

# Weight Stigma and Mental Health in Youth: A Systematic Review and Meta-Analysis

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Received 29 November 2020; revisions received 23 September 2021; accepted 29 September 2021

## Abstract

**Objective** Over the past two decades, there has been a steady increase in research focused on the association between weight-based stigma and mental health outcomes in children and adolescents. The present study is a systematic review and meta-analysis of the associations between weight stigma and mental health in youth. **Methods** A systematic search of PubMed, PsychInfo, and Embase databases was conducted in January 2020. Inclusion criteria included the following: (a) examined an association between weight stigma and a mental health outcome, (b) mean sample age <18 (+1 standard deviation) years, (c) written in English, and (d) peer reviewed. Forty eligible articles were identified. The moderating effects of age, sex (percent female), weight status (percent with overweight/obesity), and study quality were examined. **Results** Overall, meta-analytic findings using a random-effects model indicated a statistically significant moderate association between weight stigma and poorer mental health outcomes ( $r = .32$ , 95% confidence interval [0.292, 0.347],  $p < .001$ ). Age and study quality each moderated the association between weight stigma and mental health. Generally, the study quality was fair to poor, with many studies lacking validated measurement of weight stigma. **Conclusions** Although there was a significant association between weight stigma and mental health in youth, study quality hinders the current body of literature. Furthermore, findings highlight the lack of consideration of internalized weight stigma in child populations, the importance of using validated measures of weight stigma, and the need for increased awareness of how these associations affect populations of diverse backgrounds.

**Key words:** adolescents; meta-analysis; preschool children; psychosocial functioning; school-age children; systematic review.

## Introduction

Obesity is a national epidemic and is associated with increased risk for morbidity and early mortality in both children and adults (Hales et al., 2017; Ligibel et al., 2014; National Heart, Lung, Blood Institute, National Institute of Diabetes, Digestive, & Kidney Diseases (US), 1998; Skinner et al., 2018). Weight status is often inaccurately associated with negative

stereotypes in western culture, specifically that persons with overweight or obesity are lazy, lack discipline, or are not motivated (Pont et al., 2017). Some have also incorrectly suggested that shaming persons with overweight or obesity (i.e., weight stigma) will lead to motivation to lose weight (Callahan, 2013; Puhl & Heuer, 2010; Stuber et al., 2008). Weight stigma, also

called weight bias or weight-based discrimination, is the societally constructed rejection or marginalization of people due to negative perceptions of overweight (Puhl & Brownell, 2006). Prior research overwhelmingly supports that these inaccurate beliefs and behaviors from others (i.e., weight stigma) lead to increased food intake and decreased physical activity, which only exacerbates the overweight and obesity epidemic (Puhl & Heuer, 2010). Combined, these beliefs lead to discrimination against persons with overweight or obesity (Puhl & Heuer, 2009).

The formation of self-concept from childhood into adolescence is highly influenced by outside individuals (e.g., peers, parents, teachers; Blakemore & Mills, 2014; Van Harmelen et al., 2017). Experiencing weight stigma from others and/or internalizing those stigmatizing ideals may have harmful effects for social and emotional development in youth. Weight stigma in youth has been related to increased risk for developing numerous psychological and emotional problems, such as depression, anxiety, low self-esteem, and body dissatisfaction (Bucchianeri et al., 2014; Jensen & Steele, 2009; Puhl & Latner, 2007). Furthermore, adolescents who experience weight stigma are at higher risk for self-harm behaviors and suicidal ideation (Eaton et al., 2005; Eisenberg et al., 2003). Suicide is one of the leading causes of death in U.S. youth (Heron, 2019), and mental health problems can lead to severe morbidity and early mortality. Given the devastating potential risks to youth resulting from mental health concerns, a more thorough review of weight stigma and mental health outcomes specific to youth is warranted to better understand how these variables are related, which can then inform future prevention and intervention efforts.

Weight stigma can be experienced both externally (i.e., public stigma) or internally (i.e., weight bias internalization [WBI] and self-stigma). In youth, external weight stigma, defined as prejudice or negative attitudes occurring between two people due to perceived overweight or obesity, is often experienced by peers in a school setting. Youth also report experiencing weight stigma by caregivers, coaches, health-care professionals, educators, and the media (Pont et al., 2017; Puhl et al., 2013). External weight stigma encompasses many concepts including weight-bullying, weight teasing, and weight-based victimization; from here on, each of these will be subsumed within the term external weight stigma. Weight status, particularly in persons with overweight/obesity, is the most common reason for bullying in youth (Puhl et al., 2011); and children with obesity are more likely to experience external weight stigma compared to their healthy weight peers (Harriger & Thompson, 2012; Pont et al., 2017; Puhl & Latner, 2007). However, weight stigma has been reported across the weight

spectrum, including in individuals at a healthy weight status among adults (Jackson et al., 2014). External weight stigma has been associated with increased weight over time (Dutton et al., 2014; Jackson et al., 2014; Schvey et al., 2019) as well as unhealthy weight control behaviors and disordered eating (Puhl et al., 2020).

Beyond weight stigma from others, weight stigma can also be experienced internally. Internal weight stigma—referred to as WBI from here on—is when an individual internalizes the experienced stigma and believes the negative attitudes are true for oneself (Corrigan et al., 2001; Durso & Latner, 2008). Specifically, WBI is conceptualized as the personal belief that social stereotypes relating to obesity are true for oneself (e.g., being lazy, unmotivated, “less than”) and includes negative self-evaluation due to one’s weight (Durso & Latner, 2008). Internalizing society’s inaccurate views of weight can lead to shame, low self-esteem, and unhealthy behaviors such as excess eating and physical inactivity (Jackson et al., 2014; Pila et al., 2015).

Although several studies have explored associations between weight stigma and mental health in youth, no prior work has quantitatively synthesized this body of literature to better understand these associations. Puhl et al. (2020) published a narrative synthesis of the literature on how weight stigma has the potential to contribute to the obesity epidemic, highlighting the relationship between weight stigma and health outcomes broadly (e.g., maladaptive eating behaviors, increased weight gain, and psychological stress) across the lifespan. The authors called for future research to determine the links between weight stigma and psychological outcomes in youth specifically. Emmer et al. (2020) published a meta-analysis examining the association between weight stigma and mental health outcomes across the lifespan. Within this meta-analysis, higher reported weight stigma was associated with poorer mental health outcomes; an association which was stronger as body mass index increased. In examining differences between WBI and external weight stigma, the authors identified that WBI had a stronger association with mental health problems as compared to external weight stigma. This review, however, was limited as it included few studies with youth samples. Furthermore, a key limitation of this study was the aggregation of child and adolescent study results with adult studies. This methodology precludes the ability to quantify the association between weight stigma and mental health during formative developmental years.

Childhood is a key developmental period for understanding the impact of weight stigma as children and adolescents are highly susceptible to judgments from themselves and others as they grow and begin to

develop identities (Neumark-Sztainer & Eisenberg, 2005). Furthermore, this is a developmental period associated with the onset of mental illness (Kessler et al., 2007). Thus, understanding the associations between weight stigma and mental health outcomes specific to youth is vital to better understand this relationship during a key developmental period.

