The impact of autonomy-framed and control-framed implementation intentions on snacking behaviour: the moderating effect of eating self-efficacy

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Abstract

Background. Autonomy-supportive implementation intention exercises have been shown to facilitate goal-directed behaviour (Koestner *et al.*, 2006). The current study explored whether eating self-efficacy moderated the impact of autonomy-framed versus control-framed implementation intentions to reduce high-calorie snack intake. ***Methods.*** The study employed a randomized prospective design, involving two waves of data collection conducted in 2016. At Time 1, UK participants (N = 300) completed an online questionnaire which asked them to report their snacking behaviour over the previous 7 days. Participants were subsequently asked to form either an autonomy-framed implementation intention or a control-framed implementation intention. Seven days later, participants reported their consumption of high-calorie snacks and completed a measure of eating self-efficacy. ***Results.*** Hierarchical multiple regression analysis revealed that eating self-efficacy moderated the effects of implementation intention framing. Autonomy-framed implementation intentions had a greater impact on the avoidance of snacking for high eating self-efficacy participants than did control-framed implementation intentions. In contrast, for low eating self-efficacy participants, control-framed implementation intentions had more impact than did autonomy-framed implementation intentions. ***Conclusions.*** The results suggest that if implementation intentions to promote healthy diet are to be effective, the role of eating self-efficacy should be considered, and the design of interventions adapted accordingly.

Keywords: Autonomy-framed Implementation Intentions; Control-framed Implementation Intentions; Eating Self-efficacy; Snacking

Introduction

Research has shown that while many people are aware of the long-term effects of diet and are motivated to limit their consumption of 'unhealthy' foods such as high-calorie snack foods (high in fat, salt, and sugar, and low in nutritional value), their good intentions get lost in the complexity of their daily lives and do not reliably translate into actual behaviour (Mann, De Ridder, & Fujita, 2013; Weijzen, de Graaf, & Dijksterhuis, 2008). To encourage people to adopt healthy eating behaviours, it has been suggested that people should form implementation intentions (Gollwitzer, 1996; Gollwitzer, 2014; Hagger & Luszczynska, 2014).

Implementation Intentions

Evidence has demonstrated the effectiveness of implementation intention formation in encouraging the initiation of new behaviours and in shielding goal striving from intrusive thoughts and unwanted distractions (see meta-analyses by Adriaanse, Vinkers, De Ridder, Hox, & De Wit, 2011; Gollwitzer & Sheeran, 2006). In forming an *if-then* plan, people create a mental link between a specified situational cue and a goal-directed response (which could be the avoidance of a disruptive internal or external state) which leads to a fast and efficient behavioural response when the specified situation cue is subsequently encountered (Gollwitzer, 2014; Webb & Sheeran, 2004; Wieber, Thürmer, & Gollwitzer, 2015). Meta-analyses have demonstrated a medium-to-large effect of implementation intentions on goal-directed behaviour, compared to merely forming behavioural intentions (see Gollwitzer & Sheeran, 2006). However, empirical studies have also demonstrated that the effectiveness of implementation intentions may vary as a function of certain moderator variables (Hagger & Luszczynska, 2014). For example, research has shown that the effectiveness of implementation intentions may be dependent on: 1) people's

motivation to perform goal-directed behaviour, with stronger effects of implementation intention formation on goal attainment among highly motivated individuals (Hagger & Luszczynska, 2014; Sheeran, Webb, & Gollwitzer, 2005), and 2) people's commitment toward their formed implementation intention, with stronger implementation intention effects among those who are strongly committed to performing their plan (Achtziger, Bayer, & Gollwitzer, 2012, study 2). Furthermore, a range of individual difference variables have been shown to moderate the effects of implementation intentions on behaviour (Hagger & Luszczynska, 2014): for example, conscientiousness, perfectionism, stress, procrastination, impulsivity, and self-efficacy (Budden & Sagarin, 2007; Churchill & Jessop, 2010; 2011; Luszczynska, Schwarzer, Lippke & Mazurkiewicz, 2011; Owens, Bowman & Dill, 2008; Powers, Koestner, & Topcui, 2005; Webb, Christian, & Armitage, 2007; Wieber, Odenthal, & Gollwitzer, 2010). This has led to calls for research to elucidate further the conditions under which implementation intentions are engaging and effective for target groups (Hagger & Luszczynska, 2014).

