Master thesis

A study on the effect of setting specific goals, self-set goals and assigned goals on meat reduction, and the moderating role of autonomous motivation

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Abstract

This study examines effective ways to set goals in order to reduce meat consumption. The effectiveness of setting specific goals is compared with setting non-specific goals, and the effectiveness of self-set goals is compared with assigned goals. In addition, it was investigated whether autonomous motivation moderates between setting specific goals and goal pursuit. A pilot study was conducted to determine the assigned goal, so that in goal difficulty it would match a self-set goal. A repeated measures design was used in the main study with a one week interval. In the first measurement, participants had to indicate their meat consumption and autonomous motivation to reduce meat consumption and were assigned to one of three experimental conditions: no-goal, self-set goal or assigned goal. In the second measurement, meat consumption was measured again and also goal difficulty, goal pursuit and exploratory variables. No significant difference was found between the effectiveness of specific goals and non-specific goals. There was also no support found for a moderating role of autonomous motivation between setting specific goals and goal pursuit. Self-set goals and assigned goals appeared equally effective. This suggests that campaigns using assigned goals can be effective in reducing meat consumption. Future research could investigate whether this is evenly effective when the assigned goal is less difficult or more difficult than when people set their goals themselves. Attention also may be paid to the effect of placing more focus on achieving goals together with others.

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Introduction

There is increasing attention for the environmental impacts and health impact of meat consumption. Huge amounts of energy are needed for meat production and therefore the meat industry is one of the most energy-intensive within the food industry and has a significant negative impact on the environment (Dagevos & Voordouw, 2013). Also, research shows that meat consumption in large quantities is related to negative health outcomes such as increased risk for cancer, type 2 diabetes, colorectal carcinoma and cardiovascular disease (Boada, Henríquez-Hernández and Luzardo, 2016). Therefore, reducing meat consumption can help to tackle both environmental problems and health problems. Reducing meat consumption is a hot topic: in several countries, including the Netherlands, there is talk of a possible "meat tax" to reduce meat consumption (Albers, 2022). Besides that, there are more and more meat substitutes available, which is also widely advertised (Meischke, 2021).

Although the negative consequences of meat consumption are known, many people still eat meat frequently. About 20% of the Dutch population eats meat daily, and 30% eats meat 5 or 6 days a week (CBS, 2021). The transition to eating less meat requires a change in dietary behavior. There are roughly four different diet patterns when it comes to meat consumption: vegan, vegetarian, meat eater and flexitarian. This last dietary pattern is adopted by more and more people: flexitarians do not eat meat on daily basis and reduce their intake (Derbyshire, 2017). In the Netherlands, in the period from 2015 to 2019, the group of people who are consciously flexitarian is almost doubled. Even though the group is still relatively small, namely about 1 in 5 Dutch people, this does show an upward trend (Onwezen et al., 2020). However, it is known that most of the flexitarians only mildly reduce their meat intake (Dagevos, 2021). For example, approximately 75% of the adult Dutch population does not eat meat daily, but still to a maximum of 4, 5 or 6 days a week (CBS, 2021).

Even though people have the intention to reduce their meat consumption, they do not always succeed (Grassian, 2020). However, some people are more likely to succeed than others and this might be influenced by how people set their goals to reduce meat consumption. The study of Grassian (2020) suggests that those who wanted to abstain from the consumption of some specific animal-derived foods such as chicken and pork, or who wanted to abstain from all animal-derived foods and wanted to become vegan or vegetarian, were the most likely to meet their anticipated dietary changes. People who did not aim to abstain completely from some or all animal-derived foods but only wanted to reduce meat, were generally less likely to achieve their intended reductions. After one year, 50,9% of the people that only wanted to reduce their consumption reported that they met their goal,

compared to 76,8% of the complete abstainers from some or all animal-derived foods.

The different results between the reducers and abstainers could possibly be explained by the goal-setting theory of Locke & Latham (1990), as goals to reduce meat consumption and abstain from meat consumption differ in how specific they are. The goal-setting theory states that people are more likely to reach their goals when specific and measurable goals are set, instead of setting no goals or vague goals. A specific goal is clearly defined and concrete, for example: eat no meat on Mondays. A vague goal is neither concrete nor quantifiable, for example: do your best to eat less meat (Stretcher et al., 1995). Where the abstainers in the study of Grassian (2020) had a clear and concrete purpose, namely the complete abandonment of certain products, the meat reducers had not. The meat reducers only wanted to reduce their meat consumption, yet it was not clear how or to what extent. This could make it challenging to transform the behavioral intention to reduce meat consumption into actual behavior. Setting specific goals could therefore help to overcome this gap between the intention to reduce meat consumption and actual behavior.

In various contexts, the behavior change technique of setting concrete goals is used and is proven successful (Morisano et al., 2010; Pearson, 2012; Cullen, Baranowski & Smith, 2001). For example, academic performance of students who set specific goals in a university assistance programme increased, compared to the academic performance of students who did not enrol in this programme (Morisano et al., 2010). Setting specific goals has also shown to be effective in obesity studies and in changing other dietary-related behaviors (Pearson, 2012; Cullen, Baranowski & Smith, 2001). Setting concrete goals may also be effective for people who aim to reduce meat intake to translate their behavioral intention into behavior, yet this has not been investigated.

