Received: 14 December 2022 | Revised: 21 September 2023 | Accepted: 13 November 2023

DOI: 10.1111/obr.13676

REVIEW

Public Health / Policy

OBESITY Reviews WILEY

A systematic review of ecological momentary assessment studies on weight stigma and a call for a large-scale collaboration

Hugh Bidstrup[1,2] | Leah Brennan[2,3] | Leah Kaufmann[1] | Angela Meadows[4] | Xochitl de la Piedad Garcia[1]

[1]School of Behavioural and Health Sciences, Australian Catholic University, Fitzroy, Victoria, Australia

[2]School of Psychology and Public Health, La Trobe University, Albury/Wodonga, Victoria, Australia

[3]Centre for Eating, Weight, and Body Image, East Melbourne, Victoria, Australia

[4]Department of Psychology, University of Essex, Colchester, UK

Correspondence
Xochitl de la Piedad Garcia, School of Behavioural and Health Sciences, Australian Catholic University, 115 Victoria Parade, Fitzroy, Victoria 3065, Australia.
Email: xochitl.delapiedadgarcia@acu.edu.au

Funding information
Australian Government Research Training Program (RTP)

[Correction added on 22 January 2024, after first online publication: The Open Science Framework (osf) links in the abstract and discussion sections have been corrected in this version.]

Summary

Background: Weight stigma is associated with poor mental health correlates in cross-sectional research. Researchers are increasingly using Ecological Momentary Assessment (EMA) methods, collecting comprehensive within-person data to understand the temporal nature of weight stigma and its biopsychosocial correlates.

Aim: To systematically review EMA studies on the effect of weight stigma on biopsychosocial correlates and integrate the findings.

Method: PsycINFO, CINAHL, Embase, Medline Complete, and Web of Science were searched and studies were doubled screened (H.B. and X.P.G.).

Results: Twelve studies ($N = 615$) met our inclusion criteria. For both between- and within-subject effects, experienced and internalized weight stigmas were associated with negative correlates/outcomes (e.g., higher disordered eating and lower positive mood). However, studies differed in the correlate measures assessed, EMA methods used, and participant instructions provided. Given these inconsistencies, comparison across studies was difficult, and findings could not be reliably integrated.

Conclusions: Consistent with previous research, studies from this review suggest weight stigma leads to adverse outcomes. EMA has the potential to overcome many of the limitations present in cross-sectional research on weight stigma and provide more ecologically valid and reliable results. We argue for a collaborative data-sharing consortium with standardized EMA methodologies, so researchers worldwide can contribute to and make use of a large, collective dataset on weight stigma and health correlates (see osf.io/s5ru6/).

KEYWORDS
affect, ecological momentary assessment, experience sampling method, psychosocial outcomes, systematic review, weight stigma

1 | INTRODUCTION

Weight stigma is broadly defined as the pervasive social devaluation that individuals perceive, experience, anticipate, and internalize because of their weight.[1,2] Experiences and perceptions of weight stigma can manifest in a variety of forms, such as negative depictions of individuals with higher weight in the media (e.g., characters Hitchcock and Scully in the popular sitcom Brooklyn Nine-Nine being depicted as lazy, dirty, and preoccupied and obsessed with food), negative interpersonal experiences in social settings (e.g., people making negative inferences about individuals ["lazy"] due to their weight), and environmental barriers (e.g., seating that is too small for individuals with higher weight to sit in comfortably).[3] Negative and stigmatizing depictions of weight in the media, specifically, increase negative attitudes toward those with higher weight.[4] Interestingly, some of the negative health outcomes often associated with higher weight (e.g., depression, disordered eating, and body image disturbances) are also associated with individuals' perceptions, experiences, internalization, and anticipation of weight stigma, even after controlling for BMI.[2,5]

Recent data from a representative sample in the United States ($N = 2022$) showed that experienced and anticipated weight stigma were positively associated with sleep disturbance, alcohol use, comfort eating, and disordered eating.[6*] Other studies have also shown a positive relationship between anticipated weight stigma and disordered eating.[2] Moreover, a meta-analysis by Emmer et al.[5] showed that experienced ($r = -0.33$, $k = 241$) and internalised weight stigma ($r = -0.39$, $k = 222$) were both associated with negative mental health correlates, such as psychological distress, body image disturbances, and poor quality of life. Importantly, all three papers controlled for BMI in their statistical analyses. In sum, a substantial body of research accumulated over the past two decades indicates that weight stigma is associated with adverse health correlates, even when controlling for BMI.

Research on weight stigma has predominantly relied on self-report data where participants recall experiences, feelings, or behavior from their past. Though valuable, there are obvious limitations of such data (e.g., reliance on memory and possible recall bias[7,8]). Further, a considerable amount of this research assesses experiences of stigma based on items that ask about the frequency of stigmatizing situations an individual has experienced in their lifetime[3] (e.g., if you have "be [en] stared at in public" and how often: "Never, Once in your life, Several times in your life, About once a year, Several times per year, About once a month, Several times per month, About once a week, Several times per week, or Daily"). There is evidence that individuals underreport experiences of stigma when relying upon retrospective recall,[9] where salient experiences of stigma are likely to be reported, but more minor experiences omitted—despite the adverse correlates of the latter.[10,11]

*However, no relationship was observed between weight stigma and physical activity

1.1 | Using Ecological Momentary Assessment (EMA) methods to study everyday experiences of weight stigma

To overcome the limitations of cross-sectional research, some researchers have used EMA techniques.[12] In their seminal paper, Stone and Shiffman[13] define EMA as repeated sampling of an individual's current (or very recent) experience in their natural environment, usually assessing the individuals' behavior, feelings, and/or thoughts over a period of time—typically from 5 days to 2 weeks. There are several different terms, often used interchangeably, for similar types of methods: experience sampling method,[14] ambulatory assessment,[15] and real-time data capture.[16] All these approaches call for numerous assessments of participant thoughts, feelings, and/or behavior during their daily life, over several days. We will use "EMA" as an umbrella term to refer to any of these methodologies, similar to Ebner-Priemer and Trull.[17] While we acknowledge that there are many subtle differences in the history, development, and aims of these individual techniques, our aim is to be as inclusive of studies of repeated reporting of experiences in the natural environment as possible and a detailed discussion of the differences between approaches is beyond the scope of the current review. Interested readers can see several papers[18–20] that discuss these nuances.

Early EMA studies generally relied on participants to self-initiate daily reporting via written diaries or on data collection via telephone calls from researchers at fixed times (i.e., interval-contingent reporting). However, the relatively recent advent of personal messaging devices, especially smartphones, has made it possible for researchers to extend data collection from one to multiple times a day, via multiple short surveys thereby decreasing the interval between surveys (the recall reporting period) and improving the study of within-participant variability (by generating more data points). Almost all studies now use some form of computer-assisted technology. As the methodological implementation of EMA varies considerably across studies, we will briefly describe the methodological characteristics of these studies and the type of information that they make available to researchers, to provide a framework for the present literature review.

1.1.1 | EMA reporting types: Interval (time), event, and signal-contingent

In addition to interval (time)-contingent reporting (e.g., report at the end of each day in a diary study), daily surveys in these modern EMA studies may be classified as *event*- or *signal*-contingent (or both) depending on the nature of the prompt that leads to initiation of responses. In *event-contingent* surveys, the participant is instructed to start their survey whenever they encounter a particular target event. For example, a participant might be told to access the survey on their phone whenever they experience weight stigma (i.e., the weight stigma experience is an event that prompts responding to the survey).

Signal-contingent surveys, on the other hand, are pre-programmed to prompt participants' responses at different times during the day (which may occur at fixed or random intervals). For example, a study may be designed so that a person is asked to respond to surveys at six random times in their day, between 9 a.m. and 10 p.m. In this case, the phone beeps at the programmed time, and this signal is the prompt for responding to the survey. Participants are then asked to report on their experiences/feelings/behaviors since the last survey. An EMA study may use one or several types of survey prompts (e.g., event- *and* signal-contingent reporting), and the participant will typically be reporting for between 5 and 14 days.