Autonomous Motivation

Deci and Ryan (2000) refer to autonomy as volition – the experience of being free to choose, and of acting in accordance with personal values. Research has shown that the more autonomously motivated an individual is (i.e., the more their action is perceived to be freely chosen and instigated, and aligned with their core values), the more likely they will perform goal-directed behaviour (e.g., Ng *et al.*, 2012; Williams, Grow, Freedman, Ryan & Deci, 1996). Research evidence also suggests that autonomous motivation can increase the deployment of self-regulatory techniques, such as self-monitoring and coping planning (Nurmi, Hagger, Haukkala, Araújo-Soares, & Hankonen, 2016).

It has also been demonstrated that people primed with autonomy are less likely to dismiss or derogate personally-relevant health information and more likely to perform a recommended behaviour (Pavey & Sparks, 2012). Furthermore, autonomy-supportive techniques (e.g., the use of encouragement, or language that highlights personal choice [e.g., *choice, freedom*]) have been shown to be more effective in encouraging behaviour change across a wide range of health behaviour settings than have more coercive methods (e.g., the use of controlling language [e.g., *should, must*]) (Ng *et al.*, 2012; Pavey & Sparks, 2012; Williams, Cox, Kouides, & Deci, 1999).

Autonomy-Framed Implementation Intentions

There is some evidence that implementation intentions are more likely to facilitate goal-directed behaviour if formed to support self-determined (i.e., self-concordant) goals (Koestner, Lekes, Powers, & Chicoine, 2002). Implementation intentions formed in an autonomy-supportive manner can also facilitate goal progress to a greater extent than can implementation intentions formed in a neutral or controlling manner (Koestner *et al*., 2006). Specifically, in the domain of academic goals, Koestner *et al*. (2006) demonstrated that people exhibited greater goal progress after reading implementation intentions instructions that highlighted feelings of autonomy than did those people receiving instructions that used controlling language.

If priming autonomy within implementation intention instructions can facilitate goal-directed behaviour (Koestner *et al*., 2006), it seems reasonable to postulate that autonomy-framed implementation intentions ('If situation X is encountered, then I will **choose** to perform goal-directed response Y') may be more likely to elicit health-related behaviour change, compared to control-framed implementation intentions ('If situation X is encountered, then I **must** perform goal-directed response Y'). Hence, the primary aim of current study represents an initial

attempt to investigate whether autonomy-framed and control-framed implementation intentions would promote health-related behaviour: the avoidance of high-calorie snacks.

This study extends previous implementation intention research by examining the effects of if-then plans that connect a situation (the temptation to eat a snack [the *if* part]) to a cognitive-behavioural strategy (acting via autonomy vs. control [the *then* part]). We hypothesised that autonomy-framed implementation intentions would be associated with lower subsequent levels of snacking than would control-framed implementation intentions.

Eating Self-efficacy as a Moderator of Implementation Intention Effects

A social-cognitive predictor of diet that has clear bearing on eating behaviour, weight gain, and obesity is an individual's confidence in their ability to adhere to a healthy diet (e.g., 'I am confident that I can limit my consumption of high-calorie snack foods'). This is generally referred to as eating self-efficacy (Ames, Heckman, Grothe, & Clark, 2012; Schwarzer & Renner, 2000). People lower in eating self-efficacy have been shown to be less likely to mobilise their efforts to manage their diet and to persevere in the presence of temptations, compared with those with higher eating self-efficacy (Ames *et al*., 2012; Schwarzer & Renner, 2000). Thus, eating self-efficacy is an important predictor of dietary intake (Hagler, Norman, Zabinski, Sallis, Calfas, & Patrick, 2007; Steptoe, Doherty, Kerry, Rink, & Hilton, 2000) – including overconsumption of high-calorie snacks (e.g., Hankonen, Kinnunen, Absetz, & Jallinoja, 2014; Masalu & Åstrøm, 2001), and body weight (Byrne, Barry, & Petry, 2012; Warziski, Sereika, Styn, Music, & Burke, 2008).

