Research report

Emotional and uncontrolled eating styles and chocolate chip cookie consumption. A controlled trial of the effects of positive mood enhancement

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ABSTRACT

The study tested the effects of positive mood enhancement on chocolate chip cookie consumption in the context of emotional and uncontrolled eating styles. The relationship between emotional eating style and chocolate chip cookie intake was assumed to be mediated by uncontrolled eating style. Further, it was hypothesized that the effectiveness of the positive mood enhancement may be more salient among those who have effective control of their eating. In this experimental study, respondents (N = 106, 70% women, aged 16–45 years old) were assigned by means of cluster randomization to the control or positive mood enhancement condition (a comedy movie clip). Compared to the control condition, positive mood enhancement resulted in consuming on average 53.86 kcal less. Relationships between emotional eating style and cookie intake were mediated by uncontrolled eating. Moderated mediation analysis indicated that the effect of a mediator (uncontrolled eating) on cookie intake was moderated by the group assignment. Positive mood enhancement resulted in eating on average 3.3 cookies less among individuals with a more controlled eating style. By contrast, among those who presented uncontrolled eating, positive mood enhancement led to consuming an average of 1.7 cookies more.

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Deriving a high proportion of daily energy intake from snacking is positively related to overweight status (Nicklas, Yang, Baranowski, Zakeri, & Berenson, 2003) and increased intake of fat and sugar (Cusatis & Shannon, 1996). Snack consumption, therefore, appears to be one of the important indicators of overweight or obesity, which in turn is a risk factor for chronic disability and life threatening chronic conditions, such as cardiovascular diseases, type 2 diabetes, gallbladder disease, and cancer (World Health Organization, 2003).

Intake of snacks such as cookies may be indicative of a tendency to use food as a mood-regulation tool, because emotional eating co-occurs with snacking rather than at meal times (Baumeister, Heatherton, & Tice, 1994). Emotions may in turn alter eating behavior: As research has indicated the induction of negative emotions leads to increased food consumption (Canetti, Bachar, & Berry, 2002), which is likely to represent an effort to alleviate negative affect. Most previous research suggesting that negative affect induces stimuli on increased food intake enrolled either clinical populations (Munsch, Michael, Biedert, Meyer, & Margraf, 2008) or people with obesity who additionally suffer from elevated negative mood (Jansen, Vanreyten, van Balveren, Nederkoorn, & Havermans, 2008). Similar effects of positive and negative mood induction on food intake were found for samples using psychoactive substances which affect mood (Cavallo & Pinto, 2001). Effects of positive emotions on food intake were investigated in the context of restrained eating. For example, the effects of positive mood enhancement on snack consumption may depend on levels of disinhibition and restraint tendencies in eating behaviors: Women report high disinhibition and restraint ate less when exposed to stimuli evoking positive mood (compared to a negative mood enhancement; Yeomans & Coughlan, 2009). Among individuals with eating disorders, positive emotions predict the number of eating episodes on binge days (Wolff, Crosby, Roberts, & Wittrock, 2000). So far, not much evidence has been presented to support the effect of positive emotions on food consumption among non-clinical populations or in the context of other psychosocial determinants than dietary restraint.

Negative mood may promote a failure of efforts to self-regulate food intake, as mood regulation may become a priority over other self-regulatory tasks (Tice & Bratslavsky, 2000). In general,
Escaping bad moods is the most common form of emotional regulation (Tice & Bratslavsky, 2000). Regulatory eating in response to affect occurs if an individual believes that eating would improve mood (Tice, Bratslavsky, & Baumeister, 2001). However, self-regulation which may be limited can be restored by positive emotions (Baumeister, 2003).

