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SHORT COMMUNICATION

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Strategies to manage weight during the holiday season among US adults: A descriptive study from the National Weight Control Registry

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Abstract

Background: Holidays are challenging for weight control and are consistently associated with weight gain. Managing holiday weight gain may be especially difficult for individuals with higher body weight or a history of overweight/obesity. The current study evaluated how individuals with a history of successful weight loss plan for the holiday season and how the use of weight control strategies was associated with weight change.

Methods: A subgroup of participants in the National Weight Control Registry (NWCR) were asked to complete a survey before (November) and after the holidays (January). At pre-holiday, participants reported height, weight, and weight goals for the holiday season (lose, maintain, minimize gains, or gain), and selected the top three weight control strategies they planned to use (from a list of 18). Post-holiday, participants reported weight and how often (frequently, infrequently, or not at all) they used each of the 18 strategies throughout the holidays.

Results: Individuals who completed both surveys were included in the analysis ($n = 683$; 69% female, 93% white, 54.6 years [SD: 13.2], 26.9 kg/m^2 [SD: 5.5]). Pre-holiday, 64% of participants were currently trying to lose weight. Only 35% of the sample wanted to continue losing weight during the holiday season. The most common strategies individuals planned to use during the holiday season were evidence based (maintaining exercise, monitoring portions, tracking foods, and self-weighing). Participants gained 0.66 kg (SD: 1.85) from pre- to post-holiday and reported using an average of 12/18 strategies. A greater number of strategies were associated with less weight gain ($F[1, 670] = 4.28$, $p = 0.04$). Daily self-weighing ($p = 0.03$) and prioritizing food choices ($p = 0.02$) were individually associated with less weight gain.

Discussion: Participants in the NWCR entered the holiday season with a variety of goals for their weight and used many different strategies to control their weight. Having a wider range of strategies may be helpful to navigate the challenges to weight control during the holidays.

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KEYWORDS
holiday weight gain, obesity, weight control, weight control strategies

1 | INTRODUCTION

The holiday season can be a challenging time for individuals who are attempting to manage their weight. In the United States, the holiday season is conventionally considered to span the time from Thanksgiving (mid to late November) through the New Year (beginning of January). During this time, multiple holiday-related factors are thought to influence weight-related behaviors including increased stress, greater frequency of social gatherings with high-calorie foods and drinks, and competing demands limiting opportunities to engage in physical activity.[1] This period of time represents a sociocultural shift in the environment that can make it challenging to maintain a healthy lifestyle and prevent weight gain using individual behavior change strategies, with studies consistently documenting an average weight gain of 1 kg (or approximately 2 pounds) during this time.[1–3]

Certain groups may be especially at risk for larger holiday weight gains, including those who have a body mass index (BMI) greater than 25.[3] Likewise, those who are maintaining a significant weight loss utilize more effort and resources to manage holiday weight gain compared to individuals without a history of obesity.[4] The subtle weight gain observed during this time is not without health implications, as even the modest weight gains are not typically reversed following the holiday season and likely contribute to an accumulation of weight throughout the year.[3] Because of the lasting implications of the holiday season, there is general interest in identifying interventions to mitigate weight gain during this time of year.[5]

Some strategies for managing weight during the holidays have received empirical support. For example, self-monitoring of diet and body weight has been linked to better weight control[5] and interventions to increase engagement with self-monitoring during the holiday season have been shown to be effective.[6] This is consistent with the well-documented role of these self-regulatory strategies in the context of behavioral weight management treatment.[7] Yet, even among individuals engaged in weight loss treatment, self-monitoring in accordance with treatment guidelines has been shown to decrease during the holiday season.[8] Taken together, the limited current literature suggests that the holiday season creates an environment that is associated with a general decrease in attention to weight and eating, increasing vulnerability to weight gain.[4]

The goal of the current observational prospective study was to better understand how individuals with a history of successful weight loss maintenance enrolled in the National Weight Control Registry[9] approach the holiday season from a weight management perspective. The aims of the study include assessing (1) participant weight goals for the holiday, (2) which weight control strategies participants plan to prioritize in order to achieve their weight goals, (3) to observe weight changes from pre- to post-holiday season and evaluate which weight control strategies participants ultimately used, and (4) to conduct exploratory analyses evaluating the relationship between weight change and both the number of strategies as well as specific strategies utilized.

