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Comfort Eating and All-Cause Mortality in the U.S. Health and Retirement Study

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Abstract

Purpose—Comfort eating is a prevalent behavior. Prior research shows that comfort eating is associated with reduced stress responses and increased metabolic risk across adolescence, young adulthood, and middle adulthood. The purpose of the current research was to test if comfort eating prospectively predicted all-cause mortality in older adulthood.

Methods—The U.S. Health and Retirement Study is an ongoing, nationally representative, longitudinal study of older adults. The final sample for the present study ($N = 1{,}445$) included participants randomly selected to report how often they comfort ate. Comfort eating data were collected in 2008 and all-cause mortality data were collected in 2014. Participants also reported how often they consumed high-fat/sugar food as well as their height and weight in 2008.

Results—For each 1-unit increase in comfort eating, the expected odds of all-cause mortality ($n = 255$ deceased) *decreased* by 14%, OR = 0.86, $p = .048$, 95% CI [0.74, 0.99]. This analysis statistically accounted for other predictors of mortality in the sample including age, biological sex, race, highest educational degree attained, moderate and vigorous exercise, smoking, and cumulative illness. High-fat/sugar intake did not mediate (or diminish) the association but Body Mass Index did.

Conclusions—Comfort eating—irrespective of consuming high-fat/sugar food—may be associated with reduced mortality in older adults because it may promote greater body mass, and

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Compliance with Ethical Standards

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

greater body mass is associated with lower risk of mortality in nationally representative samples. Interventionists might consider both beneficial and detrimental aspects of comfort eating across the lifespan.

Keywords

Body Mass Index; high-fat/sugar food; older adults; stress

Many people eat to relieve negative emotions like anxiety or sadness. The prevalence of comfort eating ranges from 15–46% in non-clinical samples and from 47–71% in clinical samples with obesity or eating disorders [1]. Although the antecedents to comfort eating are well-studied, there is less research on the effects of comfort eating in humans [2]. Greater understanding of the health outcomes of comfort eating across the lifespan could help interventionists decide if, how, or when comfort eating should be a target for behavior change.

Dallman et al. [3] proposed a chronic stress-response network model wherein chronic stress increases comfort eating, reduces stress responses, and increases abdominal fat; this model is supported by rodent research [reviewed in 4]. In parallel, human research suggests that comfort eating is associated with reduced stress responses but increased metabolic risk. Multiple studies show that comfort eating may reduce psychological and physiological stress responses in adolescents and young adults [5–9]. For example, comfort eating buffered the effects of adverse life events (e.g., family death) on perceived stress among adolescent women [6]. On the other hand, young adults who ate more versus less in times of stress experienced weight gain and poorer metabolic health after one year [10]. In a middle-aged adult sample from the nationally representative Midlife In the U.S. study, greater comfort eating was cross-sectionally linked with higher nondiabetic levels of glucose, insulin, insulin resistance, and HbA_{1c} [11]. In sum, research suggests that comfort eating is associated with lower stress responses but greater metabolic risk across adolescence, young adulthood, and middle-aged adulthood. However, if comfort eating is paradoxically related to these interim health outcomes across early and middle life, how might it relate to clinical health endpoints such as mortality in older adulthood?

It is particularly important to study the outcomes of comfort eating in older adulthood. First, social isolation is a particular experience that triggers comfort eating [12] and is especially prevalent among older adults, with current estimates ranging from 10–43% [13]. Second, older adults are at greater risk for wasting; that is, unintentional loss of weight and lean body tissue. The incidence of wasting ranges from 5–15% in community-dwelling older adults and is over 25% in older adults receiving homecare services [14]. Comfort eating could be advantageous in older adulthood because episodic increases in eating of energy-dense foods —even when motivated by negative emotions—could promote retention of body mass. Greater body mass in this context may benefit longevity, as indicated by a meta-analysis showing greater body mass was associated with reduced all-cause mortality in nationally representative samples of older people [15]. Yet, people may eat more high-fat/sugar foods while comfort eating, which could damage health [2].

The present study sought to fill this gap in the literature by examining the association between comfort eating and all-cause mortality in the U.S. Health and Retirement Study (HRS), an ongoing, nationally representative, longitudinal study of older adults. To our knowledge, this is the first study to test if comfort eating prospectively predicts all-cause mortality. HRS measured comfort eating with a single item and, because our study is the first of its kind, we established concurrent validity of this single item (Study 1) before conducting Study 2. The primary aim of Study 2 was to test if comfort eating prospectively predicted all-cause mortality in older adults. Our secondary aim was to test if high-fat/sugar food intake and Body Mass Index (BMI) explained or changed any association between comfort eating and all-cause mortality.