Eating behaviors depend on attempts to self-regulate (Herman & Polivy, 1980). These self-regulatory efforts may have several facets, such as tendencies of exerting conscious control attempts or reacting to mood change with eating (Karlsson, Persson, Sjostrom, & Sullivan, 2000; Stunkard & Messick, 1985). They may also refer to the perceived effectiveness of self-regulatory efforts to control food intake, as represented by the “uncontrolled” eating style. Measures of uncontrolled eating style deal with the actual ability to refrain from eating after being exposed to cues/temptations (Karlsson et al., 2000). Uncontrolled eating refers to actual effects of self-regulatory processes (e.g., “when I start eating I can’t seem to stop”). Uncontrolled eating is also related to emotional eating (Karlsson et al., 2000; Stotland & Larocque, 2005), which in turn is usually defined as a tendency to react with eating behaviors to negative emotions (Stunkard & Messick, 1985).

It may be assumed that uncontrolled eating may be directly related to food consumption, whereas emotional eating may be indirectly related to food intake, with uncontrolled eating playing a mediating role. Some models of eating styles argue that uncontrolled eating is predicted by other cognitive processes (Ross & Wade, 2004). Therefore, it may act as a mediator between these processes and food intake. On the other hand, there is some evidence that the effects of an emotional eating style on food intake are mediated by other cognitive processes (e.g., coping), which in turn are directly related to the behavioral outcomes (Spoor, Bekker, van Strien, & van Heck, 2007). In sum, uncontrolled eating may be considered a proximal predictor of food intake, in addition to more distal predictors such as emotional eating.

It may be expected that individuals with a more controlled eating style may be able to better regulate their own food intake when exposed to stimuli evoking a positive mood. High self-control or self-regulation is related to lower intake of high-fat food (Wills, Isasi, Mendoza, & Ainetter, 2007). Mood inductions moderate the effects of self-regulatory processes, with those individuals exposed to positive mood stimuli dealing better with demanding tasks, requiring high self-regulation (Tice, Baumeister, Shmueli, & Muraven, 2007). Because food intake, affect, emotional and uncontrolled eating styles may be related to age, gender, body mass index (Wang & Beydoun, 2007), binge and restrained eating (Van Strien, Engels, van Leeuwe, & Snoek, 2005; Yeomans & Coughlan, 2009) we controlled for the effects of these variables. Finally, both theory and research provide a strong rationale for the relationship between intention strength and food intake (Conner, Norman, & Bell, 2002). Prior behavior is among the strongest predictors of current behavior, therefore it is often controlled for in research explaining food intake (Conner et al., 2002). Both intentions and past behaviors are often seen as more distal predictors of behavior (Schwarzer et al., 2007), and their effects are mediated by other, more proximal cognitive and emotional processes.

**Aims**

The study investigated whether a brief positive mood enhancement procedure would affect calorie intake, as indicated by chocolate chip cookie consumption (Hypothesis 1). Further, uncontrolled eating would be mediating the relationship between emotional eating and chocolate chip cookie intake and that this mediation effect (in particular, the relationship between the uncontrolled eating and cookie intake) would be moderated by positive mood enhancement (Hypothesis 2). The study controlled for sociodemographic variables, binge and restrained eating, intention, and past behavior.

**Methods**

**Sample and procedure**

The sample consisted of 106 students of a college in South England, enrolled in a mind and behavior course, a health sciences course, or an introduction to psychology course. Participants were 16–45 years old ($M = 23.46$, $SD = 6.40$), and the majority were women (70%). Average body mass index (BMI) was $22.97$ ($SD = 4.50$); 79% reported normal body weight (BMI of 18–25), 14% were overweight, 7% reported obesity (class 1: 4%; class 2: 2%; class 3: 1%). Self-reported average daily consumption of portions cookies was 1.61 ($SD = 1.25$, range: 1–7).

Potential respondents (students aged 16–45 years) were invited to take part in an experiment which would take place in the classes. Participation was voluntary and anonymous. There were no exclusion criteria. All respondents filled out a set of measures referring to sociodemographics, emotional and uncontrolled eating styles, affect, eating, and prior sweets consumption.