As a result of these different options, EMA studies may include temporal reporting windows that vary from virtually zero time since an experience (in event-contingent reporting) to the totality of waking hours (in daily diary or interval-contingent studies). With the advent of technology that allows researchers to include more signal-contingent surveys in a day, studies have started to use narrower temporal reporting windows, thereby increasing the "momentariness" of EMA and reducing the likelihood that recall biases influence responding.

The variability in temporal reporting windows certainly leads to the question of what is "momentary enough" to be considered "momentary." That is, should a diary study be considered within the EMA umbrella when its temporal reporting window includes all waking hours? Or should it be the case that only studies that use event-contingent reporting are considered EMA studies? It is our view that it is not possible, without direct empirical and psychometric evidence to indicate the appropriate temporal window, to select a threshold window length to divide studies into "momentary" and "non-momentary." For this reason, we have opted to include any studies that use repeated measurement over multiple days under the EMA umbrella, allowing a more comprehensive and nuanced view of the evidence in the area.

1.1.2 | Information provided by EMA: Between- and within-subject data structures

EMA study data can be used to compute summary statistics across the data collection period that may be used in between-person analyses. For instance, one could estimate the average number of weight stigma experiences and the average level of positive mood reported by each participant during the EMA period and then estimate the relationship between them. A negative relationship here would indicate that those participants with a higher number of stigma experiences during the EMA period also had lower positive mood. This between-subject level of analysis is similar to that conducted in a cross-sectional survey setting; however, the recall bias problem is substantially reduced, as participants do not have to "summarize" their experience over long intervals that may be unspecified. On the other hand, data may be used to study the within-person relationship between variables. For example, one could estimate the relationship between experiences of stigma and positive mood within participants by comparing the level of positive mood reported in time points with no reports of weight stigma and time points that follow reports of experiences of weight stigma for each participant. Finally, multilevel modeling of EMA data allows the use of between-subject variables (e.g., baseline-level internalized weight stigma) to account for within-subject effects (e.g., within-subject relationship between negative body-related thinking and emotional eating). Moreover, there is flexibility in designing and extracting information from EMA studies, as reporting contingencies can be combined, measures can be categorical or continuous, and temporal relationships between measures can be closely observed.[21]

1.1.3 | Studies using EMA methods to estimate the effects of weight stigma

As early as 2005, researchers started using EMA techniques to assess weight-based stigma.[11] Since then, researchers have used EMA to explore the relationships between weight stigma and a variety of cognitive, affective, and behavioral outcomes.[22,23] Although there is a growing body of research using EMA methods to observe the effects of weight stigma, there is a substantial amount of variability in the implementation of EMA methods, including the questions asked, reporting types (i.e., signal-, event-, or interval-contingent), data structures (i.e., between, within, or both), and depth of instructions at baseline (see below). In addition, there may be other potential factors and moderators of this relationship (e.g., age, gender, and sexual orientation) that may contribute to the heterogeneity of findings. In sum, the literature suggests that (a) the subtle yet pervasive nature of weight stigma may be well captured by EMA methods[24] (as opposed to traditional retrospective self-reports), (b) weight stigma is associated with adverse psychological correlates both at the between- and within-person levels, and (c) there is substantial variability in the implementation of EMA methodologies in the literature on weight stigma.

1.2 | The current review

The aim of the current review is to identify and synthesize evidence from studies using EMA methods to study the impact of weight stigma. We are aware of two prior review papers[25,26] in this area. The present study extends these previous analyses in a number of ways. First, a review by Potter et al.[25] identified 25 studies published up until January 2017 that used EMA to investigate the impact of discrimination on biopsychosocial processes. Four of the 25 studies were specific to weight stigma; the remainder related to discrimination on the grounds of gender, sex, and sexual orientation. EMA has become increasingly popular in the last 5 years, and our preliminary searches indicated many additional, relevant published studies since 2017. Thus, an updated overview of the state of the

literature is warranted. Additionally, we included studies that reported only between-person outcomes—an exclusion criterion in the Potter et al. review. We did this because we believe that between-subject effects estimated via EMA methods may provide the benefit of reducing recall biases relative to cross-sectional surveys. Whether the results differ across approaches, is an empirical question. A second review by Engel et al.[26] summarized studies using EMA methods in the context of eating disorder, bariatric surgery, and obesity research. However, their review strategy was not systematic, had a limited time frame (2013–2015), and identified only two papers (also included in Potter et al.) that studied weight stigma.

The aim of the current review is to both update and extend our understanding of the impact of weight stigma in daily life by conducting a systematic review of all studies to date that have used EMA to identify the real-time correlates of weight stigma. This is a broad exploratory aim. Although we expect to find that experienced and internalized weight stigmas will be related to negative outcomes in these studies, it is not possible to make a priori hypotheses when we are not setting out to look for evidence of relationships with specific outcomes. Additionally, we undertake a detailed assessment of methodologies used, with a view to identifying patterns, inconsistencies, and current best practices to inform the development of a standardized methodology in the field.

2 | METHOD

Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement[27] was used for this systematic literature review. Our review methods were pre-registered in the Open Science Framework (osf.io/9hfyr).

2.1 | Search Strategy

The initial literature search was conducted in November 2020 and was updated in December 2021 and again in November 2022, via five databases: PsycINFO, CINAHL, Embase, Medline Complete, and Web of Science Core Collection. Search terms were based on three concepts. Concept 1 included terms relating to stigma (e.g., discrimination, bias, and stereotyping). Concept 2 included terms relating to weight (e.g., body weight, BMI, and overweight). Concept 3 included terms relating to EMA (e.g., ecological momentary assessment, experience sampling method, and daily diary). The terms corresponding to these concepts were searched for in title and abstracts. In addition to this, relevant subject terms were selected for each database, when applicable/available (see Table S1 for search concepts and Table S2 for an example of our search strategy in PsycINFO).

To be included, studies had to be published in peer-reviewed journals written in English, Spanish, or Italian and employ EMA methodology to study the relationship between weight stigma and any biopsychosocial correlate in adults. Dissertations/theses were considered for inclusion, but if the data from the dissertation/theses was included in a published article as well, we chose to only include the information from the published article. Conference presentations, editorials, reviews, meta-analyses, and book chapters/sections were excluded from this review. Both quantitative and qualitative studies were included, and no limitations were put on year of publication. Following Stone and Shiffman,[13] studies were determined to use EMA methodology if they (a) ask about participant's current experiences, feelings, and/or behavior; (b) did so repeatedly; and (c) ask in the subject's natural environment.

Papers were double screened by H.B. and X.P.G. at title and abstract ($\kappa = 0.60$; moderate agreement and full-text $\kappa = 0.73$; substantial agreement) screening stages, using the application Covidence.[28] Conflicts were resolved through discussion. Included articles obtained through the search had their reference lists searched for relevant studies. H.B. extracted three types of information from each paper: (a) sample characteristics, (b) design features, and (c) results. Sample characteristics included sample size, recruitment method, and the country in which data were collected and sample demographics (e.g., age, BMI, and gender). Study design features included measure(s) of weight stigma and EMA methodology information, such as type of reporting (interval/event/signal-contingent), length of data collection, technology used, extent and type of instructions at baseline (if any), and data structure type (between- and/or within-subject effects). Results extracted included relevant descriptive and inferential statistics, such as the frequency of stigma experiences and the statistical information relevant to the relationship between weight stigma and biopsychosocial correlates (correlation and multilevel model coefficients). Lastly, H.B. assessed the quality of studies according to guidelines outlined in Trull and Ebner-Priemer.[19] These guidelines were adapted slightly to use as a quality assessment in the current review (i.e., by using their recommendations as a checklist to evaluate the quality of included studies; see Table S3). Based on a reviewer recommendation, we also checked whether studies reported preregistration.