2 | METHODS

2.1 | Participants and procedures

Participants were recruited from the National Weight Control Registry (NWCR; nine), a national database tracking over 10,000 men and women in the United States, who are 18 years of age and older and who lost at least 13.6 kg (30 pounds) and maintained the weight loss for at least 1 year. Participants enrolled in the NWCR complete questionnaires upon entry and annually for 10 years, thereafter to prospectively evaluate weight change and behavioral strategies associated with weight maintenance as well as factors linked to weight regain. Participants also indicate if they would like to be contacted about opportunities to complete one-time surveys. For the current study, a subset of NWCR participants ($n = 1592$) who indicated their willingness to be contacted for one-time studies and completed an annual survey within the past year (i.e., considered "active" within the registry) were invited to participate in a baseline survey prior to the US Thanksgiving holiday (November 2018). These participants were provided with a link to complete online questionnaires. Individuals who completed the first survey ($n = 819$) were eligible to complete a follow-up survey after the start of the New Year (January 2019, approximately 6 weeks after the initial assessment). A total of $n = 686$ individuals completed the post-holiday survey and form the cohort for the present analyses. This study was approved by the Lifespan Miriam Hospital Institutional Review Board and all participants provided written consent prior to enrolling in the registry.

3 | MEASURES

3.1 | Pre-holiday assessment (November)

3.1.1 | Demographics

Participants provided demographic information including age, gender, race, marital status, and years of education.

3.1.2 | Weight history

Participants were asked to provide information about their weight history including their current weight (pounds) and the highest weight (excluding pregnancy). Participants also reported their height

(feet and inches). Height and weight were converted to kilograms and meters in order to calculate =BMI (kg/m^2). Although accuracy of self-reported body weight remains debated, evidence suggests that this approach has reasonable validity.[10] Participants were also asked to indicate if at the time of the assessment they were currently trying to lose weight, gain weight, or if they were not currently trying to change their weight.

3.1.3 | Holiday plans for weight

Because individuals might have different goals for the holiday season than they had for their general (overall) weight control, participants were asked to report their goals for their weight *specifically* during the holiday season. They could choose from a list of five options including having no goals for their weight during the holiday, hoping to maintain their weight, hoping to limit their weight gain, hoping to lose weight, or hoping to gain weight because their weight is currently too low.

3.1.4 | Weight control strategies

Participants were asked to select the top three strategies from a list that they were planning to use to accomplish their weight control goal through the holiday season. The list was based on common behavioral and cognitive self-regulatory strategies utilized in evidence-based weight control treatments.[11] A full list of strategies can be viewed in Table 1. Some participants reported more than three strategies but only the top three were used for analyses in accordance with the instructions provided to participants.

3.2 | Post-holiday assessment (January)

3.2.1 | Weight update

Participants were asked to report their current weight in pounds.

3.2.2 | Weight control strategies utilized

Participants were asked to report how frequently they used ("frequently," "every once in a while," or "not at all") each of the weight control strategies (see Table 1) that were assessed at the baseline/pre-holiday assessment. Participants were not reminded of their previous responses.

4 | ANALYTIC PLAN

Statistical analyses were conducted using SPSS version 25 (IBM Corp.). The analytic approach to the current study was primarily descriptive, to better understand how individuals who are considered successful weight loss maintainers set goals related to weight management during the holiday season, to evaluate whether or not they employ the strategies they planned to use, and to identify which strategies are used regardless of original plans. Participants who completed both assessments (study completers) were compared to those who only completed the pre-holiday assessment using analysis of variance (ANOVA) to determine if attrition was associated with specific characteristics (e.g., demographics and weight goals for the holiday season).

For the pre-holiday assessment, percentages were calculated to determine the proportion of participants reporting each of the options for holiday weight plans as well as the proportion of individuals reporting each weight control strategy as one of their top three planned strategies to utilize. For the analysis of percentage of participants reporting a plan to use a strategy, response options were dichotomized as: 1 – planned to use strategy and 0 – no plan to use strategy. For the post-holiday assessment, response options used to rate the use of weight control strategies during the holidays were recoded so that "frequent" or "every once in a while" use of a strategy were combined into a single category representing 1 – at least some use of the strategy compared to "not at all," which was coded as 0 – no use. This approach was selected because it is difficult to determine what frequent versus infrequent use would be perceived as by participants in order to confidently conclude that the groups differed in meaningful as opposed to arbitrary ways.