Participants were tested in their preexisting small class groups. The cluster randomization (order applied on a coin flip) allowed for assignment of the classes to either the experimental or control condition. Two film clips were used as the experimental materials. Classes assigned to a positive mood enhancement condition watched a 7.5 min clip of a popular animated comedy program. The control group participants watched an equivalent clip of a documentary about the contribution of mercury to science. Clips of a similar style and duration (7 min) successfully induced positive and neutral moods in previous research (Phillips, Smith, & Gilhooly, 2002).

After watching the film clips, participants were asked to fill in the affect measure again. Participants were asked to sit in a way to secure largest possible distance between them, in order to secure anonymity (this strategy also secured that the respondents would have access to only one serving of cookies). Filling in the mood measure was followed by questions and answers about continuing education in Psychology and Life Sciences at English and German universities. At the beginning of the question and answer session, the experimenters placed disposable bowls with eight medium-size chocolate chip cookies on a table in front of each participant, stating that this was a gesture of gratitude for taking part. No fluids were offered during the experiment. After approximately 20 min of discussion (referring to conditions, demands, and advantages of studying psychology and life sciences at British and German universities) participants were instructed to leave their questionnaires, the disposable bowls, and remaining cookies on the desk before them. The number of biscuits eaten from each bowl was recorded on the corresponding questionnaire set. The study was approved by an ethics committee at a university in Southern England.

**Measures**

**Calorie intake** was estimated with the number of chocolate chip cookies (eaten during approximately 20 min after the experimental manipulation) multiplied by the calorie count per cookie. Calories as indicated by the producer were 57 kcal per cookie with an estimate of 2.6 g of fat. On average, participants had eaten 4.91 cookies ($SD = 2.88$), that is 279 kcal ($SD = 164.31$), with a minimum of no cookies at all and a maximum of 8 (457 kcal).

**Positive affect** was evaluated with the respective subscale from PANAS (Watson & Clark, 1988). The item referring to the levels of
attention was omitted from the questionnaire, as measuring levels of attention rather than positive mood. In the present study, Cronbach’s alphas for the positive affect index were 0.87 and 0.92 at respective measurement points. The mean values for pre- and post-tests were 2.68 ($SD = 0.79$) and 2.30 ($SD = 1.02$).

Uncontrolled and emotional eating styles were assessed with respective scales derived from the revised version of the 3-Factor Eating Questionnaire (Karlsson et al., 2000). Responses were given on a scale ranging from 1 (not at all true) to 4 (exactly true). Uncontrolled eating was measured with 9 items (e.g., “Sometimes, when I feel lonely, I console myself by eating”) with a mean item response of 1.95 ($SD = 0.58$; min = 1, max = 3.78), and Cronbach’s alpha of 0.83. Emotional eating was assessed with three items (e.g., “When I feel lonely, I console myself by eating”) with a mean item response of 1.88 ($SD = 0.86$; min = 1, max = 4), and Cronbach’s alpha of 0.74.

Control variable measures included self-reported sociodemographics, body weight and height. Binge eating was measured with the 9-item binge eating subscale of the revised Bulimia Test (Thelen, Mintz, & van der Wal, 1996). The responses to the items such as “I feel that food controls my life”, ranged from 1 (completely untrue) to 5 (completely true of me). Mean item response was 2.26 ($SD = 0.92$) and the alpha for the present study was 0.89. Six percent of participants reported scores that were indicative of bulimia nervosa (cf. Thelen et al., 1996). Prior sweet snack consumption was assessed with the item, “In the last two weeks, how often have you eaten some sweet snacks on average per day?”, with a 7-point response scale. Mean response was 1.61 ($SD = 1.25$).

Intention to reduce sweet snack consumption was assessed with the item, “Within the next week I intend to eat less sugary snacks” with a response scale ranging from 1 (strongly disagree) to 5 (strongly agree) and mean of 3.01 ($SD = 1.37$). Finally, cognitive restrained eating style was measured with a cognitive restraint scale from the revised 3-Factor Eating Questionnaire (Karlsson et al., 2000), including six items such as “I consciously hold back at meals in order not to gain weight”. Responses are given on a scale ranging from 1 (not at all true) to 4 (exactly true) with mean item response of 1.98 ($SD = 0.69$; min = 1, max = 4; alpha of 0.80).