Specific goals can be set in different ways: people can be assigned a specific goal or set these goals themselves. When using self-set goals, people can determine what their goals will be, for example in setting goals to eat less meat: “I want to eat no meat, 4 days a week”. With assigned goals, people are assigned to a goal and therefore do not have to set it themselves, for example: “You are going to try not to eat meat 4 days a week” (Locke & Latham, 2002). Some studies show that effectiveness between the two ways of setting goals does not differ (Locke & Latham, 2002). An important requirement here is that the goal difficulty between the self-set and assigned goals is held constant. This means that the difficulty of the different tasks, both of the self-set and assigned goal, is the same. When this is the case, there should be no differences between the effectiveness of both goals (Locke & Latham, 2002). However, other research shows that when an assigned goal is assigned tersely,

without a further explanation, it leads to a significantly lower effectiveness than when the goal is self-set (Locke & Latham, 2002). Hence, besides that it is important to know whether specific goals are helpful for meat reducers in the transition to eating less meat, it is also important to know whether there is a difference in effectiveness between self-set and assigned goals in reducing meat consumption.

When people set or get assigned their goal, they consider how they would implement their goal. This is called implementation planning and contributes to goal pursuit (Koestner et al., 2008). Motivation, the desire and willingness to do something, plays also an important role in achieving goals (Brown, 2007). Motivation helps to start doing something, gives direction and keeps people going when things get tough. Research shows that autonomous motivation is substantially related to goal pursuit, whereas controlled motivation is not (Koestner, et al., 2008). Autonomous motivation is the feeling of having a choice and doing something voluntary and is essential for behavioral persistence and to enable achieving a goal. It is the opposite of doing something for somebody else, or for a reward, what is called controlled motivation (Teixeira, et al., 2012). According to Koestner, et al. (2008), autonomous motivation is a moderator in the relation between implementation planning and goal pursuit. This means that autonomous motivation interacts with implementation planning and thus that the effect of setting specific goals on goal pursuit depends also on autonomous motivation. Therefore, autonomous motivation is a relevant variable that must be included in research about the effectiveness of specific goals on reducing meat consumption, because this effectiveness may be affected by autonomous motivation.

The current study

Considering the many advantages of meat reduction, and the fact that a growing group intends to eat less meat, this study will add to the limited existing literature about this topic, by examining which goals are most effective to translate the behavioral intention into behavior, in order to more successfully reduce meat consumption. The aim of present study is to examine whether a more planned way of meat reduction, through setting goals that are specific and measurable, is helpful to meat reducers in changing their dietary pattern. There has been much experimentation in recent years with introducing meatless days, like the "Meatless Monday" campaign (Milford & Kildal, 2019). This can be considered as a specific assigned goal, namely do not eat meat on Mondays. Because of the mixed results of the effectiveness of self-set and assigned goals, it is unclear whether these kind of assigned goals are more likely to successfully promote meat reduction than a more general encouragement

where more focus is placed on someone's personal goals. This study could therefore contribute to identifying practical ways of enhancing the transition to eating less meat, by examining which kind of specific goals and encouragement are more effective. This study takes into account the extent to which a person is autonomously motivated to eat less meat, since it is expected that motivation improves goal pursuit when setting specific goals and moderates between those goals and the actual performed behavior. This leads to the following research question: "*Does setting specific goals contribute to changing dietary patterns of people that intend to reduce meat consumption; are there differences between self-set goals and assigned goals in achieving the planned meat reduction; and does autonomous motivation play a moderating role between setting specific goals and goal pursuit?"* To answer the research question, the following hypotheses will be tested:

1. People that intend to reduce meat consumption are more likely to succeed in reducing their meat-intake if they set or get assigned specific and measurable goals, in comparison to people without concrete goals
2. Assigned goals are equally effective as self-set goals in reducing meat consumption, if goal difficulty is held the same and the goal is supported by enough information
3. Autonomous motivation plays a moderating role between setting specific goals and goal pursuit

Method

Pilot study

To determine the assigned goal, and make sure that the difficulty of self-set goals and assigned goals is consistent, so that the effects can be compared, a pilot study has been conducted. The following question was studied: *"To what extent do people want to reduce their meat consumption?"* A small convenience sample of 25 participants was recruited via social media. The pilot consisted of 3 questions about current meat consumption (the number of days people eat meat in a week), the possible desire to reduce this, and when desired, the question with how many days people want to reduce this. No further personal information or demographics were requested. Participants consumed 3, 4, 5, 6 or 7 days meat a week at breakfast, lunch, dinner or as snack (M = 4.68, SD = 1.31). Of the 25 participants, 22 (88%) indicated that they wanted to reduce their meat consumption. They wanted to reduce their meat consumption with a minimum of 1 day a week and a maximum reduce of 4 days a week (M = 1.91, SD = 0.75). Because people eat meat on average nearly 5 days a week and wanted

on average to reduce this with 2 days, the assigned goal in the experiment has become to eat meat up to a maximum of 3 days per week, and to not eat meat 4 days a week.

Main study

The main study had a repeated measures design with two measurements: at T0 participants reported their meat consumption of the past week at breakfast, lunch and dinner, and were assigned to one of the three goal conditions: no specific goal, specific self-set goal or specific assigned goal. The third independent variable measured at T0 was autonomous motivation. One week later at T1, meat consumption was measured again and this was the first dependent variable. The dependent variable goal pursuit was also measured at T1.

Participants

As calculated with G-Power, the research population needed to consist of at least 84 participants completing the first and second measurement, to reach a statistical power of 0.80 to find an effect size of 0.3. Participants were recruited mid-April 2022 via social media, such as WhatsApp, LinkedIn, Facebookgroups and by approaching other networks that were related to the subject of the study like local SDG-networks (Sustainable Development Goals). It was made clear that participating in the study was meant for people who intended to eat less meat. Participants were asked if they knew other people who wanted to participate, which created a snowball-effect.

