# Self-Affirmation Improves Self-Control over Snacking Among Participants Low in Eating Self-Efficacy

Susan Churchill[1], Donna C. Jessop[2], Ricky Green[1] and Peter R. Harris[2]

[1]University of Chichester

[2] University of Sussex

*Requests for reprints should be addressed to Dr Susan Churchill, Department of Psychology and Counselling, University of Chichester, Bishop Otter Campus, Chichester, West Sussex, UK (e-mail: s.churchill@chi.ac.uk).

## Abstract

***Objective:*** Individuals low in eating self-efficacy are at particular risk of engaging in unhealthy eating behaviours, including the consumption of high calorie snacks. The elevated levels of snacking displayed by these individuals can largely be attributed to their experiencing low self-control over the avoidance of such foods (Hankonen, Kinnunen, Absetz, & Jallinoja, 2014). Interventions are thus required to boost self-control over snacking among those low in eating self-efficacy. Self-affirmation has been shown to boost self-control among individuals with depleted resources in other domains (Schmeichel & Vohs, 2009). The purpose of the current study was to test the hypothesis that a self-affirmation manipulation would similarly increase self-control over snacking for individuals low in eating self-efficacy. ***Methods:*** At baseline, participants ($N = 70$) completed measures of dietary restraint and eating self-efficacy. In the main study, participants completed either a self-affirmation or a control task immediately before undertaking a joystick category judgment task that assessed self-control over snacking. ***Results:*** Hierarchical multiple regression analysis revealed the predicted significant interaction between eating self-efficacy and self-affirmation, demonstrating that self-affirmation moderated the association between eating self-efficacy and self-control over snacking. Johnson-Neyman regions of significance confirmed that for participants low in eating self-efficacy the self-affirmation manipulation resulted in higher levels of self-control. Unexpectedly, however, for participants high in eating self-efficacy the self-affirmation manipulation was found to be associated with lower levels of self-control. ***Conclusions:*** Findings supported the hypothesis that a self-affirmation manipulation would boost self-control over snacking among individuals low in eating self-efficacy. Self-affirmation may thus provide a useful technique for strengthening self-control in relation to the avoidance of unhealthy foods among individuals who find it difficult to manage challenging dietary situations.


*Keywords*: self-affirmation, self-control, eating self-efficacy, snacking, health behavior change

## Introduction

Eating self-efficacy, defined as an individual's belief in his/her ability to successfully manage healthy eating during challenging situations (Ames, Heckman, Grothe, & Clark, 2012), is an important predictor of diet and weight management behavior (Nezami, et al., 2016). Those low in eating self-efficacy are at increased risk of engaging in unhealthy eating behaviors, including the consumption of high-calorie snacks (e.g., Masalu & Åstrøm, 2001), which has been identified as an important contributor to obesity (Duffey & Popkin, 2011; WHO, 2016). Therefore, interventions are required to reduce the consumption of high-calorie snacks among those low in eating self-efficacy.

Low levels of self-control have been identified as a risk factor for snacking (Adriaanse, Kroese, Gillebaart, de Ridder, 2014). Indeed, the elevated levels of snacking displayed by individuals low in eating self-efficacy is considered by some to be largely due to low self-control over the avoidance of tempting foods (Hankonen, Kinnunen, Absetz, & Jallinoja, 2014). Therefore, one potentially profitable approach to reducing snacking among these individuals would be to strengthen their self-control in relation to avoiding high-calorie snacks.

An intervention that has been shown in some studies to improve individuals' self-control is self-affirmation. Self-affirmation theory contends that people are motivated to uphold a sense of self-integrity, which has been defined as being 'adaptively and morally adequate, that is, competent, good, coherent, unitary, stable, capable of free choice, capable of controlling important outcomes. . .' (Steele, 1988, p. 262). People's self-integrity can be affirmed by acting or reflecting upon important domains of personal worth (Cohen & Sherman, 2014), and self-affirmation interventions frequently involve participants writing about a personally important value (see McQueen & Klein, 2006). There is evidence that engaging in such self-affirmation activities can counteract reductions in self-regulatory

resources. For example, Schmeichel and Vohs (2009) demonstrated that a self-affirmation manipulation increased self-control amongst those experiencing depleted resources, apparently via its capacity to focus people on higher values (e.g., long-term goals) rather than immediate impulses and urges (see also Storr & Sparks, 2016). By extension, it seems plausible that self-affirmation may strengthen self-control in relation to the avoidance of snacks among those lacking confidence in their ability to eat healthily in challenging situations (i.e., those low in eating self-efficacy). If so, this could provide practitioners with a potentially cost-effective and minimal intervention to promote healthy eating.

