Using a Balanced Diet Day as a Licence to Indulge

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# Abstract

We commonly succumb to unhealthy food temptations, despite our intentions to be healthy. Self-licensing is a process whereby we allow ourselves to indulge because we can justify it in some way or other. In the present study, participants were required to complete an unhealthy snack diary for three consecutive days. Participants in the experimental condition were instructed to partake in a balanced diet day on the second day of the snack diary, a day where a particular effort is made to eat well and minimize unhealthy snacks. It was expected that participants in the experimental condition would use the balanced diet day as a license to indulge on the day preceding and the day following the balanced diet day. Results showed that this was not the case, participants did not use the healthy act of the balanced diet day as a license to eat more unhealthy calories on the days before and after the balanced diet day. In future studies, researchers may consider creating a more autonomous environment where participants could initiate the healthy behaviour themselves rather than having one imposed upon them. They may also consider using a more inclusive food diary so that meal consumption behaviour can be taken into account.

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### Using a Balanced Diet Day as a Licence to Indulge

Despite our efforts to be healthy, the reality seems to be that most of us succumb to food temptations on a regular basis. We frequently face temptations and cannot always resist the desire to indulge. It is not necessarily bad to treat yourself to an unhealthy snack, however engaging in these behaviours often directly opposes our long term goal of being healthy. Surrendering to our vices regularly can have lasting negative effects on health. In increasing prevalence, people are indulging to the point where they are overweight or obese (Ogden, et al., 2016), which is associated with numerous negative health outcomes such as type 2 diabetes and cardiovascular disease (Dixon, 2010). Many of us are aware of these negative health outcomes, however this awareness does not seem to be sufficient to maintain good health. Even having the intention to change a behaviour is not always enough to make the change. There is actually a large discrepancy between the many intentions that we have and those that are realized, this is also known as Intention-Behaviour Gap (Sheeran, 2002).

So, we know that poor eating behaviours can be health-damaging, and even if we have the intention to change our eating habits we often do not succeed. *Why* is unhealthy eating so frequent among us? Impulsivity has received predominant research attention in this area, although more recently research has focused on indulgence even after deliberation. Indeed, we sometimes do buy a chocolate bar or bag of chips even after having contemplated the health cost, because we justify it to ourselves somehow (De Witt Huberts, Evers, & De Ridder, 2012). Maybe we went to the gym earlier that day, or some other reason why we think we have earned an indulgence. Even planning to start a diet or exercise the following day can function as a license to indulge today. This process where we permit ourselves to engage in an unhealthy behaviour because we can justify it is referred to as self-licensing (De Witt Huberts, Evers, De Ridder, 2014a).

In the present study, we created a situation people could use as a license to indulge in unhealthy snacks. A *balansdag*, or balanced diet day, encourages healthy eating and effort to reduce unhealthy snack consumption. The Dutch Nutrition Centre introduced the balansdag as an intervention to encourage healthy eating in the Netherlands. A balanced diet day may be an appropriate license to use, as it can serve as one compact day of effort toward healthy eating which researchers can simply compare to an average eating day. Investigating snacking behaviour during and around a balanced diet day can add to the existing literature in that a mere three days (one day prior to, the balanced diet day itself, and one day following) can represent a more general effort toward healthy eating. Therefore, the aim of the present study is to investigate self-licensing in the context of unhealthy snacking behaviour. More specifically we want to gain some insight on whether taking a balansdag, or balanced diet day, can serve as a license to eat unhealthy snacks before and after the balanced diet day.

## Self-Regulation and Self-Licensing

As previously mentioned, individuals who want to become or stay healthy often encounter dilemmas where their long term goal to be healthy clashes with a short term desire to indulge (Radtke, Kaklamanou, Scholz, Hornung, & Armitage, 2014). Despite the effort that individuals may make to behave in congruence with their long-term goal, many times the desire for an immediate gratification overcomes the desire to maintain their long-term goal. In the literature, this is referred to as self-regulation failure (De Witt Huberts, et al., 2014a).