Research has found that interventions targeting planning may depend on people's level of perceived self-efficacy. Individuals high in perceived self-efficacy

are more likely to act on implementation intentions than are those low in perceived self-efficacy (Luszczynska *et al.*, 2011; Wieber *et al.*, 2010). Hence a second (exploratory) aim of the study reported here was to investigate whether self-efficacy for eating moderated the impact of autonomy-framed and control-framed implementation intentions on the avoidance of snacking.

Method

Participants

Three hundred and seventy-two participants completed the Time 1 measures. Seventy-two participants failed to respond at time 2, representing an attrition rate of 19.35%. Thus, our analyses are conducted on 300 participants who reported snacking frequency at baseline, completed the implementation intention manipulation, and reported frequency of snacking at follow-up (Figure 1). Participants (60.33 % women) were aged between 18 and 84 years (M = 33.67, SD = 15.51). Body Mass Indices (BMIs) ranged from 16.92 to 39.51, with a mean at the higher end of the 21-25 'normal' category (M = 24.81, SD = 4.14).

<Figure 1 here>

Design and Procedure

The study used a randomized prospective design, involving two waves of data collection over a 7-day period. We chose a short 7-day follow up period because recollection of eating behaviour over longer periods may be less accurate (Smith, Jobe, & Mingay, 1991). Participants responded to an email inviting them to participate in an online study about snacking[1]. Data collection occurred between February and March, 2016. People were eligible to participate if they were over 18

years of age, spoke English, and were able and willing to give informed consent. There was no material incentive for participation. At Time 1, participants read a message about the benefits of reduced snack consumption before being randomly assigned through a randomization feature in Qualtrics experimental software (Qualtrics, Inc., Salt Lake City, UT) to either an autonomy-framed (n = 157) or control-framed (n = 143) implementation intention condition. Participants including their email address at Time 1 were sent an email request to complete the Time 2 questionnaire 7 days later.

Materials

Time 1

At Time 1, participants completed a questionnaire including the following sections.

Demographic information. Participants were asked to indicate their age, gender, weight and height. We calculated BMI for each participant: BMI = weight (kg)/height [m] ^{2}.

Baseline snacking behaviour. Following Churchill and Jessop (2008), participants were asked to rate how often they had eaten each of twelve high-calorie between-meal snack foods (e.g., chocolate bars, cakes, biscuits) over the previous 7 days. Responses to all items were given in open-text boxes. Items were summed to provide a measure of baseline snacking behaviour, with higher scores indicating higher levels of snacking.

Health-Risk Information. All participants were then asked to read the following information about snacking (Pavey & Churchill, 2014):

> "*Snack foods such as cakes, biscuits, chocolate, crisps, ice-cream and pastries are high in saturated fat and added sugar. Evidence suggests that people who reduce their consumption of high-calorie snacks, compared to those who do not reduce their consumption of high-calorie snacks, are at lower risk of many serious life-threatening diseases and gain several potential health benefits. People who reduce their consumption of high-calorie snacks have a lower risk of heart disease and stroke, high blood pressure, high cholesterol, type 2 Diabetes, and cancer (e.g., bowel cancer). You can also gain health benefits by reducing your snacking, such as healthy looking skin and hair, healthy weight, increased energy and vitality.*" [2]

Implementation intentions to avoid snacking. Participants were subsequently asked to read the following statement: "*You are more likely to carry out your intention to avoid eating high-calorie snacks over the next 7 days if you make a plan not to snack*" Participants in the autonomy-framed implementation intention condition were then asked to read and repeat 3 times the following statement "*If I think I am going to eat a high-calorie snack, then I will choose to ignore that temptation*". Participants in the control-framed implementation intention condition, in contrast, were asked to read and repeat 3 times the statement "*If I think I am going to eat a high-calorie snack, then I must ignore that temptation*"**.** In terms of the behaviour change technique (BCT) taxonomy of Michie et al. (2013), the autonomy-framed and control-framed implementation intentions address the BCT of "action planning" (BCT 1.4)

Time 2 Questionnaire

Time 2 snacking behaviour was measured using the same measure as at Time 1.