Drawing on the research outlined above, we hypothesized that a self-affirmation manipulation would increase self-control over snacking for individuals low in eating self-efficacy. Specifically, we predicted that self-affirmed participants low in eating self-efficacy would display greater levels of self-control over snacking compared to their non-affirmed counterparts.

## Materials and Methods

### Participants

Eighty-two undergraduate students of psychology completed the baseline questionnaire; 79 of whom took part in the main study. Participants who made 25% or more errors in the joystick category judgment task used to assess self-control over snacking ($n$ = 9) were excluded from analysis. Accordingly, our analyses were conducted on 70 participants (83.00% female). Participants' ages ranged from 18 to 49 years ($M$ [mean] = 22.61; $SD$ [standard deviation] = 7.30); body mass indices (BMIs) ranged from 17.58 to 36.26 ($M$ = 22.59; $SD$ = 3.91).

### Design and procedure

Undergraduate students were recruited to take part in an online study about snacking. At baseline, participants were provided with information about the study, informed of their right

to withdraw, and completed a consent form. Those who included their e-mail addresses at baseline were contacted 7 days after completion of the baseline measures and invited to attend a laboratory appointment to take part in the main study. Upon arrival at the laboratory, participants were allocated alternately to either the self-affirmation ($n$ = 31) or the control ($n$ = 39) condition[1]. Participants completed a joystick category judgment task to assess self-control over snacking immediately after the self-affirmation manipulation. We utilized a non-self-report measure of self-control over snacking in the present study in order to overcome the shortcomings associated with self-report measures (Chan, 2009). The study was approved by the Ethics Committee at the hosting university. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**Measures and manipulations**

At baseline, participants indicated their age, sex, weight, and height; BMI (weight [kg])/height [m]$^2$) was calculated for each participant. Eating self-efficacy was assessed using the 8 item short-form of the Weight Efficacy Lifestyle Questionnaire (Ames et al., 2012), $\alpha$ = .87. Example items from this scale are "I can resist eating when I am anxious (or nervous)" and "I can resist eating even when others are pressuring me to eat". Responses are given on 10-point scales ranging from 1 (*not at all confident*) to 10 (*very confident*). Mean scores were calculated for each participant (possible range of scores 1-10), with higher scores indicating higher levels of eating self-efficacy. Dietary restraint was measured with the 20-item dietary restraint subscale of the Three Factor Eating Questionnaire (Stunkard & Messick, 1985), $\alpha$ = .90. Responses to 8 items were given on 4 point scales (e.g., "How conscious are you of what you are eating" [*not at all conscious* (1) to *extremely conscious* (4)] and "How often are you

[1] The unequal number of participants across conditions is a result of the fact that the number of participants making 25% of more errors in the joystick category judgement task (and hence being excluded from analysis) was not identical across conditions.

dieting in a conscious effort to control your weight" [*rarely* (1) to *always* (4)]). Responses to the remaining 12 items (e.g., "I consciously hold back at meals in order not to gain weight" and "I count calories as a conscious means of controlling my weight") were given on ten-point scales ranging from *not at all confident* (1) to *very confident* (10); A mean score was calculated for each participant (possible range of scores 1.00-7.60), with higher scores indicating greater dietary restraint.

At the start of the main study, participants' snacking frequency was assessed by asking them to rate how often they had eaten each of 13 high-calorie snack foods (e.g., chocolate bars, cookies), *not at all* (1) to *2 or more times a day over the last 7 days* (7). Responses were summed to form a single index (possible range of scores 13-91). Participants next completed an established self-affirmation manipulation (e.g., Harris et al., 2014). All participants were presented with the same list of values (e.g., compassion, creativity, kindness). Participants in the self-affirmation condition selected their most important value and wrote about why it was important to them; participants in the control condition selected their least important value and wrote about why it might be important to someone else. All participants rated how personally important the value they had written about was on a seven point scale ranging from extremely unimportant (1) to extremely important (7).