ANOVA was used to test whether the total number of strategies reportedly used (as assessed at post-holiday) differed based on participants' weight goals for the holiday (e.g., did individuals who planned to limit weight gain differ in the total strategies utilized compared to those who reported no plans at all). Furthermore, univariate analysis of covariance (ANCOVAs) was used to examine if any individual weight control strategy was associated with weight change during the holidays. Of the demographics (age, race/ethnicity, and gender), only age was significantly associated with weight change ($p < 0.01$; older age was associated with less weight gain) and therefore was included as a covariate in the model. Exploratory analyses were conducted to test the association between the number of strategies used (as reported at post-holiday) and weight change from pre- to post-holiday. Linear regression models were used to examine whether a greater number of weight control strategies reported at the post-holiday assessment was associated with lower weight gain during the holiday time frame. Age was also included as a covariate in the model.

5 | RESULTS

A total of $n = 1592$ individuals were eligible to be contacted for one-time surveys and emailed with the opportunity to complete the pre-holiday assessment. Among those individuals contacted, $n = 819$ registry participants completed the pre-holiday survey and 686 (83.8%) participated in the post-holiday survey. Those who participated in both surveys were older (54.6 ± 13.2 vs. 48.9 ± 14.0 years, $p < 0.001$) and had a lower BMI at baseline (26.9 ± 5.5 vs. 28.2 ± 5.7

TABLE 1 Percentage of participants who reported planning to use each strategy at the pre-holiday assessment and the percentage of those individuals who then reported that they used the strategy at the post-holiday assessment. Percentage of participants who reported using each strategy at post-holiday is also presented (regardless of whether they reported planning to use the strategy at the pre-holiday assessment)

	Planning to use strategy at pre-holiday (% of all participants)	Reported using strategy post-holiday (% of participants with plan to use strategy pre-holiday)	Reported using strategy frequently post-holiday (% of all participants)	Reported using strategy once in a while post-holiday (% of all participants)	Reported using strategy not at all post-holiday (% of all participants)
Weight control strategies					
Maintain an exercise routine that you already are doing	52.9% ($n = 354$)	91.5% ($n = 324$)	66.6% ($n = 450$)	14.6% ($n = 99$)	18.8% ($n = 127$)
Monitor portion sizes	40.8% ($n = 273$)	89.4% ($n = 244$)	58.7% ($n = 397$)	27.5% ($n = 186$)	13.8% ($n = 193$)
Track the kinds of foods you eat or count calories	33.9% ($n = 227$)	87.7% ($n = 199$)	49.4% ($n = 334$)	22.3% ($n = 151$)	28.3% ($n = 191$)
Weigh yourself regularly	31.5% ($n = 211$)	90.5% ($n = 191$)	56.4% ($n = 381$)	20.0% ($n = 135$)	23.7% ($n = 160$)
Add more activity into your routine	29.1% ($n = 195$)	76.4% ($n = 149$)	35.7% ($n = 241$)	26.8% ($n = 181$)	37.6% ($n = 254$)
Make choices about which holiday foods are worth eating and skip items that aren't special or important to you	28.6% ($n = 191$)	93.7% ($n = 179$)	58.6% ($n = 396$)	28.3% ($n = 191$)	13.2% ($n = 89$)
Adjust how much you eat during other meals on the days that you have a party or event	15.5% ($n = 104$)	91.3% ($n = 95$)	40.4% ($n = 273$)	32.8% ($n = 222$)	26.8% ($n = 181$)
Try to stop eating when you feel full and/or practicing other mindful eating strategies	12.9% ($n = 86$)	87.2% ($n = 75$)	44.7% ($n = 302$)	36.2% ($n = 245$)	19.1% ($n = 129$)
Avoid certain types of food	10.2% ($n = 68$)	91.2% ($n = 62$)	36.2% ($n = 245$)	29.9% ($n = 202$)	33.9% ($n = 229$)
Bring healthy dish	6.1% ($n = 41$)	80.5% ($n = 33$)	24.6% ($n = 166$)	24.7% ($n = 167$)	50.7% ($n = 343$)
Minimize the amount of time you have tempting foods in the house	6.0% ($n = 40$)	92.5% ($n = 37$)	45.3% ($n = 306$)	30.8% ($n = 208$)	24.0% ($n = 162$)
Use technology to make healthy decisions	4.9% ($n = 33$)	84.8% ($n = 28$)	37.7% ($n = 255$)	14.3% ($n = 97$)	47.9% ($n = 324$)
Skip or reduce alcoholic beverage intake	4.5% ($n = 30$)	63.3% ($n = 19$)	42.3% ($n = 286$)	20.1% ($n = 136$)	37.6% ($n = 254$)
Focus on non-food elements of the holiday season	3.6% ($n = 24$)	95.8% ($n = 23$)	38.0% ($n = 257$)	35.7% ($n = 241$)	26.3% ($n = 178$)
Decrease the amount of time sitting each day	2.8% ($n = 19$)	73.7% ($n = 14$)	25.1% ($n = 170$)	30.8% ($n = 208$)	44.1% ($n = 298$)
Start a weight loss program or follow a formal diet	2.8% ($n = 19$)	47.4% ($n = 9$)	17.9% ($n = 121$)	9.2% ($n = 62$)	72.9% ($n = 493$)
Pack healthy snacks while traveling	1.8% ($n = 12$)	100% ($n = 12$)	34.0% ($n = 230$)	26.3% ($n = 178$)	39.6% ($n = 268$)

