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## Associations between comfort eating and weight change during the COVID-19 pandemic among U.S. adults

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### Abstract

**Objective:** To examine associations between comfort eating in response to loneliness or stress and weight change during the COVID-19 pandemic among U.S. adults.

**Design:** Quantitative, cross-sectional study.

**Setting:** The 2021 *SummerStyles* survey data.

**Subjects:** U.S. adults (> 18 years; N = 4068).

**Measures:** The outcome was reported weight changes since the start of the COVID-19 pandemic with four responses: lost weight, weight remained the same, gained weight, and don't know. The exposure variable was frequency of comfort eating in response to loneliness or stress during the past year with three responses: never/ rarely, sometimes, or often/always.

**Analysis:** We used chi-square analysis to examine the independence of survey variables related to weight changes, and comfort eating in response to loneliness or stress during the COVID-19 pandemic. Next, we used a multinomial logistic regression to estimate adjusted odds ratios for weight changes by comfort eating in response to loneliness or stress frequency.

**Results:** Overall, 20.1% of adults reported losing weight, 39.9% remained about the same weight, 30.4% gained weight, and 9.4% did not know about their weight change during the COVID-19 pandemic. Taking comfort by eating in response to loneliness or stress was reported by over 33% of participants (often/always = 8.3%; sometimes = 25.3%). Weight change and comfort eating during the COVID-19 pandemic significantly varied by sociodemographic factors. Respondents that sometimes or often/always reported taking comfort by eating in response to

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

loneliness or stress were more likely to report losing weight (Adjusted Odds Ratio ranges: 1.62–2.99) or gaining weight (Adjusted Odds Ratio ranges: 3.10–4.61) than those who never/rarely took comfort by eating in response to loneliness or stress.

**Conclusions:** Taking comfort by eating when stressed/lonely was significantly associated with reported weight changes during the COVID-19 pandemic. Weight changes may lead to additional health complications. Implementing evidence-based strategies to reduce loneliness or stress and support healthy eating during the COVID-19 pandemic may benefit weight management and future well-being.

## Keywords

Population health; Nutrition; Social support; Stress management; Weight control

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## 1. Purpose

Obesity is a major public health issue in the United States. Approximately, 42% of American adults over age 20 had obesity in 2017–2020 [1]. Obesity is related to the leading causes of death in the United States, including heart disease and stroke [2]. Increasing BMI and/or having obesity is an important risk factor for SARS-CoV-2 coronavirus 2019 (COVID-19) related hospitalizations and Intensive Care Unit admissions [3]. Studies relevant to weight changes among adults and children in the United States during the COVID-19 pandemic suggest that weight changes were more common in the first 6–9 months of the pandemic with varying magnitudes, and that over time weight changes have been relatively small in magnitude [4-11].

Many risk factors for unhealthy weight changes increased during the COVID-19 pandemic, including comfort eating, loneliness, and stress [9,12-14]. Comfort eating refers to eating in response to emotion, rather than in response to hunger, which is also referred to as “emotional eating” or “stress-induced eating” [15]. Eating in response to loneliness or stress can temporarily alleviate negative emotions, but may also put people at higher risk of developing obesity due to consuming excess calories [16-19]. Prior to the COVID-19 pandemic, the prevalence of comfort eating ranged between 15% and 46% in studies of Northern American and European adults, and that comfort eating tends to be more common among people with obesity [15]. Although numerous studies have analyzed weight changes during the pandemic, none of these studies assessed whether eating in response to loneliness and stress is related to weight changes among the U.S. adult population. It is possible that loneliness, stress, and comfort eating increased during the COVID-19 pandemic due to social isolation related to quarantine and other changes to daily life. Changes in weight during the pandemic may be sustained, leading to other chronic health issues such as cardiovascular diseases and cancers. Thus, understanding weight changes during the COVID-19 pandemic may increase awareness of pandemic-related health issues.