183 respondents participated in the study at T0. Of the respondents, 59 were excluded because they already had a fully vegetarian diet, because they did not give consent or because the questionnaire was incomplete. The other 124 respondents were suitable for participation in the second measurement. They had left their e-mail addresses and received a general follow-up mail one week later, which contained a link to the second measurement. A reminder was sent to the participants who did not respond to this mail after four days. Of the 124 participants that were suitable for the second measurement, 92 did participate. The data of the first and second measuring moment were linked to each other by means of a linking code. A number of codes were not 1 on 1 the same, but could be linked because they were very similar to another code. Of the 92 participants in the second measurement, 11 could not be linked and these participants were therefore excluded from the study. Thus, 81 participants were included in the study.

The participants in the study were between 19 and 84 years old (M = 42.89, SD = 16.89), 23 of the participants that were included in the study were male (28,4%) and 58 were female (71,6%). The participants were predominantly highly educated: 35,8% went to

university; 37% to a university of applied sciences; 7,4% only had a high school diploma and 19,8% went to vocational education.

Measures & procedure

The data was collected by means of online questionnaires. First of all, demographic data of the participants were collected at the first measurement, to examine whether statements can be made about the general population. This was done by asking personal questions about age, gender and level of education. At the first measurement, the independent variables current meat consumption, goal condition and autonomous motivation were also measured. After one week, in the second measurement, the dependent variables meat consumption and goal pursuit were measured. In addition, goal difficulty was measured, to check if the difficulty of the self-set goal and assigned goal, that was based on the pilot study, did not differ and the effectiveness of both goals thus could be compared. Lastly, exploratory variables were measured.

Meat consumption T0. Participants needed to indicate in three questions their current meat consumption in terms of how many days a week (on average) they ate meat at breakfast, for lunch and dinner. For example: "How many days a week do you eat meat for breakfast (e.g. salami/chicken breast/ham)?" This could be answered with a number between 0 (not) and 7 (on 7 days). The scores on the three meals were added together and participants were thus given a score between 0 and 21.

Goal conditions. After indicating meat consumption, participants were randomly assigned to one of the three different goal conditions, namely no specific goal, a specific self-set goal, or a specific assigned goal. In the no specific goal condition, participants were told that they were going to eat less meat in the next week, without being specific and concrete about it: "How nice that you are interested in eating less meat. You will be working on this in the week!" In case of the specific self-set goal condition, people were asked to determine at what moments of the day (breakfast, lunch and/or diner) they did not want to eat meat in the upcoming week, and on how many days. For example: "How many days a week would you like to eat meat for breakfast (e.g. salami/chicken breast/ham)?" This could be answered with a number between 0 (not) and 7 (on 7 days), and this was also asked for respectively lunch and dinner. The assigned goal was based on the pilot study and therefore involved eating at least four days no meat a week: "How nice that you are interested in eating less meat. The next week you will try to eat meat a maximum of 3 days a week and not eat meat 4 days a week". So this was different from the self-set goal in that it was not specified to a time of day.

Participants in all three conditions were asked to write their goal down for themselves, so that they would not forget, and at the end of the questionnaire they could also read back their goal. The participants also received a few tips, in order to enthuse and engage them in the study.

Autonomous motivation. To measure the autonomous motivation to reduce meat consumption, part of the Treatment Self-Regulation Questionnaire (TSRQ) was used (Levesque, et al., 2007). The six statements about autonomous motivation were modified and applied to reducing meat consumption. For example: "Eating less meat is very important (to be as healthy and sustainable as possible)". Responses on the statements were measured with a 7-points Likert scale from strongly disagree (1) to strongly agree (7). The scale showed in this study a very good internal consistency with a Cronbach's α of 0.88. The individual score on autonomous motivation was created by taking the mean of the scores on the six statements (M = 5.24, SD = 1.05).

Meat consumption T1. After one week, in the second measurement, participants were asked again about their meat consumption at breakfast, lunch and dinner to compare their average meat consumption, given at T0, with the consumption in the week of the study. For example: "How many days did you eat meat last week for breakfast (e.g. salami/chicken breast/ham)?" This could be answered with a number between 0 (not) and 7 (on 7 days). The scores on the three meals were added together and participants were thus also given a score between 0 and 21 for the second measurement.

Goal pursuit. Participants needed to indicate if their goals had been met, through answering the statement "I have achieved my goals of eating less meat" with a 7-points Likert scale from strongly disagree (1) to strongly agree (7).

Goal difficulty. Goal difficulty was measured with the statement "I found it difficult to achieve my goal" with a 7-points Likert scale from strongly disagree (1) to strongly agree (7).

Exploratory variables. Lastly, to get a better understanding of why eating less meat does or does not succeed, participants were asked an open question where they could explain why the goal was or was not achieved and in what ways they had managed to succeed or not succeed. After that there was a closed question: "If you (partly) succeeded in achieving your goal, in what ways did you do this? Please tick the ones that apply to you: (1) Used more meat substitutes, and/or (2) Tried new/other recipes without meat, (3) other."

Statistical analysis

To answer the first hypothesis, the repeated measures ANOVA via SPSS Statistics was used. Meat consumption (DV) on the first measurement (T0) and on the second measurement (T1)

was compared between the group that set specific goals (IV) to reduce meat (self-set or assigned) and the group without these specific goals (IV) by using contrasts. For the second hypothesis also a repeated measures ANOVA was used. The group that have been given assigned goals (IV) was compared to the group that self-set their goals (IV) on their changes in meat consumption between T0 and T1 (DV) using contrasts. The last hypothesis, the moderating role of autonomous motivation between setting specific goals and goal pursuit, was tested with linear regression and with testing an interaction effect between goal type (IV) and autonomous motivation (IV) on goal pursuit (DV). A dummy variable of goal type was created for this purpose, where no specific goal was given the value 0 and a specific goal (self-set or assigned) was given the value 1.