(Continues)

TABLE 1 (Continued)

	Planning to use strategy at pre-holiday (% of all participants)	Reported using strategy post-holiday (% of participants with plan to use strategy pre-holiday)	Reported using strategy frequently post-holiday (% of all participants)	Reported using strategy once in a while post-holiday (% of all participants)	Reported using strategy not at all post-holiday (% of all participants)
Share your weight goals with someone in your life and ask them to support you	0.9% ($n = 6$)	83.3% ($n = 5$)	18.2% ($n = 123$)	17.6% ($n = 119$)	64.2% ($n = 434$)

Note: Among individuals who were participated in both surveys and were not pregnant ($n = 683$), 14 participants provided uninterpretable ($n = 7$) or incomplete data ($n = 7$) at the pre-holiday assessment and 7 participants provided incomplete data at the post-holiday assessment. The data from these individuals are included where available.

kg/m^2, $p = 0.01$) but did not differ in gender ($p = 0.60$), race (White vs. non-White; $p = 0.18$), level of education ($p = 0.12$), or in their weight control plans for the holiday season ($p = 0.46$) from those who only completed the pre-holiday survey. Individuals who did not participate in both surveys ($n = 133$) or were pregnant ($n = 3$) were excluded from our final sample of $n = 683$. The final sample was primarily female (69%), white (93%), with an average age of 54.6 years (SD: 13.2) and average BMI of 26.9 (SD: 5.5). Participants were highly educated with approximately 84% of the sample having a college education or higher degree and 68% of participants were married.

At the pre-holiday assessment, most participants reported active efforts to lose weight (64%); 35% reported that they were not trying to change their weight, and 1% reported trying to gain weight. However, when asked their goal for the holiday season specifically, only 35% reported wanting to lose weight, while a majority reported that they wanted to maintain their weight (47%) or limit weight gain (11%) during the holidays. Seven percent of participants reported that they did not have a goal for their body weight during the holiday season and a very small proportion (0.3%) of respondents indicated that they hoped to gain weight due to current body weight that is too low. Participants were asked to identify three strategies they planned to use in order to achieve their weight goals during the holiday season. Participants were most likely to report plans to maintain an exercise routine (53%), monitor portion sizes (41%), track the kinds of food being eaten or count calories (34%), and to self-weigh regularly (32%) (see Table 1 for the full list).

Participants reported an average weight gain of 0.66 kg (SD: 1.85) from pre- to post-holiday and reported using on average of 12 weight control strategies (range: 0–18, see Table 1 for percentage of participants reporting use of a strategy frequently, infrequently, or not at all). The number of strategies an individual reported using at the post-holiday assessment (frequently or infrequently) differed significantly based on their reported weight goal for the holiday season at the pre-holiday assessment ($F(4, 671) = 12.08$, $p < 0.001$). Individuals who reported having no goals for their weight over the holiday reported the use of approximately nine strategies (this group significantly differed from all three of the other groups at $p < 0.001$). In comparison, those who wanted to maintain or lose weight reported an average of 12 strategies, while those who wanted to limit weight gain reported using an average of 11 strategies. Weight gain also significantly differed based on the reported weight goal for the holiday season at pre-holiday assessment ($F(4, 671) = 5.61$, $p < 0.001$), with all groups significantly different from one another (no goals = 0.26 ± 2.05 kg, maintain weight = 0.75 ± 1.63 kg; limit weight gain = 1.35 ± 1.88 kg; lose weight = 0.40 ± 2.02 kg; gain weight = 1.59 ± 2.25 kg).

