multivariate regressions to examine the association between weight-based teasing and depressive symptoms, Eisenberg et al. found that boys and girls had greater odds of experiencing depressive symptoms when teasing came from family [20]. This study also observed that in response to weight-based teasing, participants reported depressive symptoms when teasing came from family, peers, and the combination of these two sources, and depressive symptoms were reported most frequently by both sex groups when teasing came from multiple sources than either source on its own [20]. In each of these circumstances, girls reported depressive symptoms more frequently than boys [20], yet boys appeared to have greater odds of experiencing depressive symptoms [20].

Two studies found that frequency of teasing as well as the number of sources of teasing was significantly associated with depressive symptoms [34, 35]. Libbey et al. suggested that more sources of weight-based teasing had a stronger association with depressive symptoms and participants teased by multiple sources had greater odds of experiencing depressive symptoms [34]. After interpreting the results, however, it appeared that a child had a greater chance of experiencing depressive symptoms if they were teased by multiple sources (e.g., family and peers) even if they did not experience teasing that often.

### Longitudinal Associations of Weight-Based Teasing and Depressive Symptoms

Of the four longitudinal studies included in the review, three reported findings on the long-term associations between weight-based teasing and depressive symptoms in relation to sex and source; each of these studies found a significant association between teasing and depressive symptoms [21, 22, 36]. Two studies reported a greater association among women compared to men [21, 22], yet this was not confirmed through statistical testing. A study by Eisenberg et al. presented two age cohorts: (i) participants who were middle school students at Time 1 and high school students at Time 2 and (ii) participants who were high school students at Time 1 and young adults at Time 2 [22]. Among the first age cohort, teasing at Time 1 was significantly associated with depressive symptoms at Time 2 only among women [22]. Among the second age cohort, a significant association existed between Time 1 teasing and Time 2 depressive symptoms for both men and women, yet it appeared that a stronger association existed for women [22]. In both age cohorts, teasing at Time 1 was no longer significantly associated with Time 2 depressive symptomology when controlling for Time 1 depressive

symptoms [22]. The authors also controlled for Time 2 teasing to determine if the earlier Time 1 teasing would maintain a significant association with later Time 2 depressive symptoms among women in both cohorts. They found that Time 1 teasing was still marginally significantly associated with Time 2 depressive symptoms even when controlling for later teasing in Time 2 [22] in women from both cohorts.

## Discussion

### Summary of Main Findings

#### Frequency of Weight-Based Teasing

One of the main findings of our review was that weight-based teasing was frequently reported by both girls and boys. This coincides with the existing literature which suggests that body weight is the most common reason that youth are teased [43, 44, 45]. Fourteen studies reported findings on the frequency of weight-based teasing in relation to sex and source. Six studies showed that girls experienced weight-based teasing significantly more than boys. It is not surprising that approximately 40% of studies found that girls were teased more than boys, as research suggests that girls' appearance is more harshly scrutinized which can result in experiencing weight-based teasing to a greater degree [46]. However, it remains uncertain whether one source of teasing is more common than the other, since only two studies found peers to be a more common source of weight-based teasing compared to family.

#### Cross-Sectional Associations of Weight-Based Teasing and Depressive Symptoms

Weight-based teasing from family and/or peers was significantly positively associated with depressive symptoms for both boys and girls. Teasing about weight sends the message that one's body size, shape, and appearance deviate from socially acceptable norms and adolescents may have experienced depressive symptoms due to this sense of deviation [32]. The apparent association between teasing and depressive symptoms during adolescence may be particularly harmful because of a teen's desire for social acceptance [47] and the immense amount of pressure they feel to conform to social norms of attractiveness [48, 49]. Children living in larger bodies, in particular, experience weight-based teasing more often than children of normal weight [8, 10, 50], which can have serious implications on their emotional well-being. Children with overweight or obesity already have higher rates of depressive symptoms [5, 50–52], and research has found stronger associations between their experiences of teasing and depressive symptoms compared to children of normal weight [35, 50, 53]. Society emphasizes the value of attractiveness