Beyond the association between weight stigma and mental health in youth, examination of the impact of age, sex, and weight status on this association is needed. Prior work has identified evidence of stronger associations between weight stigma and body dissatisfaction in girls compared to boys (Puhl et al., 2020). However, other mental health outcomes such as depression, anxiety, and conduct disorder have not been examined. In a large meta-analysis across the lifespan, age was not a significant moderator of the association between weight stigma and mental health outcomes across the lifespan (Emmer et al., 2020). However, this study did not focus on youth and included minimal focus on developmental differences between childhood and adolescence. Given the significant developmental changes that occur throughout childhood and adolescence, there may be a differential association between weight stigma and mental health across childhood (Emmer et al., 2020). Finally, although weight stigma is sometimes thought of as only affecting persons with overweight or obesity, prior research has contradicted this assumption in adults (Jackson et al., 2014). Examination of weight status as a moderator of the association between weight stigma and mental health will elucidate any potential differences in the harmful effects of weight stigma across the weight spectrum in youth (Puhl & Heuer, 2009).

A systematic and meta-analytic exploration of how weight stigma is associated with multiple mental health outcomes in child and adolescent populations is key to better understanding and advancing both research and clinical agendas. Weight stigma is one of the last forms of stigma still considered by some to be socially acceptable (Puhl et al., 2020). The associations between weight stigma and mental health have not been well studied, particularly as relates to the moderating effects of age, sex, and weight status (Emmer et al., 2020; Puhl et al., 2020), given that prior work has not quantitatively examined these relationships in youth. The current systematic review and meta-analysis sought to identify and describe the relationships between weight-based stigma and mental health in youth. In addition, the current review aimed to examine the potential moderating effects of age, sex, and weight status on the association between weight stigma and mental health outcomes in youth. Study quality was also examined as a moderator of the effect between weight-based stigma and mental health in youth. Results highlight areas for future

intervention development, future research directions, and clinical indicators of the association between weight stigma and mental health in youth.

## Methods

### Search Strategy

Standard protocol and guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) were followed (Moher et al., 2015; Shamseer et al., 2015). The current review was not registered nor was an accessible protocol prepared. Systematic searches were conducted in three databases (PubMed, PsychINFO, and Embase). No limits were placed on the date of publication. Search results were imported into Endnote for screening. Search terms were selected based on previous reviews in adults and relevant primary studies (Supplementary Table 1; Emmer et al., 2020; Pont et al., 2017; Puhl & Heuer, 2009). Database searches were conducted in January 2020. Following initial screening, reference lists of included articles were searched to identify any additional articles for inclusion.

### Eligibility Criteria

Studies were eligible for the current review based on the following criteria: (a) examined the association between weight stigma (i.e., external weight stigma, WBI) and a mental health outcome, (b) focused on children or adolescents (mean age was not more than 1 SD above 18 years old), (c) were written in English, and (d) were peer reviewed. Studies were excluded if they met criteria for one or more of the following: (a) did not explicitly measure weight stigma independent of other constructs (e.g., if weight and appearance stigma were combined, the study was excluded), (b) did not include a mental health variable (e.g., dieting not specific to mental health outcome such as disordered eating, quality of life measure without a subscale measuring emotional function), (c) primary focus of the study was a separate underlying medical condition (e.g., asthma, type 1 diabetes) or focused on children with an underlying medical condition that caused them to gain weight (e.g., Prader–Willi syndrome, thyroid disease), (d) did not provide enough information to calculate effect sizes, or (e) did not include original data (i.e., was a review article). All articles were screened to remove duplicate reporting on the same sample, which was assessed through multiple indicators (e.g., sample size, authors, methods section, study title). All authors participated in review of the articles in the current study, rotating articles to review such that two authors independently reviewed each article. Any discrepancies were discussed between authors, and when consensus could not be reached, an additional (i.e., third) author assessed the articles to obtain

consensus. The following data were extracted from eligible articles for [Table I](#): author name(s), year of publication, study design (i.e., cross-sectional or longitudinal), weight stigma type (i.e., external weight stigma or WBI) and measure, sample size, mean and standard deviation of sample age, percent sample identified as female, percent of sample who met criteria for overweight or obesity (body mass index  $\geq 85^{\text{th}}$  percentile), mental health measure, key statistical findings, and brief description of the outcome. Further explanation of the review process is detailed in the *Results* section below.

### Quality Assessment

Quality of studies included in the systematic review and meta-analysis was assessed using the Observational Cohort and Cross-Sectional Studies checklist ([Study Quality Assessment Tools | NHLBI, NIH, n.d.](#)). This 14-item checklist was designed to guide reviewers to focus on factors impacting the internal validity of a study (e.g., “Was the study population clearly specified and defined?”). All items in the assessment tool reveal an aspect of potential for study bias, with high rate of bias indicating lower-quality studies. A yes or no response is rendered for each of the 14 items to guide reviewers to an overall quality rating (good, fair, or poor), which is assigned to each article. For each study included in the current review, two authors independently assessed the quality of the study and resolved discrepancies through discussion with the input of a third author. Coders came to 100% agreement.

### Data Analytic Plan

A random-effects model within Comprehensive Meta-Analysis (CMA), Version 3 was used, as the sampling and methodological factors were different between studies ([Borenstein et al., 2005](#)). An effect size of zero was assigned for any findings reported as nonsignificant without statistical values ([Lipsey & Wilson, 2001](#)). Effect sizes were all coded to indicate that higher values on mental health indicated poorer mental health outcomes (e.g., higher depressive symptoms, poorer self-esteem) to ensure that all scales functioned in the same direction. If effect sizes were not calculated, relevant data were inputted into CMA, which calculated the relevant effect size. Analyses were conducted such that one overall effect size was calculated for articles reporting multiple eligible analyses on the same sample (e.g., inclusion of multiple mental health outcomes). However, for articles that reported multiple independent samples (e.g., study A, study B) both samples were included and treated as independent samples. Correlational effect size,  $r$ , was used to reflect the association between the constructs of interest. Guidelines for interpretation of correlation as an effect size are as follows: 0.10 is a small effect, 0.30 is a

medium effect, and 0.50 is a large effect. Meta-regression analyses were used to examine potential moderators, including average child age, percent female, percent with overweight/obesity, and study quality. The potential of publication bias was tested using Egger’s test ([Egger et al., 1997](#)) and fail-safe  $N$  ([Rosenthal, 1979](#)). Descriptive statistics (i.e., count variables) were conducted to describe the number of studies that measured specific mental health and weight stigma constructs, as well as those that included the moderation variables examined.

## Results

### Study Selection

In total, 29,162 articles were identified across PubMed, PsychInfo, and Embase databases, with an additional (nonduplicate) five articles identified from a backward search of included articles. Duplicates were removed ( $n=7,484$ ). Titles and abstracts of articles were first screened by two reviewers, resulting in the exclusion of 21,449 articles. The full text of the remaining 234 articles was assessed and evaluated for eligibility. As indicated in [Figure 1](#), the most common reason for exclusion following full-text review was not measuring weight stigma, followed by the sample not being limited to children. The authors of this review reached out to the primary and/or senior authors of 17 articles requesting additional information for the meta-analysis. They received the requested information for six articles. Articles of authors that did not respond or were unable to provide the requested information were excluded.