The proportion of strategies that were reportedly planned for use at the pre-holiday assessment, and then ultimately reported as used at the post-holiday assessment, ranged from 47.7% to 100% between participants (see the second column in Table 1 for the rates of actual use of each planned strategy). For 8 out of 18 strategies, 90% of participants reported using the strategies that were endorsed as planned for use at pre-holiday. The strategy with the highest rate of follow-through was planning to pack healthy snacks while traveling (100%), although only a small number of individuals planned to use this strategy ($N = 12$). This was followed by focusing on non-food elements of the holiday season, where over 95% of individuals who planned to use this strategy also used it.

Exploratory analyses were conducted to evaluate the association between the type of strategy used as well as the number of strategies used and weight change. For these analyses, the strategy data were recoded so that any reported use of the strategy (frequently or infrequently) was collapsed and compared to not using the strategy at all. Linear regression models indicate that a greater number of strategies reported at the post-holiday assessment was associated with lower weight gain during the holidays when adjusting for age ($F(2, 667) = 6.47$, $p < 0.01$; $\beta = -0.041$, $t = -2.03$, $p = 0.04$). Using ANCOVA (adjusting for age), the self-reported use of two individual strategies were associated with weight change while adjusting for all other strategies, daily self-weighing ($F(1, 6650) = 4.98$, $p = 0.03$) and making choices about which foods are worth eating and skipping those that are not worth eating ($F(1, 650) = 5.30$, $p = 0.02$).

6 | DISCUSSION

The holiday season is a challenging time for weight control. In the NWCR, many individuals reported holiday-specific goals for their weight and prioritized using evidence-based strategies in planning to achieve their goals. Using a greater number of strategies was

associated with less weight gain along with two specific strategies (e.g., self-weighing and making specific choices about what food is worth eating versus skipping during the holidays). Taken together, the findings suggest that among individuals who have successfully lost weight and maintained the weight loss, planning ahead for the holidays may be key. Given that a greater number of strategies, but also a few specific strategies, were associated with weight changes, there may be multiple pathways to minimizing holiday weight gain.

Consistent with previous research, participants gained an average of 1–2 pounds (0.66 kg on average) from before to after the holiday season.[1,4,8] This amount of weight gain has been observed across a wide range of samples[1,8] including previous research within the NWCR.[4] The findings indicate that a greater number of strategies were associated with better weight control. This finding is consistent with behavioral weight management protocols which rely heavily on self-monitoring but also teach individuals a variety of cognitive behavioral tools to help individuals achieve their weight loss goals.[11] Further, it may be the case that having a wider variety of tools in ones' toolbox allows for flexibility to navigate the greater volume and frequency of challenges (stress, greater frequency of social gatherings with high-calorie foods and drinks, and competing demands limiting opportunities to engage in physical activity) that arise for weight control during the holiday season. This is consistent with other areas such as emotion regulation, where ability to flexibly apply a variety of techniques has been shown to be more effective than relying on one or a specific few strategies.[12] This notion brings a new perspective to the weight management literature which tends to boil down weight control to key, specific tools (tracking dietary intake). This suggests that individuals may not have to rely on a "silver bullet" strategy to combat holiday weight gain, but instead having a wide range of strategies to deploy can help individuals navigate this tricky period of time.

In addition to using a wide range of strategies, two specific strategies may be especially associated with better weight control including regular self-weighing and making choices about what food is worth eating. Self-weighing is the hall mark of self-regulatory strategies in behavioral weight management treatments[13]; and therefore, it is not surprising this would be associated with better weight control. Further, making choices about what food is worth/not worth eating likely reflects a general level of attention to eating patterns during the holiday that helps manage caloric intake across the 6-week holiday window. In lieu of detailed monitoring of caloric intake, prioritizing certain foods may be a useful schematic or cognitive tool for portion control.