Dual-process models propose that self-regulation is governed by two processes that compete for control over behaviour (Metcalfe & Mischel, 1999; Evans, 2003). The first process is reflective, rational, careful, and methodical, and the second is reflexive, impulsive, emotional, and quick. Much of the research conducted on self-regulation failure has focused on impulsive determinants of failure. This suggests that succumbing to a sweet or greasy snack is a result of a lapse in rational judgment, and that lapses therefore occur when we are operating under reflexive or emotional processes. Dual-process models have fostered the conclusion that when people think through their decisions, they make healthy choices. Conversely, a more recent perceptive posits that people can also consciously and deliberately choose to 'fail'. This process is referred as self-licensing, and focuses on reflective processes leading to self-regulation failure. Self-licensing is "the act of making excuses for one's discrepant behavior before actual enactment, such that the prospective failure is made acceptable for oneself" (De Witt Huberts, et al., 2014a, p. 121).

Accordingly, empirical studies have shown that people indeed use justifications for their unhealthy behaviours across several contexts, including unhealthy snacking behaviour. Furthermore, they are more likely to indulge in a hedonic snack if they feel that they have exerted some effort (De Witt Huberts, et al., 2014a). In this study conducted by De Witt Huberts and colleagues (2014a), all participants worked on a task for 10 minutes total but one group was led to believe that they completed the task twice rather than once (2 x 5 minutes). Those who thought they had invested more effort by completing the task twice felt licensed to eat more unhealthy snacks (M&Ms, crisps, chocolate cookies) compared to those in the control condition. In another study, participants were asked to generate reasons for consuming a tempting snack (De Witt Huberts, Evers, de Ridder, 2014b). Participants provided justifications for conceding to the temptation and further to that, provided more justifications the more tempting the snack. Taken together, these studies show that sometimes we do use reflective processes to allow for indulgent behaviour, despite what dual-process models suggest.

# **Compensatory Health Beliefs**

One proposition as to why we tolerate failing to maintain healthy behaviours is because we use a form of justification where we believe we have or will compensate for the unhealthy behaviour somehow. Accordingly, one category of self-licensing that has received much attention is compensatory health beliefs (CHBs). CHBs are beliefs that unhealthy behaviours can be compensated for or neutralized by engaging in healthy behaviours. For example, an individual allowing him/herself to eat an unhealthy snack because they will be going to the gym later. It has been proposed that individuals cope with self-regulation failure with CHBs (Rabiau, Knäuper, & Miquelon, 2006), which can be considered a form of selflicensing. Individuals justify their decision to temporarily violate a long-term goal by using CHBs so that they can feel comfortable about their decision. Using CHBs is not necessarily maladaptive if the individual actually fulfills the compensatory behaviour. Indulging on occasion can contribute to an individual's motivation to follow their gym routine, for example. However, researchers have demonstrated that this is not always the case. Compensatory beliefs do not predict compensatory behaviours, and rather are indicative of a tendency to license indulgence (Kronick & Knäuper, 2010). Similarly, using CHBs retroactively can also backfire. An individual may overindulge after a healthy behaviour because they overestimate the value of the healthy behaviour and underestimate the consequence of the unhealthy behaviour, which can even mitigate the benefits of the compensatory behaviour. For example, an individual who has exerted him/herself at the gym may consume a large meal with 1000 calories for dinner because they think they expended more than that during their exercise, while in fact they only burned half of this. Accordingly, it has been posited that long-term goal adherence may suffer as a result of using CHBs because they provide a justification for unhealthy behaviours that hinder goal attainment (Miquelon, Knäuper, & Vallerand, 2012). In an illustrative study, it was found that using compensatory beliefs predicted a greater number of food portions consumed in dieters, meaning that using CHBs can actually work against maintaining a diet (Kronick, Auerbach, Stich, Knäuper, 2011).