Forty articles met the final eligibility criteria for the current review ([Table I](#)), which represented 43 effect sizes (due to independent samples within the same article). Of those, 35 of the studies involved cross-sectional research designs and 5 involved longitudinal designs. However, only cross-sectional data were included (e.g., baseline data from longitudinal studies), given limitations in combining cross-sectional and longitudinal data for the purposes of meta-analysis. No studies included treatments. Sample sizes ranged from 92 to 57,997 participants. Mean participant ages ranged from 9 to 16 years. Percent of participants who were female ranged from 42% to 100%. Fifteen studies did not report what percent of their participants met the criteria for overweight or obesity status. In the studies that reported percent of participants with overweight or obesity ( $n=25$ ), this ranged from 14% to 100%.

### Measurement of Weight Stigma

The majority of articles included in the current review measured external weight stigma ( $n=35$ ), while only five measured WBI. Of those that measured external

**Table 1. Overview of Included Studies**

Authors (year)	Design	Weight stigma		N	Demographics (mean age [SD], % female)	% With OV/OB	Quality	Mental health outcome	Brief description of outcome
		Measure	Type						
Balantekin et al. (2018)	Cross-sectional	1 question (Project EAT family)	External	166	15 (NA) years, 100% female	NR	Poor	UWCBs (list of UWCBs)	Maternal and friend weight stigma positively associated with unhealthy weight control behaviors. Paternal weight stigma not statistically significant
Blanco et al. (2019)	Cross-sectional	POTS-S	External	100	10.14 (1.35) years, 60% female	50.0	Fair	Anxiety (STAI-C), Depression (CDI), Self-esteem (LAWSEQ)	Weight stigma correlated with poorer psychological well-being, including greater depression and anxiety and lower self-esteem
Ciupitu-Plath et al. (2018)	Cross-sectional	WBIS	Internal	191	15.06 (1.49) years, 51.31% female	100	Fair	Quality of life (KIDSCREEN), Self-esteem (RSE)	WBIS negatively correlated with quality of life and self-esteem
Eisenberg et al. (2019) <sup>a</sup>	Cross-sectional	1 question (Project EAT family)	External	1,577	14.5 (NR) years, 49.5% female	NR	Poor	Body dissatisfaction (Likert response to list of body parts), Depression (Depressive Mood Scale), Self-esteem (RSE), UWCB (endorsement of behaviors via list)	Those who reported experiencing weight stigma reported poorer outcomes across all mental health outcomes compared to those who did not report experiencing weight stigma
Gayes and Steele (2015)	Cross-sectional	POTS, WCA	External	307	9.85 (0.72) years, 50.64% female	NR	Fair	Quality of life (PedsQL)	Both weight stigma scales were negatively correlated with HRQoL
Gerke et al. (2013)	Cross-sectional	POTS	External	92	13.92 (1.84) years, 67.4% female	100	Fair	Disordered eating (ChEDE-Q), Depression (CDI), Self-esteem (CSEI)	Weight stigma positively correlated with depression and disordered eating, negatively correlated with self-esteem
Goldfield et al. (2010)	Cross-sectional	MRSF-III (parent and peer subscales)	External	1,491	14.7 (1.8) years, 57% female	24.0	Poor	Anxiety (MASC-10), Depression (CDI), Disordered eating (DEBQ)	Weight stigma positively correlated with anxiety, depression, and disordered eating

*(continued)*



Table 1. (continued)

Authors (year)	Design	Weight stigma		N	Demographics (mean age [SD], % female)	% With OV/OB	Quality	Mental health outcome	Brief description of outcome
		Measure	Type						
Greenleaf et al. (2014)	Cross-sectional	1 author-created question (yes/no)	External	1,419	12.41 (0.97) years, 55% female	NR	Poor	Depression (CES-DC), Self-esteem (SDQII- GSE)	Those who reported experiencing weight stigma reported higher depression and lower self-esteem compared to those who did not re- port experiencing weight stigma
Greenleaf et al. (2017)	Cross-sectional	WST/PARTS	External	343	12.3 (0.8) years, 41.7% female	100	Fair	Body satisfaction (BPSS-R), Depression (CES- DC), Self-esteem (SDQII-GSE)	Weight stigma positively correlated with depres- sion and negatively cor- related with body satisfaction and self- esteem
Guardabassi et al. (2018)	Cross-sectional	POTS	External	600	9.64 (0.88) years, 51.8% female	35.8	Fair	Quality of life (PedsQL™4.0)	Weight stigma negatively correlated with PedsQL
Himmelstein and Puhl (2019)	Cross-sectional	1 author-created question of fre- quency of weight teasing	External	148	15.97 (1.25) years, 50% female	82.0	Poor	Author-created ques- tions related to neg- ative emotions and unhealthy eating behaviors	Weight stigma from peers positively correlated with negative emotions and eating, weight stigma from teachers negatively correlated with negative emotions and eating. Weight stigma from family and friends not statistically significant
Himmelstein et al. (2019)	Cross-sectional	2 questions (Project EAT family and peers and fre- quency of teasing)	External	9,838	15.6 (1.26) years, 44% cisgender female	37.2	Poor	Binge eating (4 yes/no questions), UWCB (9 questions), Stress (1 question)	Frequency of weight stigma correlated with more severe binge eat- ing, UWCB, and stress
Hutchinson and Rapee (2007)	Cross-sectional	POTS	External	1,094	12.3 (0.52) years, 100% female	NR	Fair	Body image concern (BAQ); Disordered eating (EDI-Bulimia subscale, DEBQ- Restraint subscale), UWCB (EWLB)	Weight stigma positively correlated with disor- dered eating behaviors and body image concern
Levers-Landis et al. (2019)	Cross-sectional	POTS	External	334	14.59 (1.38) years, 63.7% female	NR	Fair	Depression (CES-DC); Self-esteem (RSE)	Weight stigma negatively correlated with self-es- teem and positively with depression

(continued)

Table 1. (continued)