3 | RESULTS

Figure 1 displays our PRISMA flowchart. Our search yielded 1620 studies, and after de-duplication, this number was 981. These records were screened at title and abstract, and of these, 20 were assessed at full-text for eligibility (962 excluded). Of these 20 studies, eight were excluded and 12 met our inclusion criteria. We excluded two dissertations/theses because they had reported their data in published articles,[29,30] which were included in the 12 papers the met inclusion criteria.

3.1 | Study characteristics

Searches identified 12 studies reporting data from nine samples, totalling 615 participants. Study characteristics are described in

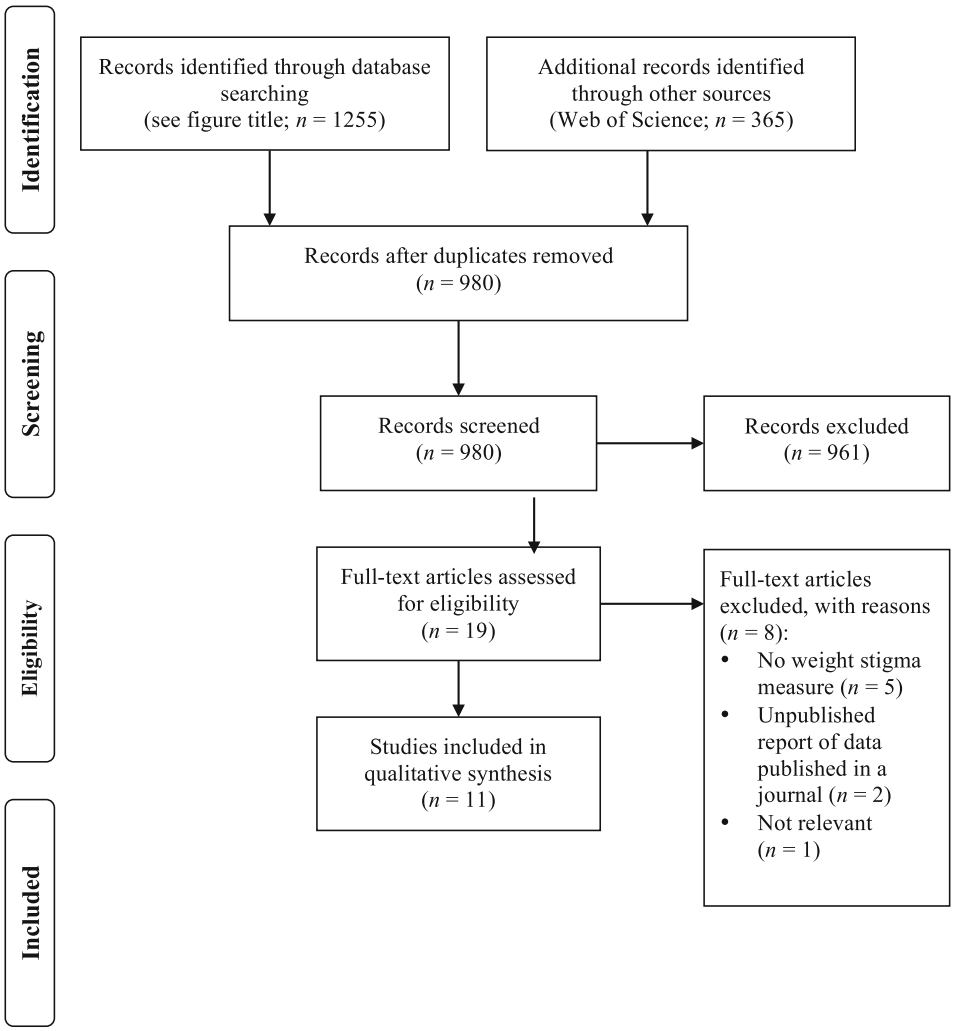

FIGURE 1 PRISMA flowchart of systematic review process.

Table 1. Studies collected data either in the United States ($n = 10$) or in Australia ($n = 2$). All 12 studies were published in peer-reviewed journals. Participants from these studies were sampled from either community ($n = 9$) or combined community and student cohorts ($n = 2$) or community and treatment-seeking cohort ($n = 1$). Five studies sampled women only, and all other studies had a larger proportion of women than men ($M_{\%women} = 67.2\%$, range = 51% to 88%).

3.2 | Quality assessment

As outlined above, we used recommendations from Trull and Ebner-Priemer[19] to assess the quality of studies included in the current review. The results of these assessments can be found in Table S3. Most studies were adequate in quality, though few studies sufficiently reported missing data, and few provided a rationale for sampling density and scheduling. Only two studies (Potter et al.[30] and Romano and Heron[34]) reported a power analysis. No studies reported pre-registration.

3.3 | Synthesis of results

The 12 studies in this review assessed a variety of correlate measures,[†] most of which assessed psychological/behavioral constructs. As can be seen in Table 1, there was very little consistency across studies in terms of EMA methodologies used. Studies used interval-contingent ($n = 3$), signal-contingent ($n = 5$), and a mix of event-contingent and signal-contingent ($n = 1$) or event-contingent and interval-contingent ($n = 3$) responding. Within each of these, the specific conditions and response intervals varied considerably. Existing validated measures of weight stigma were commonly used at baseline in studies in the current review. During the EMA period, however, measures of weight stigma differed greatly across studies, as did the additional correlate measures captured and the measures/items used to assess these constructs. This high degree of inconsistency makes it difficult to provide an overarching synthesis of

[†]The outcome/correlate measures used are not described in main body because almost all studies used ad hoc outcome measures, partly a result of the nature of EMA measures, which generally aim to be very brief and reduce participant burden as much as possible, but also due to a lack of existing measures in the literature.

TABLE 1 Demographics, brief EMA methodological features, and EMA compliance in included studies.

Author (year) Country Study length in days (D) Surveys per day (S/D)	Sample source Sample size (*N*) Age: *M* (*SD*) Gender: % women BMI: *M* (*SD*)	Reporting contingencies Baseline instructions	Method to collect data Was there momentary assessment of weight stigma?	EMA compliance: % of total completed surveys in *n* (surveys responded to divided by total surveys administered)
Carels et al.[22] (2019) United States D = 14 S/D = 2	Community, treatment seeking $N = 51$ $M_{age} = 47.2$ (13.2) 86% women $M_{BMI} = 35.8$ (6.7)	Event and signal WS defined + instruction	Smartphone application Yes	58%
Carels et al.[31] (2019) United States D = 30 S/D = 1	Community $N = 66$ M_{age} = NR (NR) 85% women $M_{BMI} = 36$ (6.2)	Interval Unclear	Daily diary No	93%
Mallet and Swim[11] (2005) United States D = 7 S/D = 1	Student, community $N = 62$ M_{age} = NR (NR) 100% women $M_{BMI} = 30$ (4.8)	Event and interval WS defined + instruction	Non-specific: subjects needed internet connection to report via a website Yes	NR
Olson et al.[32] (2023) United States D = 14 S/D = 5	Community $N = 39$ $M_{age} = 43.8$ (11.6) 51% women $M_{BMI} = 36.8$ (6.7)	Signal WS defined + instruction	Smartphone application Yes	86%
Panza et al.[29] (2020) United States D = 5 S/D = 5	Community (SMW) $N = 55$ $M_{age} = 25$ (9.3) 100% women $M_{BMI} = 32.5$ (4.9)	Signal WS defined and examples provided	Smartphone application Yes	76%
Panza et al.[23] (2020) United States D = 5 S/D = 5	Community (SMW) $N = 55$ $M_{age} = 25$ (9.3) 100% women $M_{BMI} = 32.5$ (4.9)	Signal WS defined and examples provided	Smartphone application No[a]	76%
Poon et al.[33] (2022) United States D = 5 S/D = 5	Community (SMW) $N = 55$ $M_{age} = 25$ (9.3) 100% women $M_{BMI} = 32.5$ (4.9)	Signal WS defined and examples provided	Smartphone application Yes	76%
Potter et al.[30] (2021) United States D = 7 S/D = 6	Community $N = 48$ $M_{age} = 27.7$ (9.6) 56.3% women $M_{BMI} = 31.9$ (6.2)	Signal None	Smartphone application Yes	NR
Romano and Heron[34] (2022) United States D = 14 S/D = 1	Student, community Dissatisfied with body[b] $N = 198$ $M_{age} = 21.1$ (3.8) 87.9% women $M_{BMI} = 28.1$ (7.7)	Interval None	Smartphone application No	82%
Seacat et al.[35] (2016) United States D = 7 S/D = 1	Community $N = 50$ $M_{age} = 37.9$ (11.3) 100% women $M_{BMI} = 42.6$ (12.6)	Interval WS defined	Daily diary No	85%