characterized by a lean body figure [54], and any perceived violation of these social appearance norms may ignite the onset of teasing [55] and may intensify an adolescent's feelings of depressive symptoms [56]. For example, in addition to being related to depressive symptoms, Eisenberg et al. found that weight-based teasing was associated with suicide attempts and ideation [20]. Although previous research has shown that children with overweight or obesity endure more weight-based teasing and have greater associations with depressive symptoms [35, 50, 53], our results suggested that depressive symptoms were associated with teasing across the entire weight spectrum [20]. In one study, weight was not significantly associated with depressive symptoms after controlling for teasing, further suggesting that it is the experience of being teased about weight, rather than actual body shape and weight, which is a contributing factor to depressive symptoms [10, 20]. This finding, which is in agreement with a previous study [57], explains why the relationship between weight-based teasing and depressive symptoms with regard to weight status was not a primary focus of our review, as a relationship appears to exist regardless of a child's weight category.

Moreover, our review found girls to be more affected by weight-based teasing in terms of depressive symptoms compared to their male counterparts. This may be attributed to the fact that for girls, body shape becomes a primary focus during the middle school years [58], so they may be more sensitive and susceptible to the negative psychological effects of weight-based teasing. Also, in general, girls are subjected to more appearance and weight-related pressure than boys [59]. However, research is increasingly showing that males also experience appearance-related pressures and concerns [60], with a greater focus on lean muscularity as opposed to weight loss [61–63]. Western society reinforces the stereotype of muscularity by highlighting the association between muscularity and masculinity [62].

With regard to weight-based teasing source, a study by Goldfield et al. found that the correlations between teasing and depressive symptoms appeared to be stronger for peers than for parents [10], suggesting that peer teasing may be more psychologically harmful. This could be due to the fact that adolescence is a time of increasing peer influence [64]. Nevertheless, despite the shift from parent to peer influence, parental teasing could still have an impact on depressive symptoms [5]. For example, a study by Eisenberg et al. suggested that there were greater odds of experiencing depressive symptoms when teasing came from family compared to peers [20], perhaps because parents remain important attachment figures during adolescence, especially among those with strong family values [65]. Moreover, it is also important to consider the child's age and stage of development (i.e., young childhood vs. adolescence). Prior to adolescence (ages 12–18 years), parents typically maintain a greater influence on their children compared to peers [66], so any negative

feedback from a parent towards a child may be particularly harmful to their emotional well-being. Additionally, even so-called "benign" parental weight-related comments (e.g., encouraging weight loss or modeling diet behavior) have been shown to be negatively associated with a child's well-being [67, 68]. However, Madowitz et al. contradicted this finding and suggested that there was no significant association between teasing and depressive symptoms among family [35]. Due to these conflicting findings, we cannot determine that weight-based teasing from one particular source is more related to depressive symptoms than the other, but the literature shows that both sources are harmful.

Furthermore, two studies found that frequency of weight-based teasing as well as the number of sources of teasing was significantly associated with depressive symptoms and increased the likelihood of experiencing depressive symptoms [34, 35]. After interpreting the results, our findings suggested that even if the incidence of teasing is not as recurrent, but it comes from multiple sources, then there is a greater chance that the child will experience depressive symptoms. It appears that it is not the quantity of teasing but the quantity of the sources of teasing which appears to have a greater association with depressive symptoms.

