



Universiteit Utrecht

1

**Give me some Slack: A Study Examining the Effectiveness of Emergency Reserves to
Nudge Persistence after Subgoal Failure in a Dietary Context**

Lina Heidt

Department of Experimental Psychology, Utrecht University

MSc Applied Cognitive Psychology

Dr Robert Weijers

May 25, 2023

Thesis

27.5 ECTS

Second auditor: Dr Krista Overvliet

Acknowledgements

I would like to sincerely thank Sophia Wantenaar, who I have been collaborating with on this project. It was a great pleasure to work with her and experience what excellent teamwork means.

Next, I would like to thank my supervisor, Dr Robert Weijers, for his support and guidance throughout this project.

Finally, I would like to thank my family and friends for their everlasting encouragement.

Abstract

This study examined the effectiveness of using emergency reserves as a nudge to increase goal persistence after subgoal failure. The aim was to replicate and extend the findings of Sharif and Shu (2021) to a dietary context. Additionally, self-efficacy was examined as a possible mediator of the relationship between goal persistence after subgoal failure and emergency reserves. After a one-week-long baseline phase, participants received a daily vegetarian meal goal between one and four and had to reach it either five times a week (Easy group; $n = 8$), seven times a week (Hard group; $n = 9$), or seven times a week with two optional emergency reserves (Emergency Reserve group; $n = 11$) for four weeks. Results revealed that participants using emergency reserves did not persist significantly more after subgoal failure than participants of the Easy and Hard groups. This suggests that emergency reserves may not be suitable for a dietary context due to a higher share of possible constraints (e.g., social norms, and perceived benefits and barriers) or may only work when framed as clear approach-oriented goals. Further, a lack of goal importance and salience of the superordinate goal may have decreased the effectiveness of the present nudge. Self-efficacy was not found to be a mediator but may instead be a moderator of goal persistence and emergency reserves, which should be further examined in future research.

Keywords: nudging; emergency reserves; goal persistence; subgoal failure; self-efficacy

Give me some Slack: A Study Examining the Effectiveness of Emergency Reserves to Nudge Persistence after Subgoal Failure in a Dietary Context

Long-term goal pursuit and goal failure

Eating less sugar, exercising more frequently, or getting more sleep are prominent examples of long-term goals that people set for themselves. Indeed, working on these is a central aspect to increasing overall well-being (Devezer et al., 2014), so why is it that people often choose to engage in counterproductive behaviour instead? Long-term goal pursuit is complex and without a doubt considered difficult by most people and has thus received great attention in previous research (e.g., Höchli et al., 2018; Ilies & Judge, 2005; Locke & Latham, 2002; Wilcox et al., 2011).

Before discussing potential factors that influence goal pursuit, it is useful to first look at what goals are and how they are organised. According to Elliot and Fryer (2008), “a goal is a cognitive representation of a future object that the organism is committed to approach or avoid” (p. 245), with a clear focus on the future and proactive behaviour that is influenced by the goal’s mental image. When looking at goal research and theories, one is quickly introduced to terms like “superordinate goal”, “subordinate goal”, and “goal hierarchy” (e.g., Devezer et al., 2014; Höchli et al., 2018). Broadly speaking, goal hierarchy differentiates between an abstract and broad superordinate goal at the very top and more concrete and precise subordinate goals (or simply: subgoals) at the bottom (Höchli et al., 2018). The reasoning behind this prominent structure is in line with the well-known goal-setting theory by Locke and Latham (e.g., 1990; 2002), which suggests that concrete and specific goals (subgoals) lead to more success and goal pursuit than vague and abstract goals (superordinate goals). Thus, for pursuing a long-term goal like becoming fitter, the theory suggests dividing this abstract superordinate goal into more

specific short-term subgoals like eating two high-protein meals per day and exercising three times a week, to promote enhanced motivation and better performance (Höchli et al., 2018; Locke & Latham, 2002; Steel & König, 2006; Sun & Frese, 2013).

However, in long-term goal pursuit, the occurrence of small subgoal failures, like not making it to a gym session or choosing an unhealthy, quick meal over the healthy option, is often inevitable. While one may think that failures as small as these cannot do much to a long-term goal, research has repeatedly found that it is specifically these subgoal failures that have detrimental effects on subsequent goal pursuit, such as giving up on the goal completely (e.g., Devezzer et al., 2014; Fishbach et al., 2006; Ilies & Judge, 2005). It is therefore critical to find out more about the underlying cognitive mechanisms of subgoal failures that cause goal deterioration. Further, a better understanding should be developed about which other factors lead to goal success and failure and how these may be influenced to facilitate long-term goal pursuit. These topics will be the central focus of the present research.

A study by Devezzer et al. (2014) found supportive evidence that decreases in goal commitment or complete goal deterioration emerge because of inconsistencies between consumers' performance on subgoals and the superordinate goal. Already a single subgoal failure can lead to decreased commitment to the superordinate goal. For reasoning this, Devezzer et al. (2014) turn to goal-systems theory, which suggests that both types of goals are cognitively linked and thus any traffic flows in both directions (Kopetz et al., 2012; Kruglanski et al., 2002). This means that not only changes to the superordinate goal affect subgoals but also any change to a subgoal can affect the superordinate goal. Specifically, Devezzer et al. (2014) believe that subgoal failure can decrease superordinate goal commitment, because the demotivational effects of the failure spread upwards to the superordinate goal in the goal hierarchy.

Soman and Cheema (2004) found that goal failure can lead to negative emotions, decreased self-efficacy, demotivation and thus performance deterioration and even a rebound effect. They suggest that this is because this act of violation is considered a failure. Interestingly, Wilcox et al. (2011) argue that it is not necessarily the failure itself and the amount of it that is so detrimental that it leads to goal deterioration, but rather the cognitive representation that one holds about it. Wilcox et al. (2011) suggest that goal deterioration can thus be attenuated by reducing the subjective evaluation that one holds about the failure and decreasing its psychological impact.

Regarding the type of goal and its influence on goal success, a study by Scott and Nowlis (2013) found that framing goals as high-low range goals induces greater feelings of accomplishment than single-number goals, leading to increased goal reengagement. As an example, for setting a weight loss goal, a high-low goal would be to aim to lose between one to three pounds a week, whereas a single-number goal would be to aim to lose two pounds a week. It is argued that high-low goals are more successful because they offer a two-reference point structure. When compared to a single-number goal, the low end of the goal (lose one pound) increases attainability, while the high end of the goal (lose three pounds) increases the perceived challenge. Thus, the type of framing used to formulate goals appears to be a crucial determinant for success and may also impact subsequent performance after subgoal failure. Concerning self-regulatory processes, Webb and Sheeran (2005) found that successful achievement of a goal can be particularly associated with high levels of motivation, task focus and the formation of implementation intentions and in some instances with social support and subjective norm. These can have an influence on whether people achieve or fail to achieve a personal goal, providing

crucial evidence of the importance of certain constructs, identified in goal theories, as predictors of goal attainment.

Nudging as a possible solution

Goal pursuit and persistence are ultimately about making the “right” choices repeatedly as well as about making the decision to keep pursuing a superordinate goal even after experiencing subgoal failure. More recently, research and organizations have turned to the concept of nudging as one possible solution to push people into making better choices for themselves and steer them in more desirable directions (Sunstein, 2014). A nudge can be understood as a form of intervention, in which people are softly pushed towards making a desirable choice by altering the choice architecture while preserving complete freedom of choice and without eliminating any other options or significantly increasing potential costs (Kurz, 2018; Thaler & Sunstein, 2008). Nudges appear in many forms and can be as small as making certain parts of a text on a website bigger than others or placing them first (Sunstein, 2014) or classifying citizens as organ donors by default (Thaler & Sunstein, 2021).

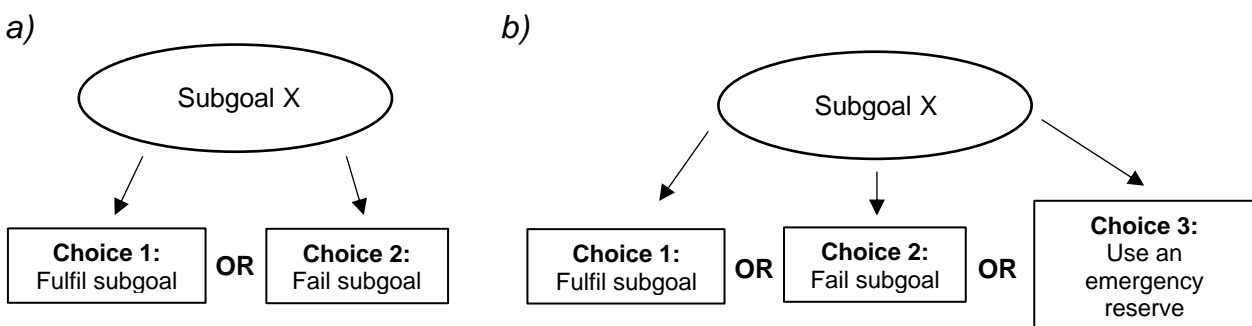
Nudging could also be useful to enhance subgoal performances like choosing to go to the gym or choosing the healthier option at a restaurant. After reviewing relevant literature, Li and Chapman (2013) conclude that nudging is an effective method to promote behaviour change, especially in the health domain. Nudges have been shown to increase the choice of healthy food options by using social norms (Reicks et al., 2012) and by changing food labelling packages (Roberto et al., 2010; Wisdom et al., 2010). Other research has found that incentivising people to go to the gym significantly increased their gym attendance (Acland & Levy, 2015; Charness & Gneezy, 2009). Thus, nudging may also hold promising potential for increasing long-term goal pursuit and decreasing the negative effects of subgoal failures.

Emergency reserves - a specific type of nudge

A recent study by Sharif and Shu (2021) has investigated a very specific type of nudge, namely the use of emergency reserves, to make people persist to a goal after experiencing a subgoal failure. This nudge aims to prevent people from giving up on their goal by providing them with the option to use an emergency reserve whenever they cannot reach the subgoal and would otherwise fail. Sharif and Shu (2017) define an emergency reserve as “pre-defined slack around a goal that can be used if needed but at a small cost” (p. 3). Emergency reserves can thus be understood as a form of joker, which allows one to skip a subgoal attainment while minimising the impression of a real failure. Ultimately, this means that while the goal itself stays the same, the presentation of choices is altered by adding an additional choice of using an emergency reserve, next to choosing to fulfil the subgoal and choosing to fail the subgoal (see Figure 1).

Figure 1

Choice architecture in a) a normal scenario and b) a scenario, in which emergency reserves can be used.



Normally, when pursuing the long-term goal of e.g., losing weight, the short-term failure of eating a high-calorie meal on one day could already lead to goal deterioration. However, with the use of an emergency reserve, the person would be allowed to experience this failure, without experiencing a loss of their progress or in other words by making it seem like they still made progress while skipping a healthy diet for that day.

The effectiveness of emergency reserves in terms of persistence and its preference over other goal types has first been demonstrated by Sharif and Shu (2017). In a weight-loss program, they were able to provide evidence that goal persistence is greater when one can make use of emergency reserves. Further, goals framed with emergency reserves were preferred over other goal types, given that a superordinate goal is present (i.e., to lose weight). Further testing revealed that goals with emergency reserves are preferred over easier reference point goals, because they are perceived as having a higher value while being equally attainable than the latter. Additionally, they are preferred over harder reference point goals because they seem more attainable than the latter while having the same value.

Sharif and Shu (2021) further examined the effectiveness of emergency reserves and were interested in whether they would be able to stop people from giving up on their goal after subgoal failure and encourage them to persist. In one field experiment and four lab-based experiments, it was demonstrated that framing goals with emergency reserves can indeed increase persistence after subgoal failure, leading to higher long-term performance, compared to goals with either the same lower reference point or the same upper reference point. For present purposes, their first field study is most relevant and will thus be outlined in more detail below.

Sharif and Shu's (2021) field study tested whether framing goals with emergency reserves, in the context of exercising and increasing people's daily steps, would increase the

likelihood that participants persist after subgoal failure. Over five weeks, participants were asked to track their steps on an App and record their daily step counts in a Google spreadsheet.

Through a baseline week, participants' average steps per day were determined. Followingly, a personal daily step goal was calculated for each participant, which was 120% of their average. Participants were then assigned to one of four groups for the next four weeks of step tracking: Easy, Hard, Reserve-Weekly, and Reserve Monthly. In the Easy group, participants were instructed to reach their daily goal five days a week. In the Hard group, participants were instructed to reach their daily goal seven days a week. In the Reserve-Weekly and Reserve-Monthly groups, participants were also instructed to reach their daily goal seven days a week but were told that they could make use of two optional emergency skips each week without any rollovers (Reserve-Weekly) or eight emergency skips, which could be applied at any time during the four weeks (Reserve-Monthly). To present feedback, a graph was placed in participants' spreadsheets that would show a blue bar for each day on which they reached their daily goal. If the goal was not reached, no blue bar would appear. In the emergency reserve groups, a blue bar would still be shown whenever a participant chose to use an emergency reserve for that day, giving the impression that they still made progress even when failing to reach their daily goal.

Sharif and Shu (2021) found that overall performance was better for participants using emergency reserves. They were more likely to take more daily steps and met their daily step goal on 40% more days on average each week compared to participants in the Easy and Hard groups. Next, participants in the Reserve-Weekly group had a significantly higher likelihood of reaching their daily goal on the day after experiencing a failure than participants in the Easy or Hard groups. This was also true for Reserve-Monthly participants with the exception that they were only directionally more likely to reach their daily goal the next day than the Easy group.

In the remaining studies of Sharif and Shu (2021), it was shown that results from study 1 could be replicated with word-search tasks (study 2), as well as with using a different graphical representation, showing that emergency reserves increase the perceived sense of progress after failure (study 3). Further, greater persistence is caused by an increase in perceived progress through emergency skips only after a failure occurs and not before (studies 4a and b). Sharif and Shu (2021) provide evidence that setting goals that offer more flexibility through emergency reserves has multiple benefits. This adds to prior research like Scott and Nowlis (2013), who found that high-low range goals can result in higher chances of goal reengagement. A possible explanation for this, according to Devezzer et al. (2014), is that people do not perceive a sense of (strong) failure when they fall below the higher end point of the goal and thus do not experience demotivation. This may also translate to framing goals with emergency reserves as they also have a higher end point (e.g., reach goal seven times) and a lower end point (e.g., reach goal at least five times with two emergency reserves). Further, emergency reserves may be able to reduce subjective evaluations about a failure and decrease its psychological impact, which can prevent goal deterioration as suggested by Wilcox et al. (2011). Emergency reserves may thus support people in reaching long-term goals, which are prone to subgoal failure and offer a more practical and realistic solution for long-term goal pursuit.

