Health Psychology

ISSN: 0278-6133

2025, Vol. 44, No. 2, 108–118
https://doi.org/10.1037/hea0001389

Daily Social Resources as a Buffer Against Stress Eating and Its Consequences

Yoobin Park[1], Brian P. Don[2], Ashley E. Mason[1], Aric A. Prather[1], and Elissa S. Epel[1]
[1] Department of Psychiatry and Behavioral Sciences, University of California, San Francisco
[2] School of Psychology, University of Auckland

Objective: Eating in response to stress can become habitual and have long-term consequences for weight gain, but little research has explored what may help break stress-eating cycles. We examined daily social resources as potential protective factors against daily stress eating and eventual weight gain. ***Method:*** In Study 1 ($N = 1,264$), we assessed stress-eating tendencies, body mass index (BMI) and waist-to-hip ratio (WHR) at baseline, receipt of emotional support over 8 days (9,649 reports), and tracked BMI/WHR after about 10 years. We examined the average likelihood of receiving emotional support as a moderator of the link between stress eating and BMI/WHR at the follow-up. In Study 2 ($N = 536$; 10,288 reports), we assessed stress-eating status and BMI at baseline, social responsiveness (feeling that others are caring), and stress-eating behavior over 24 days and tracked BMI a year later. We examined if social responsiveness moderates stress-eaters' daily stress-eating behaviors and changes in BMI. ***Results:*** In Study 1, stress eating predicted increases in BMI and WHR at the 10-year follow-up but not among individuals who were more (vs. less) likely to receive emotional support in daily life. In Study 2, stress eaters tended to report more daily stress-eating behaviors compared to nonstress eaters, but such tendency was attenuated on days they perceived high (vs. low) levels of social responsiveness. Stress eating did not predict BMI at the 1-year follow-up. ***Conclusions:*** These observational findings suggest that social resources in daily lives may have long-term benefits for stress eaters, potentially by reducing their everyday stress eating.

Public Significance Statement
Stress eating can lead to weight gain over time. This study found that having supportive relationships can be a protective factor, mitigating the negative impact of stress eating on increases in body mass index and waist-to-hip ratio over a 10-year period. A subsequent study further showed that people with habitual stress-eating patterns are less likely to engage in stress-eating behaviors when they feel cared for by others.

Keywords: emotional eating, eating behavior, social support, social buffering

Supplemental materials: https://doi.org/10.1037/hea0001389.supp

Modern life has made it easy to turn to food to cope with stress. Eating is a common response to stress that may confer some immediate benefits (Tomiyama et al., 2015), but if done habitually, it entails profound consequences for long-term weight gain and metabolic health (Araiza & Lobel, 2018). Despite the prevalence of stress eating and its link to adverse health outcomes, relatively little work has focused on investigating protective factors against stress eating or consequent weight gain, especially as compared to the large body of work on the predictors and mechanisms of stress eating (Araiza & Lobel, 2018). Further, most existing studies on protective factors have primarily focused on testing the effectiveness of interventions. Although evidence for their effectiveness is promising (e.g., success in reducing stress eating and sometimes in glucose control), these interventions entail significant costs, requiring substantial resources like money and time (e.g., 6-week mindfulness-based stress reduction training; Corsica et al., 2014) and typically target high-risk groups (e.g., individuals with obesity; Daubenmier et al., 2011; Radin et al., 2020). Given the cost and difficulty of treating obesity (De Lorenzo et al., 2020), identifying preventive factors that can help mitigate the risks at the population level is critical. The present research tests social resources in daily life as one potential buffer against the negative effects of stress eating.

Mechanisms Underlying (Habitual) Stress Eating

The close relationship between stress and eating behaviors has been well documented among animals and humans (François et al., 2022;

This article was published Online First September 19, 2024.
Eli Puterman served as action editor.
Yoobin Park https://orcid.org/0000-0002-2796-3523
This work was funded by the National Institute on Aging (U24AG072699 and R24AG048024). The authors have no conflicts of interest to declare. The R code for the analyses and the additional online materials can be found at https://osf.io/7rvs3/.

Yoobin Park served as lead for conceptualization, formal analysis, visualization, and writing–original draft. Brian P. Don served in a supporting role for writing–review and editing. Ashley E. Mason served in a supporting role for writing–review and editing. Aric A. Prather served in a supporting role for funding acquisition and writing–review and editing. Elissa S. Epel served as lead for funding acquisition and supervision and served in a supporting role for writing–review and editing. Aric A. Prather and Elissa S. Epel contributed equally to resources.

Correspondence concerning this article should be addressed to Yoobin Park, Department of Psychiatry and Behavioral Sciences, University of California, San Francisco, 675 18th Street, San Francisco, CA 94107, United States. Email: yoobin.park@ucsf.edu

Torres & Nowson, 2007). Research has shown that those undergoing stressful situations tend to show an increase in food intake, particularly for highly palatable food. At a physiological level, the activation of the hypothalamic–pituitary–adrenocortical (HPA) axis following exposure to a stressor can increase the release of cortisol, stimulating appetite, and increasing food intake (Tsigos & Chrousos, 2002). The activation of the HPA can also affect the dopaminergic neuronal activity in the mesolimbic reward pathways (Trainor, 2011) and motivate approach responses toward rewards such as food (Baldo & Kelley, 2007; but see Lemos et al., 2012).

Importantly, given the reinforcing nature of food, stress eating can become habitual and even contribute to compulsive overeating behaviors over time (Adam & Epel, 2007; Epel et al., 2012). Specifically, eating palatable food can bring comfort (i.e., reduce the stress response of the HPA axis) by stimulating the release of opioids and dopamine and providing rewarding experiences (Dallman et al., 2005). Stimulation of the reward pathways triggers changes in the dorsal striatum (the "habit circuitry"); repeated activation of these reward and habit neurocircuits over time will promote encoding stress-eating behaviors as a habit. Research suggests that it is possible to identify people who have developed such stress-eating habits using a simple self-report. In one study, people who self-identified as eating more (vs. less) during times of stress indeed showed worsened metabolic health during medical school exams (Epel et al., 2004).

Social Resources and Stress

Given that stress eating triggers relief through stimulating the reward center, it is important to examine whether other natural rewards might offset or reduce stress eating. Intimate social interactions, or feelings of closeness and connection (or potentials for such), are considered to be as rewarding as primary rewards (e.g., processed in the same neural networks; Krach et al., 2010; Vrticka, 2012). The present research thus focuses on the potential buffering role of social resources. In the literature, the term "social resources" has been used to encompass a number of different things, sometimes as broadly defined as any commodity that is transmitted through interpersonal behavior (for an extensive discussion, see Törnblom & Kazemi, 2012). In this article, we focus on one critical component of social resources: supportive, responsive, and caring relationships, consistent with how social resources have often been operationalized in the stress literature (Hobfoll, 2002; Kobasa & Puccetti, 1983).

Researchers have long theorized and provided evidence for the protective role of social relationships in people's response to stress broadly (Cobb, 1976; Cohen & Wills, 1985; House et al., 1988). For example, early laboratory studies have shown that the mere presence of another person (e.g., a close friend; Kamarck et al., 1990) can reduce stress-induced activation of the HPA axis or autonomic nervous system (Uchino et al., 1996). Subsequent work further suggested that these effects can vary depending on factors such as the nature or quality of the relationship with the social partner (e.g., Allen et al., 2002). For example, meta-analytic findings indicated that the effect is stronger if verbal support is provided, rather than the social figure being merely present (Thorsteinsson & James, 1999).