Understanding the relationship between loneliness and stress with nutrition and weight status during the pandemic can help assess the increased burden of chronic disease during the pandemic and influence the ongoing response as well as responses to catastrophic

events in the future. Thus, we examined the relationship between loneliness or stress-related “comfort eating” and weight change during the COVID-19 pandemic among U.S. adults.

## 2. Methods

### 2.1. Design

This study is a cross-sectional analysis of the 2021 *SummerStyles* survey, which is a summer wave of the *ConsumerStyles* survey. Porter Novelli Public Services conducts *ConsumerStyles* surveys using Ipsos’ KnowledgePanel®, a large-scale online panel that is representative of the non-institutionalized U.S. population [20]. This panel contains approximately 60,000 panelists randomly recruited by mail [21]. The *ConsumerStyles* surveys are sent out in several waves throughout the year. In addition to nutrition, *SummerStyles* measures a wide range of health-related attitudes, knowledge, behaviors, and conditions. The survey takes approximately 30 min to complete. The survey uses probability-based sampling methods by address to recruit participants. Households were provided with Internet access and a laptop or tablet if they did not have means to complete the survey. The datasets provided to the Centers for Disease Control and Prevention (CDC) were de-identified, and thus the present study was exempt from CDC institutional review board.

### 2.2. Sample

The *SpringStyles* survey, an initial wave, was sent to a random sample of 10,919 panelists, and 6455 adults completed the survey in March–April 2021 with a response rate of 59.1%. The second wave, known as *SummerStyles* was sent to a subset of respondents (n = 5741) from the *SpringStyles* survey in June 2021. The sample of *SummerStyles* respondents included 4085 adults, a 71.2% response rate [20]. This analysis primarily reports on results from the 2021 *SummerStyles* survey among U.S. adults. All variables in this analysis other than the body mass index (BMI) measurement were derived from the 2021 *SummerStyles* survey. The BMI variable was collected during the *SpringStyles* survey in March–April of 2021. In this analysis we excluded 17 participants that did not answer questions on weight changes or comfort eating in response to loneliness or stress, the outcome and exposure variables of interest, leaving an analytic sample of 4068. Porter Novelli Public Services weighted the data using the following factors: sex, age, household income, race/ethnicity, household size, education, census region, metro status, and whether one has children 12–17 years old [20].

### 2.3. Measures

The outcome of interest was weight change, which was based on the following question: “Excluding unintentional weight changes because of illness, did you have weight change since the start of the COVID-19 pandemic?” There were 10 responses: “I lost about 5–9 lbs.,” “I lost about 10–19 lbs.,” “I lost about 20–30 lbs.,” “I lost more than 30 lbs.,” “No, my weight remained about the same,” “I gained about 5–9 lbs.,” “I gained about 10–19 lbs.,” “I gained about 20–30 lbs.,” “I gained more than 30 lbs.,” and “I don’t know.” These responses were collapsed into four categories for analysis: (1) “I gained weight,” (2) “I lost weight,” (3) “My weight remained about the same,” and (4) “I don’t know.”

The main exposure variable was comfort eating in response to loneliness or stress, which was based on the following question: “Thinking about the past year, during the COVID-19 pandemic, when you have felt lonely or stressed, how often have you taken comfort by eating?” There were 5 response categories: “Never,” “Rarely,” “Sometimes,” “Often,” and “Always.” These responses were collapsed into three categories for analysis: (1) “Never/Rarely,” (2) “Sometimes,” and (3) “Often/Always.”