Self-efficacy as a mediator

Self-efficacy has been previously found to contribute to goal commitment (e.g., Locke & Latham, 2002) and Sharif and Shu (2021) state that the strength of perceived self-efficacy may influence people's response to failure. Therefore, self-efficacy is proposed as a potential mediator of the relationship between emergency reserves and goal persistence after subgoal failure. Beliefs about self-efficacy play a role in regulating human functioning through processes

of cognitive, affective, decisional, and motivational nature and can influence whether one thinks in self-enhancing or self-debilitating ways (Bandura & Locke, 2003). Further, self-efficacy can determine someone's level of motivation, their behaviour when facing difficulties as well as the choices made at different points in time (Bandura, 1997; Bandura & Locke, 2003).

According to Bandura and Cervone (1983), self-efficacy concerns an individual's judgement of their capability for future performance and goal attainment. They found that a higher sense of self-efficacy leads to more willingness to engage with difficult goals, more mobilised effort, and higher persistence. Goal systems receive motivational power through self-evaluative and self-efficacy mechanisms, which are activated by cognitive comparison. This suggests that subsequent effort is highest, the stronger the perceived self-efficacy for goal attainment and the higher the self-dissatisfaction over a substandard performance is. Self-efficacy can thus be regarded as a determinant of subsequent performance after facing a discrepancy between personal standards and actual performance. As Soman and Cheema (2004) found, subgoal failure can lead to decreased self-efficacy. Thus, emergency reserves may be effective because they can influence self-efficacy perceptions and prevent them from decreasing.

Nudging in a dietary context

The present paper aims to extend the research on emergency reserves by Sharif and Shu (2017; 2021) to a different area, namely a dietary context. Specifically, this paper will look at how goals related to eating less meat and fish can be aided by emergency reserves. Meat consumption has been linked to various diseases and its overproduction has detrimental consequences for the environment (Chea et al., 2020; Springmann et al., 2016). Meanwhile, overfishing raises various environmental questions with some arguing that fishing limits have been reached already (Zhou et al., 2015).

Previous research has shown the potential of nudging in altering food choices, e.g., increasing sales of vegetarian dishes in cafeterias by making the vegetarian option(s) more visible and changing the menu order (Kurz, 2018) as well as in restaurants by switching between different menus (Gravert & Kurz, 2019). Kongsbak et al. (2016) increased the choice of fruits and vegetables in a university setting by placing these at the beginning of the buffet. Bacon and Krpan (2018) found that sales of vegetarian products increased after giving them a more attractive description. To present knowledge, there has not yet been research examining the effects of emergency reserves on sustainable food choices. Therefore, an extension of the research by Sharif and Shu (2021) to the dietary context may be desirable.

The present study

The first aim of the present study is to replicate Sharif and Shu's (2021) findings that framing goals with emergency reserves leads to higher goal persistence after subgoal failure in a dietary context. Specifically, the effect of emergency reserves on goals directed at decreasing the intake of meat and fish will be tested. As the Reserve-Weekly group in Sharif and Shu (2021) showed more promising results than the Reserve-Monthly group, the present research will compare an Easy and a Hard group to only one Emergency Reserve group (ER group), which can use two emergency reserves per week. The respective overall research question is: "What is the effect of framing goals with emergency reserves on the persistence after subgoal failure in the context of decreasing meat and fish consumption in people's diets?". Based on previous research (Sharif & Shu, 2017; 2021), it was predicted that goal persistence would be superior in the ER group compared to the Easy and Hard groups. Emergency reserve goals share characteristics with both goals: The Easy goal assembles the lower reference point of the ER goal, and the Hard goal assembles the upper reference point of the ER goal.

Further, as suggested by Sharif and Shu (2021), self-efficacy may be a contributing factor as to why emergency reserves can increase goal persistence after failure. Thus, the second aim is to examine self-efficacy's role as a mediator of goal persistence after subgoal failure when using emergency reserves. The respective research question will be "What role does self-efficacy play in the promotion of goal persistence after subgoal failure when using emergency reserves?". Failure leads to a lower perception of self-efficacy (Soman & Cheema, 2004), whereas the idea behind the use of emergency reserves is that they can prevent decreases in self-efficacy. Thus, it was expected that participants of the ER group would experience a lower decrease in self-efficacy after subgoal failure compared to participants in the other two groups. Overall, this study aims to show that emergency reserves can promote goal persistence in the context of increasing vegetarian meal intake, while also examining self-efficacy as a potential mediator of this phenomenon to shed light on the working mechanisms behind emergency reserves.

Method

Participants

This study included a total of 62 participants. Recruitment took place through various social media channels (Facebook, Instagram, and LinkedIn), flyers or mouth-to-mouth (Appendix A). Additionally, two participants were students from Utrecht University, who were recruited through the Sona systems software and received course credit for their participation. Seven participants were excluded after the intake questionnaire due to priorly set exclusion criteria (vegetarian and dietary constraints). A further 23 participants were excluded after the baseline week as they either did not complete it (10 participants) or their average vegetarian meal intake exceeded 20 meals, so that goal accommodation was not possible (13 participants). Out of

the remaining 32 participants, 31 participants completed the four-week-long challenge phase and one participant dropped out during it. Participants were between 21 and 68 years old ($M = 37.52$, $SD = 17.14$) and were from the Netherlands, Germany, Luxembourg, and Slovakia. All participants had to be 18 years old or over and gave fully informed consent (Appendix B) before starting the experiment and were fully debriefed upon completion (Appendix C).

Design, measures, and experiment structure

This experiment followed a between-subjects design. The independent variable was the type of goal setting. In total, there were three different goal types (Easy, Hard and ER), which will be explained in more detail below. The first dependent variable was goal persistence after subgoal failure, measured over the challenge phase. Specifically, one persistence score was computed for each participant. This was done by scoring their subsequent performance on the following day after each subgoal failure with either a zero if they again did not reach their daily goal or a one if they reached their daily goal on the day after failure. These numbers were then summed up and averaged, leading to a score between zero and one for each participant.

The second dependent variable was self-efficacy. Specifically, the de-/increase of participants' self-efficacy after failure was determined. Self-efficacy was assessed twice via the same questionnaire, once before the challenge phase and once again after encountering the first failure (use of first emergency reserve in the ER group). The answers were then averaged, leading to a single score per questionnaire for each participant, so that each participant had two self-efficacy scores. Subsequently, a final score was computed for each participant that expressed the difference between these two scores by subtracting the second score from the first score.

The experiment was split into two parts – the baseline phase and the challenge phase. During the one-week-long baseline phase participants' average vegetarian meal intake was

measured. Upon completion, participants entered the four-week-long challenge phase, in which they received a personal daily vegetarian meal goal (based on their baseline measurement) and were randomly assigned to one out of three weekly goal groups. The first group – the Easy group – was instructed to meet their daily goal of vegetarian meals five out of seven days a week. This meant that they were allowed to not reach their daily goal on two days each week. The second group – the Hard group – was instructed to meet their daily goal seven out seven days a week, meaning they had to reach their daily goal every day for the four weeks. The third group – the ER group – was instructed to meet their daily goal seven out of seven days a week but were given the option to make use of two emergency reserves each week. This meant that whenever they did not reach their daily goal, they could choose to apply an “emergency skip” to that day. The Easy and the Hard group represented the control environment compared to the ER group.

Materials

This study was conducted online entirely with the use of Qualtrics software for the different questionnaires and Google Spreadsheets for recording participants’ meal choices.

Intake questionnaire and Google Spreadsheets

The intake questionnaire (Appendix D) was accessed through a link that was placed on all recruitment material. It consisted of an information sheet, a consent form, and questions addressing demographic information (name, e-mail address, age, gender, and country of residence). Further, participants specified whether they were fully vegetarian or were following any diets to determine if they could participate in the study.

The spreadsheet design was based on Sharif and Shu (2021). The baseline phase spreadsheet included two different sheets: the first was a filled-out example sheet and the second was the sheet for the week-long meal choice tracking (Appendix E). For each meal of the day

(breakfast, lunch, dinner, and other), participants filled out either a “Yes” for having had a vegetarian meal or a “No” for having had a meal containing meat or fish into the respective cells. Again, for the challenge phase, each participant received a personal spreadsheet with 1) their weekly goal (Easy, Hard, or Emergency Reserve) and 2) their daily goal (one, two, three, or four meals). Each spreadsheet was divided up into five sheets: one filled-out example sheet and four empty sheets for each week of tracking. Further, the spreadsheets were programmed in a way that whenever the participant reached their daily goal, a blue bar would pop up in a graph below the meal choice tracking table for that day. If they did not reach their goal on that day in the Easy or Hard groups, no bar would pop up whereas in the ER group, a blue bar would pop up if the participant made adequate use of an emergency reserve (i.e., no more than twice a week).

Self-efficacy questionnaires

To determine self-efficacy perceptions, a questionnaire was created using one of Bandura’s (2006) example scales that addressed the regulation of eating habits. Its 30 statements were adapted to the current context of retaining to the goal of reducing meat and fish intake (Appendix G). Participants had to rate their degree of confidence by pulling the slider to the left and right from zero to 100 with zero being the lowest confidence and 100 being the highest confidence that they could stick to their goal in the given situation. Some example situations included “When very hungry”, “During holiday times” or “Eating at a friend’s house for dinner”.

Covariate questionnaire

Further, covariate measures related to meat and fish consumption were added to the first self-efficacy questionnaire (Appendix H). Participants were asked to specify their moral convictions regarding the consumption of meat and fish and whether they had followed any previous diets. Next, they were asked to rate their agreement on six statements on a five-point

scale, assessing topics such as previous goal-setting behaviour, vegetarianism in one's social circle and the importance of reducing meat and fish consumption.

Procedure

A brief overview of the different experimental stages can be found in Figure 2. At first, all participants filled out the intake questionnaire. Next, a personal folder was created for each participant, including their baseline week spreadsheet. All participants received an email that included a link to their personal baseline spreadsheet and a PDF document containing detailed step-by-step instructions (Appendix I). They were instructed to record their meal choices for the next seven days in their personal baseline spreadsheet. If any meal was skipped, participants were instructed to write down a "Yes" for the respective meal as no meat or fish was consumed.

Upon completion of the baseline phase, a personal daily vegetarian meal goal was calculated for each participant by following a specific priorly set goal calculation (see Table 1). If somebody already had 20 or more vegetarian meals in the baseline week, they were not able to continue with the study as no goal accommodation was possible for them. These participants were informed by email, received a debrief sheet and were thanked for their participation. The remaining participants were randomly assigned to one of the three groups (Easy, Hard, and ER) and received an email with a link to their challenge spreadsheets, a PDF with step-by-step instructions and FAQs (Appendix J). Via the same email, participants received a link to fill out the first self-efficacy questionnaire.

Next, the challenge phase began, and participants recorded their meal choices in their spreadsheets for the next four weeks. Whenever a participant encountered their first failure, they were asked to fill out the second self-efficacy questionnaire. Participants in the ER group filled

out this questionnaire after using their first emergency reserve. At the end of the four weeks, participants were fully debriefed and thanked for their participation.

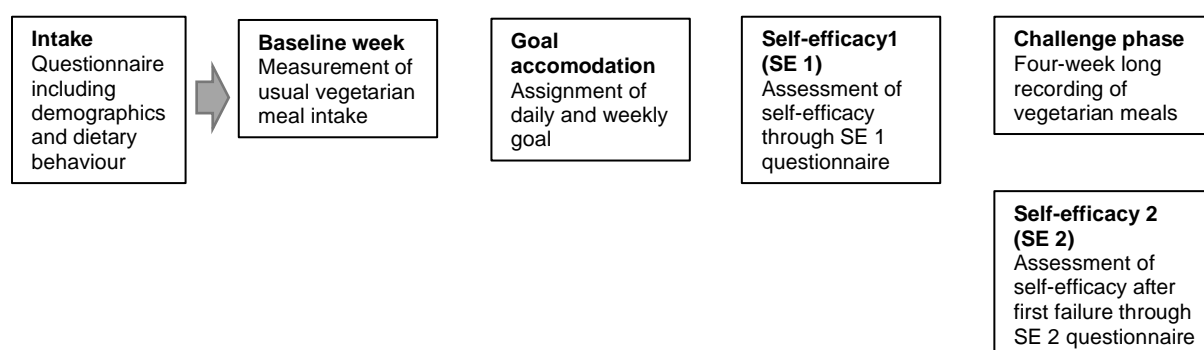
Table 1.

Overview of goal setting calculation.

Vegetarian meals in baseline week	Minimum weekly goal (5 days of the week)	Maximum weekly goal (7 days of the week)	Daily vegetarian meal goal assigned
0 – 4	5	7	1
5 – 9	10	14	2
10 – 15	15	21	3
16 – 19	20	28	4

Figure 2.

Overview of experiment structure, showing various stages and brief descriptions.



Data analysis

All data was processed and prepared using Microsoft Excel and analyses were performed using the IBM statistics program SPSS Statistics 28. Before examining the two hypotheses of

this research, general performance was assessed through two measures. The first measure concerned the average number of days on which a participant successfully reached their daily goal (average score). The second measure addressed the average number of vegetarian meals that were consumed by each participant while controlling for their actual daily goal (accounted average meal score). First, the average score posed as the dependent variable and followingly, the accounted average meal score served as the dependent variable. Dummy variables were created for the Easy and Hard groups, which served as independent variables and were compared to the ER group, which served as the reference group. Outlier detection took place in SPSS by creating boxplots and calculating the Mahalanobis distances.

The main hypothesis of this research is that participants using emergency reserves will have higher persistence rates after subgoal failure than participants in the other two groups. To test this, participants' responses to subgoal failure were examined by comparing the persistence scores of participants between the three groups (Analysis 1). Again, the dummy variables for the Easy and the Hard groups were used as independent variables and the persistence scores served as the dependent variable.

The second hypothesis of this research is that participants in the ER group will experience a lower decrease in self-efficacy after subgoal failure compared to participants in the Easy and Hard groups. Thus, self-efficacy's role as a potential mediator was tested by comparing the difference in self-efficacy scores of the three groups. Two multi-categorical mediation analyses were run using PROCESS in SPSS. The first analysis compared the Easy group to the ER group (Analysis 2a) and the second analysis compared the Hard group to the ER group (Analysis 2b). Using the difference in self-efficacy scores as a mediator variable, both analyses

tested whether self-efficacy was a mediator on goal persistence with persistence scores as the dependent variable and experimental condition as the independent variable.

Results

Analysis of general performance measures

First, the average score was analysed. One case was removed from this analysis after outlier detection. Since a Shapiro-Wilk test revealed that this dependent variable was not normally distributed, a Kruskal-Wallis test was performed. No statistically significant differences were found in average scores between the three groups, $H(2) = 2.12, p = .35$, with a mean score of 4.69 for Easy, 3.98 for Hard and 5.63 for ER (see Figure 3).

Next, the accounted average meal score was analysed. One case was identified as an outlier and was thus removed from this analysis. After checking assumptions, a linear regression was chosen to analyse this variable. Experimental condition was not found to be a statistically significant predictor of the average daily number of vegetarian meals consumed, when accounted for daily goals, $R^2 = .15, F(2, 29) = 2.44, p = .11$, with a mean score of 3.45 for Easy, 3.51 for Hard and 3.92 for ER (see Figure 3).