Authors (year)	Design	Weight stigma		N	Demographics (mean age [SD], % female)	% With OV/OB	Quality	Mental health outcome	Brief description of outcome
		Measure	Type						
Jensen and Streele (2012)	Longitudinal	POTS	External	93	11.7 (2.6) years, 59% female	100	Good	Quality of life (PedsQL™4.0)	Weight stigma negatively correlated with quality of life
Lin et al. (2020)	Longitudinal	WBIS	Internal	934	15.7 (1.2) years, 52.5% female	100	Poor	Psychological dysfunc- tion (DASS-21), Quality of life (PedsQL)	WBIS positively corre- lated with psychologi- cal dysfunction and negatively correlated with quality of life
López-Guimerà et al. (2012)	Cross-sectional	POTS	External	1,501	14.3 (1.4) years, 48% female	15.5	Fair	Body dissatisfaction (EDI-2), Disordered eating (ChEAT), Self-esteem (RSE)	Weight stigma positively correlated with disor- dered eating and body dissatisfaction, nega- tively associated with self-esteem
Maiano et al. (2019)	Cross-sectional	WSSQ	Internal	156	16.31 (0.8) years, 48.1% female	100	Poor	Anxiety (HADS), Depression (HADS), Disordered eating (EAT-26), Self-es- teem (SDQ-12)	WSSQ negatively corre- lated to self-esteem and positively correlated to anxiety, depression, and disordered eating
McCormack et al. (2011)	Cross-sectional	2 author-created questions	External	148	11.2 (NR) years, 52.4% female,	45.2	Poor	Body dissatisfaction (5 yes/no questions)	Those who reported weight stigma had lower body satisfaction than those did not re- port weight stigma
Modi and Zeller (2008)	Cross-sectional	Sizing Them Up Teasing/ Marginalization subscale (3 items)	External	220	11.6 (3.3) years, 68% female	100	Fair	Quality of life (PedsQL-Kids)	Weight stigma negatively correlated to quality of life
Nelson et al. (2011)	Cross-sectional	POTS	External	382	10.8 (0.6) years, 46% female	32.8	Fair	Body dissatisfaction (figure scales), Self- esteem (5 items modified from CSEI and RSE)	Weight stigma positively correlated to body dis- satisfaction and nega- tively correlated to self- esteem
Neumark-Sztainer et al. (2002) <sup>b</sup>	Cross-sectional	2 questions (Project EAT family and peers)	External	4,746	14.9 (1.7) years, 49.8% female	NR	Poor	Disordered eating and unhealthy weight control behaviors (yes/no unstandar- dized questionnaire)	Weight stigma associated with greater disordered eating and unhealthy weight control behaviors
Neumark-Sztainer et al. (2010)	Cross-sectional	1 author-created question	External	356	15.8 (1.2) years, 100% female	46.0	Poor	Disordered eating (2 questions), UWCB (Project EAT questions)	Weight stigma associated with greater unhealthy and extreme weight control behaviors, and binge eating

(continued)

Table 1. (continued)

Authors (year)	Design	Weight stigma		N	Demographics (mean age [SD], % female)	% With OV/OB	Quality	Mental health outcome	Brief description of outcome
		Measure	Type						
Olvera et al. (2013)	Cross-sectional	MRFS-IV	External	141	11.1 (1.5) years, 100% female	100	Poor	Disordered eating and UWCB (McKnight Risk Factor Survey- IV)	Parental weight stigma positively associated with binge eating
Pearlman et al. (2019)	Cross-sectional	2 author-created questions based upon Puhl et al. (2013)	External	128	14.35 (1.5) years, 54% female	100	Poor	Depression (BDI), Disordered eating (EDE-Q), Self-es- teem (RSE)	Weight stigma positively correlated with disor- dered eating and de- pression, and negatively correlated with self- esteem
Porter et al. (2013)	Cross-sectional	POTS	External	119	13.9 (1.7) years, 72% female	100	Fair	Body satisfaction (BDS, MBSRQ), Depression (CDI), Self-esteem (CSEI)	Weight stigma negatively correlated with self-es- teem and body satisfac- tion and positively correlated with depression
Puhl and Himmelstein (2018)	Cross-sectional	Modified WBIS	Internal	148	15.97 (1.2) years, 50% female	71.6	Poor	Disordered eating (4 validated questions regarding binge eat- ing symptoms)	WBIS correlated with more severe binge eating
Puhl and Luedicke (2012)	Cross-sectional	28 author-created items assessing forms of teasing and 8 items assessing loca- tion of teasing	External	394	16.4 (1.0) years, 56% female	35.0	Poor	Affect and disordered eating responses to bullying (author-cre- ated questions)	Weight stigma correlated with negative affect for boys only
Puhl et al. (2019) <sup>c</sup>	Cross-sectional	2 author-created questions (peers and family)	External	9,839	15.6 (1.2) years, 44% cisgender female	37.2	Poor	Depression (KADS), Self-esteem (RSE)	Weight stigma negatively correlated with self-es- teem and positively cor- related with depression
Rojas-Moreno et al. (2013)	Cross-sectional	POTS	External	57,997	Age NR (13– 16 years), 49.1% female	~14%	Fair	Body dissatisfaction (EDI), Disordered eating (ChEAT, EDI), Low self-es- teem (EDI)	Weight stigma positively correlated to all mental health variables
Stice and Whirenton (2002)	Longitudinal	2 author-created questions	External	496	Age NR (11– 15 years), 100% female	NR	Good	Body dissatisfaction (BPSS-R), Depression (K- SADS)	Weight stigma positively correlated with body dissatisfaction and depression
Suisman et al. (2008)	Cross-sectional	POTS	External	265	12.5 (1.4) years, 100% female	NR	Fair	Disordered eating (MEBS), Negative affect (EATQ-R)	Weight stigma positively correlated with disor- dered eating and nega- tive affect

(continued)



Table 1. (continued)

Authors (year)	Design	Weight stigma		N	Demographics (mean age [SD], % female)	% With OV/OB	Quality	Mental health outcome	Brief description of outcome
		Measure	Type						
Thompson et al. (1995)	Cross-sectional and longitudinal	2 author-created questions on fre- quency of teasing and how upset were by teasing; PARTS	External	210	Age NR (10– 15 years), 100% female,	NR	Fair	Body image (Body Figure Ratings; EDI), Disordered Eating (EDI, EAT- 26)	Weight stigma history positively correlated with disordered eating and negatively with body image
Thompson et al. (1995)	Cross-sectional	1 author-created question on fre- quency of teas- ing; PARTS	External	169	16 (NR) years, 100% female	NR	Fair	Body image (MBSEQ- AE, BIATQ-PSS), Global Psychological Function (CDI, STAI, COOP), Disordered Eating (BULIT-B, EDI, EAT-26)	Weight stigma positively correlated with disor- dered eating, worse global psychological functioning, and poorer body image
Turker et al. (2012)	Cross-sectional	3 author-created items	External	945	14.7 (1.2) years, 100% female	21.5	Fair	Body dissatisfaction (BSQ), Depression (BDI), Disordered eating (EAT-26), Self-esteem (RSE)	Weight stigma positively correlated with body dissatisfaction, depres- sion, and disordered eating
Van Dale et al. (2014)	Cross-sectional	PARTS	External	651	Age NR (14– 18 years), 54.8% female,	NR	Fair	Self-esteem (RSE)	Weight stigma positively correlated with low self-esteem
Van den Berg et al. (2002)	Cross-sectional	5 author-created items regarding frequency	External	470	15.5 (0.2) years, 100% female	NR	Poor	Body dissatisfaction (BAQ), Global psy- chological function (BDI, RSE)	Weight stigma positively associated with body dissatisfaction
Wertheim et al. (2001)	Longitudinal	POTS	External	130	12.82 (NR), 100% female	NR	Fair	Depression (BDI), Disordered eating (DEBQ)	Weight stigma positively correlated with depres- sion and disordered eat- ing; weight stigma predicted disordered eating
Wertheim et al. (2001)	Longitudinal	POTS	External	174	13.71 (NR), 100% female	NR	Fair	Body dissatisfaction (EDI), Disordered eating (EDI)	Weight stigma positively correlated with disor- dered eating and body dissatisfaction
Wertheim et al. (2001)	Longitudinal	POTS	External	131	15.75 (NR), 100% female	NR	Fair	Body dissatisfaction (EDI), Depression (BDI), Disordered eating (EDI), Self-es- teem (RSE)	Weight stigma positively correlated with depres- sion, disordered eating, body dissatisfaction, and negatively corre- lated with self-esteem