One way that social resources can modulate stress responses may be by shaping the appraisals of the stressor (Cohen & Wills, 1985). Feeling supported and cared for by others can help one feel more in control of the demands and lead to a less severe appraisal of the stressor. Such appraisals can in turn downregulate threat-related stress reactivity. In support of this idea, Eisenberger et al. (2007) showed that high levels of social support during a diary study were related to attenuated activity in brain regions associated with distress (e.g., dorsal anterior cingulate cortex) during a stressor task. That is, the task was perceived as less threatening for those with ample social resources in their daily lives. These individuals also showed diminished cortisol reactivity to the stressor task, which is related to the amount of dopamine release in the ventral striatum (Pruessner et al., 2004).

Social resources may also serve an important function of buffering stress eating or stress-related weight gain. Acknowledging such potentials, a recent weight loss intervention study included in its intensive 8-week program components focused on improving social relationships (along with stress management, healthy diet, and physical activity; Anand et al., 2023), although the authors did not examine the independent effect of improving social health on eating behaviors. In another observational study focusing specifically on social resources (operationalized as perceived social support; Darling et al., 2017), social resources moderated the link between stress eating and body mass index (BMI) change among male students during the transition to college. Specifically, perceiving high social resources attenuated the students' BMI increases associated with stress eating. In other words, those high in stress-eating tendencies were protected from weight gain if they had ample social resources. Despite the value of this previous work, it is limited in two key ways. First, the study's reliance on a college student sample limits the generalizability of the findings. Second, it leaves open the question of what proximal (e.g., daily) processes underlie any benefits social resources may confer in the long run.

Research Overview

The present research presents two analyses that can extend our understanding of if and how social resources benefit individuals who report to habitually engage in stress eating (scored high in continuously assessed stress-eating tendencies in Study 1 and categorized as stress eaters in Study 2). In Study 1, we used existing data from the Midlife Development in the United States (MIDUS) to explore the potential long-term benefits of having daily social resources for those high in stress-eating tendencies. We obtained the average likelihood of receiving emotional support from an 8-day diary study as a proxy for average daily social resources and examined whether those with more (vs. less) social resources in daily lives are protected from increases in BMI and waist-to-hip ratio (WHR) associated with baseline stress-eating tendencies. This analysis extends previous work (Darling et al., 2017) by testing the buffering effects of social resources among a larger and older sample over a longer follow-up period. We note that it is debatable how comparable our average daily support measure is to a global, retrospective report of social support at baseline. There has been evidence for the convergence between global and daily reports but also differences in what they can predict (e.g., Oishi & Sullivan, 2006; Zygar-Hoffmann & Schönbrodt, 2020).

In any case, the measure of emotional support in this first study is arguably limited in that it captures such a broad construct. For example, it cannot speak to the degree of social responsiveness, that is, the extent of understanding, caring, and validating of the respective partner, which may be a crucial determinant for experiencing the benefits of support (Fekete et al., 2007; Selcuk & Ong, 2013). Indeed, perceived responsiveness stands out as a pivotal construct underlying

rewarding, high-quality relationships (Reis, 2012). In Study 2, we assessed social responsiveness, a more precise measure of a rewarding social interaction, as an indicator of social resources.

Study 2 also extended Study 1 by zooming in on daily processes by which social resources can confer long-term benefits. We examined if perceiving more (vs. less) social responsiveness in daily lives reduces engagement in daily stress-eating behaviors associated with baseline stress-eating status (stress eaters vs. nonstress eaters). Finally, we explored whether less severe appraisals of stressors underlie this buffering effect such that stress eaters make less severe appraisals of the daily stressors on days they perceive greater social resources and, in turn, are less likely to engage in stress eating.

Study 1

Method

Participants and Procedure

Our research was not preregistered. All data were analyzed using R 2023.03.0 and related R codes and the additional online materials can be found at https://osf.io/7rvs3/. We analyzed data from the MIDUS study, a longitudinal study that started in 1995–1996, with more than 7,000 adults independently living in the United States. Please see Figure 1 for an overview of the study procedure.

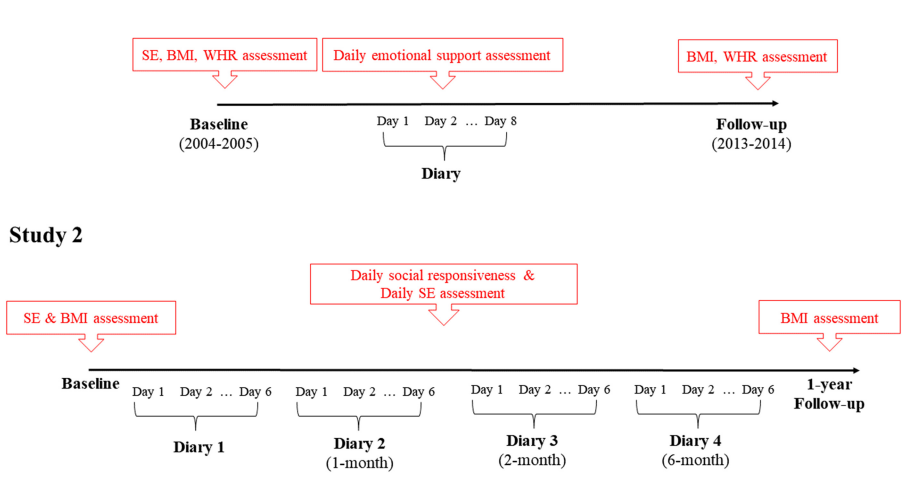
Participants were initially recruited via a nationally representative random-digit dialing (see Brim et al., 2004 for more information). The second wave (MIDUS II) in which our key measure of interest (stress-eating tendency) was first assessed began in 2004. All participants completed a main survey, and a randomly selected subset of participants was invited to participate in a daily diary study. In our final sample, the gap between the main survey and the diary study ranged from 3 to 55 months ($M = 21.20$, $SD = 13.87$). During the 8-day diary study, participants completed short telephone interviews about their experiences every day. To ensure the reliability of our emotional support measure, we only included in our analyses participants who had three or more daily reports (see the additional online materials for a flowchart describing the sample selection process). Most participants (74%) had completed eight diaries (number of diaries $M = 7.61$, $SD = 0.78$), contributing a total of 9,649 diaries. Finally, the third wave (MIDUS III) was collected between 2013 and 2014. Participants for the present analyses were selected if they had participated in MIDUS II (both the main survey and daily diary) and MIDUS III. We only considered participants with our key variables (stress-eating status and BMI) available. Among these participants, four participants had missing information on race and were excluded from our complete case analyses. Table 1 summarizes the sociodemographic characteristics of the final sample ($N = 1{,}264$). Compared to those excluded from our analyses, this sample was younger on average and consisted of more individuals who were White, married, and had higher income (see the additional online materials for full results).

Measures

Baseline Stress-Eating Tendency. Participants reported how they generally respond when they are confronted with difficult or stressful events in their lives. The following two items were assessed using 4-point scales ranging from 1 (*a lot*) to 4 (*not at all*) and averaged to capture baseline tendencies of stress eating: "I eat more than I usually do" and "I eat more of my favorite foods to make myself feel better." We used the Spearman–Brown formula to confirm the reliability ($r_{sb} = .90$). We reverse-coded the scores so that higher values indicate a greater tendency toward stress eating and used the continuous variable in our analyses. Importantly, measuring stress eating in this manner requires an individual's awareness of their tendencies, which is common in the literature (Meule et al., 2018); such self-reports also have some predictive validity (Epel et al., 2004; Sproesser et al., 2014).

