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Master thesis

Can we increase people's intention to eat more plant-based using dynamic norms with a reference to working together?

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Abstract

Introduction: The current study built on previous research on whether dynamic norms increase the intention to eat more plant-based. Moreover, it was examined if working together normative appeals increased the effectiveness of dynamic norms, and if this was mediated by psychological resistance and feelings of working together.

Method: Dutch adults (N = 238) aged 19-75 years completed an online experiment. Two experimental (dynamic norm + working together and dynamic norm only) and two control (static norm and no-norm) conditions were compared on effectiveness in changing intention. Each condition provided participants with different social norm information about plant-based consumption in the Netherlands, based on a pilot study (N = 41).

Results: Emphasizing the dynamic norm did not result in higher intentions to eat more plant-based, and a reference to working together did not increase the effect of the dynamic norm. Exploratory analyses indicated that there were no differences between conditions in their estimates of current plant-based consumption. There was also no difference between the conditions when only people that gave a correct static norm estimate of 30-40% were included. Feelings of working together did significantly relate to intention.

Discussion: The non-significant findings could be explained by the heterogeneity of the sample or limitations of the study. Future research is needed to explore if and when dynamic norms and working together normative appeals work in the context of eating more plant-based. Additionally, interventions to enhance feelings of working together should be further explored.

Keywords: Dynamic norms, Working together, Social norms, Plant-based.

Introduction

High levels of animal-based consumption (e.g., meat, dairy) pose a major threat to the environment, animal welfare, and public health. Livestock production is, for example, one of the largest sources of greenhouse gas emissions and there are many health hazards associated with meat consumption, such as coronary heart disease and diabetes mellitus (Gerber et al., 2013; Micha et al., 2010). This indicates that there is a need to decrease the consumption of animal-based products, and thus increase the consumption of plant-based food (produced without animals as a source of protein, such as vegetables). However, behavior change remains difficult because people rationalize their eating behavior by the belief that eating animal-based products is *natural*, *normal*, *necessary*, and *nice* (the 4Ns; e.g., Piazza et al., 2015). People who endorse the 4Ns argue that we are biologically evolved to eat animal-based products (it is natural), that it is what most people in civilized society do and most people expect from us (it is normal), that we need animal-based products to survive (it is necessary), and that animal-based products are tasty and bring pleasure (it is nice; Piazza et al., 2015). These rationalizations cease to exist because they are created through social norms: the majority of people eat animal-based products and approve of this behavior, thus people assume it is the right thing to do (Tsjang, 2002). Recent research has started to investigate how a change in animal-based consumption towards more plant-based consumption could be accelerated. Although it may seem counterintuitive, research has started to investigate whether plant-based consumption can be accelerated using social norms (e.g., Sparkman & Walton, 2017), but more knowledge about what works is needed to implement effective interventions. The current study, therefore, has built on previous research that examined how social norm information can be used to increase the consumption of plant-based food.

Social norms

Social norms can be described as the widely accepted rules that guide behavior in groups and societies (Bicchieri et al., 2011). As opposed to laws, social norms are learned and negotiated through social interaction (Rimal & Lapinski, 2015). Research commonly divides social norms into a *descriptive* aspect (what people think other people are doing) and a *prescriptive/injunctive* aspect (what people think other people approve or disapprove of). Both aspects have specific functions. Descriptive norms could be used as a heuristic when it is important to make accurate decisions and are most likely to be influential in situations that are new or when it is unclear what behavior is most appropriate (Cialdini & Trost, 1998; Reid et al., 2010). Injunctive norms are useful in the formation and maintenance of social bonds

(Cialdini & Trost, 1998; Reid et al., 2010). Both descriptive and injunctive norms have been studied in relation to various health behaviors, such as cigarette use (e.g., Etchevvery & Agnew, 2008) and alcohol use (e.g., Carey et al., 2006). Additionally, food choices and the amounts consumed are strongly affected by social norms. For example, people are likely to either increase or decrease their food intake based on how much their dining partners eat (Herman et al., 2003)

What people are doing generally reflects what people approve of, but in some cases, there might be a discrepancy between the two aspects of a norm. For example, seeing that most people in one's immediate environment are behaving in a certain way would represent a positive descriptive norm towards the behavior. On the other hand, one might perceive that most others disapprove of the behavior, because of the long-term consequences. This indicates a negative injunctive norm towards the behavior in question. According to the focus theory of normative conduct, people will solve this norm conflict by following the aspect of a norm that is most salient (Cialdini et al., 1990).

Positive behavior can be encouraged by appeals using social norms (e.g., 'the majority of people do this'; Goldstein et al., 2008), and evidence shows that providing normative information affects food choices stronger than health messages (Robinson et al., 2014a). Normative appeals work because they make a certain aspect of a norm more salient. For example, a positive descriptive norm can be highlighted when a negative injunctive norm is present, to take attention away from the negative injunctive norm. Moreover, normative appeals can correct inaccurate perceptions people have of the behaviors and attitudes of those around them due to perceptual biases (Reid et al., 2010).