(continued)

Table 1. (continued)

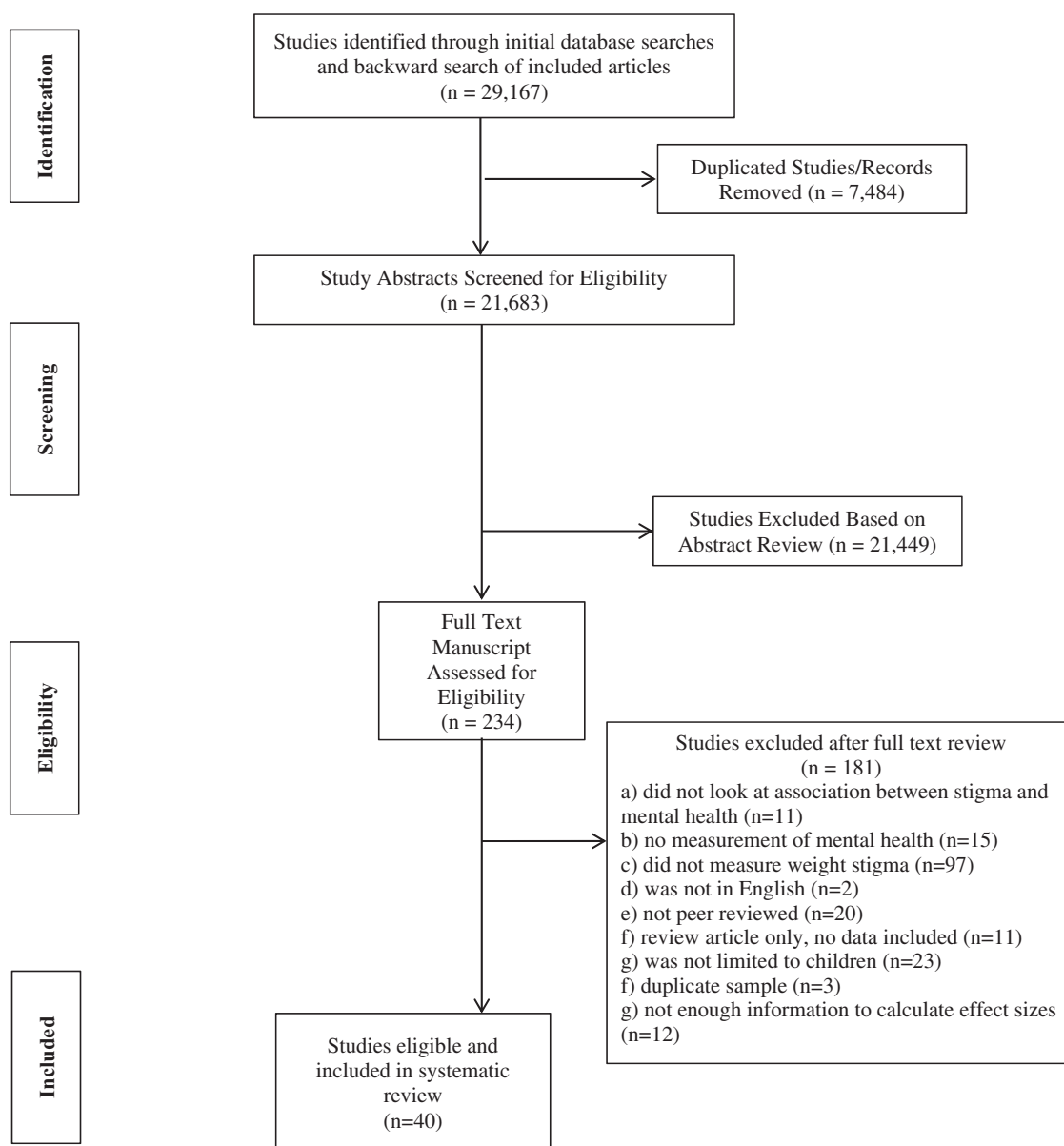
Authors (year)	Design	Weight stigma		N	Demographics (mean age [SD], % female)	% With OV/OB	Quality	Mental health outcome	Brief description of outcome
		Measure	Type						
Wojtowicz and Von Ranson (2012)	Longitudinal	POTS	External	393	15.8 (0.6) years, 100% female	NR	Fair	Body dissatisfaction (BPS), Self-esteem (RSE)	Weight stigma positively correlated to body dis- satisfaction and nega- tively to self-esteem
Zeller and Modi (2009)	Cross-sectional	Sizing Me Up Teasing/ Marginalization Subscale	External	141	9.2 (2.2) years, 67% female	100	Fair	Quality of Life (PedsQL™ 4.0)	Weight stigma negatively correlated with quality of life
Zaba and Warschburger (2018)	Cross-sectional	WBIS-C	Internal	1,484	10.55 (0.9) years, 51.9% female	19.0	Fair	Anxiety (Kinder- Angst-Test II), Body dissatisfaction (1 item), Depression (German Depression Test for Children), Disordered eating (DEBQ), Psychosocial/emo- tional problems (Strengths and Difficulties Questionnaire), Self- esteem (CHQ)	WBIS positively corre- lated with depression, anxiety, body dissatis- faction, psychosocial/ emotional problems, and disordered eating; WBIS negatively corre- lated with self-esteem

Note. NA = Not applicable; NR = Not reported; BAQ = Body Attitudes Questionnaire; BESAA = Body Esteem Scale for Adolescents and Adults; BDI = Beck Depression Inventory; BIATQ = Body Image Automatic Thoughts Questionnaire; BPSS-R = Body Parts Satisfaction Scale Revised; BSQ = Body Shape Questionnaire; BUILT-B = Bulimia Test Binge Eating Subscale; CDI = Children's Depression Inventory; CES-DC = Center for Epidemiological Studies-Depressive Scale for Children; ChEAT = Children's Eating Attitude Test; ChEDE-Q = Children's Eating Disorder Examination Questionnaire; CHQ = Child Health Questionnaire; COOP = Coopersmith Self-Esteem Inventory; CSEI = Coopersmith Self-Esteem Inventory; DEBQ = Dutch Eating Behaviour Questionnaire; EATQ-R = The Early Adolescent Temperament Questionnaire—Revised; EDDS = Eating Disorder Diagnostic Scale; EDE-Q = Eating Disorder Examination Self-Report Questionnaire; EDI = Eating Disorder Inventory; EWL = Extreme Weight Loss Behaviors Checklist; FRS = Figure Rating Scale; HADS = Hospital Anxiety and Depression Scale; HRQoL = Health-Related Quality of Life; KADS = Kutcher Adolescent Depression Scale; KIDSCREEN = KIDSCREEN 10-Index; K-SADS = Schedule for Affective Disorders and Schizophrenia for School-Age Children; LAWSEQ = Lawrence's Self-Esteem Questionnaire; MASC-10 = Multidimensional Anxiety Scale for Children; MBSRQ = Multidimensional Body-Self Relations Questionnaire; MEBS = Minnesota Eating Behavior Survey; NPS = Negative Physical Self Scale; MRSF = McKnight Risk Factor Survey; PANAS = Positive and Negative Affect Scale; PARTS = Physical Appearance Related Teasing Scale, weight-related only; POTSWeight Teasing Subscale of the Perception of Teasing Scale; POTS-S = Spanish version of the POTS; RSE = Rosenberg Self-Esteem Scale; SDQII-GSE = Self-Description Questionnaire II General Self-Esteem Scale; STAI = State-Trait Anxiety Inventory; STPI = Spielberger State-Trait Personality Inventory; UW/CB = Unhealthy weight control behaviors; WBIS = Weight Bias Internalization Scale; WCA = Weight Criticism Scale; WSSQ = Weight Self-Stigma Questionnaire.