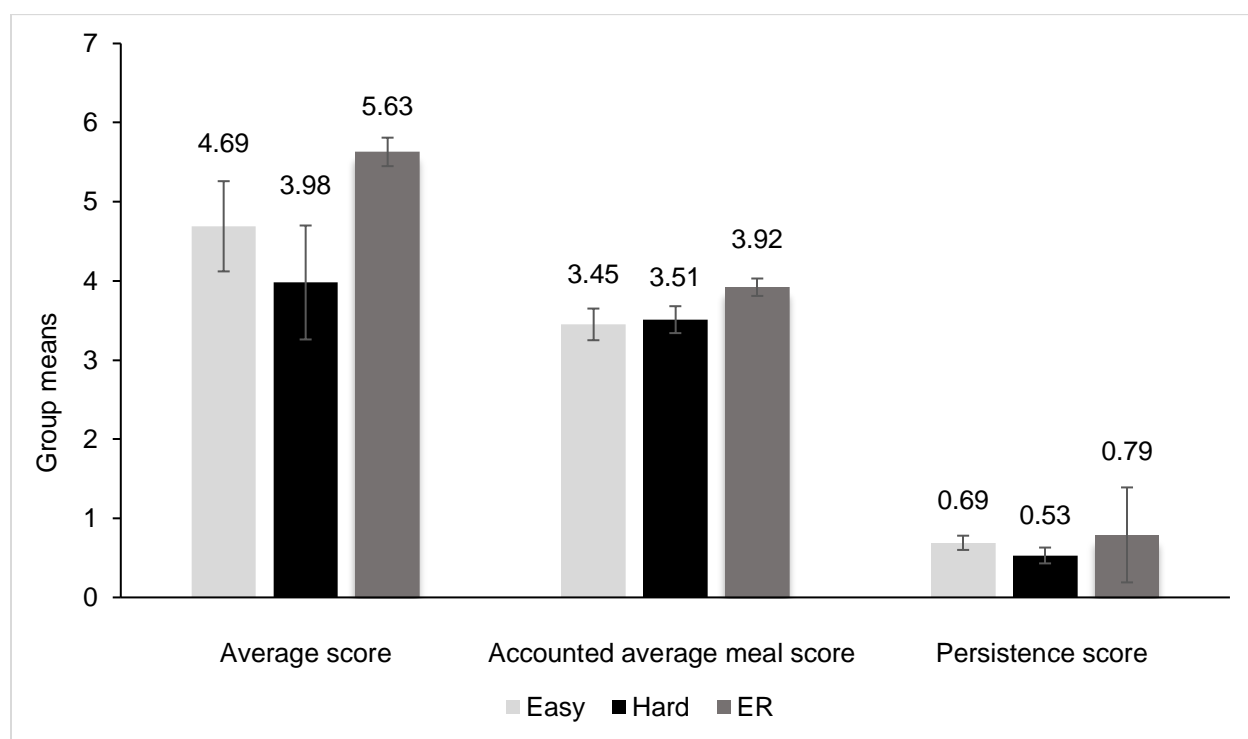
Analysis 1

For Analysis 1, the persistence scores of participants in the Easy ($n = 8$), Hard ($n = 9$), and ER group ($n = 11$) were analysed. Three participants were removed from this analysis: Two participants never encountered a failure and thus had no persistence score and one participant failed every single day of the challenge phase. The assumptions for linear regression (linearity, normality, homoscedasticity, and independence of the independent variable) were checked. After

a Shapiro-Wilk test revealed that the persistence scores were not normally distributed, a non-parametric Kruskal-Wallis test was performed. No statistically significant differences in persistence scores were found between the three groups, $H(2) = 3.067$, $p = .22$, with a mean score of 0.69 for Easy, 0.53 for Hard and 0.79 for ER (see Figure 3).

Figure 3.

Means and error bars of the general performance measure analyses and persistence scores (Analysis 1).



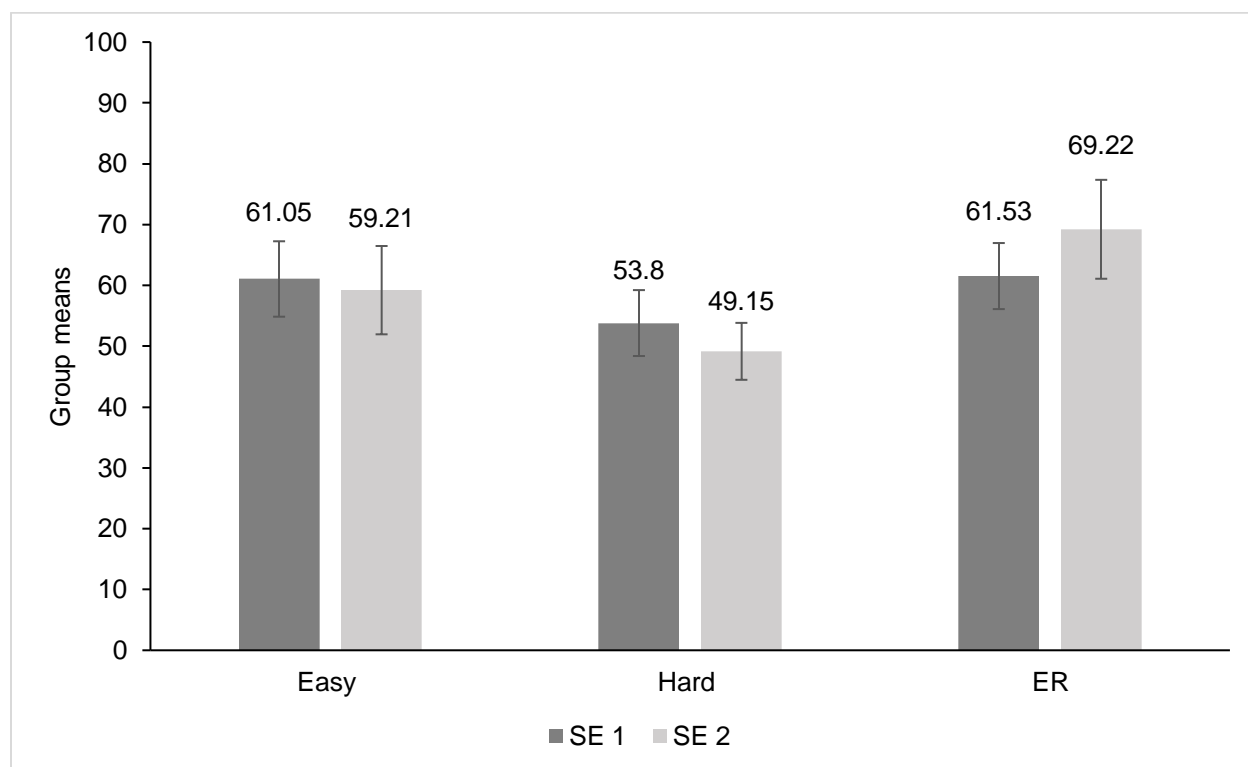
Analysis 2a & b

For Analysis 2a and 2b, self-efficacy was tested as a possible mediator between experimental condition and persistence score. Three cases were not included in this analysis as these were already excluded from Analysis 1. When checking for the assumptions of linearity, normality, homoscedasticity, and independence of the independent variable, a Shapiro-Wilk test

revealed that the self-efficacy difference scores were not normally distributed. Following Hayes' (2018) advice, it was chosen to continue with PROCESS mediation analysis despite this violation. The means and standard errors of the first and second self-efficacy scores for each group are presented in Figure 4.

Figure 4.

Means and error bars of the first self-efficacy score (SE 1) and the second self-efficacy score (SE 2) for Analysis 2a and 2b, presented per group.

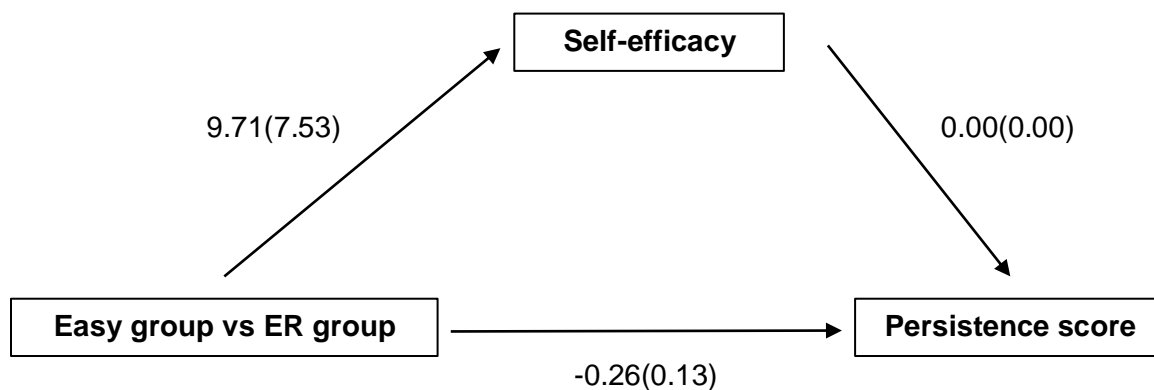


First, for Analysis 2a, a mediation analysis was conducted to examine the mediating effect of self-efficacy on persistence scores between the Easy and the ER group. See Figure 5 for an overview of the mediation model. The total effect of experimental condition on persistence scores was not found to be significant, $b = -0.10$ $t(25) = -0.76$, $p = .45$. Further, no statistically

significant direct effect of experimental condition on persistence scores was found, $b = -0.10$ $t(24) = -0.75$, $p = .46$. No statistically significant effect of experimental condition on self-efficacy was found, $b = 9.71$ $t(25) = 1.29$, $p = .21$. Additionally, no significant effect of self-efficacy on persistence scores was found, $b = .00$ $t(24) = 0.09$, $p = .93$. Lastly, no significant indirect effect of experimental condition on persistence scores through self-efficacy scores was found, $E = 0.00$, $SE = 0.04$, 95% CI[-.06, .10], meaning that no mediation has occurred for the Easy and the ER group.

Figure 5.

Overview of the mediation model for Analysis 2a (Easy group vs ER group).

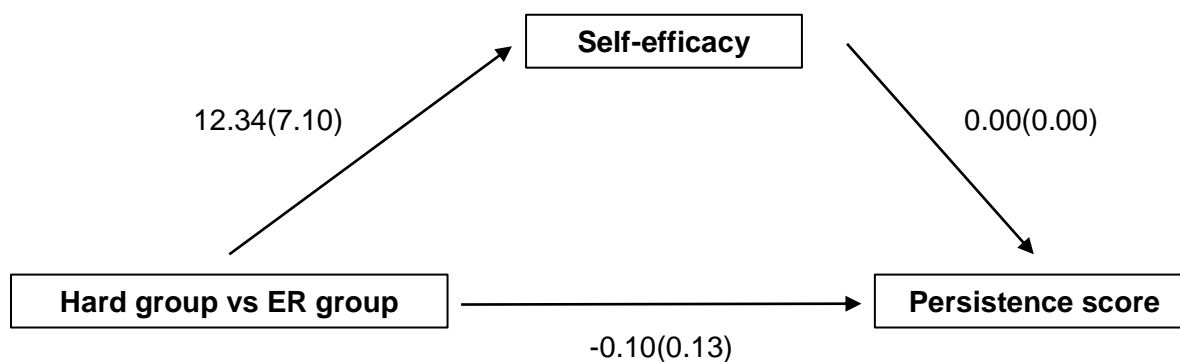


Second, for Analysis 2b, a mediation analysis was conducted to examine the mediating effect of self-efficacy on persistence scores between the Hard and the ER group. See Figure 6 for an overview of the mediation model. The total effect of experimental condition on persistence scores was found to be significant, $b = -0.26$ $t(25) = -2.19$, $p = .04$. No statistically significant direct effect of experimental condition on persistence scores was found, $b = -0.26$ $t(24) = -2.05$, $p = .05$. Further, in the indirect effect model, no statistically significant effect of experimental

condition on self-efficacy was found, $b = 12.34$ $t(25) = 1.74$, $p = .10$. Additionally, no significant effect of self-efficacy on persistence scores was found, $b = .00$ $t(24) = 0.09$, $p = .93$. Lastly, no significant indirect effect of experimental condition on persistence scores through self-efficacy scores was found, $E = .00$, $SE = .03$ 95% CI[-.05, 0.10], meaning that no mediation has occurred for the Hard and the ER group.

Figure 6.

Overview of the mediation model for Analysis 2b (Hard group vs ER group).



Discussion

The present research examined the effectiveness of using emergency reserves in personal goal setting to promote higher persistence after subgoal failure in the context of dietary change. Since Sharif and Shu (2017; 2021) presented a successful application of this nudge in the context of increasing daily step counts, this study aimed to replicate these findings in the context of increasing people’s daily intake of vegetarian meals. Contrary to expectations, goal persistence was not greater in the ER group than in the Easy and the Hard groups. This can be due to several different reasons.

Change of context and framing

Firstly, it is possible that the findings of Sharif and Shu (2021) could not have been replicated because of the change of context that took place. While both goals can be considered personal goals and are of a behavioural change nature, there is a possibility that dietary changes hold more constraints than becoming fitter. Transitioning to a more vegetarian diet addresses multiple pathways (ethical, environmental, social, and personal) and may thus involve more far-reaching complications in daily life. Examples may be if one's closest family is not vegetarian and thus meal plans have to be reorganised or if one's social circle is not accepting of this change and a constant need to justify arises. Becoming fitter will likely not result in complications to the same extent and may therefore be a more attainable goal. Additionally, as factors like social norms, perceived benefits and barriers and environmental concerns can shape one's attitudes and intentions towards reducing meat consumption (Cheah et al., 2020), goals directed at dietary changes may simply involve more possible obstacles that need to be overcome.

Further, the cognitive attributions and mental representations one holds about these goals may differ and the orientation of a goal can be trivial (Ramnerö & Törneke, 2015). The goal of increasing one's daily step count to become fitter is a clear approach-oriented goal. In contrast, the goal in the present study can be viewed as both, an approach-oriented goal if the focus is on increasing vegetarian meals to become more vegetarian, but also as an avoidance-oriented goal if the focus is on decreasing meals that contain meat and fish. In the communication to participants, more emphasis was put on the reduction of meat and fish (i.e., avoidance-oriented) instead of the increase of vegetarian food (i.e., approach-oriented) as, e.g., the recruitment flyer mentioned: “[...] we are looking into ways to reduce people's meat intake”. While both framings exhibit the same desired outcome, namely the goal of becoming more vegetarian, they differ in their focus

on behaviour performance. The avoidance-oriented framing emphasises on avoiding a certain behaviour (i.e., eating meat and fish), possibly leading to more negative thinking. In turn, the approach-oriented framing emphasises on accomplishing a certain behaviour (i.e., eating more vegetarian food), possibly leading to more positive thinking. Approach-oriented goals are associated with more positive emotions, better self-evaluations, and higher psychological well-being than avoidance-oriented goals (Coats et al., 1996). Since emergency reserves were found to work in approach-oriented goals (Sharif & Shu, 2021) and not in the present context in which framing was neither explicitly approach- nor avoidant-oriented, there is a possibility that this mechanism may only work for clearly defined approach-oriented goal framing.