Covariates included having children aged <18 years, weight status, Census region, and other sociodemographic characteristics. Sociodemographic characteristics were age (18–24, 25–44, 45–64, or 65 years), sex (female, male), race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, non-Hispanic Other/multi-races), education level (high school graduate or less, some college, college graduate), marital status (married/domestic partnership or not married), and annual household income (<\$25,000, \$25,000–\$74,999, \$75,000–\$99,999, or \$100,000). Not married was comprised of widowed, divorced, separated, or never married. Having children aged <18 years was categorized as a binary variable with “yes” or “no.” BMI was calculated using self-reported weight and height data, and individuals were grouped into underweight/healthy weight (BMI <25 kg/m<sup>2</sup>), having overweight (BMI 25–<30 kg/m<sup>2</sup>), or having obesity (BMI ≥30 kg/m<sup>2</sup>) [22]. Census region of residence was grouped into Northeast, Midwest, South, or West. The “Other/multi races” category consisted of respondents identifying their race as American Indian or Alaska Native, Asian, Hawaiian/Pacific Islander, or 2 races. The only variable with missing data was weight status (1.7% [n = 70]). We omitted these observations when the weight status variable was used in any given test or model.

#### 2.4. Analysis

Frequencies and proportions were used to describe and characterize the study population. Chi-square tests (significant at  $P < 0.05$ ) were used to examine associations between weight changes with sociodemographic characteristics (age, sex, race/ethnicity, education level, marital status, annual household income, having children under age 18), weight status, and Census region of residence. We used Chi-square tests to examine associations with comfort eating in response to loneliness or stress with the same set of variables. Last, we used polytomous multinomial logistic regression models to estimate the adjusted odds ratios (AOR) and 95% confidence intervals (CI) of weight changes (primary outcome variables) with comfort eating in response to loneliness or stress as the primary exposure variable with respondent sociodemographic variables (age, sex, race/ethnicity, education, marital status, annual household income, having children <18 years), weight status and Census region of residence as covariates. All analyses were performed in the R statistical environment (R Core Team, 2021) and accounted for sample design and weight variable by using survey procedures.

### 3. Results

Overall, 34.7% of respondents were between the ages 25–44, 51.6% were female, 63.3% were non-Hispanic White, 38.3% had a high school education or less, 57.0% were married

or in a domestic partnership, 38.7% had annual household income  $\leq$  \$100,000, 67.7% had children under age 18, 33.8% had obesity, and 37.9% were living in the South (Table 1).

In terms of weight changes, 20.1% of respondents reported losing weight, 39.9% reported that their weight remained about the same, 30.4% reported gaining weight, and 9.4% reported that they did not know whether they experienced weight changes since the start of the COVID-19 pandemic (Table 1). Bivariate analyses suggest that weight changes (i.e., increase or decrease) during the COVID-19 pandemic were associated with age, sex, race/ethnicity, education, marital status, income, having children aged  $<18$  years, weight status, and census region of residence ( $\chi^2$  tests,  $P < 0.05$ ; Table 1). For example, the percentage of respondents reporting that they gained weight was highest among young adults (18–24 years) or middle-aged adults (45–64 years), females, non-Hispanic Other/multiracial adults, adults with some college education, adults that were not married, adults with annual household income  $\leq$  \$100,000, those with children under age 18, those that had obesity, and people in the Northeast United States (Table 1).

Many respondents (66.4%) reported never or rarely taking comfort by eating in response to loneliness or stress during the COVID-19 pandemic, while 25.3% and 8.3% of respondents reporting doing so sometimes or often/always, respectively (Table 2). Bivariate associations suggest that taking comfort by eating in response to loneliness or stress was significantly associated with age, sex, marital status, annual household income, having children under 18, and weight status ( $\chi^2$  tests,  $P < 0.05$ ; Table 2). For instance, the percentage of those reporting comfort by eating often/always was highest among adults ages 18–24 years, females, adults not married, adults with annual household income  $<$ \$25,000, adults with children under 18, and adults with obesity (Table 2).

Further, unadjusted bivariate associations suggest that taking comfort by eating in response to loneliness or stress was associated with weight changes during the COVID-19 pandemic ( $\chi^2$  test,  $P < 0.05$ ; Table 3). For example, 56.1% of adults who reported often/always taking comfort by eating in response to loneliness and stress gained weight, whereas 21.7% of adults who never/rarely took comfort by eating gained weight during the COVID-19 pandemic. Based on the multinomial logistic regression model using “my weight remained about the same” as a reference category, respondents that sometimes or often/always reported taking comfort by eating in response to loneliness or stress had significantly greater odds of losing weight (AOR ranges: 1.62–2.99) or gaining weight (AOR ranges: 3.10–4.61) than those who never/rarely took comfort by eating in response to loneliness or stress (Table 3).