Dynamic norms

However, a downside of providing social norm information in the context of decreasing animal-based consumption is that eating plant-based is not the established social norm (Sparkman et al., 2021). On the other hand, the amount of people that try to eat less animal-based products is increasing (Sparkman & Walton, 2017). Recent research has hooked on to this change by starting to use these changing social norms (e.g., Sparkman & Walton, 2017; Aldoh et al., 2021). These studies suggest instead of the *static norm salient* (the current state of a norm) a *dynamic norm* (how the norm is changing; Sparkman & Walton, 2017) could be made salient to help communicate a future majority norm. Therefore, people will engage in *pre-conformity*, meaning that they already conform to an expected future norm as if it were the current norm. Additionally, dynamic norms could lead to a decrease in several

important barriers to behavior change: (1) self-efficacy, or the believe that one is able to change; (2) perceived importance of the change to others; and (3) social identity compatibility, or the belief that change fits with one's identity (Sparkman & Walton, 2019). This means that seeing other people change might indicate a possibility to change one's own behavior.

Experimental research has suggested that it can be promising to state dynamic norm information on decreased meat consumption to stimulate consuming less animal-based products (Sparkman & Walton, 2017). However, a replication of the original study did not show the same promising results (Aldoh et al., 2021). An explanation for these mixed results is the possibility that eating behavior often feels like a personal choice, and individuals perceive restrictions to this choice as a threat to their autonomy (Sparkman et al., 2021). Normative messages such as 'Most people do X' can initiate resistance because of the indirect implication: 'So you should do too'. To decrease the resistance, Howe and colleagues (2021) suggested that a working together element should be included to the normative appeal. *Working together normative appeals* invite people to "join in" and "do it together" to reach a common goal. Motivation is increased when people feel like they are working together (Carr & Walton, 2014). To date, the effects of working together normative appeals have only been studied with majority norms. However, using dynamic norms may be promising in contexts where the desired behavior is not yet the majority norm, such as eating plant-based (Sparkman et al., 2021).

The present research

Since there is high societal and individual importance for increasing the consumption of plant-based products, it is important to know how people's intention to alter their eating behavior could be improved. The first separate results of dynamic norms (Sparkman & Walton, 2017) and working together normative appeals (Howe et al., 2021) are promising, but more insight is necessary on their interaction. Moreover, there are some mixed results on dynamic norms (Aldoh et al., 2021), which need further attention. Finally, research on dynamic norms has only used a negative approach, with asking people about their intention to decrease animal-based consumption. It is interesting to explore the effects when the questions are more positively (e.g., 'eat more plant-based') instead of negatively stated (e.g., 'eat less animal-based'), since positively framed messages are usually more persuasive (Maheswaran & Meyers-Levy, 1990).The present research will therefore investigate how dynamic norms

with and without a reference to working together relate to people's intention to eat more plant-based. This leads to the following research question:

> *Do dynamic norms increase the intention to eat more plant-based compared to static norms and no norms; and does using working together normative appeals increase the effectiveness of dynamic norms?*

To answer the research question, four hypotheses will be tested. First, because Sparkman & Walton (2017) found that dynamic norm information leads to increased interest to decrease meat consumption, it is expected that it works the same with increased plant-based consumption. Therefore, the first research question was formulated as:

> *H1: Providing people with dynamic norm information leads to increased intention to eat more plant-based, compared to no-norm information and static norm information.*

To test whether a reference to working together can increase the effectiveness of dynamic norms, as it does for static norms (Howe et al., 2021) the following hypothesis has been set:

> *H2: Dynamic norms with a reference to working together result in higher intentions to eat more plant-based than only dynamic norms.*

Furthermore, Sparkman & Walton (2017) found no difference between no-norm and static norms on interest to decrease meat consumption. A possible reason for this is that decreasing meat consumption is a minority norm, which makes providing the static norm less effective. Therefore, it was expected that:

> *H3: There is no difference between the no-norm and static norm control condition on intention to eat more plant-based.*

Finally, the mediating roles of psychological resistance and feelings of working together were measured, to gain more insight in how working together normative appeals work. Psychological resistance was subdivided in feelings of social pressure and feelings of free choice (Howe et al., 2021). In their study on working together normative appeals, Howe and colleagues found that psychological resistance and feelings of working together explained the

effects of working together normative appeals on intention to donate to charity using static majority norms. Even though the effects of working together normative appeals have not been studied with dynamic minority norms, it was expected that:

> *H4: Feelings of psychological resistance (as indicated by feelings of social pressure and feelings of free choice) and feelings of working together mediate of the effects of dynamic norms with a reference to working together on intention to eat more plant-based.*

Method

Research design

To investigate the extent to which the intention to consume more plant-based food can be increased by dynamic norms and working together normative appeals, the current study used an experimental between-subjects design with four conditions. In the first three conditions, participants were asked to read a norm statement about (a) the dynamic norm with a reference to working together; (b) the dynamic norm; (c) the static norm. The final condition was a no-norm condition in which participants did not read any text. The static norm and the no-norm condition were treated as control conditions. The current research was approved by the Ethics Committee of the Faculty of Social and Behavioral Sciences of Utrecht University, reference number: 22-0708.