# **A Broader Context**

In a time where the availability and accessibility of information on diets, health trends, recommendations, and overall information on healthy eating is more than ever, it can be challenging to navigate and make sense of what eating practices we should follow. Particularly for dieters, who have the intention to improve their diet but may not know where to look or what information to trust. A premise of many popular diets today is to intermittently restrict or reduce consumption of some alimentary factor or other, and although this a logical approach to weight loss, research on dieting has yielded some unfortunate findings. It seems as though dieting leads to weight loss in the short term but typically is not maintained long-term (Garner & Wooley, 1991; Hennecke & Freund, 2014). Further research is required to identify the exact mechanisms behind this, though the theory behind selflicensing and CHBs could offer some contributions. Take the 5:2 or fast diet for example, which posits that if you fast for two non-consecutive days a week and eat what you want the remaining five days, you will lose weight and live a happier and longer life as a result (Mosley & Spencer, 2017). According to what we know about self-licensing and CHBs, people may use the fast days as a license to indulge on other days. Therefore, total weekly calorie consumption for an individual on this diet may be comparable or even more than a week where the individual eats normally over the course of seven days. The present study in addition to other research on self-licensing and unhealthy snacking could offer insight into the effectiveness of such diets that advise such periods of restriction.

#### **The Present Study**

In the present study, self-licensing was investigated in the context of unhealthy snacking behaviour. Specifically, a manipulation condition of a balanced diet day was used investigate whether participants would use this healthy behaviour as a license. All participants were required to keep an unhealthy snack diary for a three-day period. In one group participants were asked to take a balanced diet day. The second group was a control group, where participants were simply required to record the unhealthy snacks they consumed. It is expected that taking a balanced diet day will be used as a license to engage in more indulgent eating behaviours on the days preceding and following the balanced diet day. We hypothesize that participants who are instructed to take a balanced diet day will use this day as a license and therefore consume more calories in unhealthy snacks on the day before and the day after the balanced diet day. Further we will explore the possibility that participants in the experimental condition will even consume a larger number of unhealthy

calories over the course of the three days than participants in the control condition, by looking at the total caloric consumption over the three days.

#### Method

# **Participants and Design**

Participants were recruited using posters that advertised the study or through online forums, such as Facebook. The sample consisted of 63 females (77.8%) and 18 males (22.2%), a total of 81 participants. The mean age was 24.22 (SD = 8.04), and the mean BMI was 23.05 (SD = 5.36). Participants had the option of completing the questionnaires and snack diaries in Dutch or in English; 54 (66.7%) chose to participate in Dutch while the remaining 27 (33.3%) participated in English. Participants received financial compensation or course credit.

A mixed design was employed. The between-subjects factor was the balanced diet day instruction: half the participants were instructed to take a balanced diet day (experimental condition), while the other half was not given any additional instruction other than keeping an unhealthy snack diary for three days (control condition). The within-subjects factor was time: each participant had to keep a snack diary for three days, and total calories were computed for each day. Text messages were sent to participants on every day of their participation to remind them to record their unhealthy snacks and a link where they could do so. Text messages differed depending on which condition the participant was in. Refer for Figure 1 for the content of the text messages the participants received.



*Figure 1*. Text messages sent to participants in the experimental (top) and control (bottom) conditions on the first, second, and last days of their participation.

# Procedures

Individuals who were interested in participating visited a website where they could begin their participation with a ten-minute questionnaire containing questions on demographics, eating-related CHBs, and trait self-control. The study was offered in Dutch or in English, so anyone who spoke one of those two language was eligible to participate in the study. Participants were instructed to choose a set of dates when they would keep the snack diary. These days were always the Tuesday, Wednesday, Thursday of a given week because these were deemed most representative of normal diet, and so that we could keep the days consistent between participants. Once participants completed the questionnaire, they were sent a confirmation email with a copy of the consent form and instructions for the subsequent portion of the study, the snack diary. Participants who signed up were randomly assigned to either the experimental (n = 39) or control condition (n = 42). On the dates they chose to participate, participants were sent text messages or emails in the morning with a link to an online snack diary, where they could record and submit the unhealthy snacks that they consumed throughout the day. They were also sent reminders at the end of the day to ensure that they had completed or would complete their submission. Participants in the experimental condition received instructions on the second day to take a balanced diet day.