Self-control was assessed by a computer-based joystick category judgment task, which measures the relative speed at which participants can push a lever away from themselves in response to high-calorie snack food stimuli. This task has been used to assess self-control over snacking in previous research (Churchill & Jessop, 2011; Fishbach & Shah, 2006) and has been shown to predict the consumption of high-calorie snacks (Churchill & Jessop, 2011). Participants were presented with 20 target words (10 high-calorie snack food words [e.g., biscuit, cake, and chocolate] and 10 healthy food words [e.g., apple, salad, and banana]). In a series of 80 trials in 2 blocks, participants were asked to judge as quickly *as*

possible whether each presented target word was part of the category of healthy food or unhealthy food. In Block A, participants were asked to pull the joystick towards them if the word presented was related to the category of healthy food and to push the joystick away from them if the word presented was related to the category of unhealthy food. In Block B, participants' responses were reversed such that participants were asked to pull the joystick towards them in response to unhealthy food words and to push the joystick away from them in response to healthy food words. Each block was preceded by six practice trials, and block order was counterbalanced across participants. The order in which the target words were presented was randomized for each participant. The speed of participants' responses was recorded from target word onset to response to the nearest millisecond. Before analysis, as recommended by Greenwald, McGhee, and Schwartz, (1998), outliers (representing 3.09 % of responses) defined as response times less than 300 ms or greater than 1,500 ms were recoded to be equal to 300 and 1,500 ms, respectively.

Participants' levels of self-control over snacking were calculated by subtracting the average speed of their responses when pushing the joystick away from them in response to unhealthy target words from the average speed of their responses pulling the joystick towards them in response to unhealthy target words. Higher scores on this measure thus are deemed to represent better control over the avoidance of snacks[2].

## Results

Dietary restraint scores ranged from 1.70 to 7.35; eating self-efficacy scores ranged from 2.38 to 10; snacking frequency scores ranged from 14 to 56 *(M* = 30.66; *SD* = 8.14). Table 1

[2] Participants completed a number of individual difference measures and, after the joystick category judgement task, several additional self-report measures assessing their cognitions regarding snacking. Participants also completed a further questionnaire at 7-day follow up assessing these same cognitions and snacking behavior. These measures are not analyzed further in the present paper. Further details can be obtained from the corresponding author.

presents a summary of descriptive statistics for the sample. It can be seen that Chi square analysis and ANOVA revealed no pre-intervention differences between the self-affirmation and the control condition in terms of sex, BMI, dietary restraint, eating self-efficacy or baseline snacking behavior. The two groups did differ in age, however, such that participants in the self-affirmation condition were – on average - older than participants in the control condition.

<Table 1 Here>

As predicted, participants in the self-affirmation condition rated the value they chose to write about as being more important to them than did those in the control condition, $F(1, 77) = 80.48$, $p < .001$, $\eta_p^2 = .51$; means 5.94 and 2.75 respectively, indicating that they had selected a more personally important value (as instructed).

We used moderated regression analysis to explore the impact of eating self-efficacy and self-affirmation on participants' self-control over snacking. Continuous variables were standardized before analysis. Eating self-efficacy was entered at step 1. Condition (control condition [0], affirmation condition [1]) was entered at step 2. Lastly, the two-way interaction term (eating self-efficacy x self-affirmation) was entered at step 3. The dependent variable was participants' self-control over snacking (Table 2)[3].

<Table 2 Here>

The resultant analysis revealed a (marginal) main effect of eating self-efficacy on self-control over snacking; however this effect was qualified by a significant two way interaction between eating self-efficacy and self-affirmation, indicating that the relationship between eating self-efficacy and self-control was moderated by the self-affirmation manipulation. Investigation of the significant eating self-efficacy x condition interaction using Johnson-

[3] Controlling for age and dietary restraint at a separate first step in the multiple regression analysis did not alter the pattern of findings reported here.

Neyman regions of significance revealed that for participants low in eating self-efficacy (scores ≤ 3.51), the self-affirmation manipulation (vs. control) resulted in significantly higher levels of self-control as predicted. Unexpectedly, however, for individuals high in eating self-efficacy (scores ≥ 8.23), the self-affirmation manipulation was associated with reduced self-control (Figure 1).

<Figure 1 Here>

## Discussion

In line with our hypothesis that the self-affirmation manipulation would increase self-control over snacking among those low in eating self-efficacy, we found that self-affirmed participants with low levels of eating self-efficacy demonstrated higher levels of self-control over snacking compared to their control counterparts. This finding contributes to a growing body of literature documenting benefits of self-affirmation for those who are arguably most in need of intervention (Cohen et al., 2009; Cohen & Sherman, 2014; Düring & Jessop, 2014), i.e., - in the present research - those low in eating self-efficacy. It also is consistent with Schmeichel and Vohs' (2009) finding that self-affirmation can boost self-control for individuals with depleted resources.