Participants

Participants were Dutch adults aged 19-75 years (M = 42.59, SD = 15.29) who were asked to complete an online self-report measure. Of the 378 individuals who clicked on the link to the survey, 68 were removed because they did not give their full consent to participate in the study. Additionally, 69 participants were removed because they did not complete the survey. Finally, 3 participants were removed because they ate vegan. The remaining 238 participants were 196 women, 38 men, 3 persons who identified as non-binary and one as ‘other’. The highest educational levels the participants completed varied from primary school (.4%) to doctorate (2.5%). Other participants reported their highest completed education as preparatory secondary education (4.6%), senior general secondary education/university preparatory education (8%), senior secondary education and training (19.3%), first year of higher professional education or university (13.9%) a bachelors’ degree (32.8%), or a master’s degree (18.5%). Participants described their current eating pattern as almost vegan

(8.8%), vegetarian (10.1%), almost vegetarian (5.9%), flexitarian (17.2%), pesco-vegetarian (5.5%), 1 day per week vegetarian (17.2%), and omnivore (35.3%. Finally, participants indicated that they choose plant-based options daily (20.6%), 5 to 6 days a week (7.1%), 3 to 4 days per week (15.5%), 1 to 2 days per week (18.9%), 1 to 3 times per month (18.9%), less than once a month (9.2%), or never (9.7%).

An *a-priori* power analysis (G-power, $\alpha = 0.05$, 80% power for a medium effect size) indicated that a sample of 180 participants was required find differences on the intention measure between the four conditions. Each condition should consist of a least 45 participants (Cohen, 1992). This was accomplished with the current sample, since the sample distribution across condition was as follows: dynamic + working together ($N = 56$), dynamic only ($N = 61$), static ($N = 62$), no-norm ($N = 59$). The demographic and background variables were distributed equally over the four groups, as indicated by a visual check.

To recruit participants, three non-probability sampling methods have been used: convenience sampling, river sampling and snowball sampling. In convenience sampling, people who are easily reachable to the researcher are asked to participate in the study (e.g., friends, family members and acquaintances; Etikan et al., 2016). Moreover, River sampling has been used to reach a larger number of Dutch adults by sharing a link to the survey on a web page were members of the target population are likely to notice it (Lehdonvirta et al., 2020). The link for the current study has been shared via Facebook and LinkedIn. Finally, because people were asked to share the survey with others, a snowball sampling frame has been used (Emerson, 2015).

Procedure

Participants were asked to complete the online survey through Qualtrics between 22 April and 12 May 2022. Before entering the questionnaire, participants were asked to read the introduction letter and give consent for the use of their answers for research purposes. Participants were told that they would participate in a study on social norms and eating behaviors. After giving consent, Qualtrics randomly assigned participants to one of the four conditions. Depending on condition, participants were given normative information about plant-based consumption in the Netherlands. Thereafter, several dependent measures and demographic variables were measured.

Measures

A questionnaire has been developed with the use of earlier research (e.g., Sparkman & Walton, 2017; Howe et al., 2021). All questions and statements have been carefully translated to the Dutch language, to make the questionnaire understandable for the target population.

Normative statements

The norm statements were closely based on those used by Sparkman and Walton (2017) and the working together reference on the one used by Howe and colleagues (2021). To determine the estimates in the norm statement, a pilot study was conducted with a convenience sample (N = 41). Participants were aged 18-75 years (M = 33, SD = 16.69). The percentage of people who try to eat more plant-based (static norm) was estimated between 5 and 65 (M = 34.43; SD = 16.40), and the percentage of people who started to try to eat more plant-based (dynamic norm) was estimated between 5 and 70 (M = 29.69; SD = 17.27). Moreover, few people indicated that their own consumption of plant-based options decreased in the past year (9.7%). The majority of people indicated that their consumption of plant-based options had stayed the same (26.8%) or increased a little (29.3%%). Finally, 34.2% indicated that their consumption of plant-based options had increased strongly to very strongly. This was in line with the expected percentages of the participants. In all conditions, the percentage mentioned in the norm statement was rounded to 35%.

The statements consisted of normative information. In the static norm condition, people were informed about the descriptive norm towards eating more plant-based. In the dynamic norm condition, attention is drawn to the change people made. Finally, the working together condition included dynamic norm information with a reference to working together. The open-ended question “why do you think people do this?” was added to increase engagement with the text (Sparkman & Walton, 2017).

Static norm. In the static norm condition, participants read: “Recent research has shown that 35% of Dutch people make an effort to eat more plant-based. That means that 3 in 10 Dutch people eat more plant-based than they otherwise would.”

Dynamic norm. In the dynamic norm condition, participants read: “Recent research has shown that 35% of Dutch people have started to make an effort to eat more plant-based. That means that 3 in 10 Dutch people have begun to eat more plant-based than they otherwise would.”

Working together. In the working together condition, participants read: “Let’s do it together! Recent research has shown that 35% of Dutch people have started to make an effort

to eat more plant-based. This means that 3 in 10 Dutch people have begun to eat more plant-based than they otherwise would. Join in!"