Study 1

Method

Participants—We recruited 146 individuals who were 30 or more years old using Amazon's Mechanical Turk (MTurk). We paid participants $0.05 for their time. Prior work suggests that even at low compensation rates, MTurk payment levels do not appear to affect data quality [16]. Participants ($n = 6$) were excluded from analysis because they incorrectly answered quality control items that were designed to identify participants who responded without reading the questions. The final sample comprised 140 participants (67.90% female). On average, participants were 47.19 years old ($SD = 12.63$, *Range* = 30–85). Approximately one-third of the sample ($n = 45$) comprised older adults (Age > 55) [17]. The sample was 75.0% White, 11.4% Black, 6.4% Asian/Pacific Islander, 5.0% Hispanic, 0.7% Native American, and 1.4% Bi-racial/other. Average Body Mass Index was "overweight" at 28.10 ($SD = 6.80$, *Range* = 18.25–59.44).

Procedure—The University Office of the Human Research Protection Program approved all research activities. Participants provided informed consent, responded to the eating questionnaires in random order, and answered demographic questions before receiving compensation.

Measures

Comfort eating: We used the exact wording of the HRS comfort eating measure. The measure began with the prompt: "Because of all the demands of work, home, family or friends, we all feel stressed at times. The following questions ask about things you are most likely to do after having what you think is a stressful event or day." Participants responded to "How often do you eat more than normal to help make it easier to bear?" with: "Never," "Hardly ever," "Not too often," "Fairly often," or "Very often." We coded these from 1 ("Never") to 5 ("Very often").

Dutch Eating Behavior Questionnaire [18]: The Emotional Eating subscale of the Dutch Eating Behavior Questionnaire includes items such as: "Do you have a desire to eat when you are feeling lonely?" Items were rated on a 5-point Likert scale (1 = "Never" to 5 = "Very Often"). Higher scores indicated greater emotional eating ($M = 2.73$, $SD = 0.84$, *Range* = 1.21–4.86, $\alpha = .94$).

Analytic Approach—Bivariate Pearson correlations tested the association between the HRS comfort eating measure and the Dutch Eating Behavior Questionnaire Emotional eating scores. HRS measured comfort eating in older adults so we additionally tested the association constraining the sample to older adults.

Results

The HRS single-item measure of comfort eating and the Dutch Eating Behavior Questionnaire Emotional eating scores were strongly and positively correlated, $r(138) = .76$, $p < .001$. When constraining the sample to older adults, comfort eating and the Dutch Eating Behavior Questionnaire Emotional eating score remained strongly correlated, $r(43) = .84$, $p < .001$. We thus concluded that the HRS comfort eating measure evidenced concurrent validity.

Study 2

Participants—The HRS sample was generated via multi-stage, clustered area probability frame [19]. Comfort eating data were collected in 2008, when participants were randomly selected for new questionnaire modules. Our final sample included participants who responded to the module that included the comfort eating measure ($N = 1{,}445$). The outcome variable of all-cause mortality was collected in 2014. Demographics appear in Table 1 and are similar to those from other HRS study samples [20].

Procedure—HRS is supported by the National Institute on Aging and conducted by the University of Michigan, Ann Arbor. HRS interviews participants biannually to characterize transitions from active work to retirement. See http://hrsonline.isr.umich.edu for full details. The University Office of the Human Research Protection approved all present research activities.

Measures

Comfort eating: The single-item measure is described in full in Study 1. In our sample of older adults, 65.0% reported that they “Never” comfort ate, 14.3% reported “Hardly ever,” 10.7% reported “Not too often,” 6.5% reported “Fairly often,” and 3.5% reported “Very often.” We coded these from 1 (“Never”) to 5 (“Very often”).

All-cause mortality: HRS obtained date of death from the National Death Index, Social Security Death Index, or contact with proxy participants for all deceased participants for whom date of death was available at the close of 2014. Any participant was assumed to be living by HRS if HRS did not obtain death records. By 2014, 17.6% ($n = 255$) of the sample was deceased.

High-fat/sugar food intake: Participants reported number of times per week that they typically ate six types of food: potato snacks, pasta/pizza, sweets, cakes/pies/cobblers, cookies/muffins/brownies, and ice cream. Means across food types ranged from 1.13–3.32 ($SD = 2.07$–5.75) times per week but there was evidence of skew (>1) and kurtosis (>3). We created an averaged composite for high-fat/sugar food intake by taking the mean of the log-transformed means for all food types.

BMI: In 2008, participants reported height and weight. We derived BMI using with the formula: [Weight (lbs)/Height(in)^2]*703.