A theoretical explanation may be delivered by the theory of reasoned action (Ajzen & Fishbein, 1980), which articulates that past behaviour and habits like specific and repetitive consumption patterns may hinder initiation of the behaviour components needed to make dietary changes. Past behaviour and habits related to eating may be more dominant, and thus harder to change than those related to walking. While walking and eating are both central components of daily life, eating evolves around lots of other factors such as grocery shopping, meal preparations and social events. Prior eating behaviours and habits may have made it difficult for participants to adapt to a different eating pattern and thus may have prohibited the positive effects of emergency reserves from emerging in the present context.

Goal importance and salience of the superordinate goal

Further, the importance that is attributed to a superordinate goal can play a key role in goal persistence after subgoal failure. If the superordinate goal is perceived as unimportant, there is a lower likelihood to persist after subgoal failure (Devezer et al., 2014). This could be because superordinate and subordinate goals are cognitively linked within a hierarchy, so that

demotivational effects spread upwards toward the superordinate goal. Other previous research has found that increased awareness of the importance of a superordinate goal, while combined with the presence of subordinate goals, leads to better subgoal performance and goal pursuit (Chatzisarantis et al., 2010; Höchli et al., 2020). For present purposes, the importance participants attributed to the superordinate goal may not have been strong enough to moderate the relationship between subgoal performance and commitment to the superordinate goal.

Additionally, the salience of the superordinate goal may not have been stressed enough in the communication towards participants as it was only mentioned in the recruitment material and once more in the information sheet. Sharif and Shu (2017) found that emergency reserves are preferred over easier goals if a superordinate goal is present (e.g., taking a class to later take an exam) and are preferred over harder goals if no superordinate goal is present. It is possible that participants in the ER group did not clearly have the superordinate goal of becoming more vegetarian in mind when making use of their emergency reserves, so that the mechanism behind it could not be fully activated. Thus, a lack of goal importance and salience of the superordinate goal may have led to decreased persistence and no difference between the groups.

Perceived progress

While Sharif and Shu (2021) conclude that emergency reserves increase goal persistence by aggregating one's perceived sense of progress after failure, this effect has seemingly not appeared in the present study. Fishbach and Dhar (2005) found that in a dietary context, focusing on goal progress leads to choices and actions that are incongruent with the existent goal (e.g., choosing an unhealthy snack when aiming to be healthy). This may have also occurred in the present study and may explain why emergency reserves may not have helped participants to persist better as the increased sense of goal progress – inferred by emergency reserves - may

have led to incongruent choices on the following days (i.e., eating meat or fish). This would mean that goal progress may be the wrong focus and could in turn hinder goal persistence in the present context. This is contrary to the findings of Sharif and Shu (2017; 2021), which may be due to changing the nature of the goal, so that emergency reserves may still work through increasing perceived progress when increasing daily steps, but not when increasing vegetarian meals.

What the hell effect

Goals, constraining undesirable behaviour, can be counterproductive when violated, and can possibly lead to complete performance deterioration (Soman & Cheema, 2004). This observation can be explained by the “what the hell” effect, which suggests that once a goal has been violated, engagement with a constrained behaviour will become more likely than before violation or even before goal setting. To eliminate this effect, the goal should be framed in a way in which a positive outcome is promoted instead of constraining an unwanted behaviour (Cochran & Tesser, 1996), which is in line with the idea of promoting approach-oriented goals rather than avoidance-oriented goals. Thus, there is a possibility that the specific framing of the goal in terms of reducing the consumption of meat and fish is somewhat counterproductive and may have hindered the beneficial effects of using emergency reserves from occurring.

While Soman and Cheema (2004) found support for the benefits of setting goals if the goal is achievable, they further suggest that goals should neither be too easy nor too hard to reach, but instead be more moderate. This can be reasoned by Heath et al. (1999), who claim that by setting a goal, a reference point is formed, which divides outcomes into positive (e.g., achieving the goal) and negative spheres (e.g., violating the goal). Thus, an alternative explanation may be that the specific distribution of emergency reserves (i.e., two emergency

reserves per day for each week), adapted from Sharif and Shu (2021), is not ideal in the present context, suggesting two things: Firstly, the goal of becoming more vegetarian is simply more difficult to reach than the goal of becoming fitter, so that even participants in the ER group fell under the higher reference point too many times, interpreted this as a failure and thus experienced the what the hell effect at some point. Secondly, focussing on days and daily goals may not be beneficial in the present context and an application of emergency reserves to single meals may be better suited. Hence, the model of emergency reserves may not have been strong enough to withstand this effect, implying that its effectiveness may be dependent on the specific type of goal framing, the general difficulty of a goal and the respective distribution of emergency reserves across each week.

Self-efficacy as a mediator

Further, contrary to expectations, self-efficacy could not be confirmed as a mediator between emergency reserves and goal persistence, suggesting that self-efficacy may simply not contribute to this theoretical model as a mediator. This is in line with Webb and Sheeran (2005), who found that self-efficacy is not a construct predicting goal success or failure. As self-efficacy measures address the perceived capability of an individual at the point of measurement (Bandura, 2006), it is possible that feeling more capable to achieve the goal does not explain the process through which emergency reserves increase goal persistence.

Instead, self-efficacy may be a moderator, which influences the strength of the relationship between emergency reserves and goal persistence after subgoal failure. Previous research has found that people with higher self-efficacy have a higher tendency to establish effective task strategies compared to people with low self-efficacy (Latham et al., 1994; Locke & Latham, 2002; Wood & Bandura, 1989), which supports this notion. Therefore, self-efficacy's

role as a moderator could be further investigated while alternative constructs should be considered to determine what mediates the relationship between emergency reserves and goal persistence after subgoal failure.

Limitations

This study holds some limitations that should be paid attention to before conducting future research of this kind. First and foremost, the sample size of the present research (31 participants) was very limited compared to Sharif and Shu (2021), who had a larger sample with 273 participants. This decrease in power could explain the absence of significant results for both, the effectiveness of emergency reserves and self-efficacy as a mediator. As can be seen in Figure 3, participants of the ER group did have higher average scores, accounted average meal scores and persistence scores. Further, Figure 4 shows that they had higher self-efficacy scores and these seemed to increase after subgoal failure. Thus, conducting similar research with a larger sample size could potentially lead to significant results.

Secondly, the change of context might have influenced the chances of successfully adapting and adjusting Sharif and Shu's (2021) methodology. Specifically, Sharif and Shu (2021) calculated a new daily goal for each participant by taking 120% of their average step goal from the baseline week. This was not adaptable to the present context and instead, it was chosen to work with four hypothetical meals (breakfast, lunch, dinner, and snacks) per day and increase participants' number of vegetarian meals per day. However, most participants (21 participants) received a goal of four vegetarian meals per day. For the Hard group and the ER group, this meant that participants basically had to become completely vegetarian, which is arguably a bigger transition than only increasing vegetarian meals. This may thus be a more impractical goal setting, resulting in less accurate results. Further, the specific calculation (see Table 1)

consequentially led to the exclusion of many participants after the baseline week as those with 20 vegetarian meals or more could not be assigned a daily goal.

Lastly, the assumption of normality was violated for the mediation analyses. Despite Hayes' (2018) advice to proceed with PROCESS, others have suggested that when dealing with small sample sizes, there is a likelihood that this violation can affect the validity of results (Edgell & Noon, 1984; Havlicek & Peterson, 1977). Thus, this should be controlled for in future research. Also, as the self-efficacy questionnaire was based on a questionnaire by Bandura (2006) to regulate eating habits and was only adapted to the present context, a closer review of it in accordance with other self-efficacy measurement methods may be advisable.

Recommendations for future research

Next to overcoming the above-mentioned limitations, future research may also address some of the following points that were discussed earlier. First, the salience of the superordinate goal could be increased as previous research has shown that this can increase performance by providing value and meaning, and strengthening guidance (Carver & Scheier, 2001; Chatzisarantis et al., 2010; Höchli et al., 2018; 2020; Höge & Schnell, 2012; Sheldon & Elliott, 1999). Second, as goal importance can predict goal commitment (Devezer et al., 2014), it is suggested to assess individuals' goal importance as well as their willingness to change their diets.

Next, future research should more closely examine the role perceived progress plays as the present study yielded contradictory results to Sharif and Shu (2021). Participants' perceived sense of progress could be measured throughout the experiment to actively encourage them to consider their progress, additionally to the progress graphs in their Google Spreadsheets. This might be done through a questionnaire at the end of every week.

Lastly, alternative mediators should be introduced and tested to better understanding of firstly, why the use of emergency reserves resulted in higher persistence in Sharif and Shu (2017; 2021) and secondly, why this effect has not occurred in the present study. Possible mediators may be social norms, perceived benefits and barriers and environmental concerns, which were found to exhibit a positive relationship with the willingness to reduce meat consumption (Cheah et al., 2020). Alternatively, Devezer et al. (2014) found that end goal visualisation, self-relevance of the end goal, and aversive consequences of failure can decrease the negative effects associated with subgoal failure, so that these could also be considered as mediators. In sum, for future research, it is suggested to increase the salience of the superordinate goal, while measuring goal importance, goal commitment and perceived sense of progress, and assessing alternative mediators.

Conclusion

All in all, the present research was not able to replicate the positive effects of emergency reserves on goal persistence after subgoal failure, as found by Sharif and Shu (2021), in the context of dietary change. Sharif and Shu's (2021) method may not be suitable for the present context, because the transition towards a vegetarian diet may hold more far-reaching consequences for the individual than taking more steps as it addresses ethical, environmental, social, and personal pathways. Social norms and perceived benefits and barriers may have resulted in constraints that made it more difficult to perform dietary changes while framing the goal in a more avoidant-oriented manner may have had further aversive effects.

Next, a lack of goal importance and salience of the superordinate goal may have hindered the working mechanism behind emergency reserves to be activated, resulting in lower-than-expected persistence of the ER group. Since the effectiveness of using emergency reserves is

assumed to be based on its ability to heighten one's sense of perceived progress (Sharif & Shu, 2021), future research could more closely examine this by measuring participants' sense of progress throughout the experiment. Nevertheless, there is a possibility that goal progress may not be the most ideal focus as it can lead to incongruent choices (Fishbach & Dhar, 2005). Alternatively, the type of goal setting chosen by Sharif and Shu (2021) may have been too difficult for the present superordinate goal, so that ER participants still experienced too many goal violations, which led to reduced goal persistence. Hence, the effectiveness of emergency reserves may depend on goal difficulty and thus its distribution should be adjusted accordingly.

Lastly, self-efficacy could not be confirmed as a mediator. It may instead be a moderator that influenced the strength of the relationship between emergency reserves and goal persistence after failure. Thus, future research should consider alternative constructs as mediators to shed more light on the working mechanisms behind emergency reserves as a nudge to increase goal persistence after subgoal failure.

References

- Acland, D., & Levy, M. R. (2015). Naiveté, projection bias, and habit formation in gym attendance. *Management Science*, *61*(1), 146-160.
<https://doi.org/10.1287/mnsc.2014.2091>
- Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behavior. Englewood Cliffs, NJ: Prentice-Hall.
- Bacon, L., & Krpan, D. (2018). (not) eating for the environment: The impact of restaurant menu design on vegetarian food choice. *Appetite*, *125*, 190-200. <https://doi.org/10.1016/j.appet.2018.02.006>
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. Macmillan.
- Bandura, A. (2006). Guide for constructing self-efficacy scales. *Self-efficacy beliefs of adolescents*, *5*(1), 307-337.
- Bandura, A., & Cervone, D. (1983). Self-evaluative and self-efficacy mechanisms governing the motivational effects of goal systems. *Journal of Personality and Social Psychology*, *45*(5), 1017-1028. <https://doi.org/10.1037/0022-3514.45.5.1017>
- Bandura, A., & Locke, E. A. (2003). Negative self-efficacy and goal effects revisited. *Journal of Applied Psychology*, *88*(1), 87–99. <https://doi.org/10.1037/0021-9010.88.1.87>
- Carver, C. S., & Scheier, M. F. (2001). *On the self-regulation of behavior*. Cambridge University Press.
- Charness, G., & Gneezy, U. (2009). Incentives to exercise. *Econometrica*, *77*(3), 909-931.
<https://doi.org/10.3982/ECTA7416>

- Chatzisarantis, N. L. D., Hagger, M. S., & Wang, J. C. K. (2010). Evaluating the effects of implementation intention and self-concordance on behaviour. *The British Journal of Psychology*, *101*(4), 705-718. <https://doi.org/10.1348/000712609X481796>
- Cheah, I., Sadat Shimul, A., Liang, J., & Phau, I. (2020). Drivers and barriers toward reducing meat consumption. *Appetite*, *149*, 104636. <https://doi.org/10.1016/j.appet.2020.104636>
- Coats, E. J., Janoff-Bulman, R., & Alpert, N. (1996). Approach versus avoidance goals: Differences in self-evaluation and well-being. *Personality and Social Psychology Bulletin*, *22*(10), 1057-1067. <https://doi.org/10.1177/01461672962210009>
- Cochran, W., & Tesser, A. (1996). The "what the hell" effect: Some effects of goal proximity and goal framing on performance. In L. L. Martin & A. Tesser (Eds.), *Striving and feeling: Interactions among goals, affect, and self-regulation* (pp. 99–120). Lawrence Erlbaum Associates, Inc.
- Devezer, B., Sprott, D. E., Spangenberg, E. R., & Czellar, S. (2014). Consumer well-being: Effects of subgoal failures and goal importance. *Journal of Marketing*, *78*(2), 118-134. <https://doi.org/10.1509/jm.11.0599>
- Edgell, S. E., & Noon, S. M. (1984). Effect of violation of normality on the t test of the correlation coefficient. *Psychological Bulletin*, *95*(3), 576-583. <https://doi.org/10.1037/0033-2909.95.3.576>
- Elliot, A. J., & Fryer, J. W. (2008). The goal construct in psychology. *Handbook of Motivation Science*, *18*, 235-250.
- Fishbach, A., & Dhar, R. (2005). Goals as excuses or guides: The liberating effect of perceived goal progress on choice. *The Journal of Consumer Research*, *32*(3), 370-377. <https://doi.org/10.1086/497548>

- Fishbach, A., Dhar, R., & Zhang, Y. (2006). Subgoals as substitutes or complements: The role of goal accessibility. *Journal of Personality and Social Psychology*, 91(2), 232-242. <https://doi.org/10.1037/0022-3514.91.2.232>
- Gravert, C., & Kurz, V. (2021). Nudging à la carte: A field experiment on climate-friendly food choice. *Behavioural Public Policy*, 5(3), 378-395. <https://doi.org/10.1017/bpp.2019.11>
- Havlicek, L. L., & Peterson, N. L. (1977). Effect of the violation of assumptions upon significance levels of the pearson r. *Psychological Bulletin*, 84(2), 373-377. <https://doi.org/10.1037/0033-2909.84.2.373>
- Hayes, A. F. (2018). *Introduction to Mediation, Moderation, and Conditional Process Analysis, Second Edition (Methodology in the Social Sciences)* (2nd ed.). Guilford Press.
- Heath, C., Larrick, R. P., & Wu, G. (1999). Goals as reference points. *Cognitive psychology*, 38(1), 79-109. <https://doi.org/10.1006/cogp.1998.0708>
- Höchli, B., Brügger, A., & Messner, C. (2018). How focusing on superordinate goals motivates broad, long-term goal pursuit: A theoretical perspective. *Frontiers in Psychology*, 9, 1879-1879. <https://doi.org/10.3389/fpsyg.2018.01879>
- Höchli, B., Brügger, A., & Messner, C. (2020). Making new year's resolutions that stick: Exploring how superordinate and subordinate goals motivate goal pursuit. *Applied Psychology: Health and Well-being*, 12(1), 30-52. <https://doi.org/10.1111/aphw.12172>
- Höge, T., & Schnell, T. (2012). Kein Arbeitsengagement ohne Sinnerfüllung. Eine Studie zum Zusammenhang von Work Engagement, Sinnerfüllung und Tätigkeitsmerkmalen. *Wirtschaftspsychologie*, 1, 91-99.