Dependent measures.

Interest. To measure interest in eating more plant-based, participants were asked a single-item measure adapted from Sparkman & Walton (2017): "How interested are you in eating more plant-based options?". This was measured on a 7-point Likert scale ranging from 1 (not at all) to 7 (extremely). Additionally, participants were asked which plant-based options they would like to use (e.g., meat replacements, plant-based milk, none, etc.) by a check box question in which multiple answers were possible.

Intentions. Three statements were used to measure intentions (Aldoh et al., 2021; Fishbein & Ajzen, 2010): "I will try to eat more plant-based within the next year"; "I have the intention to eat more plant based within the year"; "I plan to eat more plant-based within the next year". The items were measured on a 7-point Likert scale ranging from 1 (completely disagree) to 7 (completely agree) and showed excellent internal consistency in the current sample (α = .99; George & Mallery, 2003).

Psychological resistance. In adherence with research by Howe and colleagues (2021), psychological resistance was measured through the extent to which participants felt (1) social pressure to eat more plant-based (two items; e.g., "To what extent do you feel you are being pressured to eat more plant-based"; α=.66 and (2) they could freely choose to eat more plant-based (two items; e.g., "To what extent do you feel you can decide on your own to eat more plant-based?"; α=.68. These constructs were treated separately because a person could feel they could freely choose their behavior but still experience social pressure. The items were measured on a 7-point Likert scale ranging from 1 (not at all) to 7 (extremely).

Feelings of working together. To measure whether people in the working-together condition experienced more feelings of working together than in the other groups, three items adapted from Howe and colleagues (2021) were used (e.g., "To what extent do you feel like eating plant-based something is something you would do together with other Dutch people?") and has good internal consistency (a=.83). The items were measured on a 7-point Likert scale ranging from 1 (not at all) to 7 (extremely).

Estimates of current plant-based consumption ('Current norm'). Two questions adapted from Sparkman & Walton (2017) were asked to examine if perceptions of the static norm differed across conditions. Additionally, these questions checked whether people

thought the percentage in the norm statements had been fully processed (e.g., read correctly, accepted as true, stored in memory). First, people were asked: "What percentage of people do you think make an effort to eat plant-based more often?". If this percentage is around 35%, it can be argued that the percentage in the norm statements was fully processed. Moreover, people were asked on a 5-point Likert scale ranging from 1 (none) to 5 (a lot) how many people in the Netherlands make an effort to eat more plant-based. The second question was added because in the first question people could simply repeat the norm statement without giving meaning to it. To check whether the conditions differ in how people interpret the frequency of the behavior in question (eating more plant-based), participants were asked to estimate the number of plant-based meals of 21 total meals eaten each week by people who try to increase their plant-based consumption. A higher score on this measure would indicate that people believe people are trying harder to increase their plant-based consumption.

Current consumption. Participants were also asked two single-item measures about their current consumption of animal- and plant-based products. First, participants were asked how often they replace animal-based products for plant-based options, with answer options ranging from 1 (daily) to 7 (never; adapted from Pohjolainen et al., 2015). Moreover, participants were asked what suited best with their current eating pattern, in which they could choose between: (1) vegan; (2) almost vegan; (3) vegetarian; (4) almost vegetarian; (5) flexitarian; (6) pesco-vegetarian; (7) 1 day per week vegetarian; (8) omnivore (adapted from Ryan et al., 2022).

Demographic variables. To gain insight in the homogeneity of the sample and the background of the participants, demographic questions on age, gender and educational level were asked.

Statistical analyses

Data has been analyzed using SPSS (version 27). First, the data has been screened, whereafter incomplete cases and individuals that did not meet the study criteria were removed (e.g., when participants were vegan or younger than 18 years). Moreover, descriptive statistics and Pearson correlations of the data were analyzed. To test the first three hypotheses that expected differences between the groups, a one-way analysis of variance (ANOVA) model has been developed with planned contrasts comparing: (1) dynamic norms to static and no-norm controls; (2) dynamic norms with and without a reference to working together; and (3) comparing static norm and no-norm controls. Furthermore, a parallel mediation model has been developed in which the final hypothesis has been tested: if feelings of working together,

feelings of social pressure and feelings of free choice mediated the relationship between condition and intentions to eat more plant-based. The data was explored further to check whether there were alternative explanations for the results that were found. With the use of a one-way multivariate analysis of variance (MANOVA) it was investigated whether there were group differences in the perception of the current norm. The following question was answered: *Do perceptions of the static norm and the interpretation of the frequency of eating more plant-based differ across condition?* Additionally, because it could be argued that not everyone fully processed the normative information, an ANOVA measuring the effect of condition on intention has been conducted in which only the 71 participants who gave a percentage estimate of the static norm between 30 and 40 were included. These numbers were chosen because they were close to the 35% that was mentioned in the norm statements, which makes it more likely that the information was processed. It was examined whether there was a difference between the two experimental groups and the static norm control group on their intention to eat more plant-based when only the selected group of participants was included in the analysis.