TABLE 1 (Continued)

Author (year) Country Study length in days (D) Surveys per day (S/D)	Sample source Sample size (*N*) Age: *M* (*SD*) Gender: % women BMI: *M* (*SD*)	Reporting contingencies Baseline instructions	Method to collect data Was there momentary assessment of weight stigma?	EMA compliance: % of total completed surveys in *n* (surveys responded to divided by total surveys administered)
Vartanian et al.[36] (2014) Australia D = 14 S/D = 1	Community $N = 46$ $M_{age} = 28.4$ (21.2) 52% women $M_{BMI} = 30.5$ (4.9)	Event WS defined + instruction	PDA Yes	NR
Vartanian et al.[24] (2018) Australia D = 14 S/D = 1	Community $N = 46$ $M_{age} = 28.4$ (21.2) 52% women $M_{BMI} = 30.5$ (4.9)	Event and interval WS defined + instruction	PDA Yes	NR; 92.5%

Note: Total/average surveys per day (S/D) reported—only relevant for signal and interval-contingent reporting.
Abbreviation: SMW, sexual minority women.
[a]Panza et al.[29] did assess momentary stigma, and Panza et al.[23] used the same sample and dataset; however, the latter did not report any momentary assessments of weight stigma—only baseline weight stigma.
[b]Romano and Heron's sample only included participants from a baseline survey who reported negative body image ("yes" to: "Are you currently dissatisfied with your body … weight?" and/or "… shape?"). The circumstances and methods of recruitment should be considered carefully when interpreting the findings from all studies.

findings for specific correlates across studies. Instead, we have synthesized the findings in terms of general "valence" of the correlates. Table 2 shows a summary of the main findings of studies in this review. Type of correlates assessed can be broadly categorized as psychological/behavioral, biological/physiological, and social/demographic. Table S4 lists outcomes measured in each category for all included studies.

3.4 | Weight stigma measures: Baseline and throughout the EMA period

Almost all studies assessed experienced or perceived weight stigma, and several others included measures of internalized weight stigma. Most studies used the Stigmatising Situations Inventory (SSI)[3] to assess experienced weight stigma at baseline; however, there was little consistency in the measures of weight stigma used within the EMA data collection period. Due to this variability, we have presented the descriptions of each item used and the reported prevalence rates for weight stigma measures in Table S5.

3.4.1 | Prevalence findings

Interestingly, there was a notable disparity in the prevalence of weight stigma events reported by participants in these studies. For example, Potter et al.[30] found only *eight* instances of weight stigma, reported by five participants, across their whole sample ($n = 48$) over the 7-day EMA period, whereas Vartanian et al.[24] ($n = 46$) found an average of 11 instances of weight stigma *per participant* over a 14-day EMA period. Ostensibly, such differences in prevalence rates may be due to differences in (a) the type of reporting contingencies used (i.e., signal- vs. event-contingent, respectively), (b) instructions provided at baseline (i.e., providing examples of and defining weight stigma in Vartanian et al., but not in Potter et al.; see Table 1), (c) variability in the way in which weight stigma was measured (see Table S5), (d) wording in recruitment advertisement (i.e., making direct reference to medicalized language[37] compared with avoiding it—e.g., "experiences of overweight and obese individuals"[36] vs. "weight status and health in every day life"[30]), or (e) sample types (i.e., weight-loss treatment-seeking individuals vs. general community[38–40]).

3.4.2 | Correlates of weight stigma

Table 2 shows the findings for the relationships between weight stigma and each correlate, both for between- and within-subject effects. Despite the methodological differences discussed above (i.e., reporting contingencies and instructions provided), most studies generally found (both at the between- and the within-subject levels of analysis) that both experienced and internalized weight stigmas were associated with or preceded more adverse *psychological/behavioral* correlates, such as less positive affect and reduced body appreciation, and greater negative affect, urge to avoid exercise, binge eating, emotional eating, and body dissatisfaction (see Table 2 for full list of psychological correlates).

Seven studies estimated the relationship between weight stigma and *biological/physiological* correlates. These include heart rate ($n = 1$), pain ($n = 1$), and BMI ($n = 6$). (Note that aggregate study total assessing biological/physiological adds to more than 7 because one study

TABLE 2 Main between- and within-person findings of studies included in the current review.

Citation (year) % of *n* that reported WS	Statistical analyses	Variables measured *between* and within	Summary of main between- (or combined between- and within-) person findings	Summary of main within- (or combined within- and between-) person findings
Carels et al.[22] (2019) 59% (EMA)	T-test (group comparisons): 1. Event versus random prompt 2. Reporters of WS versus non-reporters 3. Those who solely reported internal versus external WS	*Affect* *Age* *Binge eating* *BMI* *EWS* *Gender* *IWS* *Socio-economic status* *Weight loss* Affect	WS reporters versus non-reporters: ↑ Baseline binge eating ↑ Baseline EWS ↑ Baseline IWS **NS.** Affect, age, BMI, gender, SES, and weight loss after 6 months Solely internal versus solely external WS reporters: ↑ Coping using negative self-talk **NS.** All 18 other correlate variables (affect, eating/exercise urges, coping responses, BMI, binge eating, experienced or IWS, and number of stigma reports)	WS event versus random prompt: ↑ Depressed ↑ Frustrated ↑ Ashamed ↓ Happy ↓ Relaxed ↓ Inspired **NS.** Numbness/apathy and anxiety
Carels et al.[31] (2019) 100% (DD study)	Hierarchical multilevel regression	*Affect* *Body appreciation* *Coping mechanisms* *Eating behavior* *Exercise avoidance and behavior* Affect Body appreciation Coping mechanisms Eating behavior Exercise avoidance and behavior	Total IWS (mean over EMA period) associations: + Negative affect + Urge to avoid exercise + Urge to restrict food intake + Urge to overeat + Ate unhealthily that day + Ate more "forbidden" foods + Planned to restrict + Negative self-talk + Isolating self + An angry response + Emotional eating + Avoiding the situation + Punishing self − Positive affect − Body appreciation − Positive self-talk **NS.** Planned exercise, urge to exercise, exercise behavior, exercise in minutes, step count, restricted eating, overeating, ate larger portions, skipped meals, ate healthy, plan to eat healthy, and plan to eat the same, seeking support, using humor, talking to family, or using spirituality	Daily IWS associations: + Negative affect + Urge to avoid exercise + Urge to overeat + Overeating + Having ate larger portions + Having ate forbidden foods + Having ate unhealthily + Plans to eat healthily + Plans to restrict + Negative self-talk + Isolating self + Seeking support + Using humor + Responding angrily + Emotional eating + Avoiding the situation + Punishing self − Positive affect − Body appreciation **NS.** Planned exercise, urge to exercise, exercise behavior, exercise in minutes, step count, urge to restrict, restricted eating, skipped meals, positive self-talk, talking to family, and spirituality

TABLE 2 (Continued)