In certain circumstances, mediators or moderators may be present which can impact the relationship between weight-based teasing and depressive symptoms [53]. For example, research has proposed that other variables, such as BMI and/or body weight [28], body satisfaction [32, 38], and self-esteem [32], may partially influence the relationship between teasing and depressive symptoms. To our knowledge, one variable that has not been analyzed to help explain the relationship between weight-based teasing and depressive symptoms in children is weight bias internalization. Weight bias internalization can be defined as the awareness of negative stereotypes about one's social identity and the agreement and application of these stereotypes to oneself [69]. Weight bias internalization occurs when weight bias becomes self-directed, and individuals begin to devalue themselves because of their body weight [70]. For example, people who have weight bias internalization may believe that they are less attractive, less valued, less competent, or less deserving of a social life than most other people because of their weight [71]. Children could begin to internalize their experiences of weight-based teasing and feel as though this maltreatment is warranted [72]. Those who internalize weight-based teasing could then develop depressive symptoms [70, 73, 74]. In this manner, the internalization of weight-based teasing may have partially mediated the relationship between teasing and depressive symptoms [53], whereby children who internalize may be more negatively affected. This speculation ultimately suggests that weight bias internalization may influence the relationship between teasing and depressive symptoms.

Few studies have examined weight bias internalization in youth [72, 75], and to our knowledge, no studies have examined its potential impact on the association between weight-based teasing and depressive symptoms. The only study conducted that we found which resembles this form of investigation was a study recently published by Himmelstein et al. [76]. This study examined the relationship between frequency of weight-based teasing from different sources and responses as well as coping strategies used in response to teasing. However, this study did not explicitly tease out depressive symptoms in their analyses (i.e., negative emotions, in general, were an outcome measure). In the future, more research is needed on the potential presence of weight bias internalization in youth and its possible associations with important mental health indicators such as depressive symptoms. It would be important to investigate not only how it may be associated specifically with depressive symptoms but also if it partially mediates or moderates the relationship between weight-based teasing and depressive symptoms.

Finally, gender of the peer-teasing source can be an important explanatory factor when evaluating the relationship between peer weight-based teasing and depressive symptoms. During adolescence, heterosexual teens begin to have an interest in the opposite gender and wish to be seen as attractive [77–79]. Thus, girls may be more vulnerable to weight-based teasing from boys [80]. In a recent study by Valois et al., teasing from a male peer was more strongly and negatively associated with appearance esteem for female adolescents compared to male adolescents [80]. However, these results may manifest differently among LGBTQ (lesbian, gay, bisexual, transgender, queer or questioning) youth. Weight-based teasing is a common experience for adolescents across diverse sexual and gender identities [81]. LGBTQ teens may be vulnerable targets of weight-based teasing, perhaps even more so than cisgender youth (youth whose gender identity is concordant with the sex they were assigned with at birth) [81]. It would be important for future studies to consider how the gender of the weight-based teasing source influences the association between teasing and depressive symptoms among heterosexual and LGTBQ adolescent populations.

### Longitudinal Associations of Weight-Based Teasing and Depressive Symptoms

This review found that a significant positive association existed between weight-based teasing and depressive symptoms in both childhood and adulthood. Similarly, as in cross-sectional studies, there was a stronger association between teasing during childhood and depressive symptoms in childhood or adulthood among women [22]. Among men, ongoing teasing was required for a longitudinal association to exist [22]. This suggests that for women, weight-based teasing during childhood may be strong enough to influence subsequent

emotional well-being in adulthood, without the need for ongoing teasing. Previous research suggested that ongoing teasing is required for there to exist a significant longitudinal association between teasing and depressive symptoms among both men and women [20], yet our study found this only to be true among men.

Additionally, when controlling for baseline levels of depressive symptoms in childhood, the long-term association between weight-based teasing and depressive symptoms was no longer significant. This suggests that the cross-sectional association between teasing and depressive symptoms influences the longitudinal relationship as well [22]. Therefore, it might be important to consider a child's emotional well-being prior to teasing before attempting to interpret the long-term effects of weight-based teasing. Weight-based teasing can be associated with later emotional disturbances; however, our review supports prior research which has indicated that this association becomes insignificant when controlling for Time 1 levels of the outcome variable [57, 82–84].