Results

Descriptive statistics

The descriptive statistics and Spearman correlations of the study variables are presented in Table 1. Overall, participants reported quite high levels of interest in eating more plant-based intention to eat more plant-based and feelings of free choice to eat more plant-based. The participants scored relatively low on the social pressure measure, and average on feelings of working together. The differences between the conditions were quite small, as can be seen in Table 2 that shows means and standard-deviations of the primary variables per condition.

The majority of participants indicated that they are interested in using meat replacers (58.4%), using plant-based milk (50.4%), or leaving out meat and diary (60.5%). Moreover, participants indicated that they would like to use fish replacers (21.8%), plant-based yoghurt (45.8%), plant-based cheese (25.6%), or other (9.2%). Only 11.8% indicated that they did not want to use plant-based options. Estimates of current plant-based consumption (static norm) were comparable to the results of the pilot. On average, people expected that 2 to 100 percent (M = 33.23, SD = 16.39) of people make an effort to eat more plant-based. Most people did not simply repeat the norm statement, because only 30.9% of participants filled in a percentage between 30 and 40 percent. However, this could also mean that the information in the norm statements was not fully processed. Furthermore, participants indicated that they

thought those who try to eat more plant-based eat make an effort by eating on average 8 out of 21 meals without animal-based products in a week. Exploratory analyses have explored whether these expectations differ by condition.

Hypothesis testing

Group differences

An ANOVA with planned contrasts was used to measure the differences between the experimental groups and the control groups in their intention to choose more plant-based options. The normality assumption has been violated, but because ANOVA is usually robust to violations from normality, it has been decided to proceed with the analysis (Blanca et al., 2017). The ANOVA without contrasts showed no significant differences between the conditions and their intention to choose more plant-based options (F (3, 234) = .512, p = .674). Planned contrasts revealed that there was no significant difference between the experimental groups and the control groups (t (234) = -.789, p = .431). There was also no significant difference between the dynamic norm + working together and the dynamic norm only group (t (234) = .548, p = .584). Finally, there was no significant difference between the static norm group and the no-norm group (t (234) = .752, p = .453). Thus, the analyses indicated that there were no significant differences between any groups. This means there was no support for the first two hypotheses that expected between-group differences while the third hypothesis that expected no difference between the static norm and no-norm control groups could be confirmed.

Mediation

Even though there were no differences between the groups, a parallel mediation analysis using PROCESS by Andrew F. Hayes was conducted to explore the relationships between the variables. With this mediation analysis it was tested if feelings of working together, feelings of social pressure and feelings of free choice mediated the relationship between group and intentions to eat more plant-based. Only the two experimental conditions were included in the analysis to compare the effects of dynamic norms with a reference together and dynamic norms only. For feelings of working together, the assumption of homoscedasticity was violated. To reduce the risk of a false-positive effect (type 1 error) that is associated with heteroscedasticity, bias-corrected bootstrap was used (Ng & Lin, 2016). As seen in figure 1, results of the mediation analysis indicated that condition was not significantly related to feelings of working together (B = -.40, SE =.24, p =.101), feelings of social pressure (B = -

.29, *SE* =.27, *p* = .290), or feelings of free choice (*B* =.21, *SE* = .23, *p* = .352). Feelings of social pressure and feelings of free choice also did not significantly relate to intention to eat more plant-based (*B* = -.22, *SE* = .13, *p* =.100; *B* = .23, *SE* = .16, *p* = .148). Feelings of working together did significantly relate to intention (*B* =.76, *SE* = .12, *p* <.001), indicating that individuals who experienced more feelings of working together had a higher intention to eat more plant-based. The indirect effect using 10,000 bias-corrected bootstrap samples was not significant (*B* = -.19, *SE* = .23, 95% *CI* = -.692 to .235). Thus, the hypothesis that feelings of working together, feelings of social pressure and feelings of free choice mediated the relationship between experimental condition and intention to eat more plant-based has been rejected.

Exploratory analyses

The data was explored further with the use of MANOVA to see whether there were group differences in the estimates of current plant-based consumption. It was measured if perceptions of the expected percentage of people that try to eat more plant-based and the interpretation of the frequency of the behavior in question differed across condition. Because the maximum Mahalanobis distance was 51.13, one participant was excluded from the analysis. The Kolmogorov-Smirnov and Shapiro-Wilk tests did show some deviations from multivariate normality. However, the parametric statistic still outperforms the non-parametric statistic in terms of power and type-1 error when the assumption of normality is not met (Finch, 2005). Therefore, the MANOVA analysis was continued. A statistically non-significant effect was obtained (*V*= .05, *F* (6, 442) = 1.82, *p* =.094). This means perceptions of the static norm and the interpretation of the frequency of eating more plant-based did not significantly differ across condition and were therefore not an alternative explanation for earlier results. The multivariate effect size was estimated at .024, which implies that 2.4 % of the variance in the dependent variables was accounted for by condition.

Furthermore, because it could be argued that not everyone processed the information that was stated to them, which may have prevented the message from having any effect, an ANOVA has been conducted in which only the 71 participants who gave a percentage estimate between 30 and 40 were included. The ANOVA tested whether there was a difference between the experimental groups and the static norm control group when people processed the information correctly as indicated by a correct estimate. No significant differences were found between the groups (*F* (2,58) = .934, *p* = .399).