- Iliev, R., & Judge, T. A. (2005). Goal regulation across time: The effects of feedback and affect. *Journal of Applied Psychology, 90*(3), 453-467. <https://doi.org/10.1037/0021-9010.90.3.453>
- Kongsbak, I., Skov, L. R., Nielsen, B. K., Ahlmann, F. K., Schaldemose, H., Atkinson, L., Wichmann, M., & Pérez-Cueto, F. J. A. (2016). Increasing fruit and vegetable intake among male university students in an ad libitum buffet setting: A choice architectural nudge intervention. *Food Quality and Preference, 49*, 183-188. <https://doi.org/10.1016/j.foodqual.2015.12.006>
- Kopetz, C. E., Kruglanski, A. W., Arens, Z. G., Etkin, J., & Johnson, H. M. (2012). The dynamics of consumer behavior: A goal systemic perspective. *Journal of Consumer Psychology, 22*(2), 208-223. <https://doi.org/10.1016/j.jcps.2011.03.001>
- Kruglanski, A. W., Shah, J. Y., Fishbach, A., Friedman, R., Chun, W. Y., & Sleeth-Keppler, D. (2018). A theory of goal systems. In *The motivated mind* (pp. 207-250). Routledge.
- Kurz, V. (2018). Nudging to reduce meat consumption: Immediate and persistent effects of an intervention at a university restaurant. *Journal of Environmental Economics and Management, 90*, 317-341. <https://doi.org/10.1016/j.jeem.2018.06.005>
- Latham, G. P., Winters, D. C., & Locke, E. A. (1994). Cognitive and motivational effects of participation: A mediator study. *Journal of Organizational Behavior, 15*(1), 49-63. <https://doi.org/10.1002/job.4030150106>
- Li, M., & Chapman, G. B. (2013). Nudge to health: Harnessing decision research to promote health behavior. *Social and Personality Psychology Compass, 7*(3), 187-198. <https://doi.org/10.1111/spc3.12019>

- Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting & task performance*. Prentice-Hall, Inc.
- Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *The American Psychologist*, *57*(9), 705-717. <https://doi.org/10.1037/0003-066X.57.9.705>
- Ramnerö, J., & Törneke, N. (2015). On having a goal: Goals as representations or behavior. *The Psychological Record*, *65*, 89-99. <https://doi.org/10.1007/s40732-014-0093-0>
- Reicks, M., Redden, J. P., Mann, T., Mykerezzi, E., & Vickers, Z. (2012). Photographs in lunch tray compartments and vegetable consumption among children in elementary school cafeterias. *Jama*, *307*(8), 784-785. <https://doi.org/10.1001/jama.2012.170>
- Roberto, C. A., Larsen, P. D., Agnew, H., Baik, J., & Brownell, K. D. (2010). Evaluating the impact of menu labeling on food choices and intake. *American Journal of Public Health*, *100*(2), 312-318. <https://doi.org/10.2105/AJPH.2009.160226>
- Scott, M. L., & Nowlis, S. M. (2013). The effect of goal specificity on consumer goal reengagement. *The Journal of Consumer Research*, *40*(3), 444-459. <https://doi.org/10.1086/670766>
- Sharif, M. A., & Shu, S. B. (2017). The benefits of emergency reserves: Greater preference and persistence for goals that have slack with a cost. *Journal of Marketing Research*, *54*(3), 495-509. <https://doi.org/10.1509/jmr.15.0231>
- Sharif, M. A., & Shu, S. B. (2021). Nudging persistence after failure through emergency reserves. *Organizational Behavior and Human Decision Processes*, *163*, 17-29. <https://doi.org/10.1016/j.obhdp.2019.01.004>

- Sheldon, K. M., & Elliot, A. J. (1999). Goal striving, need satisfaction, and longitudinal well-being: The self-concordance model. *Journal of Personality and Social Psychology*, 76(3), 482-497. <https://doi.org/10.1037/0022-3514.76.3.482>
- Springmann, M., Godfray, H. C. J., Rayner, M., & Scarborough, P. (2016). Analysis and valuation of the health and climate change cobenefits of dietary change. *Proceedings of the National Academy of Sciences - PNAS*, 113(15), 4146-4151. <https://doi.org/10.1073/pnas.1523119113>
- Steel, P., & König, C. J. (2006). Integrating theories of motivation. *The Academy of Management Review*, 31(4), 889-913. <https://doi.org/10.5465/AMR.2006.22527462>
- Soman, D., & Cheema, A. (2004). When goals are counterproductive: The effects of violation of a behavioral goal on subsequent performance. *Journal of Consumer Research*, 31(1), 52-62. <https://doi.org/10.1086/383423>
- Sun, S. H., and Frese, M. (2013). "Multiple goal pursuit," in *New developments in goal setting and task performance*. eds E. A. Locke and G. P. Latham (New York, NY: Routledge), 177–194. <https://doi.org/10.4324/9780203082744>
- Sunstein, C. R. (2014). Nudging: A very short guide. *Journal of Consumer Policy*, 37(4), 583-588. <https://doi.org/10.1007/s10603-014-9273-1>
- Thaler, R.H., & Sunstein, C.R. (2008). *Nudge: Improving Decisions about Health, Wealth, and Happiness*. Yale University Press, New Haven.
- Thaler, R. H., & Sunstein, C. R. (2021). *Nudge: The final edition*. Yale University Press.
- Webb, T. L., & Sheeran, P. (2005). Integrating concepts from goal theories to understand the achievement of personal goals. *European Journal of Social Psychology*, 35(1), 69-96. <https://doi.org/10.1002/ejsp.233>

- Wilcox, K., Block, L. G., & Eisenstein, E. M. (2011). Leave home without it? the effects of credit card debt and available credit on spending. *Journal of Marketing Research*, 48(SPL), S78-S90. <https://doi.org/10.1509/jmkr.48.SPL.S78>
- Wisdom, J., Downs, J. S., & Loewenstein, G. (2010). Promoting healthy choices: Information versus convenience. *American Economic Journal: Applied Economics*, 2(2), 164-178. <https://doi.org/10.1257/app.2.2.164>
- Wood, R., & Bandura, A. (1989). Social cognitive theory of organizational management. *The Academy of Management Review*, 14(3), 361-384. <https://doi.org/10.5465/amr.1989.4279067>
- Zhou, S., Smith, A. D., & Knudsen, E. E. (2015). Ending overfishing while catching more fish. *Fish and Fisheries (Oxford, England)*, 16(4), 716-722. <https://doi.org/10.1111/faf.12077>

Appendices

Appendix A.....	43
Appendix B.....	44
Appendix C.....	46
Appendix D.....	48
Appendix E.....	51
Appendix F.....	52
Appendix G.....	55
Appendix H.....	61
Appendix I.....	66
Appendix J.....	67

Appendix A

Recruitment flyer

Are you up for a challenge? We are looking for YOU!

Are you up for a challenge? Want to start this year off by making the world a better place and becoming healthier? Join our research!



For our master's research, we are looking into ways to reduce people's meat intake.

There are three time slots in which you are able to participate:

1. Friday 20/01 - Sunday 24/02
2. Friday 03/02 - Sunday 12/03
3. Friday 10/02 - Sunday 19/03



Your tasks: You will keep track of the number of vegetarian meals you eat in the first baseline week. After this, you will receive a personalized challenge to increase this amount for four weeks. If you are an 18 or over carnivore, who is not already following or planning on following other diets, we are looking for **you!** Scan the QR code or click on the link below to ensure you will be part of this study!

For questions please refer to:
research.sophia.lina@gmail.com



Best regards,
Lina Heidt and Sophia Wantenaar



https://survey.uu.nl/jfe/form/SV_cLJtpFjGLe1Aato

Appendix B

Informed consent form presented at the beginning of the intake questionnaire

Dear participant,

hereby we would like to inform you about our online research. One of the main aims of this research is to find ways to reduce meat consumption and hence increase the consumption of vegetarian food. Upon completion of the study, you will be informed about the specifics of this study.

Before starting the actual experiment, you will have to give consent. If you decide to participate, you will receive an email on (the 20th of January 2023, the 3rd of February 2023, or the 10th of February 2023), the , which includes a personal link to a Google Spreadsheet and further explanation of the study's procedure. The entire study will take place online and the total study takes up to five weeks. You can either access this research through your computer or smartphone. The study is divided up into two parts. During the first part, there will be a one-week baseline measurement of your daily vegetarian food intake. Following this, everyone will receive specific instructions based on the baseline measurement. In the second part of the study, you will be asked to record your daily intake of vegetarian meals for four weeks in total. This will all be done in a personalized Google Spreadsheet at the end of each day and this will approximately take 2 minutes every time. At different stages of the experiment, you will be asked to fill out short questionnaires. The last questionnaire will be accessible on (the 26th of February 2023, the 12th of March 2023, or the 19th of March 2023) and after completion you will have finished the whole experiment. We will also ask you to check your emails regularly as we will send different reminders/ information during the course of the experiment.

You can only participate if you are **at least 18 years old**. Additionally, you **cannot** be following any other diets already. If you are vegetarian already and would be interested in going vegan, just continue with the questionnaire and let us know.

There are no risks or benefits tied to participation in this research. You will not receive any sort of compensation for participating in this study. However, Psychology students at the University of Utrecht can gain up to 3 PPU for total completion of the study. If this is applicable to you, please fill in your student number and student e-mail address at the end of this study.

For this research, the programs Qualtrics and Google Spreadsheets will be used to collect data. Only the researchers will have access to these data. Please install the Google Spreadsheets App on your smartphone, if you have not done this already. Thorough instructions will follow. Your data is stored till the end of this research, which will be around the end of April, 2023. We will not store your IP-address. However, your name and e-mail address will be stored for internal purposes, but will be completely anonymised after it has been used to connect different data.

Participation in this research is completely voluntary. Withdrawal from the experiment is possible at any moment without having to give any reason. However, once data has been made anonymous, your data can no longer be withdrawn. Participation in this study is confidential, i.e. only the researchers and the supervisor will have access to your information during the study. No personal information (name and email) will be kept or shared with another party.

For further questions or notions about the research you can contact one of the researchers (see contact information below). If you have a complaint or questions related to your privacy, please send an email to the Data Protection Officer of the UU (privacy@uu.nl), the Data Protection Authority

(<https://autoriteitpersoonsgegevens.nl>) If you have a formal complaint about the research, please send an email to the complaints officer (klachtenfunctionaris-fetcsocwet@uu.nl).

Best regards,

Sophia Wantenaar, Applied Cognitive Psychology Master Student, s.r.wantenaar@students.uu.nl

Lina Heidt, Applied Cognitive Psychology Master Student, l.heidt@students.uu.nl

Dr. Robert Weijers, UU lecturer (supervisor for this Master Thesis project), r.j.weijers@uu.nl

Consent By ticking the following boxes, you are agreeing to:

- I confirm that I have read and understood the information text about the research
- I understand that my participation is voluntarily and that I can withdraw from the research at any moment of the study
- I agree that research data gathered for the study may be published or made available provided my name or other identifying information is not used
- I understand that the research data, without any personal information that could identify me (not linked to me) may be shared with others
- I agree to participate in this research

Appendix C

Debrief sheet

You have come to the end of this research. Thank you for participating. If you would like more information on the purpose of this study, please read below. Otherwise, you can click the button to exit this window.

This experiment investigated whether goal framing is a possible tool for people to persist in their personal goals. Our initial interest was sparked by a research from Sharif and Shu (2021) that investigated whether goal framing could be used to make people persist on their goal to become fit. Thus, our main aim was to see whether this type of goal framing would also be applicable to a dietary context.

In this study there were three different conditions: the Easy, Hard and Emergency Reserve goal setting. In the Easy condition, participants were instructed to attain their personal goal on at least five out of seven days in a week. In the Hard condition, participants were instructed to attain their personal goal on all seven days in a week. In the Emergency Reserve condition people were instructed to do the same as in the Hard condition, however, they were allowed to use two emergency skips whenever they failed, to give an illusion of uninterrupted progress.

We expect that people who were allowed to make use of Emergency Skips, were better at persisting in their goal the day after a day on which the personal goal was not reached (subgoal failure). Further, The second and third elements of this study were looking into the role of self-efficacy and the role of feelings of accomplishment.

Lina's objective was to see whether people's self-efficacy was preserved after subgoal failure when using emergency skips. Self-efficacy concerns the beliefs of an individual about their capabilities for performance in the future (Stock and Cervone, 1990). Thus, self-efficacy measurements were concerned with your perception of how you would perform the next time.

Sophia's objective was to understand whether an emergency reserve is a unique phenomena on its own, or that it just works the same as a flexible goal, where there are two reference points. Flexible goals seem to work for people as it offers them one attainable and one challenging reference point. In the Emergency Reserve condition, the goal without use of the skips (7 days) might serve as a higher, thus, challenging reference point. Similarly, the goal with use of the two skips (5 days) might serve as a lower, thus, more attainable reference point. As a flexible goal of trying to reach daily goals for 5 to 7 days in a week also makes use of these two reference points, it might just be that setting goals with emergency skips works no different. In the paper of Scott and Nowlis (2013), a model is described in which the attainability and challenge flexible goals offer, together induce higher feelings of accomplishment. According to the researchers, this explains why people are better at persisting in their goals when using flexible goal setting. The expectation for this research was that setting goals with emergency skips works similarly. Therefore, people in the Emergency Reserve condition are expected to report higher feelings of accomplishment.