Eating self-efficacy. Individual differences in eating self-efficacy were assessed using the 8-item short form of the Weight Efficacy Lifestyle Questionnaire (WEL-SF; Ames *et al*., 2012). 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 to all items were given on eleven-point scales ranging from *not at all confident* (0) to *very confident* (10), α = .88. Mean scores were calculated for each participant, with higher scores indicating higher levels of eating self-efficacy.

Results

Preliminary analyses. Independent t-tests and Chi square analysis revealed no differences between conditions in terms of age, gender, BMI, baseline snacking, and eating self-efficacy. Table 1 presents a summary of the descriptive statistics of the sample by condition, and a summary of Independent t-tests and Chi square analysis comparing autonomy-framed and control-framed implementation intention conditions. Bivariate correlation analyses demonstrated significant associations between (Time 1) baseline snacking behaviour and (Time 2) snacking behaviour (r = .59, p < .001) and age and (Time 2) snacking behaviour (r = -.18, p = .002).

<Table 1 here >

Hierarchical multiple regression was used to explore the impact of eating self-efficacy and framed implementation intentions on frequency of snacking. To facilitate interpretation of interaction terms, the continuous variables were standardized before

analysis (cf. Aiken & West, 1991). Baseline snacking, gender, age, and BMI were entered as a potential covariates at step 1. Condition (control-framed implementation intention [0]; autonomy-framed implementation intention [1]) was entered at step 2 and eating self-efficacy at step 3. Lastly, the two-way interaction term (eating self-efficacy x Condition) was entered at step 4. The dependent variable was participants' frequency of high-calorie snack food intake measured at follow up (Table 2).

<Table 2 here>

Investigation of the significant eating self-efficacy x condition interaction using PROCESS (Hayes, 2013) revealed a significant association between eating self-efficacy and snacking for those in the autonomy-framed implementation intention condition (b = -0.82, t = -2.03, p = .043, 95% CI [-1.61, -0.03]), with higher levels of eating self-efficacy associated with lower levels of snacking. There was no significant association between eating self-efficacy and snacking for those in the control-framed implementation intention condition (b = 0.62, t = 1.35, p = .178, 95% CI [-0.28, 1.52]). Johnson-Neyman regions of significance at $p < .05$ revealed that for participants low in eating self-efficacy (scores ≤ 2.77), the control-framed (vs. autonomy-framed) implementation intention condition promoted significantly lower levels of snacking. However, for participants high in eating self-efficacy (scores ≥ 8.15), the autonomy-framed implementation intention condition was associated with less snacking compared to the control-framed implementation intention condition (Figure 2).

<Figure 2 Here>

Discussion

The results of the study revealed no significant main effects of implementation intention framing. However, findings demonstrated that eating self-efficacy

moderated the relationship between implementation intention framing and snacking. Participants with higher levels of eating self-efficacy reported less snacking in the autonomy-framed vs. control-framed implementation intention condition, whereas those with low levels of eating self-efficacy reported less snacking in the control-framed vs. autonomy-framed implementation intention condition. This finding contributes to a growing body of research documenting the differential effects of implementation intention formation for high and low self-efficacy participants (Luszczynska *et al*., 2011; Wieber *et al*., 2010).

In the current study, the formation of autonomy-framed implementation intentions resulted in less snacking among those who reported feeling generally more efficacious and in control of their dietary behaviour, than among those who reported less eating self-efficacy. Thus, for high eating self-efficacy participants, findings were in line with previous research demonstrating the positive effects of autonomy-supportive implementation intentions on goal attainment (Koestner *et al*., 2006). For people high in eating self-efficacy, it is possible that the autonomy-framed implementation intention condition fostered perceptions of self-confidence such that they were able to exert greater control over snacking. For those already low in eating self-efficacy, it is possible that the autonomy-framed implementation intentions made salient their perceptions of low choice and limited freedom over snacking, such that their confidence in their ability to restrict consumption was diminished, which reduced their subsequent motivation and/or control over the avoidance of snacks. Further research is needed to corroborate the current finding and to explore why the pattern of findings in the current study may have occurred. Furthermore, research has shown that goal-directed behaviour may be facilitated when autonomy-supportive (vs. coercive) styles of persuasion are used (e.g., Deci & Ryan, 2000; Koestner *et al*.,

2006; Ng *et al*., 2012); the results of the present study would suggest that these findings may only hold for high self-efficacy individuals.