Discussion

The current study aimed to investigate whether dynamic norms increase the intention to eat more plant-based compared to static norms and no norms, and if using working together normative appeals increases the effectiveness of dynamic norms. Based on earlier findings (Sparkman & Walton, 2017), it was tested whether dynamic norm information increases the intention to eat more plant-based compared to static norm and no-norm information, and if there was a difference between static norm and no-norm information. No significant differences between the groups were found. Additionally, because normative messages can initiate resistance, it was tested whether dynamic norms with a reference to working together would result in higher intentions to eat more plant-based than only dynamic norms. This was based on findings from Howe and colleagues (2018) who tested the concept of working together normative appeals with static majority norms. The current study did not find a significant difference between the dynamic norm + working together and the dynamic norm only group. Even when only participants who gave a correct static norm estimate were included in the analysis, no differences between the groups were found. These results indicate no effect of a dynamic norm intervention on people's intention to eat more plant-based. There was, however, a significant effect of feelings of working together on intention to eat more plant-based. This indicates that individuals who experience more feelings of working together have a higher intention to eat more plant-based.

The non-significant effects of the dynamic norm information could be explained by the heterogeneity of the population, since social norms are more likely to be effective in a homogeneous population (Silva & John, 2017). In such population, social norm information could give people a cue of the most efficient behavior in a specific context (Silva & John, 2017). Moreover, in a homogeneous population, people are more likely to have a shared identity. A shared identity prevents anti-conformist bias, in which people prefer not to conform to the social norm of a group, because they do not identify with the group (Silva & John, 2017). Although the current study did check for some demographic and background variables, it did not explore whether people identified with de group ('Dutch people') that was mentioned in the norm statements.

For working together normative appeals to be effective, people's relationship with the group that is referred to is also important (e.g., group identification, respect, admiration; Howe et al., 2021). The study by Howe and colleagues that found significant effects of working together normative appeals, used a university sample. It is likely that people in a student sample have stronger group relationships than people in a national sample because a

student sample is more homogeneous. Moreover, the relationship people have with a group could influence how much they view others in the group as likely to work together. It is possible that people view the group in the current study as less likely to work together, or be able to change, which could make working together normative appeals seem false, insincere, or manipulative (Howe et al., 2021). Therefore, people are less likely to be motivated to change their behavior, which could explain why no effects of working together normative appeals were found in the current study.

The finding that individuals who have greater feelings of working together have a higher intention to eat more plant-based is in line with previous research indicating that intrinsic motivation and interest in cooperating is increased when people feel like they are working together (Carr & Walton, 2014). An explanation for this is that feelings of working together could be related to perceived collective efficacy, or how much people believe that they are, as a group, capable of dealing with a problem (Sparkman & Walton, 2021). Collective efficacy is found to be important in increasing pro-environmental behaviors and can be increased by showing that others are increasingly willing to contribute to the collective goal (Jugert et al., 2016; Sparkman & Walton, 2019; Sparkman & Walton, 2021).

Limitations

The current study did not find support for the working of dynamic norms and dynamic norms with a reference to working together, but the study had some limitations which could have affected the conclusions. First, there was quite a small difference between the dynamic and static norm statements. It is difficult to find out if people perceived "are making an effort" differently from "starting to make an effort" (Aldoh et al., 2021). Although this wording was chosen to stay as close as possible to the original research (Sparkman & Walton, 2017), it might have been interesting to see what would happen if there was a larger difference between the conditions to better ensure the salience of the dynamic norm. Moreover, it has been argued that it might not always be enough to expose people to a simple norm statement in order to make the static or dynamic aspect of a norm salient (Sparkman & Walton, 2017). When people strongly associate a certain behavior with a recent trend, even a static norm statement may make people think about the change. Since plant-based options are more and more available in supermarkets and restaurants, it is likely that people are already aware of the ongoing change towards eating more plant-based (Aldoh et al., 2021).

Another limitation is that, while closely replicating Sparkman and Walton (2017), the current study deviated from Howe and colleagues (2021) in the presentation of the norm

statements. Howe and colleagues motivated participants by handing them a flyer with a visual aspect (e.g., stick-figures that were grouped together and gave hands to show they are working together). Previous research has shown that the effects of social norms depend on visual cues (Ye et al., 2021). Because the current study used normative statements that consisted only of text presented online, it could be that the statements were less engaging, even though an open-ended question to increase engagement was added.

Finally, while the materials and measures in the current study were used in previous research, there may be some questions about their validity. For example, the norm statements have been adapted from Sparkman & Walton (2017), who used them in their research on decreasing meat consumption, but no study has been dedicated to validating the statements. Additionally, even though Fishbein and Ajzen's items are widely used to measure intention, the questions are highly correlated in the current sample, with a Cronbach's alpha of .99. It can be argued that after a value of above .90 could mean that the construct is narrowly covered, which could lead to a less accurate measurement (Panayides, 2013).