<sup>a</sup>Both used Project Eat 2010 dataset.

<sup>b</sup>Both used Project Eat 1 dataset.

<sup>c</sup>Both used LGBTQ Teen Study dataset.



**Figure 1.** PRISMA flow diagram of screened articles for inclusion in systematic review. PRISMA = Preferred Reporting Items for Systematic Reviews and Meta-Analysis.

weight stigma, the majority used either the Weight Teasing Subscale from the Perception of Teasing Scale (POTS;  $n=14$ ) or created their own questions ( $n=10$ ). Four studies used questions from Project EAT (Eating Among Teens; Balantekin et al., 2018; Eisenberg et al., 2019; Himmelstein et al., 2019; Neumark-Sztainer et al., 2002), two used questions from the McKnight Risk Factor Survey (Goldfield et al., 2010; Olvera et al., 2013), and three used the weight subscale of the Physical Appearance Related Teasing Scale (PARTS; Greenleaf et al., 2014; Thompson et al., 1995; van Dale et al., 2014). Articles asked about instances of weight stigma directed from the following categories: family only ( $n=3$ ); family and peers ( $n=6$ ); family and friends ( $n=2$ ); family, peers, and friends ( $n=1$ ); and family, peers, friends,

and teachers ( $n=1$ ). Twenty-two articles did not specify the source of weight stigma. Four of the five articles measuring WBI utilized the Weight Bias Internalization Scale (WBIS; Ciupitu-Plath et al., 2018; Lin et al., 2020; Puhl & Himmelstein, 2018; Zuba & Warschburger, 2018) while one used the Weight Self-Stigma Questionnaire (WSSQ; Maiano et al., 2019).

#### Measurement of Mental Health

Studies included in this review measured a wide range of mental health constructs, with the majority of studies examining multiple mental health outcomes. The specific outcomes measured included: self-esteem ( $n=19$ ), disordered eating ( $n=17$ ), body dissatisfaction/body image ( $n=16$ ), depression ( $n=15$ ),

unhealthy weight control behaviors ( $n = 8$ ), negative affect (including stress and global psychological functioning;  $n = 8$ ), quality of life ( $n = 7$ ), and anxiety ( $n = 4$ ). Eight studies looked at the associations between weight stigma and one mental health construct, while the remainder ( $n = 28$ ) looked at multiple mental health constructs. More of the articles included in the current review measured mental health outcomes with validated, standard measurements, while few used validated measures to examine the weight stigma constructs. Three studies in the current review evaluated mental health constructs using either author-created questions or it was unclear where the questions were derived from Himmelstein and Puhl (2019), Neumark-Sztainer et al. (2002), and Puhl and Luedicke (2012).

### Associations Between Weight Stigma and Mental Health

Using a random-effects model, the overall association between weight stigma and mental health was statistically significant ( $r = .32$ , 95% confidence interval [0.292, 0.347],  $p < .001$ ,  $I^2 = 97.47$ ) for the 40 studies representing 43 effect sizes (Figure 2). This represents a medium effect size. There was no indication of publication bias based on Egger's test ( $t = 1.07$ ,  $p = .291$ ). Fail-safe  $N$  indicated that 9,842 nonsignificant effect sizes would be required to invalidate the overall association, indicating a robust association between weight stigma and mental health in youth samples. All studies included in the present study indicated a positive or nonsignificant association between weight stigma and mental health indicating that experiences of weight stigma were associated with poorer mental health outcomes.

### Moderation Analyses

Meta-regression analyses were conducted to examine age, sex, study quality, and overweight/obesity as moderators of the overall effect. There was a significant moderating effect of age ( $B = -.03$ ,  $SE = 0.01$ ,  $z = -4.92$ ,  $p < .001$ ,  $I^2 = 94.36$ ), and there was also a significant moderating effect of study quality ( $B = .14$ ,  $SE = 0.02$ ,  $z = 6.60$ ,  $p < .001$ ,  $I^2 = 97.53$ ). No other moderators were significant.

### Age

As reported above, age was a significant moderator of the overall effect size with 37 effect sizes included in this analysis. Younger age was associated with a more robust relationship between weight stigma and mental health. Most studies examined these variables among adolescents between the ages of 13 and 17 ( $n = 19$ ), and six studies examined these variables in school-aged youth between the ages of 6 and 12. Fifteen studies evaluated youth across child and adolescent

groups, though most of these ( $n = 12$ ) extended the adolescent age group to 11–12 years. The lowest mean age in the current review was 9.2 ( $SD = 2.2$ ) years (Zeller & Modi, 2009). No studies included in the current review looked at the effect of age on the association between weight stigma and mental health or compared between age groups.

### Quality

Final quality codes are listed for each article included in Table I. Quality significantly moderated the overall effect size, such that higher-quality studies were associated with a stronger relationship between weight stigma and mental health outcomes with all 43 effect sizes included. However, only two studies were rated as good quality in the current review (Jensen & Steele, 2012; Stice & Whitenton, 2002). The rest were rated as poor ( $n = 17$ ) or fair ( $n = 21$ ). Study quality was often limited by lack of reliable or valid measures, cross-sectional design, and not controlling for potentially confounding variables such as demographics or weight status.

### Sex

While two studies measured gender identity (Himmelstein et al., 2019; Puhl et al., 2019), we chose to use the word "sex" to describe the outcomes related to males and females as biological sex best represents what was reported in the majority of articles included in the current review. Forty studies were included in this analysis. Eleven studies sampled female participants only, with the other studies reporting between 41.7% and 72% female participants. No studies examined sex as a moderator of the association between weight stigma and mental health, although many studies examined differences in both weight stigma and mental health outcomes by sex.

### Weight Status

Weight status was not a significant moderator within the present study, with 25 studies included. Ten of the studies included in the meta-analysis included only individuals with overweight or obesity. Fifteen of the remaining studies reported the percentage of participants with overweight/obesity, with a range from 14% to 82%. Eight studies examined the impact of weight status on weight stigma and mental health outcomes. While weight status was not found to be a significant moderator in the current review, these eight studies found that higher weight status and weight stigma interacted such that they were associated with worsened mental health outcomes (Goldfield et al., 2010; Guardabassi et al., 2018; Himmelstein & Puhl, 2019; Ievers-Landis et al., 2019; Lin et al., 2020; Nelson et al., 2011; Thompson et al., 1995; Zuba & Warschburger, 2018).