Data analysis

Analysis of variance and analysis of covariance were applied to check the randomization and to test the differences between the experimental groups. Moderated mediation analysis (Muller, Judd, & Yzerbyt, 2005) was used to investigate the relationships between two eating styles, cookie consumption and the experimental condition. As categorizing continuous variables may lead to biased results (MacCallum, Zhang, Preacher, & Rucker, 2002) we have selected a method of data analysis which allows for testing the effects of continuous variables. In the moderated mediation analysis, three separate regression models were tested, with respect to three paths representing mediation analysis: The effect of the independent variable (emotional eating style) on the dependent variable (calorie intake), the effect of the independent variable (emotional eating) on the mediator (uncontrolled eating), and the effect of the mediator (uncontrolled eating) on the dependent variable (calorie intake). In all models an index of the moderator (the experimental condition) multiplied by a respective predictor (the independent or mediator variables) represented possible moderation effects. All continuous variables entered into the equations were centered. The values of the moderator were coded as –1 (control) and +1 (positive mood enhancement), as suggested by Muller et al. (2005). Moderated mediation is observed if at least one of following conditions is met: (1) the relationship between the independent variable and mediator is moderated, with the mediator predicting the dependent variable or (2) the independent variable predicts the mediator, and the relationship between the mediator and the dependent variable is moderated. To further test for the moderating effects of group assignment, the interaction term was decomposed in the manner specified by Aiken and West (1991). We computed slopes for the experimental and the control group.

We have estimated that assuming medium effect size of the maximum of seven predictors in the equation, alpha of 0.05 and statistical power of 0.80, the minimum required sample would consist of 103 participants. One person, identified as reporting outlier values was excluded from the regression analysis. There was no dropout in the study. Missing data fell below 1.5% and were imputed with using the expectation maximization algorithm in SPSS.

Results

Randomization check, effects of age and gender, and the validation of the manipulation

The randomization check indicated that groups of participants assigned to the experimental and control conditions did not differ in terms of study variables. They had similar age, $F(1, 105) = 0.01, ns$, prior sweets intake $F(1, 105) = 0.39, ns$, intention to reduce sweets consumption, $F(1, 105) = 0.01, ns$, body mass index $F(1, 95) = 0.22, ns$, mean binge eating index, $F(1, 105) = 0.15, ns$, positive affect at T1 $F(1, 105) = 0.07, ns$, emotional eating, $F(1, 105) = 0.01, ns$, uncontrolled eating, $F(1, 105) = 0.03, ns$, and the cognitive restraint eating style $F(1, 105) = 1.42, ns$. Both groups had similar proportions of men and women, $\chi^2(1) = 0.59, ns$.

Correlations across the study variables are presented in Table 1. Age was negatively related to calorie intake and uncontrolled and

<table>
<thead>
<tr>
<th>Table 1: Correlation between the study variables.</th>
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<tbody>
<tr>
<td>Variable</td>
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<tr>
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<td>9</td>
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<td>10</td>
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</tbody>
</table>

* The number of chocolate chip cookies consumed during the experiment was used to calculate calorie intake.

... p < 0.001.
emotional eating styles (Table 1). Women consumed slightly less calories ($M = 259.50$, $SD = 168.68$) than men ($M = 327.75$, $SD = 144.78$), $F(1, 105) = 3.99$, $p = 0.05$, and reported higher emotional eating ($M = 2.03$, $SD = 0.90$) than men ($M = 1.52$, $SD = 1.52$), $F(1, 105) = 8.46$, $p = 0.004$. There were no gender differences for uncontrolled eating, $F(1, 105) = 0.66$, $ns$. Consequently, all analyses were controlled for participants’ age and gender.