Future research

Research on dynamic norms and working together normative appeals is still in its infancy. The current study added some more insight into the literature by exploring the effects of dynamic norms in a Dutch sample, and by combining several research findings on dynamic norms and working together normative appeals. For example, the effects of working together normative appeals have only been studied with majority norms, but it has been suggested that they could also work with dynamic norms (Howe et al., 2021; Sparkman et al., 2021). Because the current study did not find any significant results, it is important to find out if and when the constructs of dynamic norms and working together could work in the context of increasing the consumption of plant-based food.

Future research should consider the limitations of the current study. Therefore, it is important to investigate how the dynamic norm can be made more salient. This should be done, for example, by using norm statements that are more distinct from each other to avoid confusion of the difference between "are making an effort" and "are starting to make an effort". Moreover, the norm statements should be made more engaging. Even though the question "why do you think people do this?" was added after the norm statements to improve engagement with the text, as replicated from Sparkman & Walton (2017), it may be that more engagement is needed. This can be done, for example, by using visual cues.

Finally, future research should further explore the relationship between feelings of working together and people's intention to eat more plant-based. It would be very valuable when we have more insight in how feelings of working together can be strengthened in the context of increasing plant-based consumption. Even though the current study did not find an effect of dynamic norms on feelings of working together, it is imperative to further explore whether working together normative appeals can be effective (e.g., when using visual cues or targeting a more homogeneous subgroup).

Conclusions

Strengthening interventions to increase the consumption of plant-based food are of high importance due to the negative consequences of animal-based consumption (e.g., environmental threat). The results of the current study indicate that dynamic norm information, and dynamic norm information with a reference to working together do not have a stronger influence on intention to eat more plant based than static norm or no-norm information. However, more research is needed to explore if and when dynamic norms and working together normative appeals work in the context of eating more plant-based. Furthermore, the current study found a relationship between feelings of working together and intention to eat more plant-based. Therefore, interventions that enhance feelings of working together are especially important to further explore to find ways to stimulate plant-based consumption.

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Table 1.

Descriptive statistics and Spearman-correlations of the study variables

	N	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Age	238	42.59	15.29											
2. Gender	238	1.20	.46	-.055	-									
3. Education	238	5.26	1.49	-.162*	.114	-	-	-	-	-	-			
4. Plant-based consumption	238	3.75	1.92	.114	.131*	-.225**	-	-	-	-	-	-	-	-
5. Eating pattern	238	5.93	2.08	.168**	.073	-.230**	.795**							
6. Static norm	230	33.23	16.40	-.117	-.010	.213*	-.130*	-.071	-	-	-	-	-	-
7. Meals in a week	229	7.72	4.59	-.028	-.055	.080	-.117	-.143*	.188**	-	-	-	-	-
8. Interest	238	4.81	1.74	-.112	-.045	.217**	-.826**	-780**	.102	.076	-			
9. Intentions	238	4.97	1.90	-.126	-.104	.146*	-.719**	-669**	.153*	.087	.807**			
10. Working together	238	3.61	3.61	-112	-.091	.189**	-.348**	-348**	.225**	.119	.383**	.495**		
11. Social pressure	238	2.47	2.47	-.042	-.017	.076	.239**	.267**	.098	.036	-.280**	-.245**	-.053	

Free choice	238	5.86	5.86	-.157	-.049	.132*	-.282**	-.312**	.067	-.020	.376**	.317**	.109	-.503**

Notes. $N = 310$; *$p < .05$; **$p < .001$.

Table 2.

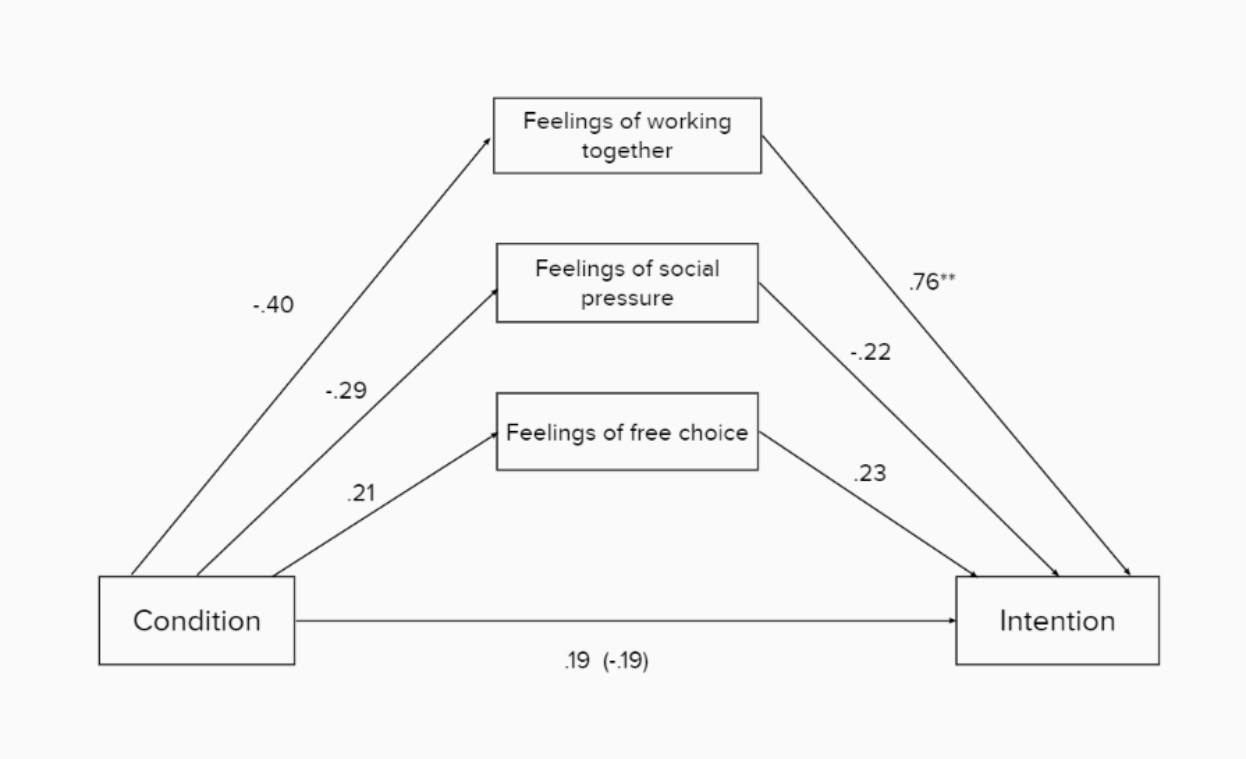
Descriptive statistics of the primary variables per condition.