Daily Emotional Support. Each day, participants were asked, "since [yesterday], did you receive any emotional support from anyone or any organizations?" We coded this binary response as 0 = *no*,

Figure 1
Study Procedure (Analyses 1 and 2)



Note. For Study 2, the time since the first diary is noted in parentheses. SE = stress eating; BMI = body mass index; WHR = waist-to-hip ratio. See the online article for the color version of this figure.

Table 1
Study 1: Participant Characteristics at Baseline (N = 1,264)

Variable	*N* (%)
Sex	
Male	553 (44)
Female	711 (56)
Age at Wave 2, *M* (*SD*)	55.37 (11.06)
Age at Wave 3, *M* (*SD*)	64.49 (11.07)
Education	
≤High school	53 (4)
College/bachelor's	954 (75)
≥Graduate	256 (20)
Household income	
<$50,000	470 (38)
$50,000–$99,999	456 (37)
$100,000–$199,999	260 (21)
≥$200,000	52 (4)
Marital status	
Married	929 (74)
Separated/divorced/widowed	234 (19)
Never married	100 (8)
Race	
Asian	5 (<1)
Black/African American	33 (3)
Native American/Alaska Native Aleutian Islander/Eskimo	17 (1)
Other	26 (2)
White	1,183 (94)

1 = *yes* and created a person mean, indicating the average likelihood of receiving emotional support over the 8 days.

BMI (kg/m^2). We calculated BMI using participants' self-reported weight and height. On average, our analytic sample significantly increased in BMI ($M = 0.32$, $SD = 3.13$) over 10 years, $t(1263) = 3.67$, $p < .001$.

WHR. We calculated WHR by dividing participants' self-reported waist size (inches) by hip size (inches). To handle the extreme values, we followed the procedures in MIDUS in which hip measurement below 22 was set to 22 (applied to six and three individuals at Waves 2 and 3, respectively). On average, our analytic sample significantly increased in WHR ($M = 0.02$, $SD = 0.14$) over the 10 years, $t(1183) = 4.33$, $p < .001$.

Analyses and Results

We ran two models, each predicting BMI and WHR at the follow-up while controlling for the respective baseline measurement. Baseline levels of stress eating, person-mean of emotional support (i.e., average from the diary), and their interaction term were included as predictors. Both models controlled for sex, age, and race. Missing data on the covariates were minimal, and we conducted a complete case analysis.

Table 2 shows that the interaction between stress-eating tendency and average emotional support was significant in both models, suggesting that the change in BMI and WHR associated with stress-eating tendency reported at baseline depended on the level of emotional support available to the individual in their daily life. Specifically, as illustrated in Figure 2, stress-eating tendency was associated with increased BMI, $b = 0.47$, $SE = 0.14$, $p < .001$, and increased WHR, $b = 0.02$, $SE = 0.00$, $p < .001$, at low (−1 *SD*) levels of mean emotional support but not at high (+1 *SD*) levels (BMI: $b = -0.09$, $SE = 0.13$, $p = .46$; WHR: $b = 0.00$, $SE = 0.00$, $p = .37$). Put differently, mean levels of emotional support were negatively associated with follow-up BMI and WHR for those who reported high stress-eating tendencies at baseline (BMI: $b = -1.00$, $SE = 0.48$, $p = .04$; WHR: $b = -0.03$, $SE = 0.02$, $p = .07$) but positively or not significantly for those low in stress-eating tendencies (BMI: $b = 1.30$, $SE = 0.56$, $p = .02$; WHR: $b = 0.03$, $SE = 0.02$, $p = .07$).

Study 2

Building on the long-term buffering effects of social resources found in Study 1, Study 2 sought to capture the daily dynamics underlying such effects. Here, we assessed perceived social responsiveness (Reis, 2012) to capture daily fluctuations in social resources. To explore its role in modulating daily eating behaviors tied to self-reported stress eating, we examined if the link between stress-eating status (i.e., stress eaters vs. nonstress eaters) at baseline and stress-eating behavior reported in everyday life is moderated by daily perceptions of others' responsiveness. Following our primary model, we conducted two sets of additional analyses. First, we sought to rule out the possibility that any buffering effects of daily social responsiveness are simply reflective of the effects of low stress intensity (i.e., the days people reported perceiving greater social responsiveness were also when they experienced less intense stress and thus engaged in less stress eating). Second, we tested the idea that perceived stress intensity underlies the buffering effects of social responsiveness (Cohen & Wills, 1985). That is, having responsive others protects stress eaters from daily engagement in stress eating by changing how they perceive stress. Finally, parallel to Study 1,

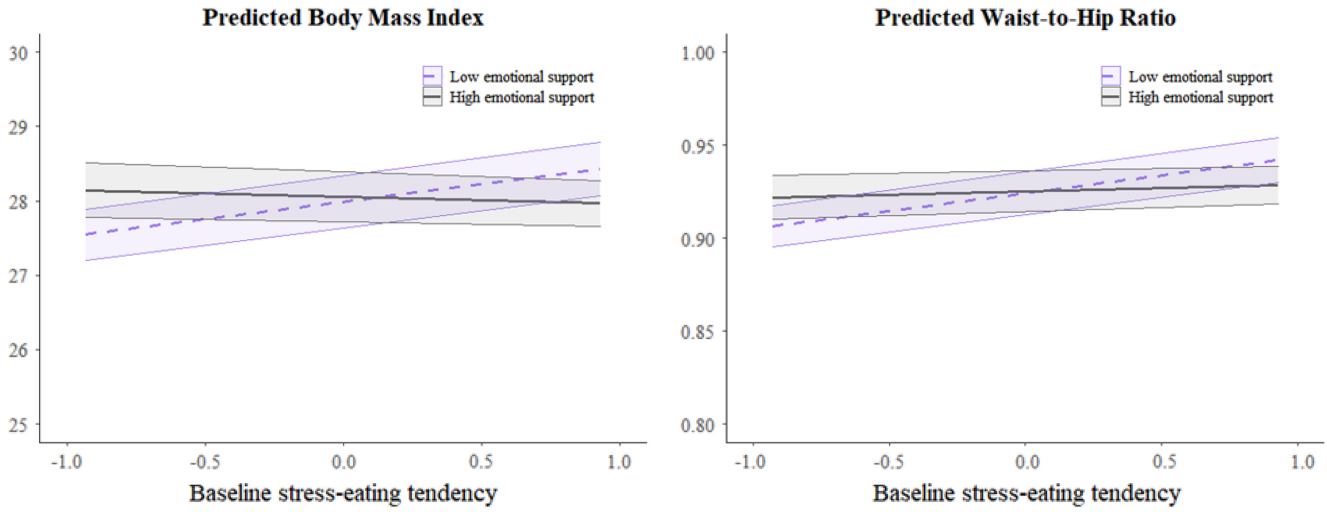
Table 2
Study 1: Baseline Stress-Eating Tendency Interacting With Average Daily Emotional Support to Predict BMI and WHR at the Follow-Up