From an applied perspective, these findings provide initial evidence suggesting that self-affirmation may represent a cost-effective strategy to help those with low eating self-efficacy experience higher levels of self-control over snacking, which could have positive implications for their eating behavior and subsequent health outcomes. It is important to note, however, that we did not directly test whether heightened self-control affected subsequent eating behavior. Furthermore, it is not clear for how long any positive effects of self-affirmation on self-control may last. Beneficial effects of self-affirmation have been found to persist over time in other domains (Cohen et al., 2009; Cook, Purdie-Vaughns, Garcia, & Cohen, 2012; Sherman et al., 2013), arguably because self-affirmation can precipitate a

"cycle of adaptive potential" (Cohen & Sherman, 2014, p. 340). However, it is not known whether self-affirmation could similarly promote long-term changes in dietary self-control (though see Logel & Cohen, 2012). As the efficacy of dietary interventions is likely to be contingent on long-term change, it would be profitable for future research to address this research question.

Unexpectedly, our findings also suggested that self-affirmation might have detrimental effects for individuals high in eating self-efficacy, as these individuals evidenced lower levels of self-control over snacking when self-affirmed. It is noteworthy that ours is not the first study to indicate that self-affirmation manipulations may backfire for those least in need of intervention (Düring & Jessop, 2014; Good, Harris, Jessop, & Abraham, 2015). The present findings further highlight the importance of establishing parameters relating to the beneficial effects of self-affirmation.

A key methodological strength of the study is our use of a non-self-report measure of self-control, which helps overcome many of the limitations associated with self-report data (Chan, 2009). However, utilizing this measure also necessitated that the main study be conducted in a laboratory setting, with attendant implications for recruitment and cost in terms of the time and effort required from participants. As a result, our findings are based on a relatively small sample of (predominantly female) students. This limits generalizability to the general population and future research would benefit from exploring whether the present findings hold in a larger stratified sample drawn from the general public. A further limitation is that we assessed self-control over snacking immediately after the self-affirmation manipulation and did not explore whether any effects persisted over time and/or impacted subsequent dietary behavior (as discussed further above).

## Conclusions

In sum, ours is the first study to show that self-affirmation can bolster self-control over snacking for individuals low in eating self-efficacy. These findings have potentially important implications for the design of interventions to promote healthier eating and target obesity. Future studies are needed to determine whether the effects of self-affirmation demonstrated in the present study persist across time and confer benefits in terms of subsequent dietary behavior and associated health outcomes.

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Table 1: Summary of Descriptive Statistics by Condition.

| Variable | Whole Sample *M* (*SD*) | Control *M* (*SD*) | Self-affirmation *M* (*SD*) | *Summary of ANOVAs Comparing Control & Self-Affirmation Conditions* *F* | $\eta_p^2$ | *p* |
|---|---|---|---|---|---|---|
| Eating self- efficacy | 6.51 (1.78) | 6.31 (1.80) | 6.74 (1.77) | 0.99 | 0.01 | .323 |
| Baseline snacking frequency | 30.66 (8.14) | 31.54 (8.30) | 29.55 (7.92) | 1.03 | 0.01 | .313 |
| Dietary restraint | 3.99 (1.23) | 3.90 (1.09) | 4.09 (1.40) | 0.41 | 0.01 | .524 |
| BMI | 22.59 (3.91) | 22.15 (3.67) | 23.15 (4.19) | 2.80 | 0.04 | .099 |
| Age | 22.61 (7.30) | 20.26 (3.52) | 25.58 (9.51) | 10.46 | 0.13 | .002 |
| | Whole Sample (*n*, %) | Control (*n*, %) | Self-affirmation (*n*, %) | *Summary of Chi-Square Analysis Comparing Control & Self-Affirmation Conditions* $\chi^2$ | *Cramer's V* | *p* |
| Gender | Male, 12 (17 %)<br>Female, 58 (83%) | Male, 6 (15 %)<br>Female, 33 (85%) | Male, 6 (19 %)<br>Female, 25 (81%) | $\chi^2$ (1) = 0.19 | 0.05 | .66 |