The snack diary was comprised of several options where participants could indicate the portions of the unhealthy snacks that they ate. At the end of the three-day period, participants completed a brief post-participation questionnaire in which they were asked what they thought the study was about and what they thought the hypothesis of the study could be. Participants were compensated either financially or with course credit once the data collection phase of the study concluded.

#### Materials

#### **Demographics**

#### Table 1.

Means and standard deviations for the variables: height, weight, ideal weight, satisfaction with current eating habits (this item was answered on a seven-point scale ranging from 1 [extremely unsatisfied] to 7 [extremely satisfied]), frequency of physical activity (this item was answered on a 5-point scale ranging from 1 [never] to 5 [every day]), currently trying to eat healthier (responses range from 1 [not at all] to 7 [very much]), currently trying to lose weight (responses ranged from 1 [not at all] to 7 [very much]), trait self-control scores

	М	SD
Height (cm)	171.33	9.29
Weight (kg)	67.94	17.41
Ideal weight (kg)	64.82	14.37
Satisfaction with current eating habits	4.27	1.10
Frequency of physical activity	2.21	.83
Currently trying to eat healthier	4.73	1.29
Currently trying to lose weight	3.48	2.11
Currently trying to cut down on snacking	4.26	1.83
Trait self-control scores	4.14	.35
CHB scores	3.59	.52

(items in this scale ranged from 1-5, refer below for more details), and CHB scores (items in this scale ranged from 1-5, refer below for more details).

**The Eating-Specific CHB Scale** (Wilde, 2013): This scale has 10 items on compensatory beliefs related to eating habits. Items included '*I can do sport today to compensate unhealthy eating yesterday*' and '*low calorie/healthy food can compensate an unhealthy meal*' ( $\alpha = .79$ ) Each item is scored on a five point Likert scale ranging from *1=totally agree* to *5=totally disagree*. A mean score was computed in combination with the CHB Scale so that each participant had one comprehensive CHB score.

**CHB Scale** (Knäuper, Rabiau, Cohen, & Patriciu, 2004): This scale is comprised of 17 items on compensatory behaviours for sleep, exercise, eating, and other health-related habits. Only the five items on eating behaviours were used ( $\alpha = .79$ ). Items were answered on a five point Likert scale ranging from *1=strongly disagree* to *5=strongly agree*. Items were '*If one exercises one can eat without many restrictions*,' '*Using artificial sweeteners compensates for extra calories*,' '*Skipping the main dish can make up for eating dessert*,' '*Starting a new diet tomorrow compensates for breaking a diet today*,' and '*Eating whatever one wants in the evening is OK, if one did not eat much during the day*.' A mean score was computed in combination with the Eating-Specific CHB Scale to create one comprehensive CHB score for each participant.

**Trait Self-Control Scale** (Tangney, Baumeister, & Boone, 2004): The brief version of the Trait Self-Control Scale was used and has 13 items on self-control. The scale for the items

ranges from 1=not at all to 5=very much. Example items include 'I am good at resisting temptation' and 'I refuse things that are bad for me' ( $\alpha = .47$ ). Trait self-control was measured to consider the role of self-control in unhealthy food consumption; individuals with more self-control are usually more successful in resisting unhealthy food temptations, and by contrast individuals who have low self-control may be poorer at resisting unhealthy food temptations.

**Snack Diary** (Verhoeven, Adriaanse, Evers, & de Ridder, 2012): Participants were required to keep a (validated) three-day unhealthy snack diary. This diary consisted of one column with 13 unhealthy snacks (i.e. cookie). A snack was defined as any food item consumed between the three main meals (breakfast, lunch, and dinner). Participants entered the quantities for each unhealthy snack they had consumed throughout the day (i.e. two handfuls of crisps). An 'other' option was available for participants to complete, if the snack(s) they consumed could not be found on the aforementioned snack list. All calories for snacks were computed using the Dutch Nutrition Center calorie counter (Dutch Nutrition Center, 2017).