Ethics

Participants needed to give their informed consent before completing the questionnaire. Before starting the study, the FERB was requested for ethical approval of the study by applying to UU-SER. The study was approved and filed under number 22-1193.

Results

Descriptives

Participants ate meat at on average 8.5 meals in the week prior to the study. In all conditions, people ate a little less, on average 6.7 meals a week (Table 1). The group with assigned goals ate the least meat in the second week (M=5.95).

Table 1

Meals with meat on T0 and T1 for each goal condition

Goal type	Meals T0 (*M*)	*SD*	Meals T1 (*M*)	*SD*	N
No goal	8.21	4.32	6.76	4.18	33
Self-set goal	8.81	4.71	7.35	4.69	26
Assigned goal	8.64	4.25	5.95	3.84	22
Total	**8.52**	**4.38**	**6.73**	**4.25**	**81**

Analysing the effect of time per mealtime showed that not all mealtimes showed a decrease at T1 (Table 2): meat consumption at breakfast did not significantly decrease ($F(1,78) = 0.030$, $p = .864$), but meat consumption at lunch and dinner did ($F(1,78) = 24.444$, $p = .000$; $F(1,78) = 32.599$, $p = .000$). So, in all conditions meat consumption was reduced with lunch and dinner.

Table 2

Meals with meat on T0 and T1 at breakfast, lunch and dinner

Meal	T0 *(M)*	*SD*	T1 *(M)*	*SD*
Breakfast	1.2	1.79	1.3	2.06
Lunch	2.84	2.23	1.88	1.81
Dinner	4.48	1.77	3.56	1.61

Goal difficulty

A oneway-ANOVA showed no difference between the group that self-set their goal and the group that got assigned their goal in subjective difficulty to achieve their goals ($F(1,46) = 0.085$, $p = .772$).

Exploratory variables

Some participants indicated that they found it difficult to achieve their goals, and others did not ($M = 3.91$, $SD = 1.63$). Several reasons were given why people succeeded in achieving their goal. Some indicated that taking part in the study had contributed to their awareness of eating less meat and had also led them to reduce meat consumption. Another reason given was that the goal had been set together with another person, and that this had helped in achieving the goal. People achieved their goals by using meat substitutes (21%), trying out new recipes (48,4%), or via other ways (30,6%), such as replacing meat with fish, or leaving meat out altogether.

There were also several reasons given why people found their goals difficult to achieve. For example, there were people who were on holiday or away for a few days, or needed to eat at work with clients, and who indicated that they had difficulty achieving their goal because of this. Another frequently mentioned reason for having difficulties with attaining the goal was the habit of eating meat. Also, some people found it difficult to adjust their grocery shopping behavior to buying vegetarian products. In addition, there was a small group of people who were not aware of a goal, these were people in the no specific goal condition.

Hypotheses

The first hypothesis was: “People that intend to reduce meat consumption are more likely to succeed in reducing their meat-intake if they set or get assigned specific and measurable goals, in comparison to people without concrete goals”. The assumptions of the repeated measures ANOVA were checked: normal distribution of dependent variables, sphericity and independence of measurements. The assumption of normal distribution of dependent variables (meat consumption prior to the study and meat consumption during the study) was met. Mauchly’s test of sphericity indicated that the assumption of sphericity had not been violated, because there are only two measurements. Therefore, the homogeneity of variances needed to be checked: equal variances between groups could be assumed ($p>0,05$). Independence of measurements could also be assumed, so all assumptions were met. Subsequently, the analysis was carried out. The repeated measures ANOVA showed a main effect of time for all the

groups and meals together ($F(1,78) = 18.394$, $p = .000$). This indicates that participants ate less meat in the week of the study (T1) than in an average week before the study (T0). There was no significant difference found between the degree to which people reduced meat consumption between the group that had a specific goal (self-set or assigned) and the group that had no specific goal ($F(1,79) = 0.419$, $p = .519$). The hypothesis was thus rejected: there is no evidence that meat-reducers are more likely to reduce their meat consumption if they set or are assigned to specific and measurable goals, compared to meat-reducers without these concrete goals.

The second hypothesis was: "Assigned goals are equally effective as self-set goals in reducing meat consumption, if goal difficulty is held the same and the goal is supported by enough information". To answer the second hypothesis, the same steps and repeated measures ANOVA analysis were carried out as for the first hypothesis but with adjusted contrasts comparing people who self-set their goals and those who had assigned goals. Although people in the assigned goal group had eaten the least meat in the week of the study ($M = 5.95$), this difference with the group that had set a goal ($M = 7.35$) was not significant ($F(1,46) = 0.896$, $p = .349$). This means that the hypothesis is accepted and that no significant difference in meat reduction between the group that self-set their goal and the group that had a assigned goal has been found.

Lastly, the third hypothesis was tested: "Autonomous motivation plays a moderating role between setting specific goals and goal pursuit". A linear regression was used to examine whether autonomous motivation (IV) is a moderator in the relationship between goal type (IV) and goal pursuit (DV). Assumptions for linear regression were tested: normality, homoscedasticity, independence and linearity. According to the Kolmogorov-Smirnov test, the assumption of normality was violated ($p < 0,05$). However, this test could be too sensitive and the Q-Q plots showed that the residuals of the variables involved roughly followed a normal distribution. With a Durbin-Watson value of 1.71, independence could be assumed. Also, linearity between goal type and autonomous motivation versus goal pursuit could be assumed. Lastly, checking equality of variances, showed homoscedasticity could be assumed. Then the regression model could be constructed with the independent variables goal type x autonomous motivation, and the dependent variable goal pursuit. The explained variance of this model was $R_2 = 0,081$. This means that 8.1 percent of the differences between people on goal pursuit are explained by the independent variables in the model. Autonomous motivation was no significant predictor of goal pursuit ($\beta = -0.151$, $t = -0,357$, $p = .722$), neither was goal type ($\beta = -0.372$, $t = -0,611$, $p = .543$). Also, autonomous motivation x goal type was not a

significant predictor of goal pursuit (β = .649, t = 0.897, p = .372). This means that no moderation of autonomous motivation between specific goals and goal pursuit has been found. This means that the effect of goal type on goal pursuit is not affected by autonomous motivation and that the hypothesis is rejected.