	BMI				WHR			
Predictor	*b* (β)	*SE*	*p*	95% CI	*b* (β)	*SE*	*p*	95% CI
Sex	0.02 (.00)	0.18	.95	[−0.34, 0.36]	−0.08 (−.36)	0.01	<.001	[−0.10, −0.07]
Age	−0.06 (−.11)	0.01	<.001	[−0.07, −0.04]	0.00 (.04)	0.00	.10	[−0.00, 0.00]
Race	0.29 (.01)	0.35	.40	[−0.40, 0.98]	0.01 (.01)	0.01	.56	[−0.02, 0.03]
Baseline BMI or WHR	0.90 (.84)	0.02	<.001	[0.87, 0.94]	0.20 (.25)	0.02	<.001	[0.16, 0.24]
Stress-eating tendency	0.19 (.03)	0.10	.07	[−0.01, 0.39]	0.01 (.09)	0.00	<.001	[0.01, 0.02]
Mean emotional support	0.15 (.01)	0.39	.69	[−0.60, 0.91]	0.00 (.00)	0.01	.86	[−0.02, 0.03]
Stress-Eating Tendency × Mean Emotional Support	−1.23 (−.05)	0.38	.001	[−1.97, −0.50]	−0.03 (−.07)	0.01	.008	[−0.06, −0.01]

Note. For categorical covariates, the majority group served as a reference: sex (0 = *female*, 1 = *male*); race (0 = *White*, 1 = *non-White*). BMI = body mass index; WHR = waist-to-hip ratio; CI = confidence interval.

Figure 2

Study 1: The Moderating Effect of Average Emotional Support on the Link Between Baseline Stress-Eating Tendency and Body Mass Index and Waist-to-Hip Ratio at the Follow-Up



Note. Each model controlled for the baseline assessment of the outcome. Shaded bands represent 95% confidence intervals. See the online article for the color version of this figure.

we examined whether average levels of daily social responsiveness during the diary study moderate the link between stress-eating status at baseline and BMI changes.

Method

Participants and Procedure

Participants were recruited for a study on COVID-19 vaccine booster injections (see Prather et al., 2023 for more information), and daily diaries were collected at four time points over 1 year, based in part on a vaccination schedule. At each time point, participants completed 6-day diary studies (see Figure 1). During the diary study period, participants received a link to a short survey through texts or emails depending on their indicated preferences twice a day, at 7 a.m. (morning diary) and 7 p.m. (evening diary), and responded to it on phone or computer. Participants also received a reminder notification for the morning diary at 11 a.m. The survey links did not expire, and only the evening diaries (which included our key measures) that were completed by the end of the day were analyzed for the present research. In total, there were 10,288 diaries available for analysis (i.e., 80% of 12,864 possible reports for 536 individuals). On average, participants contributed 19.19 diaries ($SD = 6.46$), with the number of total reports not systematically differing across the four time points, $F(3, 1940) = 0.99$, $p = .40$. Table 3 shows a summary of participant characteristics.

Baseline Measures

Stress-Eating Status. Participants responded to a question, "Do you tend to eat more or less when you feel stressed?" on a scale ranging from 1 = *much less* to 5 = *much more*. Of note, participants also responded to this item at the 1-month and 6-month follow-up surveys. Stress eating at baseline showed high correlations with later assessments (.71 and .69), suggesting good test–retest reliability. We coded those who reported eating a little more or much more (as opposed to little less, much less, or about the same) when stressed as stress eaters.[1]

Daily Measures

Every evening, participants responded to a short questionnaire that included the following items. All items were rated on a 5-point scale ranging from 1 (*not at all*) to 5 (*extremely*).

Daily Stress-Eating Behavior. Participants indicated how they had been dealing with stressful situations in their lives that day. Stress-eating behavior was assessed using an item, "to feel better, I ate more than usual or ate foods I don't usually let myself eat."

Daily Social Responsiveness. We assessed social resources using a daily measure of perceived responsiveness (Reis, 2012). Participants' responses to the following two items were averaged: "Today, I felt people were responsive to my needs" and "Today, I felt people valued, understood, and cared about me."

Daily Stress Intensity. Participants were asked to think of the most stressful event that day and indicate how stressful that situation was for them at its peak.

Follow-Up Measures

Changes in BMI (kg/m^2). Both at baseline and at the 1-year follow-up, participants visited the clinic and were weighed on a

[1] To be consistent with our operationalization of stress eating in Study 1, we created a binary variable distinguishing individuals who eat more versus not in response to stress. The lower end of the original continuous measure of stress eating represents eating less in response to stress, which may be different from eating more in response to stress to a lesser degree. Nevertheless, using the original continuous measure of stress eating yields the same pattern of results as using the binary variable. That is, the effects found for stress eaters and nonstress eaters in the current results are found for individuals scoring higher (vs. lower) on this continuous measure. The full results are reported in the online supplemental materials.

Table 3
Study 2: Participant Characteristics at Baseline (N = 536)

Variable	All (N = 536)	Stress eaters (n = 290)	Nonstress eaters (n = 246)
Number of evening reports	10,288	5,658	4,630
Sex			
Male	191 (36%)	97 (33%)	94 (38%)
Female	345 (64%)	193 (67%)	152 (62%)
Age, *M* (*SD*)	52.46 (12.09)	51.89 (12.02)	53.13 (12.15)
Education			
≤High school	12 (2%)	4 (1%)	8 (3%)
College/bachelor's	282 (53%)	155 (53%)	127 (52%)
Professional/doctorate	242 (45%)	131 (45%)	111 (45%)
Household income			
<$50,000	66 (12%)	36 (12%)	30 (12%)
$50,000–$99,999	105 (20%)	52 (18%)	53 (22%)
$100,000–$199,999	162 (30%)	86 (29%)	76 (31%)
≥$200,000	132 (25%)	78 (27%)	54 (22%)
Prefer not to answer	70 (13%)	37 (13%)	33 (13%)
Partnership status			
In a long-term or marital relationship	313 (58%)	161 (56%)	152 (62%)
Race			
Asian	128 (24%)	62 (22%)	66 (27%)
Black/African American	17 (3%)	12 (4%)	5 (2%)
Hispanic/Latinx	53 (10%)	37 (13%)	16 (7%)
Other	38 (7%)	23 (8%)	15 (6%)
White	300 (56%)	156 (53%)	144 (59%)
Baseline BMI, *M* (*SD*)	26.90 (5.72)	28.21 (5.85)	25.40 (5.18)

Note. BMI = body mass index.

digital research grade scale. Data for 370 individuals were available. On average, participants showed a significant increase in BMI, $M = 0.22$, $SD = 1.66$, $t(369) = -2.59$, $p = .01$. Please see the additional online materials for the differences in our key variables between individuals who stayed in versus dropped out of the study by the follow-up. There was a higher proportion of females among individuals who stayed (vs. dropped out), but no other differences were observed (i.e., in terms of age, race, baseline stress-eating status, average levels of social responsiveness, or stress eating during the diary period).

Analytic Plan

To account for the nested structure of the data (diaries nested within individuals), we ran multilevel models using the lme4 package (Bates et al., 2015) in R. Our primary model specified fixed effects of baseline stress-eating status, daily social responsiveness, and their interaction term. To disaggregate the within- versus between-person effects of social responsiveness, we included person mean-centered daily social responsiveness (grand mean-centered), person mean of daily social responsiveness, and their interactions with stress-eating status as predictors in the model. Our model also included a random intercept for individuals and a random slope for within-person daily social responsiveness.

To test and ensure the robustness of any effect we found, we also ran a model accounting for the different time points in which diaries were completed (see Figure 1). We created three dummy variables for time points and added three-way interactions involving the dummy variables and Stress-Eating Status × Social Responsiveness interaction (along with all possible lower-order interactions) to the primary model.