Citation (year) % of *n* that reported WS	Statistical analyses	Variables measured *between* and within	Summary of main between- (or combined between- and within-) person findings	Summary of main within- (or combined within- and between-) person findings
Mallet and Swim[11] (2005) 100% (EMA—DD study)	Hierarchical linear modeling	Affect-related and threat-related primary appraisals Primary and secondary control efforts Secondary appraisals	NA (no solely between-person findings reported)	Perceived discrimination associations: + Affect-related primary appraisals + Threat-related primary appraisals + Primary control efforts + Secondary control efforts − Secondary appraisals **NS.** Perceived intrapersonal outcome of coping
Olson et al.[32] (2023) EWS: 33% (EMA) IWS: 100% (EMA)	Multilevel generalized linear mixed models	*Physical pain, aches, or joint pain* *Muscle soreness* Physical pain, aches, or joint pain Muscle soreness	Higher baseline IWS associations with total pain during EMA: + Physical pain, aches, or joint pain + Muscle soreness **NS.** EWS and any symptoms of pain.	Momentary IWS associations: + Muscle soreness **NS.** IWS and future physical pain, aches, or joint pain. EWS and any symptoms of pain either at the same EMA prompt or future risk.
Panza et al.[29] (2020) 24% (EMA) 100% (lifetime)	Non-multilevel generalized linear models	*Age* *BMI* *Education* *Race*	WS frequency (cumulative over EMA period) associations: + Age + BMI + Education **NS.** Race, EMA compliance	NA (no within-person findings reported)
Panza et al.[23] (2020) 24% (EMA) 100% (lifetime)	Non-multilevel generalized linear models	*Binge eating* *Overeating*	Baseline experienced and IWS associations: + Total instances of binge eating during EMA period + Overeating during EMA period	NA (no within-person findings reported)
Poon et al.[33] (2022) 24% (EMA) 100% (lifetime)	Multilevel (and non-multilevel) generalized linear models	*Weight/shape concerns* *Affect* Weight/shape concerns Size-based avoidance	Higher baseline EWS (compared with lower): ↑ Size-based avoidance ↑ Weight and shape concerns (marginally significant)	At the same random prompt, momentary weight stigma associated with: ↑ Likelihood of reporting momentary weight and shape concerns **NS.** Negative affect. Insufficient data to assess size-based avoidance at the within-subject level.

(Continues)

TABLE 2 (Continued)

Citation (year) % of *n* that reported WS	Statistical analyses	Variables measured *between* and within	Summary of main between- (or combined between- and within-) person findings	Summary of main within- (or combined within- and between-) person findings
Potter et al.[30] (2021) 10.42% (EMA)	Multilevel mixed modeling	*BMI*	WS reporters versus non-reporters: **NS.** BMI	NA (no within-person findings reported)
Romano and Heron[34] (2022) 43.94% (during EMA period—DD study)	Multilevel models (maximum likelihood estimation): time lagged and concurrent NB. Models run and reported here were only for women in *n* (males excluded due to insufficient data points)	*Body dissatisfaction (1 measure)* *Disordered eating behaviors (10 measures)* *Intuitive eating (global and 4 subscales)* Body dissatisfaction Disordered eating behaviors Intuitive eating	Concurrent associations Women with more frequent experiences of WS (compared with lower): ↑ Skip meals ↑ Purging behaviors ↓ Global intuitive eating (IE) ↓ IE—unconditional permission to eat **NS.** For all other 12 outcomes: Overeating, loss of control eating, binge eating, excessive exercise, refused food or drinks, no or low calorie meal replacements, limit amount of food eaten, followed food rules, IE—eating for physical versus emotional reasons, IE—reliance on hunger and satiety cues, IE—body–food congruence, and body dissatisfaction Time-lagged associations Women with more frequent experiences of WS (compared with lower): ↑ Purging behaviors **NS.** For all other 15 outcome measures (all listed above).	Concurrent associations Days where WS was experienced versus not: ↑ Skip meals ↑ Body dissatisfaction ↑ Binge eating **NS.** For all other 13 outcome measures: Overeating, loss of control eating, excessive exercise, refused food or drinks, no or low calorie meal replacements, limit amount of food eaten, followed food rules, Global IE, IE—unconditional permission to eat, IE—eating for physical versus emotional reasons, IE—reliance on hunger and satiety cues, and IE—body–food congruence Time-lagged associations Days where WS was experienced versus not: ↑ limit food intake **NS.** For all other 15 outcome measures (all listed above).
Seacat et al.[35] (2016) NR (DD study)	Correlation	*BMI* *Education* *Eating behavior* *Social interactions*	Total stigma (over EMA period) associations: + BMI − Self-reported diet quality IWS (total over EMA period) associations: + BMI − Self-reported diet quality Public barrier (total over EMA period) association: + BMI Interpersonal stigma (total over EMA period) associations: + Number of daily interactions − Education **NS.** For all 28 other relationships measured, including NS for all relationships with institutional stigma.	NA due to WS being the outcome measure in their within-person findings (thus, this analysis does not meet our inclusion criteria).

TABLE 2 (Continued)

Citation (year) % of *n* that reported WS	Statistical analyses	Variables measured *between* and within	Summary of main between- (or combined between- and within-) person findings	Summary of main within- (or combined within- and between-) person findings
Vartanian et al.[36] (2014) 91% (EMA)	Correlation Multilevel modeling with full maximum likelihood estimation	*Age* *BMI* *Ethnicity* *Income* *Sex* Affect	Overall frequency of WS experiences over EMA period associations: **NS.** BMI, sex, age, income, or ethnicity	WS source—stranger versus spouse or the media: ↑ Negative affect **NS.** Positive affect WS modality (e.g., verbal comment and body language/gesture), setting/location of WS, and number of bystanders: **NS.** Positive affect, negative affect
Vartanian et al.[24] (2018) 91% (EMA)	Correlation Multilevel modeling	*Age* *BMI* *Resting HR* Affect (positive, negative) Motivation to diet Motivation to lose weight Motivation to exercise	Baseline EWS associations: + Baseline resting heart rate + Baseline IWS **NS.** Age and BMI Baseline IWS associations: + Baseline resting heart rate **NS.** Age, BMI Between-subject moderators of within-subject relationships: Baseline experienced and IWS were moderators of the following relationships: A. Positive affect and motivation to diet + For high EWS and IWS Null for low EWS and IWS B. Positive affect and motivation to exercise + For high EWS and IWS Null for low EWS and IWS C. Affect and motivation to lose weight + For high EWS and IWS Null for low EWS and IWS **NS.** No interaction for BMI for any of these analyses (across gender). Baseline EWS (but not IWS) moderated the relationship between: I. Negative affect and motivation to lose weight + For low EWS Null for high EWS **NS.** All others including baseline IWS (13 reported)	After experience of WS: 1. IWS associated with: − Positive affect − Motivation to diet − Motivation to exercise − Motivation to lose weight **NS.** Negative affect 2. Baseline WS experiences associated with: − Negative affect **NS.** Negative affect (when controlling for BMI, sex, and IWS), positive affect, motivation to diet, motivation to exercise, and motivation to lose weight 3. Women versus men reported: − Positive affect − Motivation to diet NS. Not reported for other outcome variables EoD WS experiences associated with: − Motivation to diet, exercise, and lose weight − Positive affect NS. Negative affect Positive affect mediates the relationship between frequency of WS experiences and:

(Continues)

TABLE 2 (Continued)

Citation (year) % of *n* that reported WS	Statistical analyses	Variables measured *between* and within	Summary of main between- (or combined between- and within-) person findings	Summary of main within- (or combined within- and between-) person findings
				– Motivation to diet, exercise, and lose weight (*Additional moderator analyses of within-subject findings reported in the cell to the left*)

Note: % of *n* that EWS = % of sample that reported at least one experience of weight stigma either during the EMA period, during the daily diary (DD) study, or over their lifetime (if reported). Bold = non-significant. Italics = between-subject correlate. Non-italics = within-subject outcome. ↑ = significantly higher than, ↓ = significantly lower than, + = significant positive association, – = significant negative association. In Carels et al.,[22] the results and discussion appear to report different percentage of participants reporting WS. Here, we report figures in the results. In Carels et al.,[31] "Daily IWS associations" are compared with their average IWS score. In Vartanian et al.,[24] "motivation to diet, exercise, and lose weight" were three separate variables. They were combined to reduce table length. In Romano and Heron,[34] concurrent = 16 models and time lagged = predicts changes in outcome measure (e.g., overeating) based on the prior day's report, while also observing the association between WS and overeating on the current day (i.e., WS → overeating today relative to changes in overeating from yesterday).