Perhaps you can make use of emergency skips in your future goals too! We hope that you have enjoyed participating in this study. Please do not hesitate to contact us if you should have any questions:

Students: Sophia Wantenaar (s.r.wantenaar@students.uu.nl); Lina Heidt (l.heidt@students.uu.nl)

Supervisor: Dr. Robert Weijers (r.j.weijers@uu.nl)

References

Sharif, M. A., & Shu, S. B. (2021). Nudging persistence after failure through emergency reserves. *Organizational Behavior and Human Decision Processes*, 163, 17-29.

Stock, J., & Cervone, D. (1990). Proximal goal-setting and self-regulatory processes. *Cognitive therapy and research*, 14(5), 483-498.

Scott, M. L., & Nowlis, S. M. (2013). The Effect of Goal Specificity on Consumer Goal Reengagement. *Journal of Consumer Research*, 40(3), 444–459. <https://doi.org/10.1086/670766>

Appendix D

Intake questionnaire

Q16 Please state your first and last name:

Q18 If you have one, please leave your Gmail address here.

Otherwise, please leave an other e-mail address here. This address will be used to send important further instructions and links to your personal Google Spreadsheet.

Q17 If you do not have a Gmail account or a different email address linked to Google, please tick the box underneath. In that case the researchers will create an anonymous one for you to join this experiment

Create an anonymous Google account for me (1)

Q16 In what country do you live?

Q2 What is your age?

17 or under (1)

Other, namely: (2) _____

Q3 With what gender do you identify yourself?

- Male (1)
- Female (2)
- Non-binary / third gender (3)
- Prefer not to say (4)
-

Q5 Do you consider yourself a full vegetarian? (full vegetarian means that you only eat vegetarian and never eat meat)

- Yes (1)
- No (2)
-

Q6 Are you currently following any diet(s)?

- Yes, specify: (1) _____
- No (2)

IF PARTICIPANT SELECTED THAT THEY ARE A FULL VEGETARIAN:

Q11 Sadly you cannot participate in this research, because you are already a full vegetarian.

However, we might launch another study very soon with the challenge of becoming **vegan**, specifically made for vegetarians. If you are interested in joining please tick the box below and we will let you know by email.

Keep me updated! (4)

Q20 Thank you for deciding to take part in this study. We will reach out to you with further instruction via the e-mail address you supplied earlier in this study. This will be in the week of the 16th of January 2023.

If you have any questions in the meantime, please reach out to one of the researchers or the supervisor via e-mail.

Researchers: Sophia Wantenaar (s.r.wantenaar@students.uu.nl);
Lina Heidt (l.heidt@students.uu.nl)

Supervisor: Dr. Robert Weijers (r.j.weijers@uu.nl)

By clicking on the yellow arrow button below, you will exit this questionnaire.

Appendix E

Screenshots of the Baseline Week Spreadsheet

The screenshot shows a spreadsheet titled "Baseline - Spreadsheet" with a menu bar (File, Edit, View, Insert, Format, Data, Tools, Extensions, Help) and a toolbar. The spreadsheet data is as follows:

Baseline Week	20/01/2023	21/01/2023	22/01/2023	23/01/2023	24/01/2023	25/01/2023	26/01/2023
	Friday Day 1	Saturday Day 2	Sunday Day 3	Monday Day 4	Tuesday Day 5	Wednesday Day 6	Thursday Day 7
Breakfast	No	Yes	No	No	Yes	No	Yes
Lunch	No	No	Yes	No	No	Yes	Yes
Dinner	Yes	Yes	Yes	Yes	No	Yes	Yes
Other	No	No	No	Yes	Yes	Yes	No
Sum		1	2	2	2	2	3
Total amount of vegetarian meals of the week				15			

A red arrow points to the "Breakfast" row. A text box on the left contains the instruction: "Please specify for each meal of the day if you either had a vegetarian meal (insert 'yes') or a meal containing meat (insert 'no')".

The screenshot shows the same spreadsheet as above, but with all meal data set to zero. The data is as follows:

Baseline Week	20/01/2023	21/01/2023	22/01/2023	23/01/2023	24/01/2023	25/01/2023	26/01/2023
	Friday Day 1	Saturday Day 2	Sunday Day 3	Monday Day 4	Tuesday Day 5	Wednesday Day 6	Thursday Day 7
Breakfast							
Lunch							
Dinner							
Other							
Sum		0	0	0	0	0	0
Total amount of vegetarian meals of the week				0			

A red arrow points to the "Breakfast" row. The text box on the left contains the same instruction as in the first screenshot.

Appendix F

Example spreadsheet for a participant in the Easy goal condition

Participant 10 - Four week challenge ☆ 📅 🔄

File Edit View Insert Format Data Tools Extensions Help

Last edit was made 7 hours ago

	A	B	C	D	E	F	G	H	I	J	K	L	M		
1	Weekly Goal:	Reach vegetarian meal goal on 5 days of the week													
2	Daily vegetarian meal Goal:	4 out of 4													
3															
4															
5		30/01/2023		31/01/2023		01/02/2023		02/02/2023		03/02/2023		04/02/2023		05/02/2023	
6	Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday							
7		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7							
8	Breakfast	Yes	Yes	Yes	Yes	Yes	Yes	Yes							
9	Lunch	Yes	Yes	Yes	Yes	Yes	Yes	Yes							
10	Dinner	Yes	Yes	Yes	Yes	Yes	Yes	Yes							
11	Other	Yes	Yes	Yes	Yes	Yes	Yes	Yes							
12	Sum	4	4	4	4	3	4	1							
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															
26															
27															
28															
29															
30															
31															
32															
33															
34															
35															
36															
37															
38															
39															
40															
41															
42															
43															
44															
45															
46															
47															

Day	Goal Achievement
Day 1	1.0
Day 2	1.0
Day 3	1.0
Day 4	1.0
Day 5	0.75
Day 6	0.5
Day 7	0.25

V24

fx

50% | € | % | .0 | .00 | 123 | 10 | B | I | S | A | 📄 | 📅 | 🔄

+ 📄

🔒 Example ▾

🔒 Week1 ▾

🔒 Week2 ▾

🔒 Week3 ▾

🔒 Week4 ▾

Example spreadsheet for a participant in the Hard goal condition

Participant 15 - Four week challenge

File Edit View Insert Format Data Tools Extensions Help

Last edit was made yesterday a

10

Q28

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Weekly Goal:	Reach vegetarian meal goal on 7 days of the week											
2	Daily vegetarian meal Goal:	4 out of 4											
3													
4													
5		30/01/2023	31/01/2023	01/02/2023	02/02/2023	03/02/2023	04/02/2023	05/02/2023					
6	Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday					
7		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7					
8	Breakfast	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
9	Lunch	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
10	Dinner	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
11	Other	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
12	Sum	4	4	4	4	4	4	0					
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													

Week1

Week2

Week3

Week4

Q28

Day	Goal Achievement
Day 1	1
Day 2	1
Day 3	1
Day 4	1
Day 5	1
Day 6	1
Day 7	0

Week1

Week2

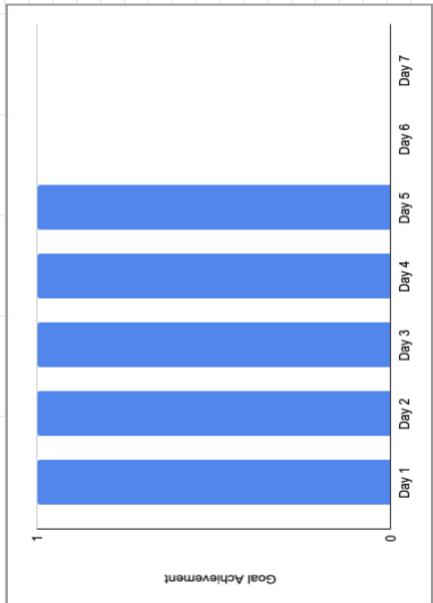
Week3

Week4

↶ ↷ 🏠 📄 50% ▾ € % .0 .00 123 ▾ Default (Ari... ▾ 10 ▾ B I S A ▾

V28

1	Weekly Goal:	Reach vegetarian meal goal on 7 days of the week							Optional Emergency Skips Available (ES):	2
2	Daily vegetarian meal Goal:	4 out of 4								
3										
4										
5		30/01/2023	31/01/2023	01/02/2023	02/02/2023	03/02/2023	04/02/2023	05/02/2023		
6	Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday		
7		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7		
8	Breakfast	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
9	Lunch	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
10	Dinner	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
11	Other	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
12	Sum	4	4	4	4	4	4	0		
13										
14	Use of Emergency Skip (ES)									
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										



+ ☰ Example ▾ Week1 ▾ Week2 ▾ Week3 ▾ Week4 ▾

Appendix G

Self-efficacy questionnaire based on Bandura (2006) with 30 different statements, rated on a confidence scale between 0 – 100

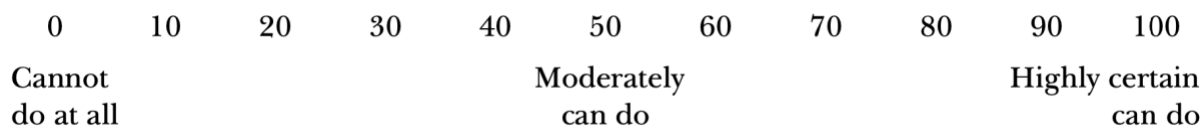
Self-efficacy questionnaire

Dear participant,

After this page, a number of situations are described that can make it hard to stick to a certain diet like increasing your vegetarian meals. We would like to ask you to rate each of these situations, **keeping your individual daily goal and your weekly goal in mind**. You can view these two goals by accessing the link to your personal spreadsheet that was sent in our last email along with this link. If you did not have a look at it yet, please do so now **before you continue**.

Please rate with the use of the sliders how certain you are that you can stick to your goal in each of these situations. **So with each situation think something like: "I am xx certain that I can stick to my goal when..."**

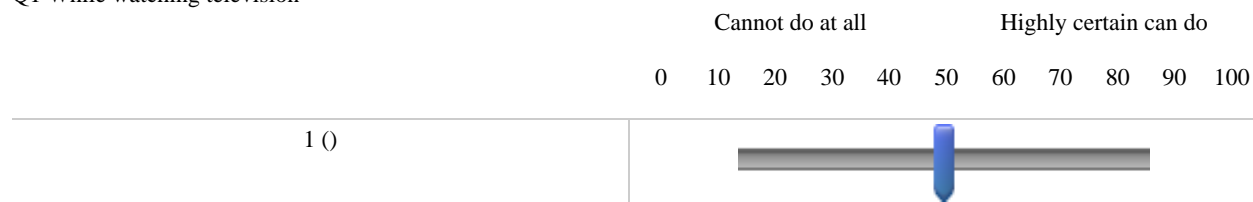
Rate your degree of confidence by recording a number from 0 to 100 using the scale given below:



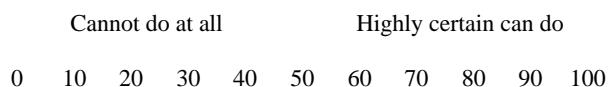
Keep in mind: Self-efficacy concerns your own beliefs about your capabilities to fulfil a task.

While keeping your daily and weekly goal in mind, read each situation and think how likely you are to keep up with your goal of not eating meat or fish in each situation.

Q1 While watching television

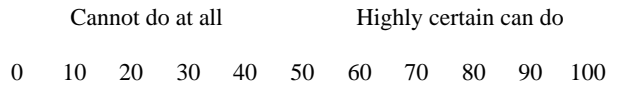


Q2 Feeling restless and bored

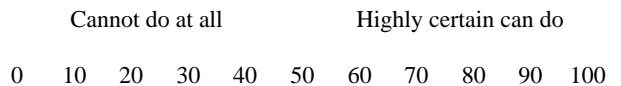




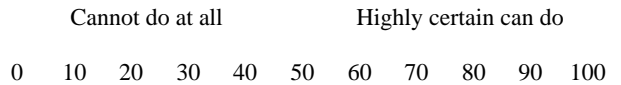
Q3 During holiday times



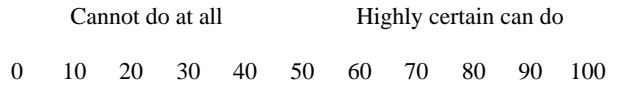
Q4 Feeling upset or tense over job-related matters



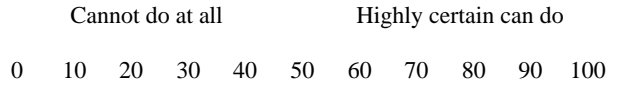
Q5 Eating at a friend's house for dinner



Q6 Preparing meals for others



Q7 Eating at a restaurant alone



Q8 When angry or annoyed

Cannot do at all Highly certain can do
 0 10 20 30 40 50 60 70 80 90 100

Click to write Choice 1 ()



Q9 When very hungry

Cannot do at all Highly certain can do
 0 10 20 30 40 50 60 70 80 90 100

Click to write Choice 1 ()



Q10 When depressed

Cannot do at all Highly certain can do
 0 10 20 30 40 50 60 70 80 90 100

Click to write Choice 1 ()



Q11 When you want to sit back and enjoy food

Cannot do at all Highly certain can do
 0 10 20 30 40 50 60 70 80 90 100

Click to write Choice 1 ()



Q12 When lots of meat/fish is available in the house

Cannot do at all Highly certain can do
 0 10 20 30 40 50 60 70 80 90 100

Click to write Choice 1 ()



Q13 Feel like celebrating with others

Cannot do at all Highly certain can do
 0 10 20 30 40 50 60 70 80 90 100

Click to write Choice 1 ()



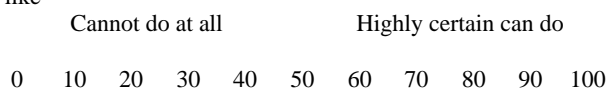
Q14 Someone offers you food that contains meat/ fish

Cannot do at all Highly certain can do
 0 10 20 30 40 50 60 70 80 90 100

Click to write Choice 1 ()



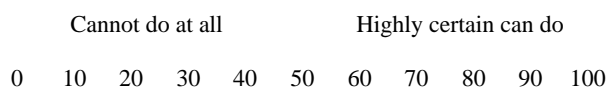
Q15 Feel a strong urge to eat foods containing meat/fish that you like



Click to write Choice 1 ()



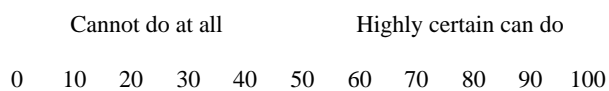
Q16 When you are entertaining visitors



Click to write Choice 1 ()



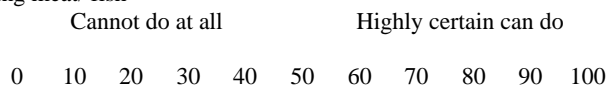
Q17 During vacations



Click to write Choice 1 ()