Additional Analyses. We conducted two sets of additional analyses: (a) to examine whether the effects of (high) daily social responsiveness are discriminant from those of (low) daily stress intensity, we repeated the primary analyses controlling for daily stress intensity and its interaction with baseline stress-eating status[2] and (b) to examine whether low stress intensity underlies the buffering effects of social responsiveness (i.e., stress eaters perceive stressors as less intense on days with high levels of social responsiveness which in turn relates to less engagement in stress-eating behavior), we used the Monte Carlo method for assessing indirect effects (Preacher & Selig, 2010). This involved running two models, one predicting stress intensity with baseline stress-eating status, daily social responsiveness, and their interaction and another predicting daily stress-eating behaviors with the same set of predictors as well as stress intensity. We used the same covariates as in the primary analysis.

Follow-Up Analyses. To examine whether daily social responsiveness serves as a buffer against BMI increases associated with stress-eating status at baseline, we ran a regression model including stress-eating status, average levels of social responsiveness during the diaries (i.e., person mean), and their interactions as predictors of BMI at the 1-year follow-up. As in Study 1, this model also controlled for baseline BMI.

[2] Given that our question about daily stress-eating behavior assumes the presence of some stressors on a given day, we also conducted sensitivity analyses excluding days when participants responded with "not at all" to the stress intensity item, which could be indicative of stress-free days. Our primary results remained the same. Please see the additional online materials for the full results.

Results

Preliminary Results

At the within-person level, daily social responsiveness was negatively associated with daily stress-eating behaviors, $r = -.08$, $p < .001$, suggesting that people report having engaged in stress eating less on days they perceive more responsiveness from others. When comparing average daily stress-eating behaviors, those identified as stress eaters at baseline tended to score higher than nonstress eaters, $t(480) = -9.28$, $p < .001$. However, the two groups did not differ in average perceptions of social responsiveness, $t(507) = 0.67$, $p = .50$.

Primary Results

As summarized in Table 4, our primary model showed a significant main effect of baseline stress-eating status, such that those who identified as stress eaters (vs. nonstress eaters) at baseline were more likely to engage in stress eating at the daily level. However, a significant interaction between stress-eating status and daily social responsiveness suggested that baseline stress-eating status was less strongly associated with daily stress-eating behaviors on days one perceived higher levels of social responsiveness ($b = 0.31$, $SE = 0.04$, $p < .001$), as compared to days they perceived lower levels ($b = 0.44$, $SE = 0.04$, $p < .001$; see Figure 3). Put differently, perceiving more (vs. less) responsiveness from others was associated with less engagement in stress-eating behaviors for those identified as stress eaters at baseline ($b = -0.11$, $SE = 0.01$, $p < .001$) but not for those who did not identify as such ($b = -0.02$, $SE = 0.02$, $p = .41$). These results remained the same in a model accounting for the effects of time.

Additional Analyses

Uniqueness of the Daily Social Responsiveness Effects. Controlling for stress intensity and its interaction with baseline stress-eating status did not change our key effect of interest (see the additional online materials for the full results).

Intensity Appraisal as a Mediator. The indirect effect of Stress-Eating Status × Daily Social Responsiveness interaction on daily stress-eating behavior via stress intensity was not significant, $ab = -0.001$, 95% CI = [−0.01, 0.00] (see the additional online materials for the full results).

Follow-Up Analyses

Finally, we examined whether stress-eating status at baseline predicted BMI 1 year later (controlling for BMI at baseline) and whether average levels of social responsiveness can moderate this link. Somewhat unexpectedly, our results showed that the main effect of stress-eating status was not significant ($b = -0.28$, $SE = 0.18$, $p = .11$). The main effect of average social responsiveness was also not significant ($b = -0.01$, $SE = 0.17$, $p = .95$), and most importantly, the interaction between stress-eating status and average social responsiveness was not significant ($b = -0.07$, $SE = 0.24$, $p = .78$). That is, there were no differences between stress eaters and nonstress eaters in terms of 1-year changes in BMI, regardless of the levels of social responsiveness they perceive in daily life.

General Discussion

This research examined social resources as a buffer against daily stress-eating behavior and long-term changes in BMI associated with self-reported stress-eating tendencies. Across two studies, we found some behavioral (i.e., more daily stress-eating behaviors) and health (i.e., increases in BMI and WHR) implications of self-reported stress-eating tendencies. However, social resources moderated these effects. In Study 1, we found that 10-year increases in BMI and WHR associated with baseline stress-eating tendencies were significantly smaller among individuals who were more (vs. less) likely to receive emotional support in their daily lives. In Study 2, assessing a key ingredient of rewarding social interactions and using large daily diary experience sampling data that can shed light on the daily dynamics underlying this buffering effect, we found that on days participants perceive high (vs. low) levels of others' caring and understanding, the association between stress-eating status and daily stress-eating behaviors was significantly weaker. Put differently, those identified as stress eaters at baseline were less likely to engage in stress-eating behaviors on days they felt cared for. Importantly, this effect was not a mere reflection of participants' experiencing less intense stressors on such days.

Our findings in Study 1 conceptually replicate and extend previous work by Darling et al. (2017) that found a buffering effect of social

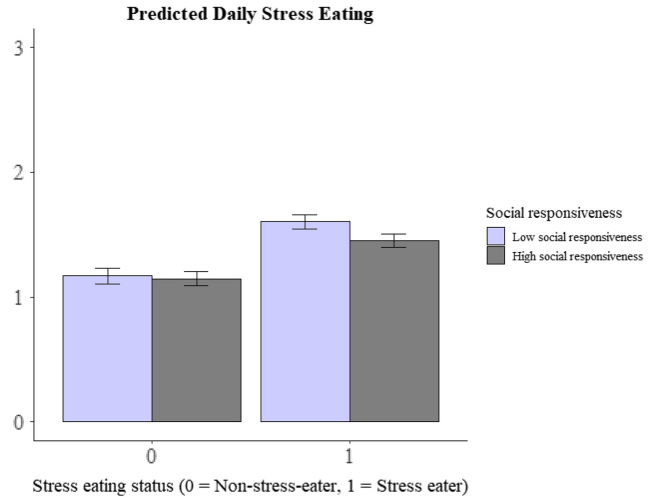
Table 4
Study 2: Baseline Stress-Eating Status Interacting With Daily Social Responsiveness to Predict Daily Stress-Eating Behavior

Predictor	*b*	*SE*	*p*	95% CI	*r*
Sex	−0.05	0.04	.21	[−0.13, 0.03]	.06
Age	−0.00	0.00	.11	[−0.01, 0.00]	.07
Race	−0.05	0.04	.23	[−0.13, 0.03]	.05
Stress eating	0.37	0.04	<.001	[0.30, 0.45]	.39
Mean social responsiveness	−0.08	0.04	.04	[−0.16, −0.00]	.09
Daily social responsiveness	−0.01	0.02	.44	[−0.05, 0.02]	.04
Stress Eating × Mean Social Responsiveness	−0.09	0.05	.08	[−0.20, 0.01]	.08
Stress Eating × Daily Social Responsiveness	−0.10	0.02	<.001	[−0.15, −0.05]	.20

Note. $N = 536$. Observations = 10,288. Weekday is also included as a covariate (Sunday as the reference group). For categorical covariates, the majority group served as a reference: sex (0 = *female*, 1 = *male*); race (0 = *White*, 1 = *non-White*). Effect size r was computed as $r = t/\sqrt{t^2 + df}$ (Rosenthal & Rosnow, 2008). CI = confidence interval.