#### 4. Discussion

The purpose of this study was to assess the relationship between taking comfort by eating in response to loneliness or stress and weight changes during the COVID-19 pandemic. In this study, 1 in 2 respondents reported weight changes during the COVID-19 pandemic, with about 20% losing weight and 30% gaining weight. Further, taking comfort by eating was significantly associated with higher odds of experiencing any weight changes during the COVID-19 pandemic.

The results of this analysis suggest that there was a significant relationship between comfort eating in response to loneliness or stress and changes in weight, and especially weight gain, among U.S. adults. The odds of gaining weight were more than 4 times as high among those who reported comfort eating often/always relative to people that never/ rarely took comfort by eating. Other studies suggest that adults who reported increased stress associated with the COVID-19 pandemic were likely to report increased eating to cope, consumption of sugars and sweets, and snacking [23-26]. Although comfort eating is typically associated with weight gains, there are other factors not accounted for this in this analysis that are related to weight, eating behavior, and stress or loneliness. For example, during the pandemic some adults have reported increasing healthy eating behaviors and other lifestyle changes such as increased physical activity, which may lead to weight loss [13,27]. A large study of American and British adults suggested that people experiencing high disruption in diet and health behaviors during the pandemic were more likely to experience variation in weight, and larger magnitude weight loss [28]. In addition, the relationship with loneliness, stress, and weight may be mediated by other factors such as living with children. While having children may alleviate loneliness, it may have been related to increased stress during the pandemic. Further, loneliness or stress during the pandemic may be related to disordered eating in addition to taking comfort by eating, increasing the likelihood of weight decreases [29]. Although eating in response to stress or loneliness was related to weight changes during the pandemic, it is only one factor among many related to weight changes.

Notably, our study results indicated that people with obesity were more likely to take comfort by eating, as well as experience a weight increase. Events that cause loneliness or stress may put people with obesity at risk of experiencing weight gain. Several studies suggested that people with higher initial BMI were more likely to report a weight increase during the pandemic [30-32]. Further, surveys conducted during the pandemic suggest that obesity was associated with eating while stressed and weight gains [7,9,31,33]. A review of studies analyzing weight changes during the COVID-19 pandemic reported a pooled prevalence of 51% for weight gain among people with obesity across four studies [34]. Consistent with previous studies, we also found that adults with obesity reported comfort eating at much higher rates (14.3%) than those with overweight (7.8%) or with underweight/ healthy weight (6.8%). Research suggested that people with higher BMI may be more likely to eat while stressed prior to the pandemic [19,35]. The onset of the COVID-19 pandemic may have contributed to increased likelihood of eating in response to loneliness or stress and weight gain among people with higher BMIs, who already experienced higher rates of both. The ongoing COVID-19 response may consider supporting people with obesity to cope with stress or loneliness to address risk factors during the COVID-19 pandemic and thereafter.

Our findings on significant differences in weight changes during the pandemic could partially reflect one's perception of weight and diet rather than true changes in the population. An analysis of over one million electronic health records suggests that most adults did not experience weight changes. Further, the percentage of those gaining and losing weight was similar, which is consistent with the results of this analysis [36]. A survey of college students indicated that perceived weight increased during the COVID-19 pandemic, while actual weights did not change substantially in study participants [37]. Messaging around the "Quarantine 15," which suggested that people were more likely to

gain weight during the pandemic, may adversely affect how people perceive their weight and nutrition habits, especially among people who have already experienced stigma related to weight and nutrition [38]. For example, a study of mostly female college students found that perceived weight changes were larger than actual weight changes [37]. Further, different groups may perceive weight differently. For example, we found that people ages 18–24 years, non-Hispanic Black people, and people with lower education or income reported higher percentages of “I don’t know” responses to whether their weight changed. Thus, self-reported weight status may be in part reflective of perceived changes in weight, which may be influenced by sociocultural messaging in the media and from public health agencies noting that quarantine measures are likely to influence weight and health.