Discussion

This study sought to answer the following research question: *"Does setting specific goals contribute to changing dietary patterns of people that intend to reduce meat consumption; are there differences between self-set goals and assigned goals in achieving the planned meat reduction; and does autonomous motivation play a moderating role between setting specific goals and goal pursuit?"* The results show that setting goals contributes to eating less meat: all groups, both with a specific and non-specific goal, ate significantly less meat in the week of the study. However, the hypothesis that people would eat less meat when having a specific goal and that this would therefore be more effective than a non-specific goal, could not be supported. Moreover, although there was a difference in the average meat reduction between those with a self-set goal and those with an assigned goal, namely that those with an assigned goal ate less meat on average in the week of the study, this difference was not significant, suggesting self-set goals and assigned goals were equally effective. Lastly, no moderation of autonomous motivation between setting specific goals and goal pursuit has been found. Autonomous motivation was no significant predictor of goal pursuit and neither was goal type. Thus, the hypothesis that autonomous motivation plays a moderating role between setting specific goals and goal pursuit is rejected. In conclusion, this study suggests that goal setting can help in reducing meat consumption, but no difference was found between non-specific and specific goals, and self-set and assigned goals. There was also no support found for that autonomous motivation does affect the relationship between setting specific goals and goal pursuit.

No significant differences between specific and non-specific goals was not in line with expectations based on existing literature. Through the very extensive tests of the goal-setting theory of Locke & Latham (1990) in the past, also in the area of changing dietary patterns, it was expected that specific goals in reducing meat consumption would be more effective, because it could help to overcome the gap between the intention to reduce meat consumption and the actual behavior (Pearson, 2012; Cullen, Baranowski & Smith, 2001). It may be that the non-specific goal was relatively specific, especially since people knew in advance that they would be taking part in a study about eating less meat and knew that this would (only) last a week. People received the following message: "How nice that you are interested in

eating less meat. You will be working on this in the week!" The fact that it was time-bound, and for a period that was not too long, namely during one week, may have made it somewhat specific and thus a clearly defined and concrete goal (Stretcher et al., 1995). Therefore, a non-specific goal also proved to be effective in this study, as participants in all conditions ate less meat in the week of the study. To test the differences between non-specific goals and specific goals in relation to meat reduction in future research, it is interesting to find out how long the period of time between the first and second measurement has to be to optimize a non-specific goal.

In line with several other studies about self-set and assigned goals, when goal difficulty is held the same, no significant difference was found between the effectiveness of self-set goals and assigned goals (Locke & Latham, 2002). Research shows that to achieve this, an assigned goal should not be given tersely, but with a little more information, so that people think and plan how they will achieve and implement their goal (Locke & Latham, 2002). This was done in current study by having people write down their goal, and having them think about how they wanted to achieve it, and offering tips on how to do so. Both goals appeared to be effective, which has important practical implications. As mentioned in the introduction, several campaigns are introduced in recent years, like the "Meatless Monday campaign" or the "Week without meat campaign" (Milford & Kildal, 2019; Voedingscentrum, 2022). These campaigns can be considered assigned goals as they are determined by someone else (e.g. an institution) and not by an individual. According to the results of the current study, current results suggest that these assigned goals could successfully promote meat reduction.

However, in the current study, people had to go 4 days without eating meat in the assigned goal condition, based on the pilot study. The perceived goal difficulty of an assigned goal may be important for its effectiveness (Locke & Latham, 2002). The potential effectiveness of a campaign where the perceived goal difficulty of the assigned goal is lower or higher than when people would set goals themselves, e.g. a Meatless Monday (one day without meat) and Week without meat campaign (one whole week no meat), could not be demonstrated and should be further investigated in future research.

Another unexpected result was that autonomous motivation did not moderate between goal type and goal pursuit. Also, autonomous motivation was no significant predictor of goal pursuit and neither was goal type. It was expected that the effect of goal type was dependent on the degree of autonomous motivation. This, whereas the results of the study of Koestner et al (2008) have shown that implementation planning, the working mechanism behind a specific

goal, because when people set a specific goal they think about how they are going to implement it, has an effect on goal pursuit and that this effect also depends on autonomous motivation. When autonomous motivation is higher, goal pursuit also increases. A possible explanation that this was not found in current study could be that only motivated people participated. In the introduction letter of the study it was emphasised that only people who were motivated to eat less meat for a week could participate. As a result, people who were less motivated may not have participated. Moreover, people with less motivation may have dropped out before participation before or during the second questionnaire. The mean score on autonomous motivation was indeed high (M = 5.24). Perhaps moderation could not be demonstrated because everyone actually had a high degree of motivation, and there were hardly any participants with low motivation.

Current research also suggests that various barriers are perceived in achieving goals. Participants reported in particular that the habit of eating meat made it difficult to achieve their goal. The habit of eating meat was integrated in various parts of their lives: for example, participants indicated that meat was also served at work. Some indicated that they also did not know enough about meatless products at the supermarket. The perceived barrier of habit is mentioned in earlier research on reducing meat consumption: people are used to eating meat (Rees et al., 2018). Although this barrier therefore could make it more difficult to eat less meat, there were also participants that indicated what had helped in achieving their goal. In particular, the benefit of social support in reducing meat consumption was mentioned. Several participants indicated that they had achieved the goal because they had done it together, or that someone else had corrected them if they had lost focus on the goal for a while, and that this was very helpful. Recent research also shows that social support may contribute to goal pursuit (Lee & Ybarra, 2017). The social component in reducing meat consumption should therefore also be further investigated, and could complement to the effectiveness of goal setting in reducing meat consumption.