In order to test the validity of the intervention, analysis of variance with T1 affect entered as the covariate was employed to test the effects of the mood enhancement procedures. Analysis was controlled for age and sex groups. We found that the effect of manipulation was significant, $F(1, 105) = 40.40$, $p < 0.001$, $\eta^2 = 0.28$. Participants assigned to the positive mood enhancing condition reported higher positive mood ($M = 2.95, SD = 0.90$) than the control group participants ($M = 1.90, SD = 0.95$).

**Effects of positive mood enhancement on calorie intake**

According to the first hypothesis, positive mood enhancement should affect consumed calories. Analysis of variance, controlled for age and sex groups, indicated a main effect of the experimental condition, $F(1, 105) = 5.40$, $p = 0.022$, $\eta^2 = 0.05$. Participants exposed to the positive mood enhancement procedure consumed on average 250.80 kcal ($SD = 155.36$), whereas controls consumed approximately 304.66 kcal ($SD = 169.01$). The intervention had a small to medium effect (Cohen’s $d = 0.28$). On average, control group participants consumed one chocolate chip cookie more.

**Relationships between emotional eating, uncontrolled eating, and calorie intake**

According to our second hypothesis uncontrolled eating would be mediating the relationship between emotional eating and chocolate chip cookie intake and that this mediation effect would be moderated by positive mood enhancement. The results of moderated mediation analysis indicated that emotional eating and uncontrolled eating were positively associated (Table 2, column 3). This relationship was not moderated by the experimental condition (Fig. 1). The association between uncontrolled eating and calorie intake was moderated by experimental condition (Table 2, column 4; see also Fig. 1). In particular, the effects of the experimental manipulation were salient among participants with low uncontrolled eating: Those exposed to the positive mood

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**Table 2**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Dependent variable: calorie intakea</th>
<th>Mediator: uncontrolled eating</th>
<th>Dependent variable: calorie intakea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>$74.64^{**}$</td>
<td>$27.79$</td>
<td>$74.64^{**}$</td>
</tr>
<tr>
<td>Age</td>
<td>$-7.24^{***}$</td>
<td>$1.37$</td>
<td>$-7.24^{***}$</td>
</tr>
<tr>
<td>Step 2</td>
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<td></td>
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<tr>
<td>Gender</td>
<td>$69.31$</td>
<td>$28.72$</td>
<td>$65.03^{**}$</td>
</tr>
<tr>
<td>Age</td>
<td>$-7.58^{***}$</td>
<td>$1.38$</td>
<td>$-6.91^{**}$</td>
</tr>
<tr>
<td>Independent variable: emotional eating</td>
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<td>$15.84$</td>
<td>$-7.01$</td>
</tr>
<tr>
<td>Moderator: experimental condition</td>
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<td>$12.63$</td>
<td>$-20.61$</td>
</tr>
<tr>
<td>Independent variable × moderator</td>
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<td>$14.92$</td>
<td>$-28.17$</td>
</tr>
<tr>
<td>Mediator: uncontrolled eating</td>
<td>$18.75$</td>
<td>$30.75$</td>
<td>$64.03^{**}$</td>
</tr>
</tbody>
</table>

B: unstandardized regression coefficient. * The number of chocolate chip cookies consumed during the experiment was used to calculate calorie intake. ** $p < 0.01$. *** $p < 0.001$. 

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*Fig. 1.* Results of moderated mediation analyses: Emotional eating predicts uncontrolled eating, with the effects of uncontrolled eating on intake of chocolate chip cookies moderated by positive mood enhancement. Note: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001*. Solid lines represent significant effects.
enhancer consumed less calories than participants assigned to the control condition (Fig. 2). Among participants with a more controlled eating style, the effect of the intervention was large, with Cohen’s $d = 1.13$, and may be translated into the average difference between the conditions equivalent to 3.26 cookies. For those with a higher uncontrolled eating style, the effect of the mood manipulation was the opposite, that is, lower consumption of cookies was found for those who were assigned to the control condition, Cohen’s $d = 0.57$, which translates into an average difference of 1.67 cookies.