Implementation intention effects on goal attainment have been found to be enhanced when people are strongly committed to their formed implementation intentions (Achtziger *et al*., 2012). In the current research, it may be that for low eating self-efficacy participants, the controlling language embedded in the control-framed implementation intention bolstered individuals' commitment to the formed implementation intention, which conferred benefits in terms of their subsequent dietary behaviour. It is also conceivable that low self-efficacy participants perceived the injunctions in the control-framed (vs. autonomy-framed) implementation intention condition to be more concrete and obligatory. Further research is required to confirm our findings and to explore the mechanisms by which control-framed implementation intentions may lead to less snacking among low eating self-efficacy individuals. In the current study, we did not measure participants' commitment to their plans nor their perceptions of concreteness versus abstraction (see Trope & Lieberman 2010). However, these extensions to our study offer a profitable avenue for future research.

The aim of the current study was exploratory and designed to assess the efficacy of autonomy-framed and control-framed implementation intentions. However, our findings need to be considered in relation to some limitations. In the current study, we did not include a standard implementation intention manipulation, or a control group to establish a non-intervention level of Time 2 snacking. Hence, it is not possible to say whether autonomy-framed implementation intentions and control-framed implementation intentions were more effective than other forms of implementation intentions, or than no implementation intention. It is possible that message framing may interfere with the strategic automaticity of an implementation

intention. Replication of this study with the addition of a control condition (i.e., a three-arm design) is warranted to elucidate the findings of this preliminary investigation. Furthermore, it is possible that self-presentational biases may have impacted on our assessment of participants' snacking behaviour (Chan, 2009). Although underreporting of dietary behaviour is problematic (Huang, Roberts, Howarth, & McCrory, 2005), this is likely to have occurred to a similar extent across experimental conditions. Nonetheless, future research could replicate the study using more objective measures of food intake. Future researchers may also consider employing more fine-grained, behavioural indicators of intervention success (e.g., plan enactment: Fleig et al., 2017; Keller et al., 2017). For example, instead of asking the participant to give an estimate of her/his intake of researcher-defined snack items (aggregated), researchers could ask specifically about the snacks the participant plans to avoid (planned behaviour). In addition, the intervention tested in the current study aimed to examine whether framing the behavioural response as a choice (autonomy-framed) may be more effective than framing the behavioural response outcome as a requirement (control-framed). It is possible that this type of intervention embeds autonomy at the point of automatic activation, rather than at the point of planning or in the choice of contextual cue (see Koestner et al., 2006). Further studies are needed to determine whether the effects of autonomy-framed and control-framed implementation intentions demonstrated in the present study hold for self-generated (vs. researcher-provided) implementation intentions. We measured eating self-efficacy using the short form of the Weight Efficacy Lifestyle Questionnaire (WEL-SF; Ames *et al*., 2012). All items in this scale are behavioural-domain-general, in so far as they assess eating self-efficacy in general rather than in the context of a specific

dietary behaviour: snacking. Further research could helpfully replicate our investigation using a domain-specific measure of eating self-efficacy.

Another limitation of the current study is the short-term follow up that prevents us from examining the longer-term effects of the framed implementation intention manipulations on snacking. Hence, developments of this research might also usefully investigate the effects of autonomy-framed and control-framed implementation intentions over a longer time period. We should also emphasize that we only explored the interactive effects of autonomy-framed and control-framed implementation intentions and eating self-efficacy within the domain of snacking behaviour. Additional research is required to see if the results hold across other behavioural domains. Implementation intentions can be approach-oriented (healthy eating, exercise) or avoidance-oriented (avoiding snacks, reducing alcohol); research has shown stronger effects for approach vs. avoidance-oriented planning (e.g., Adriaanse *et al*., 2011; Chatzisarantis & Hagger, 2010; Hagger *et al*., 2012; Luszczynska, Sobczyk, & Abraham, 2007). We would predict, therefore, that the interactive effects of eating self-efficacy and implementation intention framing demonstrated in the present study would be most likely amplified for approach-oriented implementation intentions (e.g., implementation intentions to increase fruit and vegetable consumption), and it would be profitable for future research to address this research question.