# Results

# **Randomization Check**

A randomization check was conducted for several variables to ensure that they did not vary across condition. One way ANOVAs were conducted for continuous variables and Chi-Square tests were performed on dichotomous variables. All variables (age, gender, language, scores for trait self-control, CHB scores, weight loss goal, satisfaction of current eating habits, frequency of physical activity, intention of eating healthier, intention of losing weight, and intention of cutting down on unhealthy snacks) were randomly distributed across conditions (all p's > .101). Language was not equally distributed across conditions,  $X^2$  (2, N=81) = 6.57, p = .010. There were 20 English speaking participants in the control condition and 8 in the experimental condition, while there were 22 Dutch speaking participants in the control condition. Hence, there were significantly fewer English speaking participants in the control condition, though this does not seem to be a problem as there were no differences in the aforementioned demographics between English and Dutch speaking participants.

### **Main Analyses**

An ANOVA was used to test whether there was a main effect of time. Time was the within-subjects factor of the experiment; participants each filled the snack diary for three consecutive days. There was no main effect of time (p = .474) or time by condition (p = .401), meaning that there was no effect of time on calories consumed over the course of the

three days or the interaction between time by condition. Because there was no main effect of time or time by condition over the three days, we decided to investigate further by looking at differences within each day separately.

To examine the hypothesis that participants in the experimental condition would consume more calories on the days preceding and following the balanced diet day, one-way ANOVAs were conducted. Condition was the between-subjects factor of the experiment; one group of the participants were instructed to take a balanced diet day while the second group were not given this instruction. We compared the differences between mean calories consumed on the first day, the second day, and the last day in the control and experimental conditions. Refer to Figure 2 for a graphical representation of the means of calories consumed for each of the days. On the first day of the snack diary, there were no differences in calories consumed between the control (M = 419, SD = 447) and experimental conditions (M = 433, SD = 488), F(1, 78) = .02, p = .887. There were no differences in calories between conditions on the second day (control: M = 445, SD = 464; experimental: M = 287, SD =493), the day where participants in the experimental condition were instructed to take the balanced diet day, F(1, 78) = 2.18, p = .144. There were no differences between calories consumed on the final day of the snack diary, (control: M = 470, SD = 522; experimental: M = 423, SD = 486) F(1, 78) = .18, p = .675. Lastly, there were no differences between the average total number of calories consumed over the three days (control: M = 1333, SD =1072; experimental: M = 1143, SD = 1057) F(1, 78) = .63, p = .429.



Calories Consumed by Condition

■Control <sup>□</sup>Experimental

*Figure 2*. Calories consumed on the first, second, and last days of the unhealthy snack diary for control and experimental conditions.

# Regressions

Since no effects were found in the main analyses, we wanted to explore whether trait self-control had a role, such that participants high or low on trait self-control would have different calorie consumption behaviours. To test for a possible interaction between condition and self-control scores, a hierarchical linear regression analysis was conducted with calories of unhealthy snacks as the dependent variable. Separate analyses were conducted for calories on the first, second, and last days, respectively. Condition and self-control scores (centred) were added in Step 1. Next, the interaction term was added to Step 2 of the model. The regression showed that the second model could not predict caloric intake on any of the snack diary days (first day, F(2, 77) = 1.39, p = .26, second day F(2, 78) = .51, p = .60, or last day F(2, 78) = .99, p = .37) based on self-control scores or the interaction term (first,  $\beta = -401.58$ , p = .19, second,  $\beta = -316.35$ , p = .32, third,  $\beta = -421.95$ , p = .19).