There are some limitations of the current study. First, the results cannot be generalised to the entire Dutch population, because the sample proved to be insufficiently representative: it was predominantly women (71,6%) and highly educated people (72,8%) who participated in the study. The fact that more women participated is not surprising: women are more likely to be vegetarian or eat less meat, whereas men are more likely to eat meat often (De Boer, Schösler & Aiking, 2017). It could be that this biased the results, because women are thus more willing to eat less meat and could therefore have been better in succeeding in this. Although education level was high, this probably did not bias the results. Previous research

shows that the role of educational level in meat reduction is negligible (Vandermoere, et al., 2019). More research is needed to see if current results can be translated to a larger population.

Another limitation of the study is that the data was self-reported: participants indicated their meat consumption, but this could not be ascertained, so there may be mistakes in the reporting of meat consumption by participants. This means that it could be that the actual meat reduction is higher or lower than reported. Therefore, future research could investigate the actual change in behavior.

To conclude, setting goals may help in reducing meat consumption and can be of value in accelerating the shift to a more plant-based diet, and make a positive contribution to health and the environment. An effective way of doing this could be through assigned, general goals, as long as the perceived difficulty of the goals correspond to the difficulty of goals people would set themselves. This study suggest that the difficulty of a assigned goal in which people do not eat meat 4 days a week matches well with goals that people set themselves. This insight could be useful to take into account in campaigns promoting meat reduction. Further research might look at the effectiveness of assigned goals that do not correspond with the goal difficulty of self-set goals to investigate whether they then still work as well as self-set goals. Furthermore, attention should be paid to achieving goals "together with others". After all, a growing group of people is open to reduce their meat consumption (Onwezen et al., 2020). Combining different insights, such as the effect of goal setting, but also the influence of social support, could give them just that little extra push they need to succeed in their intended reductions.

Bibliography

Albers, M. (2022, March 30). De vleestaks ligt weer op tafel: ministerie gaat gezondheidseffecten onderzoeken. *De Volkskrant*. Retrieved from https://www.volkskrant.nl/nieuws-achtergrond/de-vleestaks-ligt-weer-op-tafel-ministerie-gaat-gezondheidseffecten-onderzoeken~bd89c43d/

Boada, L. D., Henríquez-Hernández, L. A., & Luzardo, O. P. (2016). The impact of red and processed meat consumption on cancer and other health outcomes: Epidemiological evidences. *Food and Chemical Toxicology*, *92*, 236-244. https://doi.org/10.1016/j.fct.2016.04.008

Brown, L. V. (2007). *Psychology of motivation*. Nova Publishers.

CBS. (2021, June 9). Vlees geen dagelijkse kost voor 8 op de 10 Nederlanders. Retrieved from https://www.cbs.nl/nl-nl/nieuws/2021/23/vlees-geen-dagelijkse-kost-voor-8-op-de-10-nederlanders

Cullen, K. W., Baranowski, T. O. M., & Smith, S. P. (2001). Using goal setting as a strategy for dietary behavior change. *Journal of the American Dietetic Association*, *101*(5), 562-566. https://doi.org/10.1016/S0002-8223(01)00140-7

Dagevos, H. (2021). Finding flexitarians: Current studies on meat eaters and meat reducers. *Trends in Food Science & Technology*. https://doi.org/10.1016/j.tifs.2021.06.021

Dagevos, H., & Voordouw, J. (2013). Sustainability and meat consumption: is reduction realistic?. *Sustainability: Science, Practice and Policy*, *9*(2), 60-69. https://doi.org/10.1080/15487733.2013.11908115

De Boer, J., Schösler, H., & Aiking, H. (2017). Towards a reduced meat diet: Mindset and motivation of young vegetarians, low, medium and high meat-eaters. *Appetite*, *113*, 387-397. https://doi.org/10.1016/j.appet.2017.03.007

Derbyshire, E. J. (2017). Flexitarian diets and health: a review of the evidence-based literature. *Frontiers in nutrition*, *3*, 55. https://doi.org/10.3389/fnut.2016.00055

Grassian, D. T. (2020). The Dietary Behaviors of Participants in UK-Based Meat Reduction and Vegan Campaigns–A Longitudinal, Mixed-Methods Study. *Appetite*, *154*, 104788. https://doi.org/10.1016/j.appet.2020.104788

Koestner, R., Otis, N., Powers, T. A., Pelletier, L., & Gagnon, H. (2008). Autonomous motivation, controlled motivation, and goal progress. *Journal of personality*, *76*(5), 1201-1230. https://doi.org/10.1111/j.1467-6494.2008.00519.x

Lee, D. S., & Ybarra, O. (2017). Cultivating effective social support through abstraction: Reframing social support promotes goal-pursuit. *Personality and Social Psychology Bulletin*, *43*(4), 453-464. https://doi.org/10.1177/0146167216688205

Levesque, C. S., Williams, G. C., Elliot, D., Pickering, M. A., Bodenhamer, B., & Finley, P. J. (2007). Validating the theoretical structure of the Treatment Self-Regulation Questionnaire (TSRQ) across three different health behaviors. *Health education research*, *22*(5), 691-702. https://doi.org/10.1093/her/cyl148

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. *American psychologist*, *57*(9), 705. https://doi.org/10.1037/0003-066X.57.9.705