Abbreviations: EoD, end of day; EWS, experienced weight stigma; IWS, internalized weight stigma; NS, non-significant; WS, weight stigma.

assessed both heart rate and BMI). Both experienced and internalized weight stigmas were positively associated with heart rate. For symptoms of pain, internalized weight stigma at baseline was positively associated with muscle soreness and physical pain, aches, and joint pain.[‡] Within subjects, however, momentary internalized weight stigma was positively associated with muscle soreness, but not physical pain, aches, and joint pain. No relationships were found between experienced weight stigma and pain. Two studies reported a positive relationship between weight stigma and BMI; however, four other studies found no relationship. With one exception[35] whose sample had a notably higher average BMI than the other samples, all other samples reporting this relationship had similar means and standard deviations for BMI.

Few studies measured *social/demographic* correlates, and in those that did, most found they were not related to weight stigma. Specifically, two studies measured the relationship between weight stigma and education. In one study, education was negatively associated with one measure of experienced weight stigma (but not the other four measures of weight stigma used); in the other study, education was positively associated with weight stigma. Interestingly, their measures of education in these different studies were almost identical. One study found that the SES of participants who reported weight stigma during the EMA period was not significantly different to that of participants who did not report weight stigma. Further, another study found total frequency of weight stigma over the EMA period was not associated with income or ethnicity. One study found weight stigma was positively associated with age, but three other studies found no relationship. Two studies measured and found no relationship between weight stigma and gender, though many studies sampled women only and all studies consisted mostly of women.

4 | DISCUSSION

The current systematic review (a) synthesized the findings of studies that used EMA methods to estimate the impact of weight stigma on biopsychosocial correlates and (b) collated information about the methodological approaches adopted in these studies. Results showed that overall, at both the between- and within-person levels, experienced and internalized weight stigmas were associated with or led to more adverse psychological correlates/outcomes (e.g., lower body appreciation and higher levels of negative affect and emotional eating) across the eight studies that measured these outcomes. These findings are consistent with cross-sectional and experimental research showing that weight stigma is associated with adverse psychological correlates.[5,41–44]

There was mixed evidence for the relationship between weight stigma and biological/physiological correlates. For example, internalized (but not experienced) weight stigma was related to various measures of pain. Additionally, four of six studies found no relationship between BMI and weight stigma. It is important to note that the average BMI

‡Note this is one variable.

was >30 in all studies in the current review (with relatively small standard deviations for most; see Table 1). It is possible that the lack of observed relationship between BMI and stigma is attributable to reasons other than no relationship (e.g., restricted range of BMI and lack of power). It is also possible that weight stigma is experienced and has detrimental impacts on individuals irrespective of their actual weight status. Indeed, there is evidence that shows weight stigma and negative weight-related experiences are associated with adverse psychological and other health related correlates, controlling of BMI.[5,6,45,46]

Finally, the review found, overall, no association between weight stigma and the social/demographic correlates in the identified studies, with minor exceptions (see Table 2). Given the small number of statistical effect estimates for any of the measured variables, there are no clear conclusions that can be drawn from the identified data. A lack of sample diversity may explain some of these findings (e.g., studies in this review had mostly white female samples). Indeed, all studies in this review were conducted in the United States or Australia, which may lead to bias in generalizing the conclusions to other countries, particularly non-western countries. Importantly, many observed effects of these variables were measured solely between subject (often for reasons beyond the researchers' control, such as low numbers of weight stigma reports), which makes such findings similar to findings from cross-sectional studies.

Overall, the quality of studies in the current review was adequate. Most elements of EMA methodologies were appropriately used and clearly reported. However, only two of 12 studies in this review reported a power analysis. In addition, explanations on the handling of missing data were incomplete or missing at times. Although this may be because of strict journal word limits, researchers should in future submit such explanations in the Supporting Information. We also encourage future EMA studies to pre-register their study methods and provide a priori hypotheses in the interest of open science.

Many studies in the current review could best be classified as exploratory in nature. That is, they included a large number of variables and tested a large number of effects, which may be of concern in terms of type I error. Further, there were few consistencies in methodological features across studies. Specifically, there was minimal overlap in the types of reporting contingencies used, the instructions provided at baseline (see Table 1), length of reporting window, weight stigma measures used, or the outcomes/correlates measured (see Table S4). One notable exception was affect, which was measured as an outcome/correlate variable in half of the studies in the current review ($n = 6$). The effect of the variability in these methodological features should be explored empirically in future work.

Lastly, the current literature focuses almost entirely on experienced and internalized weight stigmas. Future research should also look into the impact of the anticipation of weight stigma,[47] as well as microagressions, as both of these are arguably experienced more commonly in daily life. Existing non-EMA research suggests both anticipated weight stigma and microaggressions are associated with adverse psychological health correlates.[2,48]

This review is limited in a number of ways. Primarily, we were unable to meta-analyze the data due to study heterogeneity and insufficient data. Although there were some common outcomes assessed (e.g., affect measured in six studies in the current review), the EMA methods used between these studies varied greatly. Thus, we could

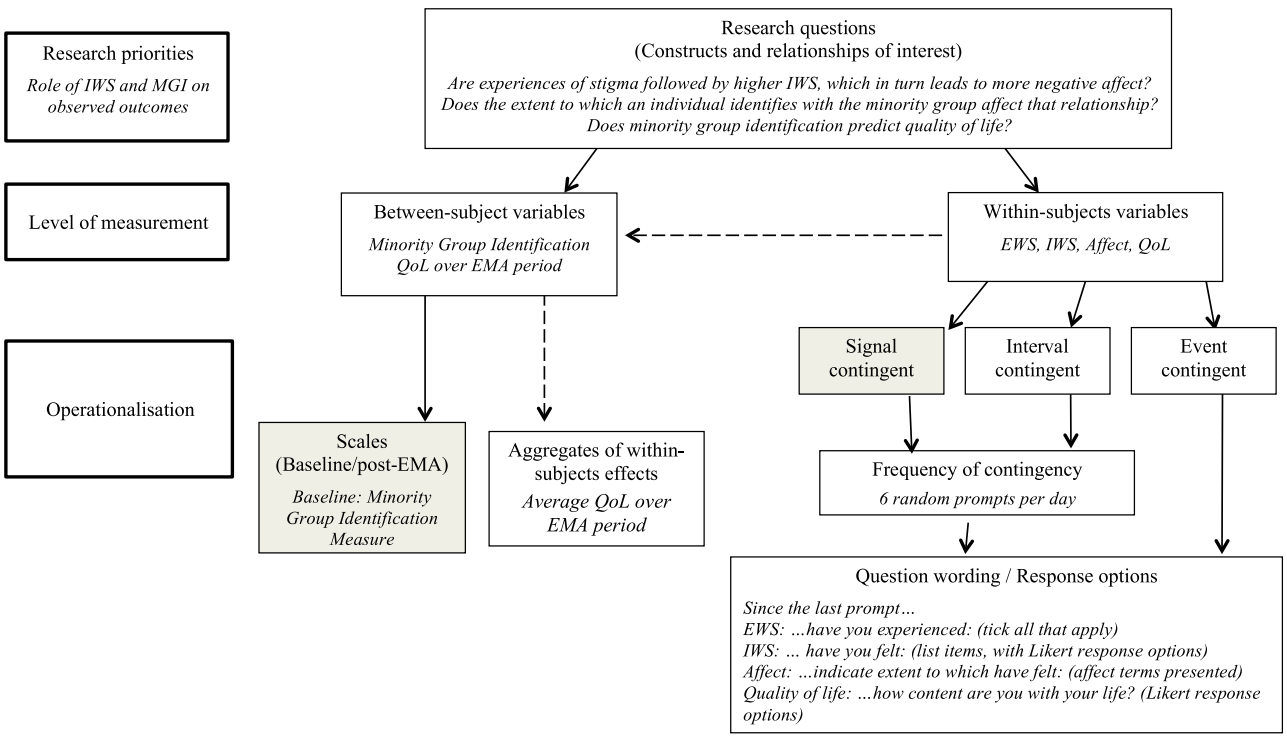

FIGURE 2 Flow chart displaying decisions in EMA protocol design.

not combine these estimates and meta-analyze these data; our synthesis is qualitative and cannot provide effect size estimates. Although many studies in this review had well implemented EMA methodologies and clear reporting, the large variability in the goals and methodological features of individual studies make it impossible to make inferences about shared findings across studies. This variability is a natural consequence of the number of possible design permutations that result from multiple decision points, each presenting many choices in EMA protocol design (see Figure 2). The diversity in study designs coupled with the resource intense nature of this research resulted in numerous relatively small studies that are not readily synthesized. As such, the current evidence can only be classified as preliminary, and replication of the findings presented within this review across a range of samples is warranted to validate their generalizability. It is our view that we are missing an opportunity to take advantage of the incredible potential of EMA methods to answer research questions about mechanisms underpinning the observed effects of weight stigma. These benefits include improved ecological validity by studying participants in their daily lives, drastically reducing (or eliminating) the recall period of self-reports, and improved understanding of the complex temporal nature of the relationships between variables by obtaining comprehensive within-person data.