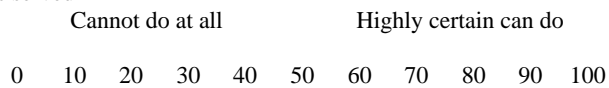
Q18 Eating out with others when they are ordering meals containing meat/ fish



Click to write Choice 1 ()



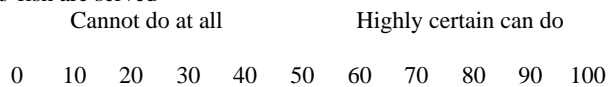
Q19 Parties where a lot of appetizing food containing meat/ fish is served



Click to write Choice 1 ()



Q20 At recreational and sport events where foods containing meat/ fish are served



Click to write Choice 1 ()	
----------------------------	--

Q21 When visiting a city and needing a quick meal

Cannot do at all Highly certain can do

0 10 20 30 40 50 60 70 80 90 100

Click to write Choice 1 ()	
----------------------------	--

Q22 Airplane meals with meat/ fish

Cannot do at all Highly certain can do

0 10 20 30 40 50 60 70 80 90 100

Click to write Choice 1 ()	
----------------------------	--

Q23 When visiting a city and wanting to experience the local food and restaurants

Cannot do at all Highly certain can do

0 10 20 30 40 50 60 70 80 90 100

Click to write Choice 1 ()	
----------------------------	---

Q24 Holidays and celebrations where foods counting meat/ fish are served

Cannot do at all Highly certain can do

0 10 20 30 40 50 60 70 80 90 100

Click to write Choice 1 ()	
----------------------------	--

Q25 When upset over family matters

Cannot do at all Highly certain can do

0 10 20 30 40 50 60 70 80 90 100

Click to write Choice 1 ()	
----------------------------	--

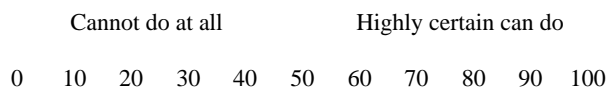
Q26 When you want some variety in your diet

Cannot do at all Highly certain can do

0 10 20 30 40 50 60 70 80 90 100

Click to write Choice 1 ()	
----------------------------	--

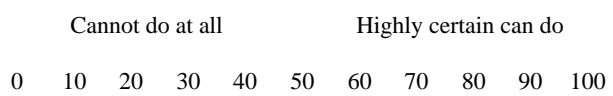
Q27 When eating breakfast in a restaurant



Click to write Choice 1 ()



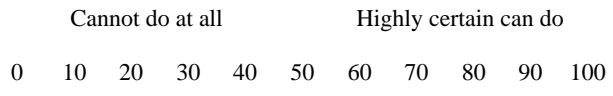
Q28 Others bring or serve foods containing meat/ fish



Click to write Choice 1 ()



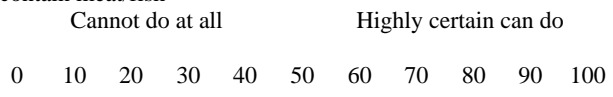
Q29 When you have to prepare your own meals



Click to write Choice 1 ()



Q30 When faced with appealing foods in the supermarket, which contain meat/fish



Click to write Choice 1 ()



Appendix H

Covariate measures assessed before the first self-efficacy questionnaire

Q1 Please state your first and last name:

Q34 Do you have any moral convictions regarding the consumption of meat and fish? Please elaborate.

Q35 Have you ever followed any previous diets? If so, were you successful?

Please rate to which extent you agree to the following statements:

Q37 A lot of my friends are vegetarian

- Strongly disagree (6)
 - Somewhat disagree (7)
 - Neither agree nor disagree (8)
 - Somewhat agree (9)
 - Strongly agree (10)
-

Q40 A lot of my family members are vegetarian

- Strongly disagree (6)
 - Somewhat disagree (7)
 - Neither agree nor disagree (8)
 - Somewhat agree (9)
 - Strongly agree (10)
-

Q43 Reducing meat and fish consumption is important in general

- Strongly disagree (6)
 - Somewhat disagree (7)
 - Neither agree nor disagree (8)
 - Somewhat agree (9)
 - Strongly agree (10)
-

Q44 Reducing meat and fish consumption is important to me

- Strongly disagree (6)
 - Somewhat disagree (7)
 - Neither agree nor disagree (8)
 - Somewhat agree (9)
 - Strongly agree (10)
-

Q41 When I set a goal for myself, I usually pursue it

- Strongly disagree (6)
 - Somewhat disagree (7)
 - Neither agree nor disagree (8)
 - Somewhat agree (9)
 - Strongly agree (10)
-

Q42 When I fail at a goal that I set for myself, I tend to give up on that goal completely. (e.g., when trying to become more fit and setting the intention to work out 3 times per week, failing to do so will lead to giving up on becoming fit completely)

- Strongly disagree (6)
- Somewhat disagree (7)
- Neither agree nor disagree (8)
- Somewhat agree (9)
- Strongly agree (10)

SPSS Output of covariate measures

Frequencies

		Statistics					
		veg_friends	veg_family	reduc_gen	reduc_me	usual_pursue	giveup_after_f ail
N	Valid	31	31	31	31	31	31
	Missing	0	0	0	0	0	0
Mean		1.81	.71	3.48	2.81	2.71	1.61
Std. Error of Mean		.199	.162	.102	.142	.168	.206
Median		2.00	.00	4.00	3.00	3.00	1.00
Std. Deviation		1.108	.902	.570	.792	.938	1.145
Variance		1.228	.813	.325	.628	.880	1.312
Minimum		0	0	2	1	0	0
Maximum		4	3	4	4	4	3

Frequency Table

		veg_friends			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	4	12.9	12.9	12.9
	1	9	29.0	29.0	41.9
	2	8	25.8	25.8	67.7
	3	9	29.0	29.0	96.8
	4	1	3.2	3.2	100.0
	Total	31	100.0	100.0	

		veg_family			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	16	51.6	51.6	51.6
	1	10	32.3	32.3	83.9
	2	3	9.7	9.7	93.5
	3	2	6.5	6.5	100.0
	Total	31	100.0	100.0	

		reduc_gen			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	3.2	3.2	3.2

	3	14	45.2	45.2	48.4
	4	16	51.6	51.6	100.0
	Total	31	100.0	100.0	

reduc_me

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	6.5	6.5	6.5
	2	7	22.6	22.6	29.0
	3	17	54.8	54.8	83.9
	4	5	16.1	16.1	100.0
	Total	31	100.0	100.0	

usual_pursue

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	1	3.2	3.2	3.2
	1	3	9.7	9.7	12.9
	2	4	12.9	12.9	25.8
	3	19	61.3	61.3	87.1
	4	4	12.9	12.9	100.0
	Total	31	100.0	100.0	

giveup_after_fail

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	6	19.4	19.4	19.4
	1	10	32.3	32.3	51.6
	2	5	16.1	16.1	67.7
	3	10	32.3	32.3	100.0
	Total	31	100.0	100.0	

Appendix I

Baseline instructions sent to all participants prior to starting with the baseline week

Baseline instruction

You are now starting on the baseline measurement. Please read the following carefully before starting on the baseline week:

- You only have to fill out “Yes” or “No” for every meal of each day as shown within the red border. A “Yes” indicates that the meal you ate on that particular day was vegetarian. A “No” means it was not, hence it contained meat or fish.
- The days are given in the columns and the meals in the rows. The row indicating “Other” is meant for any snacks consumed on that day. **Note:** if one of the snacks was non-vegetarian and the others were vegetarian, please fill out “No” as not all snacks were vegetarian.
- **Note:** If you skip a meal, please fill out a “Yes”, as no meat or fish has been consumed.
- You don’t have to fill out the sum row, it will be filled out automatically. It calculates the sum of vegetarian meals for you for that day.
- The total amount of vegetarian meals in the baseline week is given below.

To show what the spreadsheet might look like, an example baseline spreadsheet is given in figure 1. This is also included in your personal spreadsheet. You are not able to fill out or change this sheet, as it only serves as an example.

Please go to the sheet called “Baseline” and fill this one out. You can change sheets by clicking on the tabs at the very bottom of your screen.

If you have any questions, please feel free to always reach out to us. Our contact details can be found in any of the emails we sent to you.

Baseline Week	20/01/2023	21/01/2023	22/01/2023	23/01/2023	24/01/2023	25/01/2023	26/01/2023
	Friday Day 1	Saturday Day 2	Sunday Day 3	Monday Day 4	Tuesday Day 5	Wednesday Day 6	Thursday Day 7
Breakfast	No	Yes	No	No	Yes	No	Yes
Lunch	No	No	Yes	No	No	Yes	Yes
Dinner	Yes	Yes	Yes	Yes	No	Yes	Yes
Other	No	No	No	Yes	Yes	Yes	No
Sum		1	2	2	2	2	3
Total amount of vegetarian meals of the week				15			

Please specify for each meal of the day if you either had a vegetarian meal (insert "yes") or a meal containing meat (insert "no")

Figure 1. Example of a baseline sheet filled out.

Appendix J

Instructions for Easy group

Challenge instructions:

You have now received your personal spreadsheet to track your meals for the next four weeks. In there your **daily** vegetarian meal goal AND a **weekly** goal can be found in the **yellow top left corner** of the spreadsheet (See Figure 1 on page 2).

- Your **daily** vegetarian meal goal can be any number between one to four, e.g., if your daily vegetarian meal goal is one, this means your goal is to have at least one vegetarian meal per day.
- Your **weekly** goal is to reach your daily vegetarian meal goal on **at least five** out of seven days each week.
- Just like in the baseline week, you only have to fill out “Yes” or “No”. Again, a “Yes” indicates that the meal you ate on that particular day was vegetarian. A “No” means it was not, hence it contained meat or fish.
- The days are given in the columns and the meals in the rows. You don’t have to fill out the sum row, it will be filled out automatically. It calculates the sum of vegetarian meals for you for that day.
- When you reach your daily goal, **a blue bar** will show in the graph below, indicating success. If the sum of vegetarian meals on a given day is lower than your daily vegetarian meal goal, you have not attained your daily goal and no bar will show in the graph.
- **Note:** If you skip a meal, please fill out a “Yes”, as no meat or fish has been consumed.

During measurement weeks, links can show up in either the red or the green field below the table. When that happens, please click on the link and fill out the short questionnaires that pop up.

- The questionnaire in the **red field** takes you five minutes. The link in the red field **only** has to be clicked on **once** right after it appears for the first time.
- The questionnaire in the **green field** is one minute. The link in the green field will appear **after** the completion of **each week**, thus it should be filled out four times in total.
- If you fail to reach your weekly goal of five days to attain your daily vegetarian meal goal, no consequences will follow. Please continue the four-week challenge as you were.

To show what the spreadsheet might look like, an example spreadsheet is given in Figure 1. This is also included in your personal spreadsheet. You are not able to fill out or change this sheet, as it only serves as an example.

Please go to the sheet called “Week 1” and fill this one out first and then continue on the next week. You can change sheets by clicking on the tabs at the very bottom of your screen.

Please feel free to reach out to us at any time if you have questions via email s.r.wantenaar@students.uu.nl or l.heidt@students.uu.nl.

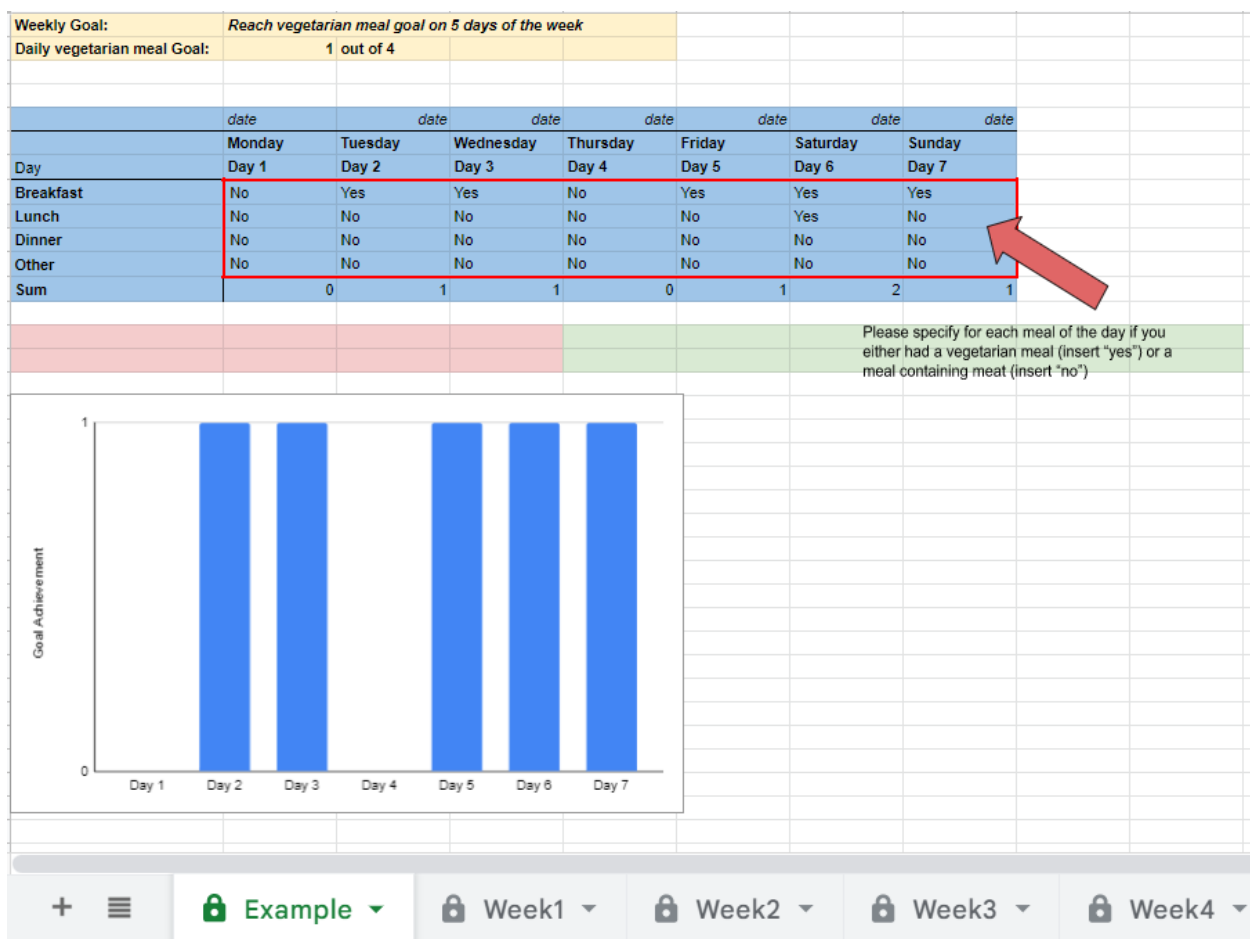


Figure 1. Example of a Week sheet filled out.