The current study augments the literature exploring the conditions under which implementation intention interventions are most effective; further research is required to investigate the mechanisms by which the effects of autonomy-framed and control-framed implementation intentions operate. People low in eating self-efficacy may be those most in need of dietary interventions and the study findings have

potential implications for practice. Control-framed implementation intentions may present an effective technique to promote healthy diet among low eating self-efficacy individuals, and this relatively simple cost-effective technique could be easily incorporated in dietary-focused interventions targeting low eating self-efficacy individuals or those with overweight and obesity. Health professionals may also consider employing controlling language in face-to-face dietary interventions when dealing with low eating self-efficacy clients, while interacting with high eating self-efficacy clients in a more autonomy-supportive fashion.

High-calorie snack reduction remains a national agenda for public health policy. Ours is the first study to investigate the moderating effects of eating self-efficacy on autonomy-framed and control-framed implementation intentions. Our findings revealed a significant interaction between eating self-efficacy and implementation intention framing on snacking. Participants with higher levels of eating self-efficacy reported less snacking in the autonomy-framed (vs. control-framed) implementation intention condition. Participants with lower levels of eating self-efficacy reported less snacking in the control-framed (vs. autonomy-framed) implementation intention condition. Our findings potentially have important implications for the design of interventions to promote healthy dietary behaviour and subsequent health-beneficial outcomes.

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Footnotes

[1] A snowball technique was used to recruit participants. At Time 1, email contacts of undergraduate students attending a psychology module were sent an email message requesting volunteers to take part in a study investigating snacking. The email message contained a link to the Time 1 questionnaire.

[2] The data presented forms part of a larger study, in which participants were also given information about the costs associated with snacking. Furthermore, in addition to the measures described here, participants completed a number of additional items after reading the health message. These assessed 1) intention to reduce snacking, 2) attitudes towards snacking, and 3) perceived control over snacking. These items are not analyzed further in the current study.

Table 1: Summary of Descriptive Statistics by Condition.