Meischke, J. (2021, May 10). Geen enkel Europeaan eet zoveel vleesvervangers als de Nederlander. *Trouw*. https://www.trouw.nl/economie/geen-enkele-europeaan-eet-zo-veel-vleesvervangers-als-de-nederlander~b7800b2c/

Milford, A. B., & Kildal, C. (2019). Meat Reduction by Force: The Case of "Meatless Monday" in the Norwegian Armed Forces. *Sustainability*, *11*(10), 2741. https://doi.org/10.3390/su11102741

Morisano, D., Hirsh, J. B., Peterson, J. B., Pihl, R. O., & Shore, B. M. (2010). Setting, elaborating, and reflecting on personal goals improves academic performance. *Journal of applied psychology*, *95*(2), 255. https://doi.org/10.1037/a0018478

Onwezen, M. C., Kunz, M. C., Dagevos, H., & Verain, M. C. D. (2020). *Consumenten meer geneigd om 'alternatieve'eiwitten te eten dan in 2015*. Wageningen University & Research.

Pearson, E. S. (2012). Goal setting as a health behavior change strategy in overweight and obese adults: a systematic literature review examining intervention

components. *Patient education and counseling*, *87*(1), 32-42. https://doi.org/10.1016/j.pec.2011.07.018

Rees, J. H., Bamberg, S., Jäger, A., Victor, L., Bergmeyer, M., & Friese, M. (2018). Breaking the habit: on the highly habitualized nature of meat consumption and implementation intentions as one effective way of reducing it. *Basic and Applied Social Psychology*, *40*(3), 136-147. https://doi.org/10.1080/01973533.2018.1449111

Strecher, V. J., Seijts, G. H., Kok, G. J., Latham, G. P., Glasgow, R., DeVellis, B., ... & Bulger, D. W. (1995). Goal setting as a strategy for health behavior change. *Health education quarterly*, *22*(2), 190-200. https://doi.org/10.1177/109019819502200207

Teixeira, P. J., Silva, M. N., Mata, J., Palmeira, A. L., & Markland, D. (2012). Motivation, self-determination, and long-term weight control. *International Journal of Behavioral Nutrition and Physical Activity*, *9*(1), 1-13. https://doi.org/10.1186/1479-5868-9-22

Vandermoere, F., Geerts, R., De Backer, C., Erreygers, S., & Van Doorslaer, E. (2019). Meat consumption and vegaphobia: An exploration of the characteristics of meat eaters, vegaphobes, and their social environment. *Sustainability*, *11*(14), 3936. https://doi.org/10.3390/su11143936

Voedingscentrum. (2018, October 11). Bijna de helft van de Nederlanders probeert minder vlees te eten. Retrieved from https://www.voedingscentrum.nl/nl/nieuws/bijna-de-helft-van-de-nederlanders-probeert-minder-vlees-te-eten.aspx

Voedingscentrum. (2022). Week zonder vlees. Retrieved from https://www.voedingscentrum.nl/nl/duurzaam-eten/week-zonder-vlees.aspx

Appendix A: Questionnaire pilot study

1) Hoeveel dagen per week eet u ongeveer vlees (bij het avond eten, vleeswaren, vlees in soep en/of salades)?

- Iedere dag (7 dagen)
- 6 dagen per week
- 5 dagen per week
- 4 dagen per week
- 3 dagen per week
- 2 dagen per week
- 1 dag per week
- Minder dan 1 dag per week

2) Zou u uw vleesconsumptie willen verminderen?
Ja/nee

3) Bij ja: Als u nu een doel zou mogen zetten om minder vaak vlees te eten, wat zou uw doel dan zijn (ten opzichte van uw huidige consumptie)?

- 1 dag minder vlees eten
- 2 dagen minder vlees eten
- 3 dagen minder vlees eten
- 4 dagen minder vlees eten
- 5 dagen minder vlees eten
- 6 dagen minder vlees eten
- 7 dagen minder vlees eten

Appendix B: Questionnaire main study TO

Section 1: Socio-demographic characteristics

1) Wat is uw leeftijd?
2) Wat is uw opleidingsniveau?
VMBO – HAVO – VWO – MBO – HBO – Universiteit

3) Wat is uw geslacht?
Man – vrouw – anders
4) Eet u volledig vegetarisch of veganistisch? Ja – Nee

Section 2: Current meat consumption

Geef hieronder uw huidige vleesconsumptie aan, en ga hierbij uit van de afgelopen week. Als u het niet precies meer weet, kies dan het antwoord wat u denkt dat het meeste in de buurt komt.

1) Hoe vaak at u de afgelopen week vleeswaren bij het ontbijt (denk aan bijvoorbeeld salami/kipfilet/ham) de afgelopen week?
Iedere dag – 6 dagen – 5 dagen – 4 dagen – 3 dagen – 2 dagen – 1 dag – niet

2) Hoe vaak at u vlees bij de lunch (denk aan vleeswaren, maar ook vlees in soep of salades) de afgelopen week?
Iedere dag – 6 dagen – 5 dagen – 4 dagen – 3 dagen – 2 dagen – 1 dag – niet

3) Hoe vaak at u de afgelopen week vlees bij het avondeten (denk aan een stuk vlees/of gehakt door een gerecht)?
Iedere dag – 6 dagen – 5 dagen – 4 dagen – 3 dagen – 2 dagen – 1 dag – niet

Section 3: Goal conditions
Participants are assigned to one of the following conditions: no specific goal, specific goal self-set, specific assigned goal

Niet-specifiek doel

Wat leuk dat u interesse heeft om minder vaak vlees te gaan eten, u gaat hiermee de komende twee weken aan de slag! Over twee weken zal er weer een meetmoment zijn om te kijken of

het gelukt is om minder vaak vlees te eten. Schrijf dit voor u zelf op. Er komt nu een vragenlijst over uw motivatie om dit te gaan doen.