Figure 3

Study 2: The Moderating Effect of Daily Social Responsiveness on the Link Between Baseline Stress-Eating Status and Daily Stress-Eating Behavior



Note. Error bars indicate 95% confidence intervals. See the online article for the color version of this figure.

support on weight gain associated with stress-eating tendencies among male students. By drawing on a larger, older sample of adults possibly experiencing a variety of stressors (vs. 70 students transitioning into college), we were able to test the generalizability of the buffering role of social resources. Further, using 10-year follow-up data helped capture longer-term consequences of stress-eating tendencies on BMI and WHR that critically depended on daily receipt of emotional support.

The potential long-term benefits of daily social resources for stress eaters call for further investigations into the proximal mechanisms driving such effects. To the authors' knowledge, our Study 2 provides the first investigation into the daily dynamics implicated in the buffering role of social resources. We found that having caring and responsive others around can play a vital role in modulating day-to-day stress-eating behaviors for those self-identified as stress eaters. Notably, contrary to the idea that stress-buffering effects of social resources may be driven by more benign appraisals of the stressor (Cohen & Wills, 1985), we did not find support for an indirect effect via less intense appraisals of the daily stressor. However, our test arguably lacked the temporal precision needed to capture such effects—that is, we assessed daily social resources, stressor intensity, and stress-eating behavior all retrospectively and simultaneously at the end of the day. To elucidate the dynamic interplay among stress, social resources, and eating behaviors, future research should draw on more intensive assessments of social resources and stress appraisals (e.g., at an hourly interval) or conduct experimental studies to precisely examine how the availability of social resources shape stress eaters' perceptions of stress and in turn affect their drive to eat. Alternatively, it is also possible that having responsive others can prevent stress eating via other routes. For example, rewarding social interactions may serve as a distraction from stressors and rumination or may function to substitute food as a readily pursued reward.

The latter idea that rewarding social interactions can serve as a substitute for food has been discussed in a broader context of reward-driven eating. Specifically, some researchers suggest that providing nonfood reward alternatives, such as intimate social interactions, may reduce the relative reinforcing value of food and ultimately help prevent or treat obesity (Carr & Epstein, 2018; Epstein et al., 2010). Nevertheless, this idea lacks strong empirical support (Cummings et al., 2019) or even testing. In particular, our research seems to suggest that a more nuanced consideration of the contexts in which cravings or food intake occur may be needed to observe social reward acting as a "substitute" for food. Indeed, we found some support for the substitution idea when examining a particular context (eating in response to stress) and among a particular sample (self-identified stress eaters). Likewise, future research exploring if and what type of nonfood rewards can serve to replace food may benefit from attending to when and for whom eating may be reward driven.

Notably, Study 2 did not reveal a similar buffering effect of social resources on stress eaters' BMI changes as in Study 1. In fact, the main effect of stress-eating status was not predictive of 1-year BMI changes in this study. We may need a longer follow-up to observe the weight gain effects of stress eating, not to mention the protective role of daily social resources. It is also possible that the differences in the measures played a role. Study 1 assessed the extent to which one engages in stress eating, whereas Study 2 attended to the tendency to eat more versus less in response to stress; the levels of stress eating may be a more sensitive measure. Further, Study 1 focused on "emotional support" as a moderator, whereas Study 2 considered others' responsiveness; while responsiveness may offer a more nuanced measure of the quality of social interactions, it is not tied to the experience of stressful events the way "support" is, and thus its average levels may not fully represent the available social resources during times of stress. Alternatively, the unique context of Study 2 may have affected the link between baseline stress-eating status and BMI changes. Data collection for this study took place amid the COVID-19 pandemic, during which changes in eating behaviors (Hassen et al., 2021; Zachary et al., 2020) and in other influential factors to weight gains such as sleep and physical activity were common (Alzueta et al., 2022; Castañeda-Babarro et al., 2020). That is, there were multiple forces affecting the expected differences in BMI changes among those identified as stress eaters (vs. nonstress eaters).

One unique feature of our studies was the use of daily reports as an indicator of social resources rather than a one-time global retrospective assessment. Despite the theoretical strengths of the daily assessments (e.g., free from recall bias), whether average tendencies over eight or 24 days represent a good summary of available social resources is debatable and will benefit from an empirical test. Indeed, previous research suggests that aggregated momentary reports and global reports are related but are distinct (Zygar-Hoffmann & Schönbrodt, 2020). It is also important to acknowledge the limitations of our stress-eating measures, including concerns about their validity. Given the inconsistent evidence, the validity of self-reported eating behaviors in general has raised concerns (Braden et al., 2020; Schneider et al., 2012). Nevertheless, previous research showed that those who self-reportedly eat more (vs. less) in response to stress do indeed eat more after a stressor in the laboratory (Sproesser et al., 2014). Another study found that self-identified stress eaters gained more weight during a period of exam stress (Epel et al., 2004).

Overall, previous findings provide some support for the validity of self-assessments of stress eating, but more efforts will be needed to validate self-reported measures.

In conclusion, we tested and provided some novel evidence for the idea that social resources can confer benefits for individuals high in stress-eating tendencies such as attenuating daily stress-eating behaviors, which can accumulate to have long-term health implications. Distinct from work focusing on the implementation of costly interventions for high-risk populations, this investigation was an attempt to identify daily environmental factors that can help prevent the adverse effects of nonclinical levels of stress eating in a community sample. This has important implications, given the high prevalence of stress, stress-eating, and obesity. We hope the present findings stimulate more work replicating and testing the generalizability of our findings in more diverse samples. Combined, these observational findings will establish a robust foundation for experimental research that can provide more direct causal evidence for the idea that promoting daily social rewards can help reduce habitual stress eating. In the long term, such small social nudges could be applied to scalable interventions.

Resumen

Objetivo: Comer en respuesta al estrés puede volverse habitual y tener consecuencias a largo plazo en el aumento de peso, pero poca investigación ha explorado qué puede ayudar a romper los ciclos de alimentación por estrés. Examinamos los recursos sociales diarios como posibles factores protectores contra la alimentación diaria por estrés y el eventual aumento de peso. ***Métodos:*** En el estudio 1 ($N = 1{,}264$), evaluamos las tendencias a comer por estrés, el índice de masa corporal (BMI, por sus siglas en inglés) y la relación cintura-cadera (WHR, por sus siglas en inglés) al inicio del estudio, la recepción de apoyo emocional durante ocho días (9,649 informes) y realizamos un seguimiento de BMI/WHR después de unos diez años. Examinamos la probabilidad promedio de recibir apoyo emocional como moderador del vínculo entre comer por estrés y el BMI/WHR en el seguimiento. En el Estudio 2 ($N = 536$; 10,288 informes), evaluamos el estado de alimentación por estrés y el BMI al inicio del estudio, la capacidad de respuesta social (sentir que los demás se preocupan) y el comportamiento de alimentación por estrés durante 24 días y realizamos un seguimiento del BMI un año después. Examinamos si la capacidad de respuesta social modera las conductas diarias de alimentación estresada de los consumidores y los cambios en el BMI. ***Resultados:*** En el Estudio 1, comer por estrés predijo aumentos en el BMI y el WHR en el seguimiento de 10 años, pero no entre las personas que tenían más (frente a menos) probabilidades de recibir apoyo emocional en la vida diaria. En el Estudio 2, los consumidores que comían por estrés tendían a informar más conductas diarias de alimentación estresada en comparación con los que no comían por estrés, pero esa tendencia se atenuaba en los días en que percibían niveles altos (frente a bajos) de capacidad de respuesta social. Comer bajo estrés no predijo el BMI al año de seguimiento. ***Conclusiones:*** Estos hallazgos observacionales sugieren que los recursos sociales en la vida diaria pueden tener beneficios a largo plazo para quienes comen por estrés, potencialmente al reducir su alimentación diaria por estrés.