4.1 | Recommendations for future EMA studies

In order to address the concerns raised above, it is important for researchers to either (a) conduct EMA studies with large samples or (b) join forces with other researchers to conduct large-scale, collaborative EMA projects. To maximize resources, we suggest that researchers collaborate in collecting EMA data across different labs, using shared design protocols, and sharing data. Ideally, researchers would develop a structured and well-defined research agenda focused on specific theory-driven hypotheses of interest. This research agenda can then translate in the design of EMA research protocols that use the same operationalization of variables, the same methodological features (see Figure 2), and pre-registered statistical analyses. This approach will likely overcome the limitations imposed by the resource-intensive nature of EMA studies, increasing the power of the studies and the capacity to have comparable data across a variety of samples. This can also facilitate collection of more diverse samples of participants (e.g., cross-cultural). There are precedents for this type of approach in other domains of psychology, which have been extremely successful (e.g., the ManyBabies Consortium in infant research).[49–51] Bringing together the efforts of multiple research groups and standardizing our practices will not only overcome statistical and methodological obstacles posed by EMA, but it is likely to result in high quality data that will form the basis of reliable theories. We have created a project page for this purpose in the Open Science Framework. We encourage researchers to visit the project (osf.io/s5ru6/) and register their interest to be contacted by our team.

4.2 | Conclusion

The present review found that weight stigma was associated with adverse psychological correlates both between and within subjects. However, we found mixed evidence for the association between weight stigma and biological/physiological correlates, and no evidence for an association between weight stigma and social/demographic correlates. We hope this review inspires a "call to arms" for researchers—as previous research has shown, EMA methods provide a considerable opportunity to understand constructs of interest and the mechanisms underpinning weight stigma correlates. However, continuing current practices (i.e., conducting research in isolation with limited samples and resources) may not lead to sufficient progress relative to the importance of weight stigma research. Given the pervasive impact of weight stigma already identified in the literature, additional progress in the field will likely translate to informing vital changes to several contexts, including education, healthcare practices and policy, and employment. Our proposed consortium is overdue and, if successful, will lead to meaningful progress in research and the broader community, through (a) sizable cross-cultural samples, (b) clarity on the temporal relationships between weight stigma and biopsychosocial correlates, and (c) information and in turn recommendations to inform future policy development and clinical guidelines.

ACKNOWLEDGMENTS

H.B. is supported by an Australian Government Research Training Program (RTP) scholarship through ACU. Open access publishing facilitated by Australian Catholic University, as part of the Wiley - Australian Catholic University agreement via the Council of Australian University Librarians.

CONFLICT OF INTEREST STATEMENT

No conflict of interest statement.

ORCID

Hugh Bidstrup https://orcid.org/0000-0001-5572-3132
Leah Kaufmann https://orcid.org/0000-0003-0034-4068
Angela Meadows https://orcid.org/0000-0002-6273-7564
Xochitl de la Piedad Garcia https://orcid.org/0000-0002-9319-8671

REFERENCES

1. Puhl R, Brownell KD. Bias, discrimination, and obesity. *Obes Res*. 2001;9(12):788-805. doi:10.1038/oby.2001.108
2. Hunger JM, Dodd DR, Smith AR. Weight discrimination, anticipated weight stigma, and disordered eating. *Eat Behav*. 2020;37:101383. doi:10.1016/j.eatbeh.2020.101383
3. Myers A, Rosen JC. Obesity stigmatization and coping: relation to mental health symptoms, body image, and self-esteem. *Int J Obes (Lond)*. 1999;23(3):221-230. doi:10.1038/sj.ijo.0800765
4. Kite J, Huang B-H, Laird Y, et al. Influence and effects of weight stigmatisation in media: a systematic review. *eClinicalMedicine*. 2022;48:101464. doi:10.1016/j.eclinm.2022.101464