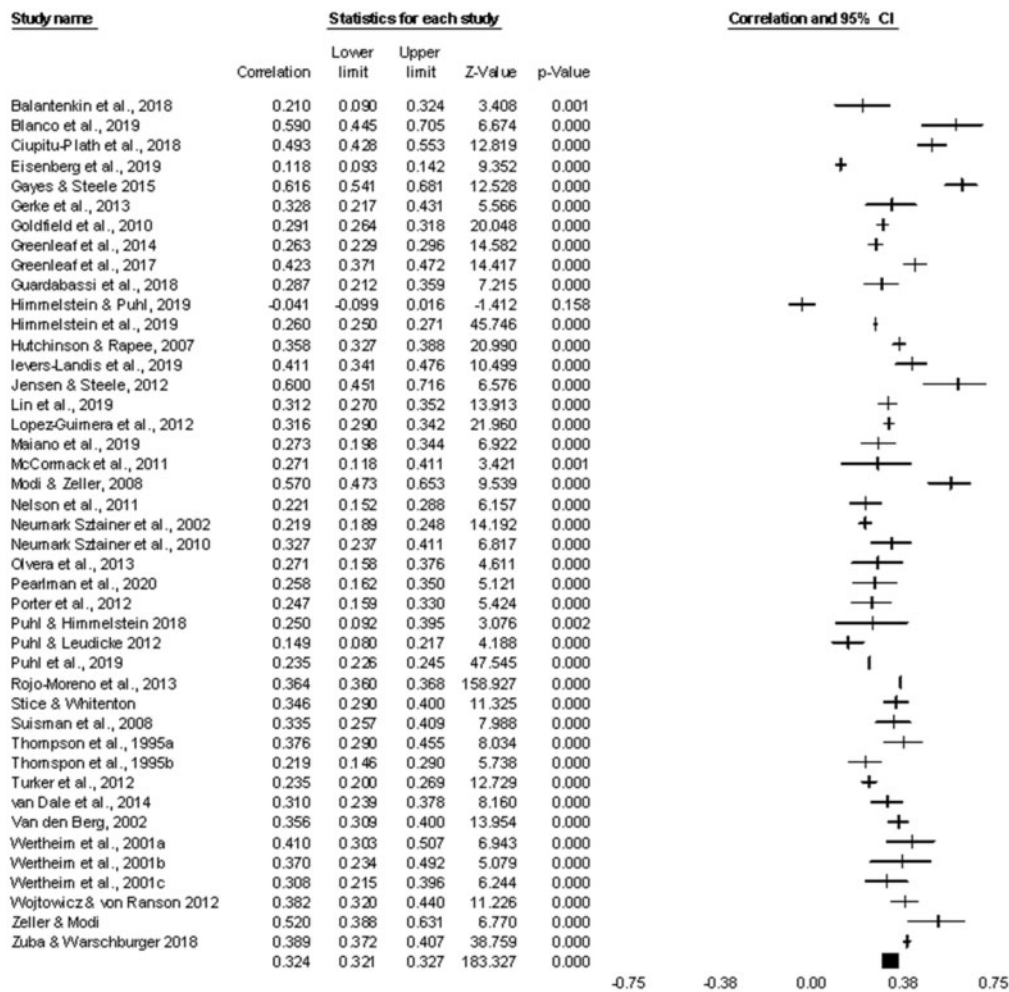


Figure 2. Forest plot of statistical effect sizes for studies included in the meta-analysis. CI = confidence interval.

## Discussion

The purpose of the current systematic review and meta-analysis was to synthesize the published information regarding associations between weight stigma and mental health outcomes in children and adolescents. Forty articles (representing 43 effect sizes) met inclusion criteria for the present review, highlighting the relevance of examining the impact of weight stigma on mental health outcomes. The number of published studies on this topic has steadily increased over the past two decades, with 37.5% of the articles captured in this review published in the last 5 years. Results highlight the vast array of mental health outcomes considered, types of weight stigma assessed (e.g., WBI and external), and challenges related to measure validity and study quality.

Broadly, the compiled literature suggests that there is a clear association between weight stigma and mental health problems in youth as meta-analytic results indicated a robust medium effect size. These findings are consistent with Emmer and colleagues (2020) meta-analysis examining the associations of weight

stigma and mental health across the lifespan, with the current review finding a similar sized association (Emmer et al., 2020). Mental health variables examined in the current review included depression, anxiety, disordered eating, unhealthy weight control behaviors, poor self-esteem, body dissatisfaction, stress, negative affect, and reduced quality of life. These mental health outcomes were associated with both external experiences of weight stigma and WBI.

Conceptualization of weight stigma varied amongst studies. Notably, several published articles discussed “weight stigma” but were excluded from the present review due to measurement of broader appearance-related stigma, rather than specific measurement of weight stigma. The term weight stigma was used to describe both external weight stigma as well as WBI, at times interchangeably, amongst studies included. Yet, it is more likely that these two types of weight stigma are discrete concepts. Only five studies included in the present review focused on WBI. None of the studies provided information on the relationships between WBI and external stigma. Future researchers



would benefit from (a) specifying the type of weight stigma measured and (b) measuring both external weight stigma and WBI to further clarify the relationships between these two variables and subsequent mental health outcomes.

In adults, WBI is consistently associated with poor mental and physical health outcomes (Emmer et al., 2020; Pearl & Puhl, 2018). WBI was only included in five studies in the current review, and four of those studies were with adolescent samples. This result highlights the limited study of WBI in the child and adolescent literature and warrants future research to better understand this construct in youth. Pearl and Puhl (2018) conducted a thorough review of WBI across the lifespan. Consistent with findings from the present study that review highlighted the lack of developmental research on this topic in children and adolescents (Pearl and Puhl, 2018). Furthermore, the WBIS has only recently been validated for use in adolescents and has not yet been validated in children. Only one study thus far, and included in this review, used the WBIS in a child sample, and the researchers of that study changed the questions slightly to meet the developmental level of participants (Zuba & Warschburger, 2018). Future research is needed to determine whether certain social and cognitive capabilities, which develop at different times across the lifespan, are associated with experiences of weight stigma. Younger children develop stigma/outgroup evaluations based upon instruction from others, while older children tend to develop these evaluations based upon personal experience (Kang & Inzlicht, 2012).

Age and study quality were the only significant moderators in the present study. Specifically, age moderated the overall association between weight stigma and mental health such that there was a stronger association in younger samples. This result differs from the meta-analysis of Emmer and colleagues' (2020), where they determined that age was not a significant moderator of the association between weight stigma and mental health, although that analysis was among individuals across the age spectrum with considerable focus on studies with adults. One possible explanation for this difference may be the cognitive and emotional development throughout childhood and adolescence as opposed to more stable processes in adulthood. It may be that the experience of weight-based stigma has a larger impact on mental health for young children. During formative years, younger children may have fewer coping strategies to handle weight-based stigma. This may be especially true for children without prior experience dealing with victimization, leading to a stronger impact on mental health. However, it may also be that the current tools for measurement of weight-based stigma are not accurately capturing the experiences of younger children, who may be less

likely to recognize and report more subtle experiences than older adolescents. Future research is needed to better understand these developmental processes over time. Specifically, future research should explore whether the effect of age differs across external and internal weight stigma, especially given potential developmental changes in the experiences and reporting of external and internal weight stigma across childhood.