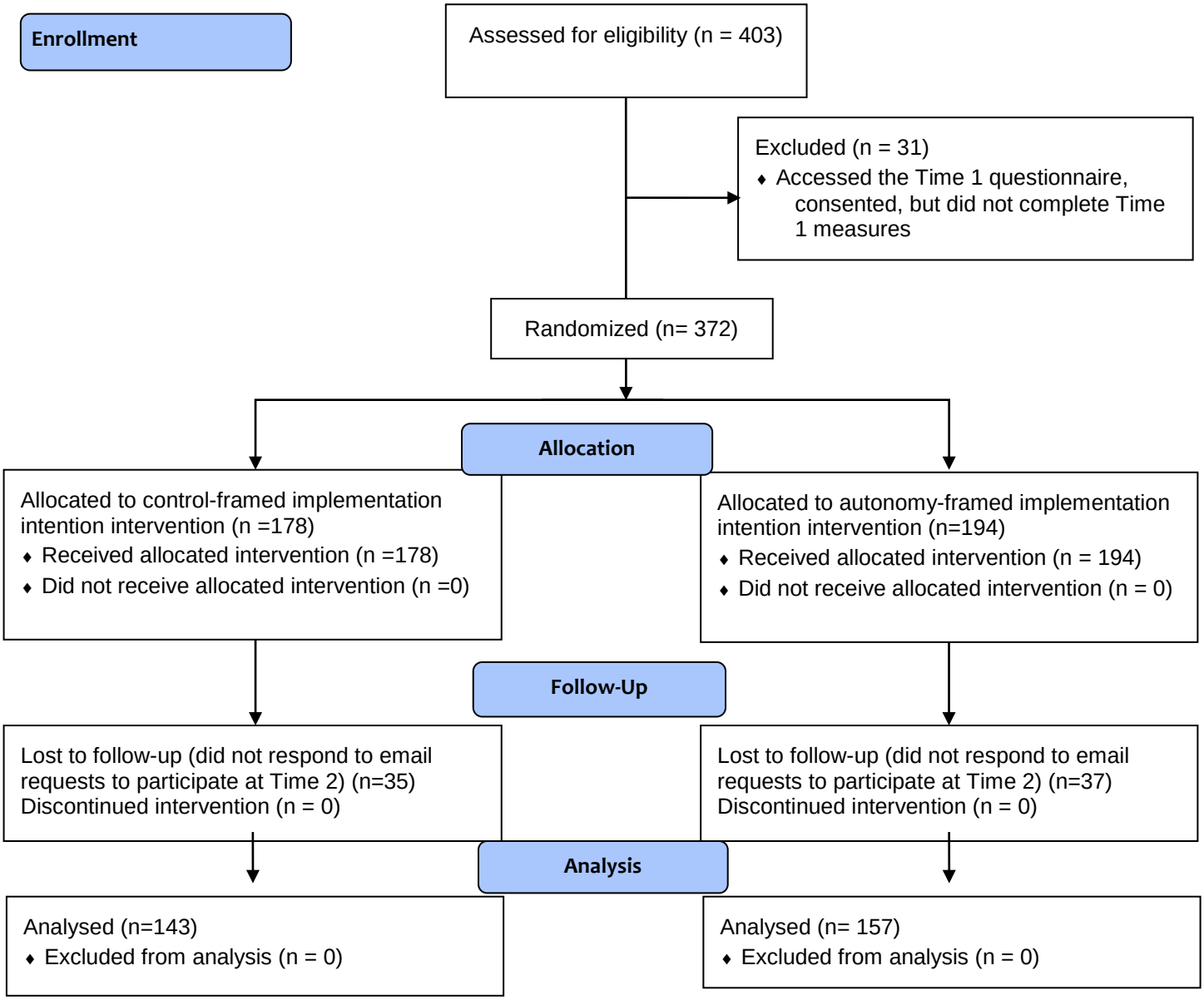
Variable	Whole Sample *M* (*SD*), Range	Control-Framed Condition *M* (*SD*), Range	Autonomy-Framed Condition *M* (*SD*), Range	*Summary of Independent t-tests Comparing Control-Framed & Autonomy-Framed Implementation Intention Conditions* *t*	*df*	*p*
Age	33.67 (15.51), 18-84	33.70 (16.20), 18-84	33.64 (14.90), 18-70	0.03	298	.975
BMI	24.81 (4.14), 16.92-39.51	24.48 (3.76), 17.60-35.20	25.12 (4.45), 16.92-39.51	-1.33	292	.184
Baseline snacking	15.19 (14.28), 0.00-114	16.29 (17.13), 0-114	14.23 (11.22), 0-78	1.11	235	.267
Eating self- efficacy	6.37 (1.92), 0-10	6.53 (1.82), 0-10	6.23 (2.01),1.5-10	1.32	293	.187
	Whole Sample (*n*, %)	Control-Framed Condition (*n*, %)	Autonomy-Framed Condition (*n*, %)	*Summary of Chi-Square Analysis Comparing Conditions* χ^2	*Cramer's V*	*p*
Gender	Male, 118 (40 %) Female, 181 (60%)	Male, 57 (40 %) Female, 85 (60%)	Male, 61 (39 %) Female, 96 (61%)	$\chi^2(1) = 0.05$	0.01	.820

Table 2: Hierarchical regressions of snacking frequency scores at Time 2, on eating self-efficacy and implementation intention framing, controlling for baseline snacking, gender, age and BMI.