5. Emmer C, Bosnjak M, Mata J. The association between weight stigma and mental health: a meta-analysis. *Obes Rev*. 2020;21(1):e12935. doi:10.1111/obr.12935
6. Lee KM, Hunger JM, Tomiyama AJ. Weight stigma and health behaviors: evidence from the Eating in America Study. *Int J Obes (Lond)*. 2021;45(7):1499-1509. doi:10.1038/s41366-021-00814-5
7. Smyth J, Wonderlich S, Crosby R, Miltenberger R, Mitchell J, Rorty M. The use of ecological momentary assessment approaches in eating disorder research. *Int J Eat Disord*. 2001;30(1):83-95. doi:10.1002/eat.1057
8. Ezzati M, Martin H, Skjold S, Hoorn SV, Murray CJ. Trends in national and state-level obesity in the USA after correction for self-report bias: analysis of health surveys. *J R Soc Med*. 2006;99(5):250-257. doi:10.1177/014107680609900517
9. Swim JK, Hyers LL, Cohen LL, Ferguson MJ. Everyday sexism: evidence for its incidence, nature, and psychological impact from three daily diary studies. *J Social Issues*. 2001;57(1):31-53. doi:10.1111/0022-4537.00200
10. DeLongis A, Coyne JC, Dakof G, Folkman S, Lazarus RS. Relationship of daily hassles, uplifts, and major life events to health status. *Health Psychol*. 1982;1(2):119-136. doi:10.1037/0278-6133.1.2.119
11. Mallett RK, Swim JK. Bring it on: proactive coping with discrimination. *Motivation Emotion*. 2005;29(4):407-437. doi:10.1007/s11031-006-9014-0
12. Shiffman S, Stone AA, Hufford MR. Ecological momentary assessment. *Annu Rev Clin Psychol*. 2008;4(1):1-32. doi:10.1146/annurev.clinpsy.3.022806.091415
13. Stone AA, Shiffman S. Ecological momentary assessment (EMA) in behavorial medicine. *Ann Behav Med*. 1994;16(3):199-202. doi:10.1093/abm/16.3.199
14. Csikszentmihalyi M, Larson R. Validity and reliability of the experience-sampling method. In: *Flow and the Foundations of Positive Psychology*. Springer; 2014:35-54. doi:10.1007/978-94-017-9088-8_3
15. Fahrenberg J, Myrtek M, Pawlik K, Perrez M. Ambulatory assessment—monitoring behavior in daily life settings. *Eur J Psychol Assess*. 2007;23(4):206-213. doi:10.1027/1015-5759.23.4.206
16. Stone AA, Broderick JE. Real-time data collection for pain: appraisal and current status. *Pain Med*. 2007;8(suppl 3):S85-S93. doi:10.1111/j.1526-4637.2007.00372.x
17. Ebner-Priemer UW, Trull TJ. Ecological momentary assessment of mood disorders and mood dysregulation. *Psychol Assess*. 2009;21(4):463-475. doi:10.1037/a0017075
18. Trull TJ, Ebner-Priemer UW. Using experience sampling methods/ecological momentary assessment (ESM/EMA) in clinical assessment and clinical research: introduction to the special section. *Psychol Assess*. 2009;21(4):457-462. doi:10.1037/a0017653
19. Trull TJ, Ebner-Priemer UW. Ambulatory assessment in psychopathology research: a review of recommended reporting guidelines and current practices. *J Abnorm Psychol*. 2020;129(1):56-63. doi:10.1037/abn0000473
20. Neubauer AB, Scott SB, Sliwinski MJ, Smyth JM. How was your day? Convergence of aggregated momentary and retrospective end-of-day affect ratings across the adult life span. *J Pers Soc Psychol*. 2020;119(1):185-203. doi:10.1037/pspp0000248
21. Nezlek J. Ecological momentary assessment: statistical issues. *Eur Psychiatry*. 2015;30:121. doi:10.1016/S0924-9338(15)31837-X
22. Carels RA, Rossi J, Solar C, Selensky JC. An ecological momentary assessment of weight stigma among weight loss participants. *J Health Psychol*. 2019;24(9):1155-1166. doi:10.1177/1359105317692855
23. Panza E, Fehling KB, Pantalone DW, Dodson S, Selby EA. Multiply marginalized: linking minority stress due to sexual orientation, gender, and weight to dysregulated eating among sexual minority women of higher body weight. *Psychol Sex Orientat Gend Divers*. 2020;8(4):420-428. doi:10.1037/sgd0000431
24. Vartanian LR, Pinkus RT, Smyth JM. Experiences of weight stigma in everyday life: implications for health motivation. *Stigma Health*. 2018;3(2):85-92. doi:10.1037/sah0000077
25. Potter LN, Brondolo E, Smyth JM. Biopsychosocial correlates of discrimination in daily life: a review. *Stigma Health*. 2019;4(1):38-61. doi:10.1037/sah0000120
26. Engel SG, Crosby RD, Thomas G, et al. Ecological momentary assessment in eating disorder and obesity research: a review of the recent literature. *Curr Psychiatry Rep*. 2016;18(4):37. doi:10.1007/s11920-016-0672-7
27. Page MJ, McKenzie JE, Bossuyt PM, et al. Updating guidance for reporting systematic reviews: development of the PRISMA 2020 statement. *J Clin Epidemiol*. 2021;134:103-112. doi:10.1016/j.jclinepi.2021.02.003
28. Veritas Health Innovation. *Covidence Systematic Review Software*. Veritas Health Innovation; 2016.
29. Panza E, Olson K, Goldstein CM, Selby EA, Lillis J. Characterizing lifetime and daily experiences of weight stigma among sexual minority women with overweight and obesity: a descriptive study. *Int J Environ Res Public Health*. 2020;17(13):4892. doi:10.3390/ijerph17134892
30. Potter L, Meadows A, Smyth J. Experiences of weight stigma in everyday life: an ecological momentary assessment study. *J Health Psychol*. 2021;26(14):2781-2793. doi:10.1177/1359105320934179
31. Carels RA, Hlavka R, Selensky JC, Solar C, Rossi J, Caroline MJ. A daily diary study of internalised weight bias and its psychological, eating and exercise correlates. *Psychol Health*. 2019;34(3):306-320. doi:10.1080/08870446.2018.1525491
32. Olson KL, Panza E, Lillis J, Wing RR. Association of weight-related stigmas with daily pain symptoms among individuals with obesity. *Ann Behav Med*. 2023;57(3):269-274.
33. Poon JA, Panza EA, Selby E, Feinstein BA. Lifetime and daily weight stigma among higher weight sexual minority women: links to daily weight-based concerns, avoidance, and negative affect. *Stigma Health*.1-12 2022. doi:10.1037/sah0000421
34. Romano KA, Heron KE. Daily weight stigma experiences, and disordered and intuitive eating behaviors among young adults with body dissatisfaction. *Int J Eat Disord*. 2022;56(3):538-550. doi:10.1002/eat.23859
35. Seacat JD, Dougal SC, Roy D. A daily diary assessment of female weight stigmatization. *J Health Psychol*. 2016;21(2):228-240. doi:10.1177/1359105314525067
36. Vartanian LR, Pinkus RT, Smyth JM. The phenomenology of weight stigma in everyday life. *J Contextual Behav Sci*. 2014;3(3):196-202. doi:10.1016/j.jcbs.2014.01.003
37. Meadows A, Daníelsdóttir S. What's in a word? On weight stigma and terminology. *Front Psychol*. 2016;7:1527. doi:10.3389/fpsyg.2016.01527
38. Meadows A. *Fear and Self-Loathing: Internalised Weight Stigma and Maladaptive Coping in Higher-Weight Individuals*. University of Birmingham; 2018.
39. Meadows A, Higgs S. Challenging oppression: a social identity model of stigma resistance in higher-weight individuals. *Body Image*. 2022;42:237-245. doi:10.1016/j.bodyim.2022.06.004
40. Puhl RM, Lessard LM, Pearl RL, Himmelstein MS, Foster GD. International comparisons of weight stigma: addressing a void in the field. *Int J Obes (Lond)*. 2021;45(9):1976-1985. doi:10.1038/s41366-021-00860-z
41. Papadopoulos S, Brennan L. Correlates of weight stigma in adults with overweight and obesity: a systematic literature review. *Obesity*. 2015;23(9):1743-1760. doi:10.1002/oby.21187
42. Bidstrup H, Brennan L, Kaufmann L, de la Piedad GX. Internalised weight stigma as a mediator of the relationship between experienced/perceived weight stigma and biopsychosocial outcomes:

a systematic review. *Int J Obes (Lond)*. 2021;1-9(1):1-9. doi:10.1038/s41366-021-00982-4
43. Schvey NA, Puhl RM, Brownell KD. The impact of weight stigma on caloric consumption. *Obesity*. 2011;19(10):1957-1962. doi:10.1038/oby.2011.204
44. Bidstrup H, Brennan L, Hindle A, Kaufmann L, de la Piedad GX. Internalised weight stigma mediates relationships between perceived weight stigma and psychosocial correlates in individuals seeking bariatric surgery: a cross-sectional study. *Obes Surg*. 2022;32(11):3675-3686. doi:10.1007/s11695-022-06245-z
45. Puhl RM, Wall MM, Chen C, Austin SB, Eisenberg ME, Neumark-Sztainer D. Experiences of weight teasing in adolescence and weight-related outcomes in adulthood: a 15-year longitudinal study. *Prev Med*. 2017;100:173-179. doi:10.1016/j.ypmed.2017.04.023
46. Tomiyama AJ, Carr D, Granberg EM, et al. How and why weight stigma drives the obesity 'epidemic' and harms health. *BMC Med*. 2018;16(1):123. doi:10.1186/s12916-018-1116-5
47. Hunger JM, Major B. Weight stigma mediates the association between BMI and self-reported health. *Health Psychol*. 2015;34(2):172-175. doi:10.1037/hea0000106
48. Barber S, Gronholm P, Ahuja S, Rüsch N, Thornicroft G. Microaggressions towards people affected by mental health problems: a scoping review. *Epidemiol Psychiatr Sci*. 2020;29:e82. doi:10.1017/S2045796019000763
49. Frank MC, Bergelson E, Bergmann C, et al. A collaborative approach to infant research: promoting reproducibility, best practices, and theory-building. *Inf Dent*. 2017;22(4):421-435. doi:10.1111/infa.12182
50. The ManyBabies Consortium. Quantifying sources of variability in infancy research using the infant-directed-speech preference. *Adv Methods Pract Psychol Sci*. 2020;3(1):24-52. doi:10.1177/2515245919900809
51. Byers-Heinlein K, Bergmann C, Davies C, et al. Building a collaborative psychological science: lessons learned from ManyBabies 1. *Can Psychol*. 2020;61(4):349-363. doi:10.1037/cap0000216

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Bidstrup H, Brennan L, Kaufmann L, Meadows A, de la Piedad Garcia X. A systematic review of ecological momentary assessment studies on weight stigma and a call for a large-scale collaboration. *Obesity Reviews*. 2024;25(3):e13676. doi:10.1111/obr.13676