FAQ's

1. What if I skipped a meal today?

If you have only skipped this meal today, please fill out "Yes" for the respective meal. After all, you have not eaten meat/fish for this meal, meaning you are still in line with your goals.

BUT: If you regularly skip that meal (e.g. if you never have breakfast), please send us a quick email informing us about this.

2. What counts as non-vegetarian?

You are allowed to eat animal products like eggs, dairy (milk, cheese, butter), and other products that are not directly the flesh of animals or fish. So only meat and fish count as non-vegetarian.

3. What if I forget to fill out my spreadsheet for a day?

If you forget to fill out your spreadsheet, this is usually no problem. Just fill it out as soon as possible, so that you do not forget whether meals were vegetarian or not.

Tip: Fill out the spreadsheet at the end of every day right before going to bed. This way you will have no distractions and because of routine, you will be less likely to forget.

Tip: If you are really forgetful, set an alarm clock to remind yourself! ;)

Instructions for Emergency Reserve group

Challenge instructions:

You have now received your personal spreadsheet to track your meals for the next four weeks. In there your **daily** vegetarian meal goal AND a **weekly** goal can be found in the **yellow top left corner** of the spreadsheet (See Figure 1 on page 2).

- Your **daily** vegetarian meal goal can be any number between one to four, e.g., if your daily vegetarian meal goal is one, this means your goal is to have at least one vegetarian meal per day.
- Your **weekly** goal is to reach your daily vegetarian meal goal on **all seven** days each week.
- Just like in the baseline week, you only have to fill out “Yes” or “No”. Again, a “Yes” indicates that the meal you ate on that particular day was vegetarian. A “No” means it was not, hence it contained meat or fish.
- **Note:** If you skip a meal, please fill out a “Yes”, as no meat or fish has been consumed.
- The days are given in the columns and the meals in the rows. You don’t have to fill out the sum row, it will be filled out automatically. It calculates the sum of vegetarian meals for you for that day.
- When you reach your daily goal, **a blue bar** will show in the graph below, indicating success. If the sum of vegetarian meals on a given day is lower than your daily vegetarian meal goal, you have not attained your daily goal and no bar will show in the graph.

However, you are allowed to make use of **two emergency skips** each week!

- After you have failed to reach your daily vegetarian meal goal, you can type “Yes” in the “Use of Emergency Skip (ES)”-row and your failure will **not** count. In that case, a blue bar will show in the graph just like it would for successes.
- After using an emergency skip, the counter in the **orange top right** will go down. Thus, this field in the spreadsheet shows you how many emergency skips you have left for that week. If none are left, it will show “no more skips left!”.
- If you fail to reach your daily goal and there are no emergency skips left, you will not be able to use another emergency skip and no blue bar will show in the graph.

During measurement weeks, links can show up in either the red or the green field below the table. When that happens, please click on the link and fill out the short questionnaires that pop up.

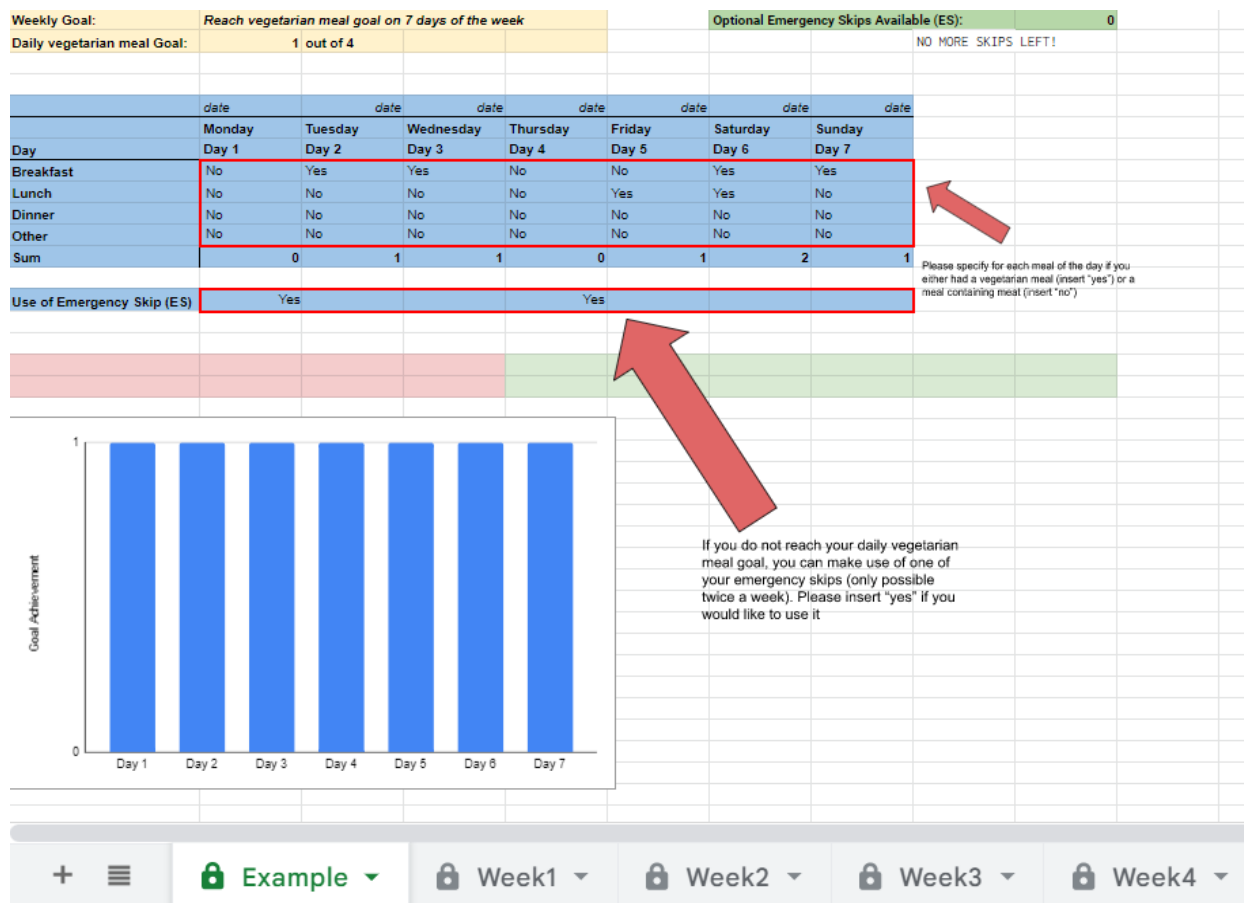
- The questionnaire in the **red field** takes you five minutes. The link in the red field **only** has to be clicked on **once** right after it appears for the first time.
- The questionnaire in the **green field** is one minute. The link in the green field will appear **after** the completion of **each week**, thus it should be filled out four times in total.
- If you fail to reach your weekly goal of seven days to attain your daily vegetarian meal goal even though you have made use of two emergency skips, no consequences will follow. Please continue the four-week challenge as you were.

To show what the spreadsheet might look like, an example spreadsheet is given in Figure 1. This is also included in your personal spreadsheet. You are not able to fill out or change this sheet, as it only serves as an example.

Please go to the sheet called “Week 1” and fill this one out first and then continue on to the next week. You can change sheets by clicking on the tabs at the very bottom of your screen.

Please feel free to reach out to us at any time if you have questions via email s.r.wantenaar@students.uu.nl or l.heidt@students.uu.nl.

Figure 1. Example of a Week sheet filled out.



FAQ's

2. What if I skipped a meal today?

If you have only skipped this meal today, please fill out "Yes" for the respective meal. After all, you have not eaten meat/fish for this meal, meaning you are still in line with your goals.

BUT: If you regularly skip that meal (e.g. if you never have breakfast), please send us a quick email informing us about this.

3. What counts as non-vegetarian?

You are allowed to eat animal products like eggs, dairy (milk, cheese, butter), and other products that are not directly the flesh of animals or fish. So only meat and fish count as non-vegetarian.

4. What if I forget to fill out my spreadsheet for a day?

If you forget to fill out your spreadsheet, this is usually no problem. Just fill it out as soon as possible, so that you do not forget whether meals were vegetarian or not.

Tip: Fill out the spreadsheet at the end of every day right before going to bed. This way you will have no distractions and because of routine, you will be less likely to forget.

Tip: If you are really forgetful, set an alarm clock to remind yourself! ;)

Instructions for Hard group

Challenge instructions:

You have now received your personal spreadsheet to track your meals for the next four weeks. In there your **daily** vegetarian meal goal AND a **weekly** goal can be found in the **yellow top left corner** of the spreadsheet (See Figure 1 on page 2).

- Your **daily** vegetarian meal goal can be any number between one to four, e.g., if your daily vegetarian meal goal is one, this means your goal is to have at least one vegetarian meal per day.
- Your **weekly** goal is to reach your daily vegetarian meal goal on **all seven** days each week.
- Just like in the baseline week, you only have to fill out “Yes” or “No”. Again, a “Yes” indicates that the meal you ate on that particular day was vegetarian. A “No” means it was not, hence it contained meat or fish.
- The days are given in the columns and the meals in the rows. You don't have to fill out the sum row, it will be filled out automatically. It calculates the sum of vegetarian meals for you for that day.
- When you reach your daily goal, **a blue bar** will show in the graph below, indicating success. If the sum of vegetarian meals on a given day is lower than your daily vegetarian meal goal, you have not attained your daily goal and no bar will show in the graph.
- **Note:** If you skip a meal, please fill out a “Yes”, as no meat or fish has been consumed.

During measurement weeks, links can show up in either the red or the green field below the table. When that happens, please click on the link and fill out the short questionnaires that pop up.

- The questionnaire in the **red field** takes you five minutes. The link in the red field **only** has to be clicked on **once** right after it appears for the first time.
- The questionnaire in the **green field** is one minute. The link in the green field will appear **after** the completion of **each week**, thus it should be filled out four times in total.
- If you fail to reach your weekly goal of seven days to attain your daily vegetarian meal goal, no consequences will follow. Please continue the four-week challenge as you were.

To show what the spreadsheet might look like, an example spreadsheet is given in Figure 1. This is also included in your personal spreadsheet. You are not able to fill out or change this sheet, as it only serves as an example.

Please go to the sheet called “Week 1” and fill this one out first and then continue onto the next week. You can change sheets by clicking on the tabs at the very bottom of your screen.

Please feel free to reach out to us at any time if you have questions via email s.r.wantenaar@students.uu.nl or l.heidt@students.uu.nl.

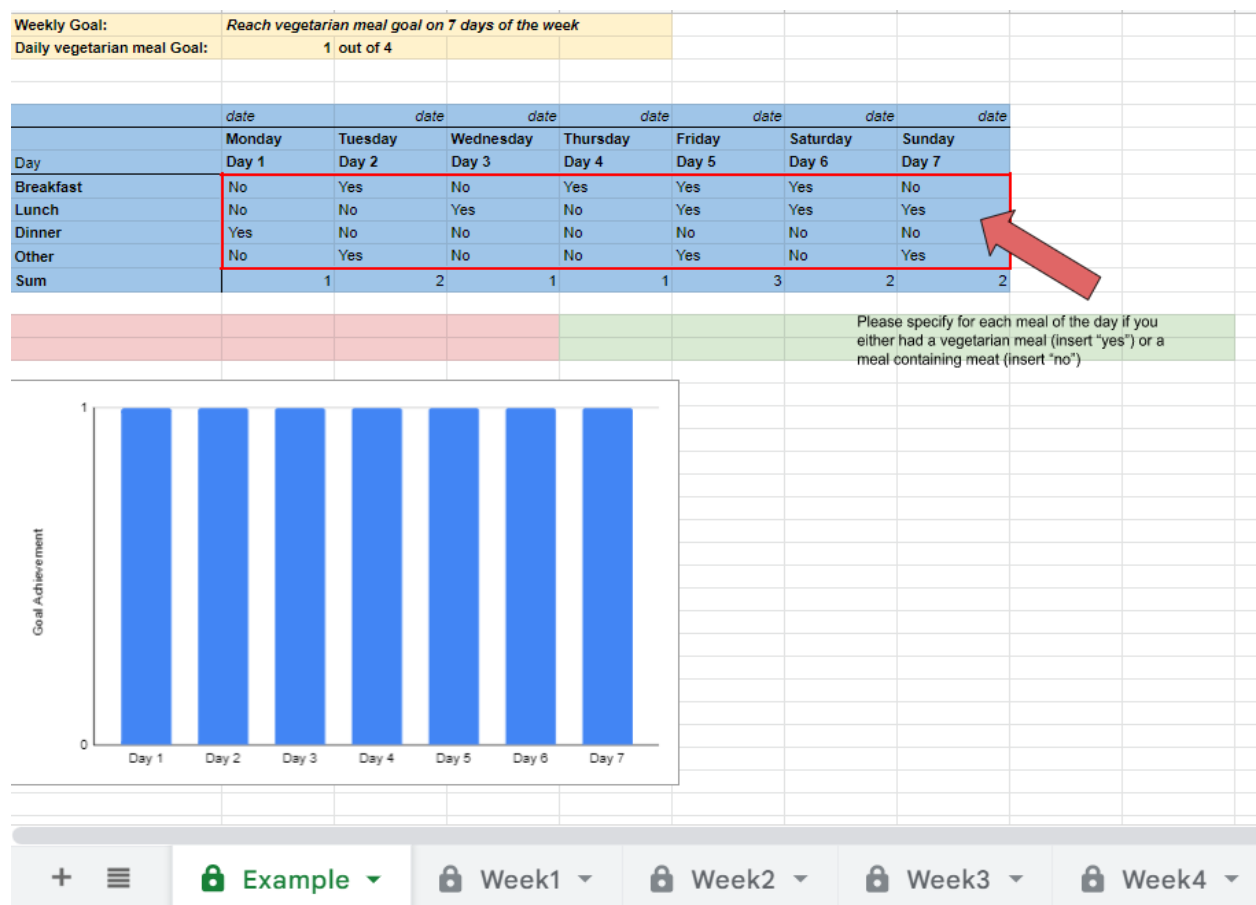


Figure 1. Example of a Week sheet filled out

FAQ's

3. What if I skipped a meal today?

If you have only skipped this meal today, please fill out "Yes" for the respective meal. After all, you have not eaten meat/fish for this meal, meaning you are still in line with your goals.

BUT: If you regularly skip that meal (e.g. if you never have breakfast), please send us a quick email informing us about this.

4. What counts as non-vegetarian?

You are allowed to eat animal products like eggs, dairy (milk, cheese, butter), and other products that are not directly the flesh of animals or fish. So only meat and fish count as non-vegetarian.

5. What if I forget to fill out my spreadsheet for a day?

If you forget to fill out your spreadsheet, this is usually no problem. Just fill it out as soon as possible, so that you do not forget whether meals were vegetarian or not.

Tip: Fill out the spreadsheet at the end of every day right before going to bed. This way you will have no distractions and because of routine, you will be less likely to forget.

Tip: If you are really forgetful, set an alarm clock to remind yourself! ;)