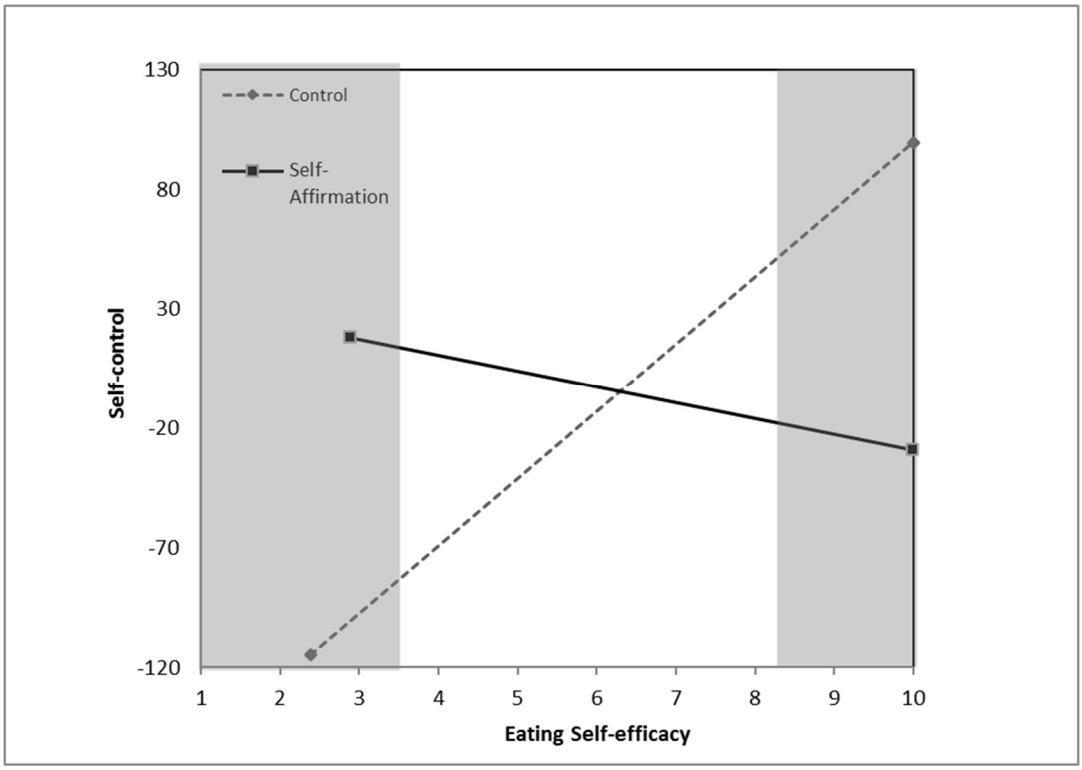
Table 2

*Hierarchical Regression of Participants' Self-Control on Self-Affirmation and Eating Self-Efficacy.*

| | *b* | *t* | *p* | *95% CI* | *b* | *t* | *p* | *95% CI* | *b* | *t* | *p* | *95% CI* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variables entered | | | *Step 1* | | | | *Step 2* | | | | *Step 3* | |
| Eating self-efficacy | 0.22 | 1.83 | .072 | (-.02, .45) | 0.22 | 1.85 | .069 | (-.02, .46) | 0.48 | 3.10 | .003 | (.17, .78) |
| Condition | | | | | -0.09 | -0.36 | .723 | (-.56, .39) | -0.07 | -0.29 | .771 | (-.53, .39) |
| Condition x eating efficacy | | | | | | | | | -0.59 | -2.52 | .014 | (-1.05, -.12) |
| *F* | 3.35† | | | | 1.71 | | | | 3.36* | | | |
| $R^2$ | 0.05† | | | | 0.05 | | | | 0.13* | | | |
| $\Delta F$ | 3.35† | | | | 0.13 | | | | 6.37* | | | |
| $\Delta R^2$ | 0.05† | | | | 0.00 | | | | 0.08* | | | |

Note. Cl = confidence interval; (lower limit, upper limit).
† $p < .08$; *$p < .05$

*Figure 1*. Self-control over snacking regressed onto eating self-efficacy scores for participants in the self-affirmation and control conditions respectively.




*Note.* This graph depicts the relationship between actual (i.e., non-standardized) self-control and eating self-efficacy scores; higher scores indicate greater levels of self control over snacking. The shaded areas highlight the regions of significance identified using the Johnson-Neyman techique.