### Strengths and Limitations

Strengths of this review included the comprehensive summary of the current literature relevant to the research question, including a rigorous search strategy and critical appraisal of the quality of studies. To our knowledge, this is the first review to systematically evaluate the association between weight-based teasing in childhood and depressive symptoms in childhood and adulthood, according to time, source, and sex. The primary limitation of our review was that many of our interpretations were based on qualitative comparisons because many of the included studies did not conduct statistical tests to answer our research questions. Furthermore, the NHLBI assessment tool that we used to assess the quality of included studies lists questions that help guide the researchers to evaluate the internal validity of the studies. However, the NHLBI states that “they are not intended to create a list that you simply tally up to arrive at a summary judgment of quality” [27]. Although we did not use the quality rating score to exclude studies in this review, we recognize the limitations of the subjective nature of this tool that required the researchers (E.S. and F.M.) to subjectively evaluate the overall quality rating score (i.e., good, fair, or poor) without being provided with distinct cutoff scores. Moreover, the majority of studies were cross-sectional in nature; therefore, we could not determine causality, and only four longitudinal studies were included in the review, limiting the ability to make conclusions on the effect of time. Seven studies performed secondary analyses using data from Project EAT, which included the same sample of people within each published study. The studies included in this review did not distinguish between sex and gender whereby studies only described youth participants as boys or girls and men or women for adults. Furthermore, some studies in

our review only included female participants or had substantially more women compared to men. The majority of the studies were conducted in the USA, and participants' ethnicity was predominantly Caucasian.

Variability existed among study designs and reporting of outcome measures, which prevented us from performing a meta-analysis. Many studies had different characteristics that were deemed not sufficiently homogeneous (e.g., different lengths of follow-up, exposures, outcomes, statistical procedures, confounding variables) to perform a meta-analysis. This systematic review reports on results from a narrative synthesis which provides a qualitative rather than a quantitative assessment of the studies included in the review, which may have introduced bias when interpreting results.

### Implications and Future Research Directions

The findings of our study serve to guide the implementation of policies against weight-based teasing in both the school and the home to reduce its frequency and its negative effects on mental health in childhood and adulthood. Although girls may be more psychologically vulnerable to teasing, our review found that both sexes can be adversely affected, warranting programs for all students of all genders. Based on our systematic review in combination with other studies' findings [5, 20, 22], parents should learn to institute a “no teasing” zone at home to protect their children from at least one source of teasing [34]. School administrators could also explore strategies for reducing weight-based teasing as a recent meta-analysis found that anti-bullying programs successfully reduced bullying victimization by 17–20% [85].

In the future, quantitative studies are warranted to continue to explore the relationship between weight-based teasing and depressive symptoms in order to understand differences among youth of sexual minorities and diverse gender identities as well. Studies where ethnically diverse groups are included are warranted as well given that perception of body image and weight may vary among different ethnic backgrounds. More longitudinal studies are necessary, where baseline levels of depressive symptoms are adjusted, to better understand this relationship as well.

### Conclusion

The main findings of our review highlighted the permeating issue of weight-based teasing from family and peers and its relationship with depressive symptoms in both the short and long term. This review established that girls are teased more frequently than boys and they were found to be more affected in terms of depressive symptoms by weight-based teasing. It appears that teasing from multiple sources increased the likelihood of experiencing depressive symptoms, yet it remains

uncertain whether one source of teasing is more common than the other. However, our findings were based on a narrative synthesis, and some studies showed contradicting results and lacked statistical support, emphasizing the need for further, more quantitative investigation on the relationship between weight-based teasing in childhood and concurrent or future depressive symptoms in adulthood. Nevertheless, we provide enough evidence to demonstrate the psychological harm associated with weight-based teasing in children and youth, highlighting the need to develop effective anti-bullying interventions and programs targeted in the home and school environments.

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### Compliance with Ethical Standards

**Conflict of Interest** The authors report no conflicts of interest.

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