References

Adam, T. C., & Epel, E. S. (2007). Stress, eating and the reward system. *Physiology & Behavior*, *91*(4), 449–458. https://doi.org/10.1016/j.physbeh.2007.04.011

Allen, K., Blascovich, J., & Mendes, W. B. (2002). Cardiovascular reactivity and the presence of pets, friends, and spouses: The truth about cats and dogs. *Psychosomatic Medicine*, *64*(5), 727–739. https://doi.org/10.1097/01.psy.0000024236.11538.41

Alzueta, E., Perrin, P. B., Yuksel, D., Ramos-Usuga, D., Kiss, O., Iacovides, S., de Zambotti, M., Cortes, M., Olabarrieta-Landa, L., Arango-Lasprilla, J. C., & Baker, F. C. (2022). An international study of post-COVID sleep health. *Sleep Health*, *8*(6), 684–690. https://doi.org/10.1016/j.sleh.2022.06.011

Anand, C., Hengst, K., Gellner, R., & Englert, H. (2023). Effects of the healthy lifestyle community program (cohort 1) on stress-eating and weight change after 8 weeks: A controlled study. *Scientific Reports*, *13*(1), Article 3486. https://doi.org/10.1038/s41598-022-27063-4

Araiza, A. M., & Lobel, M. (2018). Stress and eating: Definitions, findings, explanations, and implications. *Social and Personality Psychology Compass*, *12*(4), Article e12378. https://doi.org/10.1111/spc3.12378

Baldo, B. A., & Kelley, A. E. (2007). Discrete neurochemical coding of distinguishable motivational processes: Insights from nucleus accumbens control of feeding. *Psychopharmacology*, *191*(3), 439–459. https://doi.org/10.1007/s00213-007-0741-z

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, *67*(1), 1–48. https://doi.org/10.18637/jss.v067.i01

Braden, A., Emley, E., Watford, T., Anderson, L., & Musher-Eizenman, D. (2020). Self-reported emotional eating is not related to greater food intake: results from two laboratory studies. *Psychology & Health*, *35*(4), 500–517. https://doi.org/10.1080/08870446.2019.1649406

Brim, O. G., Ryff, C. D., & Kessler, R. C. (2004). The MIDUS National Survey: An overview. In O. G. Brim, C. D. Ryff, & R. C. Kessler (Eds.), *How healthy are we? A national study of well-being at midlife* (pp. 1–34). University of Chicago Press.

Carr, K. A., & Epstein, L. H. (2018). Influence of sedentary, social, and physical alternatives on food reinforcement. *Health Psychology*, *37*(2), 125–131. https://doi.org/10.1037/hea0000563

Castañeda-Babarro, A., Arbillaga-Etxarri, A., Gutiérrez-Santamaría, B., & Coca, A. (2020). Physical activity change during COVID-19 confinement. *International Journal of Environmental Research and Public Health*, *17*(18), Article 6878. https://doi.org/10.3390/ijerph17186878

Cobb, S. (1976). Social support as a moderator of life stress. *Psychosomatic Medicine*, *38*(5), 300–314. https://doi.org/10.1097/00006842-197609000-00003

Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, *98*(2), 310–357. https://doi.org/10.1037/0033-2909.98.2.310

Corsica, J., Hood, M. M., Katterman, S., Kleinman, B., & Ivan, I. (2014). Development of a novel mindfulness and cognitive behavioral intervention for stress-eating. *Eating Behaviors*, *15*(4), 694–699. https://doi.org/10.1016/j.eatbeh.2014.08.002

Cummings, J. R., Mamtora, T., & Tomiyama, A. J. (2019). Non-food rewards and highly processed food intake in everyday life. *Appetite*, *142*, Article 104355. https://doi.org/10.1016/j.appet.2019.104355

Dallman, M. F., Pecoraro, N. C., & la Fleur, S. E. (2005). Chronic stress and comfort foods: Self-medication and abdominal obesity. *Brain, Behavior, and Immunity*, *19*(4), 275–280. https://doi.org/10.1016/j.bbi.2004.11.004

Darling, K. E., Fahrenkamp, A. J., Wilson, S. M., Karazsia, B. T., & Sato, A. F. (2017). Does social support buffer the association between stress eating and weight gain during the transition to college? Differences by gender. *Behavior Modification*, *41*(3), 368–381. https://doi.org/10.1177/0145445516683924

Daubenmier, J., Kristeller, J., Hecht, F. M., Maninger, N., Kuwata, M., Jhaveri, K., Lustig, R. H., Kemeny, M., Karan, L., & Epel, E. (2011). Mindfulness intervention for stress eating to reduce cortisol and abdominal fat among overweight and obese women: An exploratory randomized controlled study. *Journal of Obesity*, *2011*, Article 651936. https://doi.org/10.1155/2011/651936

De Lorenzo, A., Romano, L., Di Renzo, L., Di Lorenzo, N., Cenname, G., & Gualtieri, P. (2020). Obesity: A preventable, treatable, but relapsing disease. *Nutrition*, *71*, Article 110615. https://doi.org/10.1016/j.nut.2019.110615

Eisenberger, N. I., Taylor, S. E., Gable, S. L., Hilmert, C. J., & Lieberman, M. D. (2007). Neural pathways link social support to attenuated neuroendocrine stress responses. *Neuroimage*, *35*(4), 1601–1612. https://doi.org/10.1016/j.neuroimage.2007.01.038

Epel, E. S., Jimenez, S., Brownell, K., Stroud, L., Stoney, C., & Niaura, R. A. Y. (2004). Are stress eaters at risk for the metabolic syndrome? *Annals of the New York Academy of Sciences*, *1032*(1), 208–210. https://doi.org/10.1196/annals.1314.022

Epel, E. S., Tomiyama, A. J., & Dallman, M. F. (2012). Stress and reward. In K. D. Brownell & M. S. Gold (Eds.), *Food and addiction: A comprehensive handbook* (pp. 266–272). Oxford University Press.