Variables entered	*β*	*SE*	*t*	*p*	*95% CI*	*F*	*R2*	Δ*R2*	Δ*F*
Step 1						30.98***	0.35	0.34	30.98
Baseline Snacking	0.60	0.06	10.73	.000	(.49, .71)				
Gender	0.04	0.12	0.34	.732	(-.19, .27)				
Age	-0.07	0.06	-1.12	.266	(-.19, .05)				
BMI	-0.07	0.06	-1.07	.283	(-.19, .06)				
Step 2						24.70***	0.35	0.00	0.10
Baseline Snacking	0.60	0.06	10.66	.000	(.49, .71)				
Gender	0.04	0.12	0.35	.727	(-.19, .27)				
Age	-0.07	0.06	-1.11	.269	(-.19, .06)				
BMI	-0.07	0.06	-1.05	.295	(-.19, .06)				
Condition	-0.04	0.11	-0.32	.752	(-.26, .19)				
Step 3						20.60***	0.35	0.00	0.40
Baseline Snacking	0.60	0.06	10.41	.000	(.48, .71)				
Gender	0.02	0.12	0.15	.878	(-.22, .26)				
Age	-0.07	0.06	-1.04	.298	(-.19, .06)				
BMI	-0.08	0.06	-1.16	.247	(-.20, .05)				
Condition	-0.04	0.11	-0.35	.725	(-.26, .18)				
Eating self-efficacy	-0.04	0.06	-0.63	.529	(-.16, .08)				
Step 4						18.89***	0.37	0.02	5.92
Baseline Snacking	0.60	0.06	10.66	.000	(.49, .72)				
Gender	0.03	0.12	0.28	.778	(-.20, .27)				
Age	-0.06	0.06	-0.97	.332	(-.19, .06)				
BMI	-0.09	0.06	-1.39	.167	(-.22, .04)				
Condition	-0.06	0.11	-0.49	.625	(-.28, .17)				
Eating self-efficacy	0.12	0.09	1.35	.178	(-.05, .29)				
Condition x Self-efficacy	-0.28	0.11	-2.43	.016	(-.51, -.05)				

Note. Cl = confidence interval; (lower limit, upper limit).
***$p < .001$

Figure 1: Consort 2010 Flow Diagram



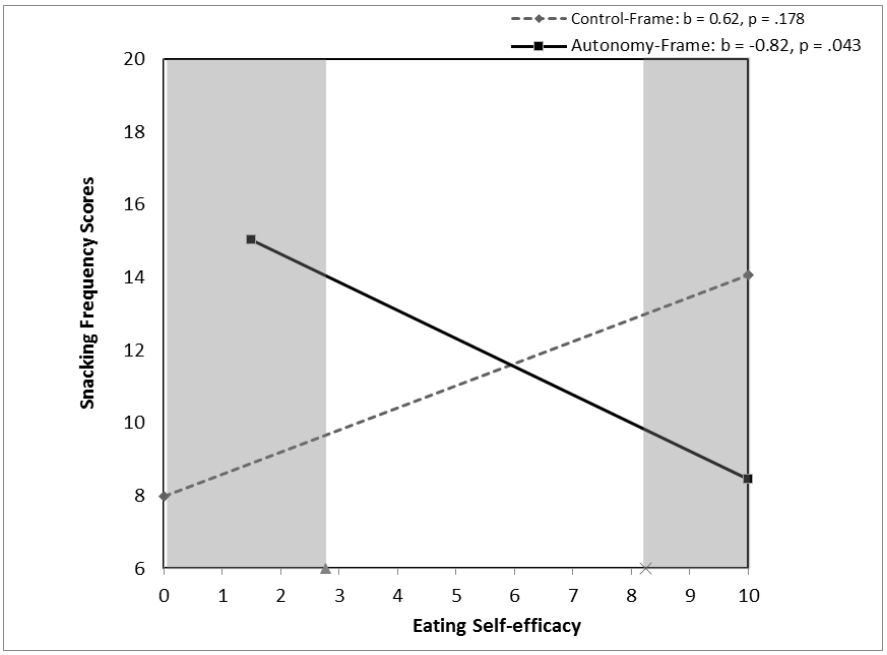


Figure 2: Number of snacks consumed in the past 7 days (assessed at Time 2), regressed onto eating self-efficacy, for participants in the autonomy-framed and control-framed implementation intention conditions, controlling for baseline snacking (assessed at Time 1). Regions of significance at $p < .05$ for low and high levels of eating self-efficacy are shown in grey.