As the main analyses did not yield any effects and trait self-control did not have an effect on caloric intake, we wanted to test whether eating-related CHBs played a role such that participants who scored high or low on the CHB scale would have different caloric consumption patterns. To test for a possible interaction between condition and CHB scores, a hierarchical linear regression analysis was conducted with calories of unhealthy snacks as the dependent variable. As was done previously, separate analyses were conducted for calories on the first, second, and last days, respectively. Condition and CHB scores (centred) were added in Step 1. The interaction term was then added to Step 2 of the model. The regression showed that the second model could not predict caloric intake on any of the snack diary days (first day F(2, 78)=.19, p=.83, second day F(2, 78)=.32, p=.73, or last day F(2, 78)=.13, p=.88) based on CHB scores or the interaction between condition and CHB, and all had nonsignificant slopes for the interaction term (first,  $\beta = 82.58$ , p = .69, second,  $\beta = 79.68$ , p = .71, third,  $\beta = 107.42$ , p = .62).

#### Discussion

The present study examined how adhering to a balanced diet day could be used as a license for unhealthy snacking. Given that self-licensing effects have been observed in research on eating behaviour (Khan & Dhar, 2006; De Witt Huberts, et al., 2012; De Witt Huberts, et al., 2014a; De Witt Huberts, et al., 2014b; Taylor, Webb, & Sheeran, 2014), we expected to find that participants instructed to take a balanced diet day, compared to participants in the control condition who were not given this instruction, would use this day as a license to eat more calories in unhealthy snacks before and after this day. The results

showed that this hypothesis was not confirmed: it does not seem as though participants used the balanced diet day as a license to consume more unhealthy calories on the day before or the day after the balanced diet day. There was no difference between the number of calories consumed between conditions on any of three snack diary days. Moreover, there was no difference between the total number of calories consumed over the course of the three days between conditions.

The findings of the present study are not consistent with the literature on selflicensing and eating behaviour. Self-licensing effects have been observed in numerous studies (De Witt Huberts, et al., 2012; De Witt Huberts, et al., 2014a; Prinsen, Evers, & Ridder, 2016), showing that people are inclined to justify an unhealthy food choice when faced with a temptation. One way in which people justify their choices is by intending or believing they will compensate for it, usually by engaging in a healthy behaviour which "neutralizes" the unhealthy behaviour (Rabiau, et al., 2006). This process can occur both before and/or after the unhealthy behaviour. For example, "I can eat pizza tonight because I'm going to the gym tomorrow" or "I can eat pizza tonight because I went to the gym yesterday". It was expected that participants who were instructed to take a balanced diet day in the present study would use this kind of thinking to justify indulgence on the day preceding or the day following the balanced diet day. Given that self-licensing as it occurs in eating behaviour is well-founded in research, why, then, were similar effects not observed in the present study?

A possible explanation is that a balanced diet day is quite a specific license; it is one day where a particular effort is made to eat well, and although the intent was to use it as a microcosm for healthy eating more generally, it may not have fulfilled that purpose. Moreover, prior studies which have observed self-licencing effects were more flexible with the type of license. For example, in one study participants were asked to think of reasons as to why they deserved to eat the chocolate bar in front of them (De Witt Huberts, et al., 2014b). In this study and others, participants could think of anything from their personal life as a justification for why they deserved to eat the treat, rather than the imposition of a license like the balanced diet day. It is conceivable that participants in the present study do use healthy behaviours as licenses to engage in less healthy behaviours, however this did not show through in the specific context of a balanced diet day. Lastly, because participants were only asked to keep a diary of unhealthy snacks consumed, it is possible that a more comprehensive diary including meals would offer more information about how a balanced diet day may or may not be used as a licence.

Another consideration is that the balanced diet day was imposed on participants. In our usual and everyday lives, we choose for ourselves to be healthy. In line with the notion of the balanced diet day as an imposition, it is possible that being instructed to take a balanced diet day creates a sense of external responsibility where individuals do not feel like they have "earned" eating unhealthily because they did not personally initiate the healthy behaviour. Autonomously making health decisions and having a sense of ownership over those decisions is associated with maintenance of healthy eating habits in the long term (Pelletier, Dion, Slovinec-D'Angelo, & Reid, 2004; Pelletier & Dion, S, 2007; Teixeira, Patrick, & Mata, 2011). By contrast, we can speculate that health decisions not made autonomously would not give us the sense of responsibility to reward or discipline ourselves accordingly. It is therefore feasible to expect that using a healthy behaviour as a license to engage in an unhealthy behaviour requires us to intrinsically choose to engage in that healthy behaviour. Feeling responsible for our choices may be what allows us to feel entitled to reward ourselves. For future studies, researchers should consider creating an autonomous environment in which participants can initiate a healthy behaviour themselves. This may clarify whether autonomous decision making is necessary to observe self-licensing effects in unhealthy eating.