Epstein, L. H., Salvy, S. J., Carr, K. A., Dearing, K. K., & Bickel, W. K. (2010). Food reinforcement, delay discounting and obesity. *Physiology & Behavior*, *100*(5), 438–445. https://doi.org/10.1016/j.physbeh.2010.04.029

Fekete, E. M., Stephens, M. A. P., Mickelson, K. D., & Druley, J. A. (2007). Couples' support provision during illness: The role of perceived emotional responsiveness. *Families, Systems, & Health*, *25*(2), 204–217. https://doi.org/10.1037/1091-7527.25.2.204

François, M., Fernández-Gayol, O., & Zeltser, L. M. (2022). A framework for developing translationally relevant animal models of stress-induced changes in eating behavior. *Biological Psychiatry*, *91*(10), 888–897. https://doi.org/10.1016/j.biopsych.2021.06.020

Hassen, T. B., El Bilali, H., Allahyari, M. S., Berjan, S., & Fotina, O. (2021). Food purchase and eating behavior during the COVID-19 pandemic: A cross-sectional survey of Russian adults. *Appetite*, *165*, Article 105309. https://doi.org/10.1016/j.appet.2021.105309

Hobfoll, S. E. (2002). Social and psychological resources and adaptation. *Review of General Psychology*, *6*(4), 307–324. https://doi.org/10.1037/1089-2680.6.4.307

House, J. S., Umberson, D., & Landis, K. R. (1988). Structures and processes of social support. *Annual Review of Sociology*, *14*(1), 293–318. https://doi.org/10.1146/annurev.so.14.080188.001453

Kamarck, T. W., Manuck, S. B., & Jennings, J. R. (1990). Social support reduces cardiovascular reactivity to psychological challenge: A laboratory model. *Psychosomatic Medicine*, *52*(1), 42–58. https://doi.org/10.1097/00006842-199001000-00004

Kobasa, S. C., & Puccetti, M. C. (1983). Personality and social resources in stress resistance. *Journal of Personality and Social Psychology*, *45*(4), 839–850. https://doi.org/10.1037/0022-3514.45.4.839

Krach, S., Paulus, F. M., Bodden, M., & Kircher, T. (2010). The rewarding nature of social interactions. *Frontiers in Behavioral Neuroscience*, *4*, Article 22. https://doi.org/10.3389/fnbeh.2010.00022

Lemos, J. C., Wanat, M. J., Smith, J. S., Reyes, B. A. S., Hollon, N. G., Van Bockstaele, E. J., Chavkin, C., & Phillips, P. E. M. (2012). Severe stress switches CRF action in the nucleus accumbens from appetitive to aversive. *Nature*, *490*(7420), 402–406. https://doi.org/10.1038/nature11436

Meule, A., Reichenberger, J., & Blechert, J. (2018). Development and preliminary validation of the Salzburg stress eating scale. *Appetite*, *120*, 442–448. https://doi.org/10.1016/j.appet.2017.10.003

Oishi, S., & Sullivan, H. W. (2006). The predictive value of daily vs. retrospective well-being judgments in relationship stability. *Journal of Experimental Social Psychology*, *42*(4), 460–470. https://doi.org/10.1016/j.jesp.2005.07.001

Prather, A. A., Dutcher, E. G., Robinson, J., Lin, J., Blackburn, E., Hecht, F. M., Mason, A. E., Fromer, E., Merino, B., Frazier, R., O'Bryan, J., Drury, S., & Epel, E. S. (2023). Predictors of long-term neutralizing antibody titers following COVID-19 vaccination by three vaccine types: The BOOST study. *Scientific Reports*, *13*(1), Article 1. https://doi.org/10.1038/s41598-022-26890-9

Preacher, K. J., & Selig, J. P. (2010). *Monte Carlo method for assessing multilevel mediation: An interactive tool for creating confidence intervals for indirect effects in 1-1-1 multilevel models* [Computer software]. https://quantpsy.org/medmc/medmc111.htm

Pruessner, J. C., Champagne, F., Meaney, M. J., & Dagher, A. (2004). Dopamine release in response to a psychological stress in humans and its relationship to early life maternal care: A positron emission tomography study using [11C] raclopride. *The Journal of Neuroscience*, *24*(11), 2825–2831. https://doi.org/10.1523/JNEUROSCI.3422-03.2004

Radin, R. M., Epel, E. S., Daubenmier, J., Moran, P., Schleicher, S., Kristeller, J., Hecht, F. M., & Mason, A. E. (2020). Do stress eating or compulsive eating influence metabolic health in a mindfulness-based weight loss intervention? *Health Psychology*, *39*(2), 147–158. https://doi.org/10.1037/hea0000807

Reis, H. T. (2012). Perceived partner responsiveness as an organizing theme for the study of relationships and well-being. In L. Campbell & T. J. Loving (Eds.), *Interdisciplinary research on close relationships: The case for integration* (pp. 27–52). American Psychological Association. https://doi.org/10.1037/13486-002

Rosenthal, R., & Rosnow, R. L. (2008). *Essentials of behavioral research: Methods and data analysis.* (3rd ed.). McGraw-Hill.

Schneider, K. L., Panza, E., Appelhans, B. M., Whited, M. C., Oleski, J. L., & Pagoto, S. L. (2012). The emotional eating scale. Can a self-report measure predict observed emotional eating? *Appetite*, *58*(2), 563–566. https://doi.org/10.1016/j.appet.2012.01.012

Selcuk, E., & Ong, A. D. (2013). Perceived partner responsiveness moderates the association between received emotional support and all-cause mortality. *Health Psychology*, *32*(2), 231–235. https://doi.org/10.1037/a0028276

Sproesser, G., Schupp, H. T., & Renner, B. (2014). The bright side of stress-induced eating: Eating more when stressed but less when pleased. *Psychological Science*, *25*(1), 58–65. https://doi.org/10.1177/0956797613494849

Thorsteinsson, E. B., & James, J. E. (1999). A meta-analysis of the effects of experimental manipulations of social support during laboratory stress. *Psychology & Health*, *14*(5), 869–886. https://doi.org/10.1080/08870449908407353

Tomiyama, A., Finch, L. E., & Cummings, J. R. (2015). Did that brownie do its job? Stress, eating, and the biobehavioral effects of comfort food. In R. A. Scott & S. M. Kosslyn (Eds.), *Emerging trends in the social and behavioral sciences: An interdisciplinary, searchable, and linkable resource* (pp. 1–15). John Wiley & Sons.

Törnblom, K., & Kazemi, A. (Eds.). (2012). *Handbook of social resource theory*. Springer. https://doi.org/10.1007/978-1-4614-4175-5

Torres, S. J., & Nowson, C. A. (2007). Relationship between stress, eating behavior, and obesity. *Nutrition*, *23*(11–12), 887–894. https://doi.org/10.1016/j.nut.2007.08.008

Trainor, B. C. (2011). Stress responses and the mesolimbic dopamine system: Social contexts and sex differences. *Hormones and Behavior*, *60*(5), 457–469. https://doi.org/10.1016/j.yhbeh.2011.08.013

Tsigos, C., & Chrousos, G. P. (2002). Hypothalamic–pituitary–adrenal axis, neuroendocrine factors and stress. *Journal of Psychosomatic Research*, *53*(4), 865–871. https://doi.org/10.1016/S0022-3999(02)00429-4

Uchino, B. N., Cacioppo, J. T., & Kiecolt-Glaser, J. K. (1996). The relationship between social support and physiological processes: A review with emphasis on underlying mechanisms and implications for health. *Psychological Bulletin*, *119*(3), 488–531. https://doi.org/10.1037/0033-2909.119.3.488

Vrticka, P. (2012). Interpersonal closeness and social reward processing. *The Journal of Neuroscience*, *32*(37), 12649–12650. https://doi.org/10.1523/JNEUROSCI.3157-12.2012

Zachary, Z., Brianna, F., Brianna, L., Garrett, P., Jade, W., Alyssa, D., & Mikayla, K. (2020). Self-quarantine and weight gain related risk factors during the COVID-19 pandemic. *Obesity Research & Clinical Practice*, *14*(3), 210–216. https://doi.org/10.1016/j.orcp.2020.05.004

Zygar-Hoffmann, C., & Schönbrodt, F. D. (2020). Recalling experiences: Looking at momentary, retrospective and global assessments of relationship satisfaction. *Collabra: Psychology*, *6*(1), Article 7. https://doi.org/10.1525/collabra.278

Received June 4, 2023
Revision received February 20, 2024
Accepted February 21, 2024 ■