The strengths of this study include its large and diverse sample. Despite the strengths of this data source and this analysis, this research is subject to several limitations. First, *SummerStyles* is a cross-sectional survey, and causal relationships cannot be inferred. Second, survey data are self-reported; thus, findings may be subject to bias including recall or social desirability bias, and self-reported weight change may not reflect true changes in weight. Certain people may be subject to different social pressures or have different cultural norms about weight and health. For example, males may be less aware of their weight than females and thus less likely to report a weight change even if they were more likely to experience a weight change [31]. Third, the study only looked at the association between comfort eating in response to loneliness or stress and weight changes. Future studies should consider other behaviors such as TV viewing, physical activity, and diet, as those factors can influence weight changes. Fourth, BMI and several control variables were coded as categorical variables rather than continuous. Both BMI (e.g. underweight and healthy weight in the same category) and race/ethnicity categories (e.g. Other/multi races) were collapsed due to limitations in the survey sample. This limited our analyses. Future work using continuous variables for exposure and outcome variables would strengthen the analysis. Last, survey responses are derived from a convenience sample. The data are weighted to match the U.S. population, but biases in the underlying survey population may influence reported results.

In conclusion, 1 in 2 US. adults reported experiencing a weight change during the ongoing COVID-19 pandemic and 1 in 3 adults sometimes or often/always reported taking comfort by eating in response to loneliness or stress. Comfort eating in response to loneliness or stress was significantly associated with both weight increases and decreases since the start of the COVID-19 pandemic. Additionally, weight gain was more prevalent among younger or middle-aged adults, females, non-Hispanic Other/multiracial adults, adults with some college education, adults that were not married, adults with annual household income \$100,000, those with children under age 18, those that had obesity, and people living in the Northeast. Our findings can inform mental health and nutrition interventions during the COVID-19 pandemic, as well as inform efforts in future health emergencies. When experiencing increased stress or loneliness, some people may be more likely to take comfort by eating, and resources could be made available to them to help encourage healthy eating behaviors as well as alleviate loneliness and stress.

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## SO WHAT?

### What Is Already Known on This Topic?

Weight gains are associated with comfort eating in response to loneliness or stress, and weight gains are linked to developing chronic diseases. There is limited information on whether comfort eating in response to loneliness or stress is related to weight changes during the COVID-19 pandemic among American adults.

### What Does This Article Add?

Comfort eating in response to loneliness or stress often/always or sometimes was reported by 8.3% and 25.3% of respondents, respectively. Respondents that sometimes or often/always reported comfort eating in response to loneliness or stress had significantly greater odds of losing weight (AOR ranges: 1.62–2.99) or gaining weight (AOR ranges: 3.10–4.61) than those who never/rarely took comfort by eating in response to loneliness or stress.

### What Are the Implications for Health Promotion Practice or Research?

Comfort eating in response to loneliness or stress was significantly associated with weight changes during the COVID-19 pandemic. Implementing evidence-based strategies to reduce loneliness or stress and support healthy eating during the COVID-19 pandemic or future similar emergencies may benefit weight management and future well-being.

**Table 1**

Sociodemographic characteristics and their associations with perceived weight changes since the start of the COVID-19 pandemic among U.S. adults, *SummerStyles 2021* survey.