**Discussion**

The study supports the assumption that a positive mood enhancement procedure affects immediate consumption of cookies, with participants exposed to a brief mood manipulation eating one chocolate chip cookie less than those assigned to the control condition. The effect of the manipulation was significant but small, and respondents from both groups consumed a relatively large number of calories ($M = 279$ kcal; fat intake: $M = 12.77$ g). Deriving such a high proportion of daily energy intake from snacking is positively related to attaining overweight status (Nicklas et al., 2003).

The findings are in line with a general assumption that emotions may alter eating behaviors (Canetti et al., 2002; Tice & Bratslavsky, 2000). So far, however, the evidence indicated that an induction of negative emotions leads to an increase of food intake (Canetti et al., 2002; Tice & Bratslavsky, 2000). Further, the role of negative affect has been supported among samples derived from clinical populations (Cavallo & Pinto, 2001; Jansen et al., 2008; Munsch et al., 2008). Our study adds to the literature, providing preliminary evidence for the association between positive affect, uncontrolled eating, and intake of chocolate chip cookies in a non-clinical population.

The moderated mediation analysis indicated that the positive mood enhancement resulted in lower intake of cookies among those participants who reported that they are able to control their eating. Controlled eating indicates that the individual perceives their self-regulatory strategies as effective: When exposed to cues (e.g., chocolate chip cookies) one usually does not start eating or is able to stop eating. The findings indicate large effects of the intervention among respondents reporting more effective self-regulation. As Baumeister (2003) assumed, positive emotions may actually lead to restoring limited self-regulation capacities. Our study suggested that if positive emotions lead to lower food intake, such effect may be observed mostly among those, who already practice effective self-regulation. Other studies, applying moderated mediation analysis to predict food intake and other obesity-related behaviors indicated that other self-regulation variables (e.g., self-efficacy) are among key determinants of the interplay between cognitions and subsequent behaviors (Luszczynska & Haynes, in press; Wiedemann, Schüz, Sniehotta, Scholz, & Schwarzer, 2009).

Interaction plotting yielded that among individuals with a high uncontrolled eating style the effects of the positive mood enhancement were just the opposite (although smaller) than in the group with controlled eating. Among individuals with high uncontrolled eating style, exposure to positive mood enhancement led to eating more chocolate chip cookies. These findings are in line with the Boundary Model (Herman & Polivy, 1980), suggesting that positive mood induction may lead to an increase of consumption of sweets, such as chocolate chip cookies. This model, however, clearly indicated that emotion acts as a disinhibitor of usual dietary restraints (Herman & Polivy, 1980), that is, its prediction may be valid foremost among populations with disordered eating. In our study, participants who reported a high level of uncontrolled eating style also reported higher binge eating, which may be indicative of elevated symptoms of eating disorders. Previous studies also suggested that high uncontrolled eating was found among people with elevated depression and physiological stress (Stotland & Laroque, 2005). Further research should control for the symptoms of mood disorders and eating disorders while testing for the effects of mood manipulation, the uncontrolled eating style, and intake of cookies.

The relations between emotional eating styles and cookie consumption were unaffected by the experimental condition. There was no direct effect of emotional eating on intake of cookies, although there was a strong relation between emotional and uncontrolled eating styles. These findings are in line with our assumptions, suggesting that a general tendency to respond to emotional states with food intake (i.e., an emotional eating style) is related to food consumption indirectly, with a mediating effect of perceived effectiveness to regulate food intake (i.e., an uncontrolled eating style). Further, the results of our study support models suggesting that uncontrolled eating is an outcome of other perceptions, cognitions, and self-regulatory efforts (Ross & Wade, 2004), or indicating that effects of emotional eating on food intake are mediated by other cognitive processes (Spoor et al., 2007).