Specifiek doel zelf-gezet

Wat leuk dat u interesse heeft om minder vlees te gaan eten. De komende twee weken gaat u werken aan de doelen die u nu voor uzelf gaat zetten. Schrijf deze doelen ook meteen op en bedenk op welke dagen u dit zou willen doen. U kunt hieronder aangeven wat uw doelen zijn:

1. Hoe veel dagen per week wilt u maximaal vleeswaren eten bij het ontbijt (denk aan bijvoorbeeld salami/kipfilet/ham)?

Iedere dag – 6 dagen – 5 dagen – 4 dagen – 3 dagen – 2 dagen – 1 dag – niet

2. Hoe veel dagen per week wilt u maximaal vlees eten bij de lunch (denk aan vleeswaren, maar ook vlees in soep of salades)?

Iedere dag – 6 dagen – 5 dagen – 4 dagen – 3 dagen – 2 dagen – 1 dag – niet

3. Hoe veel dagen per week wilt u maximaal vlees eten bij het avondeten (denk aan een stuk vlees/of gehakt door een gerecht)?

Iedere dag – 6 dagen – 5 dagen – 4 dagen – 3 dagen – 2 dagen – 1 dag – niet

Specifiek doel toegewezen

Wat leuk dat u interesse heeft om minder vlees te gaan eten. De komende 2 weken gaat u proberen om **maximaal 3 dagen per week vlees** te eten en dit houdt dus in dat u probeert 4 dagen per week geen vlees te eten tijdens het ontbijt, de lunch en het avondeten. Schrijf dit ook meteen voor u zelf op en bedenk op welke dagen u dit wilt gaan doen.

Section 4: Autonomous motivation

In hoeverre bent u gemotiveerd om minder vaak vlees te eten?

1) Minder vlees eten is erg belangrijk (om zo gezond en duurzaam mogelijk te zijn)
2) Ik geloof dat minder vlees eten het beste is om te doen (om gezond en duurzaam te leven)
3) Ik wil verantwoordelijkheid nemen door minder vaak vlees te eten
4) Minder vaak vlees eten is een belangrijke keuze die ik echt wil maken
5) Ik heb er goed over na gedacht en geloof dat minder vlees eten erg belangrijk is
6) Minder vlees eten komt overeen met de doelen die ik heb in mijn leven

Antwoordopties 7 points Likert scale (Sterk mee oneens, oneens, enigszins oneens, niet oneens en niet eens, enigszins eens, eens, sterk mee eens)

Section 5 – Intention

This is additionally requested but not included in the study.

In hoeverre bent u gemotiveerd om uw doel te behalen?

1) Ik ben van plan het gestelde doel om minder vlees te eten te behalen
2) Ik weet wat ik moet doen om het doel te behalen
3) Ik denk dat ik in staat ben om het doel te behalen

Antwoordopties 7 points Likert scale (Sterk mee oneens, oneens, enigszins oneens, niet oneens en niet eens, enigszins eens, eens, sterk mee eens)

Section 6 – Tips and summary

Bedankt voor het invullen van de vragenlijsten. Hier zijn nog een aantal tips voordat u aan de slag gaat:

1) Het aantal vleesvervangers in de winkel is de afgelopen jaren flink gestegen, zo kunt u

redelijk makkelijk een maaltijd bereiden die u altijd al maakte met vlees, maar dan nu met een vleesvervanger.
2) Online staan heel veel vegetarische recepten, waar u mee kunt experimenteren.
3) Misschien zijn er in uw omgeving wel mensen vegetarisch of mensen die weinig vlees eten, die vast hun favoriete recepten en gerechten willen delen!

Veel succes!

Op de volgende pagina kunt u uw antwoorden en doel teruglezen.

Appendix C: Questionnaire T1

Section 1: Meat consumption

Hoe vaak at u de afgelopen week vlees?

1. Hoe veel dagen at u vlees bij het ontbijt (denk aan bijvoorbeeld salami/kipfilet/ham)?
Iedere dag (7 dagen) – 6 dagen – 5 dagen – 4 dagen – 3 dagen – 2 dagen – 1 dag – niet

2. Hoe veel dagen at u vlees bij de lunch (denk aan vleeswaren, maar ook vlees in soep of salades)?
Iedere dag (7 dagen) – 6 dagen – 5 dagen – 4 dagen – 3 dagen – 2 dagen – 1 dag – niet

3. Hoe veel dagen at u vlees bij het avondeten (denk aan een stuk vlees/of gehakt door een gerecht)?
Iedere dag (7 dagen) – 6 dagen – 5 dagen – 4 dagen – 3 dagen – 2 dagen – 1 dag – niet

Section 2: Goal pursuit and goal difficulty

1. Ik heb mijn doelen om minder vlees te eten behaald
Sterk mee oneens – oneens - enigszins oneens - niet oneens en niet eens - enigszins eens – eens - sterk mee eens

2. Ik vond het moeilijk om mijn doel te behalen
Sterk mee oneens – oneens - enigszins oneens - niet oneens en niet eens - enigszins eens – eens - sterk mee eens

Hieronder kunt u een toelichting geven waarom het doel wel of niet behaald is. Ging het erg goed of waren er misschien momenten waarop het niet lukte om het doel te behalen, en wat deed u toen?

Section 3: Strategies

3. Indien het (gedeeltelijk) gelukt is om uw doel te bereiken, op welke manieren heeft u dit gedaan?
Vink aan wat op uw van toepassing is:
- Meer vleesvervangers gebruikt
- Nieuwe/andere recepten uitgeprobeerd zonder vlees
- Anders: _____
- Niet van toepassing