Another possibility that may have contributed to why the expected results were not obtained is that the sample was largely comprised of university students who were either neutral about or satisfied with their current eating habits and not trying to cut down on snacking between meals. Since the sample consisted of individuals who were not particularly concerned with their diet, it is possible that they did not perceive the balanced diet day as much of a challenge and therefore not enough to warrant a license for the day preceding or following the balanced diet day. There is no obvious conflict for individuals who do not have the intention to restrict certain foods (Kronick, et al., 2011), and therefore they have no need to license.

Compared to the current sample which was mostly made up of individuals who were not dieting, licensing in unhealthy snacking may be more obvious in a dieting population where there tend to be more restrictions and therefore more need to license (De Witt Huberts, et al., 2014a). Making a change in eating patterns requires effort and that effort may be used by dieters as a justification for deserving some form of reward. As previously mentioned, participants in the present study were either neutral or satisfied with their eating habits. It is therefore possible that they did not devote much effort into changing their eating behaviour, and in turn feel like they earned an indulgence. As a second, more exploratory inquiry, we wanted to investigate whether participants in the experimental condition would have a higher total consumption of unhealthy calories over the course of the three days. This would suggest an *over* compensation for "having eaten well yesterday" or "eating well tomorrow" on the days before and after the balanced diet day. We had initially speculated that participants taking the balanced diet day may overcompensate, beyond merely "making up" for unhealthy snacks or calories not consumed on the balanced diet day. The hypothesis that participants taking the balanced diet day may overcompensate was not supported. The results showed that there was no difference between total calories consumed over the three days between those instructed to take the balanced diet day and those who were not. In future studies, researchers could request participants to fill in a complete food diary, including meals, which would allow them investigate the possibility that individuals use healthy acts as a licenses to indulge with their meals. Researchers could additionally require participants to fill in an exercise diary, which would be interesting to overlay with the coinciding food diary since links could be drawn between food entries and exercise entries.

Although the self-licensing effect was not observed in the present study, it is important to investigate further and advance our knowledge in self-licensing. One implication may be in the broader context of diets. Although going on a diet may have its health benefits short-term, research on the long-term effectiveness of diets suggests that they are not lasting (Garner & Wooley, 1991; Hennecke & Freund, 2014). Investigating the mechanisms for the temporary nature of diet effectiveness, for instance overcompensating on "cheat days", can lead to valuable knowledge on how to maintain the health benefits. If we are using healthy behaviours as licenses to indulge then we may be countering or mitigating the positive effects those healthy behaviours are having. This was found in a study where individuals who believed they were taking dietary supplements, when in fact they were given placebo pills, expressed less desire to exercise and felt more inclined to engage in hedonic activities compared to participants who knew they were taking placebo pills (Chiou, Yang, & Wan, 2011). Further research on self-licensing as it occurs in the context of healthy eating can provide insight into how we can overcome the consequences of it, especially if we are unknowingly sabotaging our pursuit of health, so we can in turn attain our health goals and reap the short and long term health benefits.

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# Appendix A: Screenshot of the Snack Diary

Enter the unhealthy snacks that you ate today, and if applicable, how much of each respective snack.

Small cookie	0
Big cookie	0
Cake	0
Pie or pastry	0 //
Small piece of chocolate	0 //
Large piece of chocolate	0
Candybar (ex: Snickers)	0
Candy	0
Popcicle	0
Ice cream (by scoop)	0
Piece of cheese or meat	0 //
Crisps/trail mix/prezels (by hand)	0
Popcorn (by hand)	0