Although theoretical models focus on the role of cognitive restraint style in the prediction of food intake (the Boundary Model; Herman & Polivy, 1980), the evidence accumulated in longitudinal studies, supporting this assumption is mixed (cf. De Lauzon-Guillain et al., 2006). Additionally, restrained eating seems to have a much more pronounced role in clinical rather than non-clinical populations (Van Strien et al., 2005). There is also some experimental evidence suggesting that the direct effect of restrained eating style on food intake may be non-significant in non-clinical populations (Boon, Stroebe, Schut, & Jentema, 2002). In line with these findings, we found no significant difference between restrained eating and snacking. In sum, our study suggests that in a non-clinical sample, perceived effectiveness of (or ability to) stop eating may be a better predictor of food consumption than an actual amount of cognitive efforts aiming at refraining from eating.

Our findings may inform obesity prevention programs for non-clinical populations of young adults. In particular, the results are of relevance for programs focusing on self-regulation and conscious control of eating. The present study indicated that both low and high uncontrolled eating styles may be related to an increased risk of chocolate chip cookie consumption, depending on the presence or absence of positive mood-evoking stimuli. For example, prevention programs may educate about the risk situations, which combine personal characteristics and environmental triggers (e.g., high uncontrolled eating tendencies interacting with an exposure...
to positive affect inducing stimuli) that may be followed by higher consumption of foods.

Our study has several limitations. Although we have controlled for age and gender, future research should carefully analyze these variables while testing for uncontrolled eating, mood induction, and intake of cookies. Uncontrolled eating may decrease with age, and this effect may be more salient among women (Stotland & Larocque, 2005). Ideally, analyses should be conducted with gender and age playing a moderating role; our sample was relatively small and consequently we did not have enough power for such analyses. Further, the measure of consumption of cookies had some shortcomings. Participants were offered only eight cookies per person, which reduced the outcome variability. On the other hand, respondents were not offered fluids during the experiment, which may reduce the intake of chocolate chip cookies. Participants were offered one type of sweet snack (chocolate chip cookies), whereas personal preferences for the type of snack were not assessed. Although several possible confounders were controlled for, other processes influencing food intake such as preference for sweet food, satiation, and processes of liking or wanting (Finlayson, King, & Blundell, 2008) were not evaluated. Therefore, any conclusions must be drawn with caution.

The present study has applied cluster randomization, which is usually used to avoid the contamination that would arise in an individually randomized design. Cluster randomization is advocated to reduce the flow of the information (e.g., about the content of the intervention and experimental procedures) from the experimental to the control group (Torgerson, 2001). Applying cluster randomization in the present study aimed at reduction of the likelihood that respondents’ emotions, expectations, and behaviors would be altered by means of a discussion of the actual content of the procedures with individuals who already participated in the experiment. On the other hand, the shortcoming of the cluster approach is that the outcomes within clusters are more likely to be related, which is likely to reduce the within-group variability. Strong associations obtained in the present study, indicating a relationship between uncontrolled eating and intake of cookies may be specific for the type of food used in the experiment (i.e., rich in fat and sugar), and may not generalize to other types of snacks. Previous research indicated that uncontrolled eating is indicative of a strong preference for energy-dense foods, rich in fats (De Lauzon et al., 2004). Finally, we have not controlled for symptoms of eating disorders, except for binge eating. Future research should more carefully control for symptoms of eating disorders, as they may emerge as relevant moderators of mood induction effects, even in non-clinical samples. The study was conducted in a convenience sample of young adults. Therefore, generalizability is limited.

Regardless of its shortcomings, the study provides some insight into the relationships between positive mood, cookie consumption, and eating styles (emotional and uncontrolled). In general, positive mood enhancement results in consuming less calories (approximately one medium chocolate chip cookie less). This effect, however, very much depends on uncontrolled eating style. Compared to exposure to neutral stimuli, positive mood enhancement may result in eating 3.3 cookies less among individuals who perceive that they can effectively stop their consumption after being exposed to food cues. By contrast, among those who have a high uncontrolled eating style, positive mood enhancement may actually lead to higher intake of chocolate chip cookies (and eating on average 1.6 cookies more).

References