Characteristics	All % <sup>a</sup>	Excluding weight changes because of illness, did you have weight change since the start of the COVID-19 pandemic?				P value <sup>b</sup>
		I lost weight % <sup>a</sup> ± SE	My weight remained about the same. % <sup>a</sup> ± SE	I gained weight % <sup>a</sup> ± SE	I don't know % <sup>a</sup> ± SE	
<b>Total (N = 4068)<sup>c</sup></b>		20.1 ± 0.6	39.9 ± 0.8	30.4 ± 0.7	9.4 ± 0.5	<0.001
<b>Age</b>						<0.001
18–24 years	10.6	14.8 ± 1.7	37.1 ± 2.3	33.8 ± 2.3	14.1 ± 1.7	
25–44 years	34.7	21.7 ± 1.1	36.7 ± 1.3	28.5 ± 1.2	12.9 ± 0.9	
45–64 years	33.3	20.6 ± 1.1	40.0 ± 1.3	33.9 ± 1.3	5.2 ± 0.6	
65 years	21.4	19.5 ± 1.3	46.1 ± 1.7	26.0 ± 1.5	7.9 ± 0.9	
<b>Sex</b>						<0.001
Female	51.6	19.4 ± 0.9	37.0 ± 1.1	34.2 ± 1.0	9.1 ± 0.6	
Male	48.4	20.8 ± 0.9	43.0 ± 1.1	26.3 ± 1.0	9.6 ± 0.7	
<b>Race/ethnicity</b>						<0.001
NH White	63.3	19.4 ± 0.8	42.4 ± 1.0	29.9 ± 0.9	8.1 ± 0.5	
NH Black	11.6	20.8 ± 1.9	30.3 ± 2.1	31.7 ± 2.1	17.0 ± 1.7	
Hispanic	8.8	23.6 ± 1.6	45.0 ± 2.6	27.8 ± 2.4	8.8 ± 1.5	
NH Other/multiracial	16.3	18.2 ± 2.0	34.4 ± 1.8	32.8 ± 1.8	9 ± 1.1	
<b>Education level</b>						<0.001
High school or less	38.3	18.0 ± 1.0	39.6 ± 1.2	27.8 ± 1.1	14.4 ± 0.9	
Some college	30.1	20.2 ± 1.1	39.2 ± 1.4	33.0 ± 1.3	7.5 ± 0.8	
College graduate	31.5	22.7 ± 1.2	41.0 ± 1.4	31.1 ± 1.3	5.0 ± 0.6	
<b>Marital status</b>						<0.001
Married/domestic partnership	57.0	19.9 ± 0.8	43.0 ± 1.0	30.1 ± 1.0	6.8 ± 0.5	
Not married	43.0	20.4 ± 1.0	35.8 ± 1.1	30.8 ± 1.1	12.8 ± 0.8	
<b>Annual household Income</b>						<0.001
<\$25,000	12.3	19.3 ± 1.8	32.0 ± 2.1	25.7 ± 2.0	22.8 ± 1.9	
\$25,000–\$74,999	34.9	19.3 ± 1.0	41.8 ± 1.3	29.1 ± 1.2	9.5 ± 0.8	
\$75,000–\$99,999	14.1	20.7 ± 1.7	41.5 ± 2.1	29.7 ± 1.9	8.0 ± 1.1	
\$100,000	38.7	20.9 ± 1.0	40.2 ± 1.2	33.3 ± 1.2	5.5 ± 0.6	
<b>Currently have children under 18</b>						<0.001
Yes	32.3	19.5 ± 1.1	35.8 ± 1.3	33.4 ± 1.3	11.1 ± 0.9	
No	67.7	20.4 ± 0.8	41.9 ± 0.9	29.0 ± 0.9	8.5 ± 0.5	
<b>Weight status (n = 3998)</b>						<0.001
Underweight/ Healthy weight	33.2	17.2 ± 1.0	53.1 ± 1.4	20.9 ± 1.1	8.6 ± 0.8	
Overweight	32.2	22.1 ± 1.2	39.3 ± 1.4	31.2 ± 1.3	7.3 ± 0.7	
Obesity	34.6	21.3 ± 1.1	28.5 ± 1.2	38.7 ± 1.3	11.4 ± 0.9	
<b>Census regions of residence</b>						0.008