While two-thirds of the sample reported that they were trying to lose weight at the time of the pre-holiday assessment, only one-third of the sample reported having a goal of continued weight loss during the holidays. This reflects a shift in weight goals, perhaps in anticipation of the challenges that accompany the holiday season. To achieve weight goals, regardless of what they were, individuals most commonly endorsed plans to use what can be considered evidence-based strategies including exercise, self-monitoring of food/weight, and attending to portion sizes. Across strategies, a substantial majority of individuals reported using strategies that they had initially planned to employ. The fact that many participants followed through is consistent with the Theory of Planned Behavior[14] emphasizing that intending to use a strategy was associated with subsequent use of the weight control behavior. However, individuals generally employed a wide variety of strategies to achieve their weight control goals during the holiday season as opposed to relying on a specific few. Individuals who had a goal (any goal) for their weight during the holidays used a similar amount of strategies on average (12/18 strategies), but even those without specific plans (as reported) at the start of the holiday season still reported using quite a few strategies in retrospect (9/18 strategies).

It is of note that more individuals reported using each strategy at the post-holiday assessment than had reported planning to use the strategy (as one of their top three strategies) at the assessment leading up to the holiday season (e.g., only $n = 354$ individuals planned to maintain an exercise routine but $n = 549$ reported using this strategy at the post-holiday assessment). This calls into question whether there is a meaningful difference in the benefit of the strategy among individuals who had prioritized a strategy to list it as one of their top three tools versus those who had not reported planning to use a strategy. Exploratory post hoc analyses were conducted evaluating some of the most commonly utilized strategies in this sample (e.g., maintaining physical activity, monitoring portions, tracking calories, and self-weighing), to determine if the association between using the strategy and weight change differed based on whether the individual reported planning to use it initially. ANOVA indicated that the association with weight change did not differ between those who had planned versus those who had not reported planning for any of the strategies investigated (maintaining activity, $p = 0.18$; monitoring portions, $p = 0.28$; tracking calories, $p = 0.88$; and self-weighing, $p = 0.75$). Taken together with the rest of the analyses presented, the findings suggest (very loosely given the observational and post hoc nature of the analyses) that encouraging people to plan may be important for increasing likelihood of employing a strategy but intent is not a key ingredient for the efficacy of the strategy. This coincides with the potential for just-in-time interventions to promote adaptive weight-related behaviors on a more momentary basis.

There are a number of limitations that should be considered in interpreting this research. First, this study is observational and primarily descriptive in nature. The goal was to better characterize how individuals navigate the holiday season related to weight control. Further, this study relies on recall as well as self-report (i.e., for body weight), which are both subject to bias. Ecological momentary assessment (EMA) may be helpful for future research to solicit this information in real time with reduced bias. EMA could also offer insight into contextual factors that make the holiday period especially challenging. Relatedly, the NWCR is not a random sample and the sample in the current study was primarily white, female, and highly educated. Therefore, the current findings may not generalize

to other samples. Lastly, there are limitations related to the weight control strategy assessment. The assessment did not include a validated measure of weight-related behaviors and items were not calibrated across participants (examples were not provided to illustrate strategies), so there may be variability in how participants interpreted items. These limitations highlight opportunities for future research including determining the degree to which findings are relevant for samples without a history of successful weight loss, using more rigorous assessment methodology to capture weight control strategies during the holiday season, and integrating a sociocultural perspective in the assessment.

The current findings provide rich descriptive data that enhances our current understanding of how a vulnerable group (those who are maintaining a significant weight loss) navigates the challenges of holiday weight gain. The findings suggest that individuals who remain engaged with self-monitoring behaviors (self-weighing) and use cognitive strategies focused on prioritizing which foods to eat have better weight control outcomes during the holidays. However, the findings also suggest that having a wider range of strategies may be important for navigating this time. More research is needed to elucidate how greater use of strategies translates to better weight control during the holiday season, but may also be relevant for the broad question of how to promote weight maintenance over time.

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CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

AUTHOR CONTRIBUTIONS

Rena R. Wing and KayLoni Olson conceptualized the study design. KayLoni Olson conducted study procedures, developed analytic plan, and wrote the manuscript. Jaime A. Coffino implemented the analytic plan. J. Graham Thomas, Rena R. Wing, and Jaime A. Coffino contributed to revising and finalizing manuscript.

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