Potential covariates: Participants reported birthdate, sex, and race upon study entry. In 2008, participants reported highest degree attained, frequency of moderate and vigorous exercise, previous and current smoking status, number of alcoholic drinks consumed per week, and a count of prior diagnosis with hypertension, diabetes, all cancers except skin cancer, lung disease, heart disease, stroke, and/or a psychiatric disorder. We obtained total household income from a publicly available file from the RAND Corporation.

Analytic approach—We used binary logistic regression to test the prospective association between comfort eating and all-cause mortality. We considered a nonlinear association by modeling comfort eating in cubic, quadratic, and linear terms [21]. We sequentially dropped the cubic term and the quadratic term if they were non-significant.

We used the SPSS PROCESS macro (Model 4) to test high-fat/sugar food intake and BMI as potential mediators between comfort eating and all-cause mortality [22]. We used 1000 bootstrap samples to create 95% bias-corrected and accelerated (BCa) confidence intervals to test the significance of indirect effects. Indirect effects are significant at $p < .05$ if the 95% BCa confidence intervals do not include zero.

Results

We tested all potential covariates in independent binary logistic regression models predicting all-cause mortality. Age, biological sex, race, highest degree attained, moderate and vigorous exercise, smoking, and illness significantly predicted all-cause mortality ($p < .05$) and were included as covariates in our final model.

Final model results appear in Table 2. Comfort eating in cubic (OR = 1.05, $p = .55$, 95% CI [0.91, 1.20]) and quadratic (OR = 1.06, $p = .43$, 95% CI [.92, 1.21]) terms did not predict all-cause mortality. Comfort eating linearly predicted reduced all-cause mortality (OR = 0.86, $p = .048$, 95% CI [0.74, 0.99]); for each 1-unit increase in comfort eating, the expected odds of all-cause mortality significantly *decreased* by 14%.

Mediation analysis indicated that the indirect effect of comfort eating on all-cause mortality through high-fat/sugar food intake was not significant, 95% BCa CI [−0.06, 0.06]. Greater comfort eating did predict greater high-fat/sugar food intake, $B = 0.05$, $SE = 0.01$, $p < .001$, 95% CI [0.03, 0.07], but greater high-fat/sugar food intake predicted greater mortality, OR = 1.77, $p = .004$, 95% CI [1.20, 2.60]. On the other hand, greater comfort eating remained a significant predictor of reduced mortality when controlling for high-fat/sugar food intake, OR = 0.84, $p = .022$, 95% CI [0.72, 0.97]. This suggests that—while comfort eating and high-fat/sugar food intake were related—each behavior had an independent association with all-cause mortality.

In contrast, mediation analysis indicated that the indirect effect of comfort eating on all-cause mortality through BMI was significant, 95% BCa CI [−0.10, −0.01]. Greater comfort eating predicted greater BMI, $B = 0.66$, $SE = 0.21$, $p = .002$, 95% CI [0.24, 1.08], and greater BMI in turn predicted reduced mortality, OR = 0.94, $p = .006$, 95% CI [0.90, 0.98]. Comfort eating no longer predicted all-cause mortality when controlling for BMI, OR = 0.92, $p = .48$, 95% CI [0.73, 1.16].[1]

Discussion

In the nationally representative, longitudinal U.S. Health and Retirement Study, comfort eating prospectively predicted *lower* all-cause mortality in older adults six years later. High-fat/sugar food intake did not mediate this association and instead independently predicted greater odds of all-cause mortality in older adults. In contrast, BMI mediated the association between comfort eating and all-cause mortality such that comfort eating predicted greater body mass, which in turn predicted lower odds of all-cause mortality. Thus, regardless of how much high-fat/sugar food participants consumed, greater comfort eating was related to lower odds of all-cause mortality because it was associated with greater body mass, which may be important for longevity in older adults. Indeed, a meta-analysis [15] indicated that compared to those with a normal BMI those with an overweight BMI (BMI = 25–30) had the lowest risk of mortality; this finding was stronger when limited to studies with participants age 65 or older. The mean BMI of our older adult sample was within the overweight category (Mean = 28.35, SD = 6.07).

What other factors might explain an association between comfort eating and reduced all-cause mortality in older adults? An alternate explanation could be derived from our finding that high-fat/sugar food intake did not explain the association between comfort eating and all-cause mortality. Perhaps comfort eating predicted reduced mortality in older adults because the behavior involved eating healthier energy-dense foods rather than high-fat/sugar food. Indeed, older compared to younger adults consume more meals and fewer snacks, and meal foods are often more nutritious than snack foods [23]. HRS has not included questions on consumption of non-high-fat/sugar food; thus, we can only speculate on this explanation. Another possible explanation is that comfort eating may actually function to reduce potentially damaging physiological stress mediators such as cortisol responses [24], which may in turn offset metabolic risk. The chronic stress-response network model supported by rodent research suggests that comfort eating can reduce physiological stress responses [3]. In human research, there is preliminary support for this model [7–9] but no studies have longitudinally assessed or manipulated comfort eating [4].