Characteristics	All % <sup>a</sup>	Excluding weight changes because of illness, did you have weight change since the start of the COVID-19 pandemic?				P value <sup>b</sup>
		I lost weight % <sup>a</sup> ± SE	My weight remained about the same. % <sup>a</sup> ± SE	I gained weight % <sup>a</sup> ± SE	I don't know % <sup>a</sup> ± SE	
Northeast	17.4	19.3 ± 1.5	39.6 ± 1.8	32.8 ± 1.8	8.2 ± 1.0	
Midwest	20.8	19.7 ± 1.4	39.4 ± 1.7	32.4 ± 1.6	8.4 ± 1.0	
South	37.9	19.9 ± 1.0	39.6 ± 1.2	28.5 ± 1.1	11.9 ± 0.8	
West	23.9	21.5 ± 1.3	41.2 ± 1.6	29.9 ± 1.5	7.3 ± 0.8	

Abbreviation: SE: standard error; NH: non-Hispanic.

<sup>a</sup>Weighted percent may not add up to 100% because of rounding.

<sup>b</sup> $\chi^2$  tests were used for each variable to examine differences across categories.

<sup>c</sup>Unweighted sample size.

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**Table 2**

Associations between sociodemographic characteristics and comfort eating during the COVID-19 pandemic among US adults, *SummerStyles 2021* survey.

Characteristics	Thinking about the past year, during the COVID-19 pandemic, when you have felt lonely or stressed, how often have you taken comfort by eating?			P value <sup>b</sup>
	Never/ Rarely % <sup>a</sup> ± SE	Sometimes % <sup>a</sup> ± SE	Often/ Always % <sup>a</sup> ± SE	
<b>Total (N = 4068)<sup>c</sup></b>	66.4 ± 0.7	25.3 ± 0.7	8.3 ± 0.4	<0.001
<b>Age</b>				<0.001
18–24 years	53.9 ± 4.7	32.5 ± 4.4	13.6 ± 3.2	
25–44 years	59.0 ± 2.6	28.6 ± 2.4	12.4 ± 1.7	
45–64 years	66.1 ± 2.5	25.5 ± 2.3	8.4 ± 1.5	
65 years	74.5 ± 2.9	20.3 ± 2.7	5.2 ± 1.5	
<b>Sex</b>				<0.001
Female	55.4 ± 2.1	31.6 ± 2.0	12.9 ± 1.4	
Male	73.4 ± 1.9	20.4 ± 1.8	6.1 ± 1.1	
<b>Race/ethnicity</b>				0.09
White, non-Hispanic	63.4 ± 1.9	27.0 ± 1.7	9.5 ± 1.1	
Black, non-Hispanic	67.6 ± 4.2	21.6 ± 3.7	10.7 ± 2.8	
Hispanic	61.8 ± 3.7	27.9 ± 3.4	10.2 ± 2.3	
Other/multiracial, non-Hispanic	68.7 ± 4.8	23.1 ± 4.4	8.2 ± 2.8	
<b>Education level</b>				0.44
High school or less	65.7 ± 2.4	24.6 ± 2.1	9.7 ± 1.5	
Some college	62.7 ± 2.7	27.3 ± 2.5	10.0 ± 1.7	
College graduate	63.6 ± 2.6	27.1 ± 2.4	9.3 ± 1.6	
<b>Marital status</b>				<0.001
Married/domestic partnership	68.8 ± 1.9	23.1 ± 1.7	8.1 ± 1.1	
Not married	57.9 ± 2.3	30.4 ± 2.2	11.7 ± 1.5	
<b>Annual household income</b>				0.002
<\$25,000	59.1 ± 4.3	27.7 ± 3.9	13.2 ± 3.0	
\$25,000–\$74,999	62.6 ± 2.5	26.8 ± 2.3	10.5 ± 1.6	
\$75,000–\$99,999	66.1 ± 3.9	27.2 ± 3.6	6.7 ± 2.0	
\$100,000	66.4 ± 2.3	24.8 ± 2.1	8.8 ± 1.4	
<b>Currently have children under 18</b>				<0.001
Yes	59.3 ± 2.7	28.7 ± 2.4	12.0 ± 1.8	
No	66.4 ± 1.8	25.0 ± 1.6	8.5 ± 1.0	
<b>Weight status (n = 3998)</b>				<0.001
Underweight/ Healthy weight	71.9 ± 2.4	21.4 ± 2.2	6.8 ± 1.4	
Overweight	66.7 ± 2.6	25.5 ± 2.4	7.8 ± 1.5	
Obesity	54.5 ± 2.6	31.3 ± 2.4	14.3 ± 1.8	
<b>Census regions of residence</b>				0.11