Study quality also significantly moderated the association between weight stigma and mental health in youth. Higher-quality studies were associated with stronger relationships between weight stigma and mental health. A large majority of studies were either poor quality ( $n=17$ ) or fair quality ( $n=21$ ) due mostly to cross-sectional designs, not including relevant control variables (i.e., weight status, gender, age), and not including validated measures. Although the reviewed studies were strengthened through the use of validated measures of mental health outcomes, measurement of weight stigma was limited by a strong reliance on retrospective self-report measures and limited use of validated measures. Twelve studies used investigator-created questions to inquire about external weight stigma with associated lack of reliability and challenges to construct validity. Five used questions from Project EAT (Eisenberg et al., 2006), which decreases concerns about replication; yet these measures have not been tested for validity or reliability. Only one high-quality longitudinal study was included in the present review (Stice & Whitenton, 2002), pointing to the need for increased longitudinal, laboratory-based, and prospective studies to better elucidate the associations between weight stigma and mental health in children and adolescents. Given the lack of longitudinal studies, this review is unable to address the question of causal relationship between weight stigma and mental health outcomes.

Findings from the present study highlight significant gaps in the literature and suggestions for future researchers. It is imperative that future researchers use validated measures of weight stigma, specifically those tested with child and/or adolescent populations. Future studies should also consider novel strategies that utilize technology to collect real-time data, such as ecological momentary assessment or electronically activated recorder data, to reduce the potential bias inherent with self-report data and better understand the fluid associations between weight stigma and mental health. The association between mental health and weight stigma may be bidirectional, and future research would benefit from determining how mental health variables and weight stigma interact over time. Results indicated that, among the studies examined in this review, age was the only statistically significant demographic moderator of the relationship between weight stigma and mental health. There is a paucity of



literature examining the relationship between weight stigma and mental health by age, and there is a clear gap in the studies assessing the experience of weight stigma in school-age children. More research is needed to determine how these experiences develop and change over time from childhood to adolescence and into young adulthood. Neither sex nor weight status was statistically significant moderators, though this may be due to lack of heterogeneity in the included studies. A quarter of articles in this review sampled only females and/or only youth with overweight or obesity.

Increased exploration is needed of potential differences in the relationship between weight stigma and mental health by other environmental and demographic variables such as family income, racial and ethnic identity, gender identity, and geographic regions. This may provide greater context for risk factors exacerbating the association between weight stigma and mental health. While this review excluded studies specific to childhood medical conditions, no studies were actually excluded based on this criterion, indicating the lack of literature and need for work in this area. Few of the studies included in this review examined potential differences between race or ethnicity. Not only might there be differences regarding experienced weight stigma amongst youth with differing racial identities but it is also unknown in child and adolescent literature whether weight stigma and mental health are associated differently amongst youth of different racial and ethnic identities. It is possible that the relationships between weight stigma and mental health outcomes could be compounded by racial stigma, but further research is needed. Cumulative racial stigma and weight stigma have been associated with increased substance use and self-harm in adolescents (Bucchianeri et al., 2014).

Findings from the present review also indicate that most of the external weight stigma questions focused on stigma from a child's family, peers, and/or friends. Only one study included stigma from teachers, and 22 studies did not specify the source of the experienced stigma. This is limiting and makes generalization difficult in that literature suggests other potentially influential causes of weight stigma experiences such as health-care providers, store-clerks, authority figures, and the media (Heuer et al., 2011; Puhl & Brownell, 2006; Tomiyama et al., 2018), and these experiences may have differing associations with mental health in youth. *The Lancet* recently published a call for media to refrain from publishing stigmatizing or discriminatory images and information related to persons with obesity (Flint et al., 2018). Future research on how the media may be disseminating weight stigma to youth, how youth may internalize weight bias from media outlets, and the potential mental health sequelae are

crucial to study as it may empower social media creators and policymakers to create safeguards to protect youth from hurtful messages.

### Strengths and Limitations

While this study improves the understanding of the relationships between weight stigma and mental health outcomes in youth, the results should be considered within the context of several limitations. Due to the large variety of mental health outcomes, the current review collapsed across all mental health outcomes in the analysis. The authors recognize that there are conceptual differences between each (i.e., depression, disordered eating, quality of life). However, there were far too many outcome types and measures to appropriately examine by type of mental health outcome. Similarly, the study combined biological sex and gender identity in the moderation analyses, in accordance with limitations in how data were collected and reported in the included studies. The authors strongly encourage future researchers to clearly report both biological sex and gender identity so that future reviews can elucidate potential differences based on gender and sex. The review also includes many studies rated poor and fair quality, which limits the impact of the results, though the moderation analyses were completed to account for study quality. Additionally, due to the cross-sectional nature of most of the research examined, findings from the present study are based upon associations and therefore causality cannot be inferred. Strengths of the current review include the methodological rigor, inclusion of meta-analysis with demographic and study quality moderators, and the process of reviewing potentially eligible manuscripts and analyzing data with multiple authors to reduce bias.

### Clinical Implications

Any provider working in a health-related field should be thoughtful of how they discuss weight with child and adolescent patients, especially with consideration to the potential mental health implications. A cautious rule is to first ask the patient and/or caregiver whether they feel comfortable discussing weight and if there are specific words they prefer regarding weight (Dutton et al., 2010; Eneli et al., 2007). Given the finding that there may be a stronger association between weight stigma and mental health in younger youth, it is important to be thoughtful when discussing weight with young patients and consider developmentally appropriate language to ask about both weight and mental health. Furthermore, providers treating youth with mental health diagnoses should consider whether weight stigma—either external experiences or WBI—could play a role in their patients' symptoms and treatments. Educators and other care providers

for youth should be mindful of weight stigma communication amongst peers and within environments they manage to appropriately intervene upon or educate youth on the harms associated with weight stigma. Finally, this review adds to the mounting evidence discrediting the idea that weight stigma may encourage improved health. Although findings from the present study are cross-sectional and do not provide evidence that weight stigma *causes* mental health problems or vice versa, the strength and associations from this and other reviews provide evidence that there is an association between weight stigma and poor mental health (Emmer et al., 2020; Pearl & Puhl, 2018; Puhl et al., 2020).

In sum, the current review provides a synthesized report of the literature regarding relationships between weight stigma and mental health outcomes in youth. Results indicate that weight stigma, both WBI and external weight stigma, are moderately associated with negative mental health outcomes in youth. Age and study quality moderated these associations, such that younger age and higher study quality amplified the association between weight stigma and mental health, while neither biological sex nor weight status moderated the association. The results highlight suggested areas for improvement in future studies, such as the need for longitudinal and laboratory-based studies in this area, more attention to individual factors, and the use of objective and validated measurements. Results also suggest clinical implications for anyone who provides care to children and adolescents, specifically that younger children may be more at risk for poorer mental health associations with weight stigma. Results make clear that this is a critical topic of study in the field of child and adolescent psychology, and this review offers suggestions for researchers to build upon the existing literature.

### Supplementary Data

Supplementary data can be found at: <https://academic.oup.com/jpepsy>.

### Funding

This work was supported by the National Heart, Lung, and Blood Institute (T32HL076134) and the Agency for Healthcare Research and Quality (F32HS02707). The funders had no explicit role in the current systematic review and meta-analysis.

*Conflicts of interest:* Dr. E. Jelalian is a Consultant for Weight Watchers International. There are no other potential conflicts of interest to disclose.

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