This study was limited because the prospective period between comfort eating and all-cause mortality was only six years. HRS participants who engaged in comfort eating across the lifespan may have died before 2008 and there were a relatively small number of those who

[1]BMI and waist circumference were highly correlated ($r = .79$, $p < .001$). Results indicated that the indirect effect of comfort eating on all-cause mortality through waist circumference was also significant, 95% BCa CI [−0.10, −0.01]. Greater comfort eating predicted greater waist circumference, $B = 0.8439$, $SE = 0.2178$, $p < .001$, 95% CI [0.42, 1.27]. Greater waist circumference in turn predicted lower odds of mortality, OR = 0.95, $p = .034$, 95% CI [0.91, 0.99]. Greater comfort eating no longer predicted all-cause mortality when controlling for waist circumference, OR = 0.96, $p = .73$, 95% CI [0.75, 1.22].

reported comfort eating fairly or very often in 2008 (10%). It is also possible that comfort eating longitudinally correlated with existing mortality trajectories and did not play a causal role. However, comfort eating may be trait-like [25], which would bolster an argument of temporal precedence. The HRS measure of comfort eating was a single item measure and, although we cross-validated this measure in a separate sample, the single item may still be inappropriate for measuring the multidimensional construct of comfort eating [26].

Limitations notwithstanding, these results address a gap in the literature and raise important issues for future research. Specifically, prior research suggests that comfort eating may reduce stress responses and increase metabolic risk in early and middle life but this is the first study to show that comfort eating predicts lower odds of mortality in late life. Although these findings provide novel insight into how comfort eating relates to the clinical health endpoint of mortality, future research that replicates this finding with a multidimensional measure of comfort eating, additional tests of mediators (e.g., complete nutritional data, physiological stress mediators), and a longer prospective period may better address this question. Interventionists might consider both beneficial and detrimental aspects of comfort eating across the lifespan.

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Table 1

Demographics of U.S. Health and Retirement Study sample (N = 1445)

Age	
Mean	77.31 (*SD* 9.94)
Sex	
Male	40.10%
Female	59.90%
Race	
White/Caucasian	81.40%
Black or African American	14.00%
Other	4.60%
Highest degree attained	
No degree	22.20%
Degree unknown/some college	0.10%
GED	4.30%
High school diploma	48.40%
Two year college degree	3.80%
Four year college degree	11.30%
Master degree	7.30%
Professional degree (PhD, MD, JD)	2.50%
Total household income ($)	
Mean	66,798.76 (*SD* 471,155.91)
Body Mass Index	
Mean	28.35 (*SD* 6.07)
Moderate exercise	
Hardly ever or never	52.00%
One to three times a month	16.50%
Once a week	9.90%
More than once a week	21.60%
Vigorous exercise	
Hardly ever or never	23.60%
One to three times a month	9.10%
Once a week	7.40%
More than once a week	59.90%

Smoking	
Never smoked	42.90%
Have smoked in past, do not smoke currently	45.20%
Currently smoke	11.90%
Alcohol use	
Mean number of drinks per week	2.29 (*SD* 5.29)
Illness (% Diagnosed)	
Hypertension	63.10%
Diabetes	24.70%
All cancers (except skin)	15.10%
Lung disease	12.30%
Heart disease	27.00%
Stroke	6.90%
Psychiatric disorder	17.60%

Table 2

Adjusted binary logistic regression of 2014 all-cause mortality on 2008 comfort eating in U.S. Health and Retirement Study sample

Model	Predictor	Odds Ratio	95% CI
Linear	Age	1.06 ***	(1.04, 1.08)
	Sex	0.71 *	(0.53, 0.97)
	Race	0.87 †	(0.75, 1.02)
	Highest degree attained	0.91 †	(0.82, 1.01)
	Exercise	1.35 ***	(1.17, 1.55)
	Smoking	1.40 **	(1.12, 1.76)
	Illness	1.37 ***	(1.22, 1.53)
	Comfort eating	0.86 *	(0.74, 0.99)

Notes. Covariates measured in 2008 and included if significantly predicted 2014 all-cause mortality in an independent binary logistic regression model.

† $p < .082$,

* $p < .05$,

** $p < .01$,

*** $p < .001$