Characteristics	Thinking about the past year, during the COVID-19 pandemic, when you have felt lonely or stressed, how often have you taken comfort by eating?			P value <sup>b</sup>
	Never/ Rarely % <sup>a</sup> ± SE	Sometimes % <sup>a</sup> ± SE	Often/ Always % <sup>a</sup> ± SE	
Northeast	62.4 ± 3.6	27.1 ± 3.3	10.5 ± 2.3	
Midwest	61.2 ± 3.3	29.6 ± 3.1	9.1 ± 1.9	
South	65.4 ± 2.4	24.5 ± 2.1	10.1 ± 1.5	
West	65.9 ± 3	25.3 ± 2.7	8.7 ± 1.8	

Abbreviation: SE: standard error.

<sup>a</sup>Weighted percent may not add up to 100% because of rounding.

<sup>b</sup> $\chi^2$  tests were used for each variable to examine differences across categories.

<sup>c</sup>Unweighted sample size.

Associations between self-reported frequency of comfort eating and perceived weight changes since the start of the COVID-19 pandemic among US adults, *SummerStyles 2021* survey.

**Table 3**

Excluding weight changes because of illness, did you have weight change since the start of the COVID-19 pandemic?						
Bivariate Analysis <sup>a</sup>		Multinomial Logistic Regression Analysis <sup>b</sup>				
I lost weight. % <sup>c</sup> ± SE	My weight remained about the same. % <sup>c</sup> ± SE	I gained weight. % <sup>c</sup> ± SE	I don't know. % <sup>c</sup> ± SE	I lost weight. AOR (95% CI)	I gained weight. AOR (95% CI)	I don't know. AOR (95% CI)
<b>Thinking about the past year, during the COVID-19 pandemic, when you have felt lonely or stressed, how often have you taken comfort by eating?</b>						
Never/Rarely	20.6 ± 0.8	48.1 ± 1.0	21.7 ± 0.8	9.6 ± 0.5	Reference	Reference
Sometimes	20.2 ± 1.2	28.4 ± 1.4	42.3 ± 1.5	9.2 ± 0.9	<b>1.62 (1.32, 1.99)</b>	<b>3.10 (2.30, 3.54)</b>
Often/ Always	17.7 ± 1.9	17.2 ± 1.9	56.1 ± 2.5	9.0 ± 1.4	<b>2.99 (1.62, 3.58)</b>	<b>4.61 (3.11, 6.83)</b>

Abbreviation: SE: standard error; AOR: adjusted odds ratio; 95% CI: 95% confidence intervals.

<sup>a</sup>P value < 0.001 based on  $\chi^2$  test across categories (N = 4068).

<sup>b</sup>Reference outcome category was “My weight remained about the same”. Significant findings are bolded based on the 95% CI (i.e., the CI does not include 1). Adjusted for age, sex, race/ethnicity, education level, marital status, annual household income, currently having children aged <18 years, weight status, and census region of residence. The multinomial logistic regression model is based on a sample of 3998 adults without missing data for weight status.

<sup>c</sup>Weighted percent may not add up to 100% because of rounding.