	M	SD
Interest in eating more plant-based		
Dynamic norm + working together	4.80	1.98
Dynamic norm only	4.80	1.71
Static norm	4.84	1.78
No-norm	4.78	1.50
Intention to eat more plant-based		
Dynamic norm + working together	4.96	2.02
Dynamic norm only	4.77	1.99
Static norm	5.19	1.91
No-norm	4.93	1.71
Feelings of working together		
Dynamic norm + working together	3.38	1.33
Dynamic norm only	3.78	1.30
Static norm	3.59	1.43
No-norm	3.71	1.27
Feelings of social pressure		
Dynamic norm + working together	2.32	1.48
Dynamic norm only	2.61	1.43
Static norm	2.44	1.25
No-norm	2.51	1.24
Feelings of free choice		
Dynamic norm + working together	5.91	1.31
Dynamic norm only	5.70	1.16
Static norm	5.92	1.03
No-norm	5.93	1.10

Note. Scores range from 1 (not at all) to 7 (extremely)

Figure 1.

The mediating effect of feelings of working together, feelings of social pressure, and feelings of free choice in the relationship between experimental condition and intention.



Notes. ** $p < .001$; Dynamic norm = 0, dynamic norm + working together = 1.

Appendix A

Questionnaire

Definitie plantaardig

(Deze definitie werd op iedere nieuwe pagina van de vragenlijst herhaald)

Plantaardig = zonder dierlijke producten zoals vlees, vis, kaas, zuivel en eieren. Denk hierbij aan het gebruik van vleesvervangers, sojamelk of bonen. Ook het weglaten van dierlijke producten kunt u zien als een plantaardige optie (bijv. een pastasaus met alleen groente).

Normative statements

Static norm conditie

Recent onderzoek heeft aangetoond dat 30-35% van de Nederlanders probeert om vaker voor plantaardige opties te kiezen. Dit betekent dat 1 op de 3 mensen vaker plantaardig eten dan ze normaal gesproken zouden doen.

Waarom denkt u dat mensen dit doen?

Dynamic norm conditie

Recent onderzoek heeft aangetoond dat 30-35% van de Nederlanders probeert om vaker voor plantaardige opties te kiezen. Dit betekent dat 1 op de 3 mensen hun gedrag hebben veranderd en zijn begonnen om vaker plantaardig te eten dan ze normaal gesproken zouden doen.

Waarom denkt u dat mensen dit doen?

Dynamic norm + working together conditie

Laten we het samen doen! Recent onderzoek heeft aangetoond dat 30-35% van de Nederlanders is begonnen met proberen om vaker voor plantaardige opties te kiezen. Dit betekent dat 1 op de 3 mensen hun gedrag hebben veranderd en zijn begonnen om vaker plantaardig te eten dan ze normaal gesproken zouden doen. Doe mee!

Waarom denkt u dat mensen dit doen?

Dependent measures

Interesse

- Hoe geïnteresseerd bent u om vaker voor plantaardige opties te kiezen? *(1 = helemaal niet, 2 = niet, 3 = nauwelijks, 4 = een beetje, 5 = redelijk, 6 = in hoge mate, 7 = in zeer hoge mate)*

Plantaardige opties

- Welke plantaardige opties zou u willen gebruiken? *(meerdere antwoorden mogelijk)*
    - Vleesvervangers
    - Visvervangers
    - Plantaardige melk (sojamelk, amandelmelk, havermelk, etc.)
    - Plantaardige yoghurt of kwark
    - Plantaardige kaas
    - Het weglaten van vlees en zuivel (bijv. een pastasaus met alleen groente)
    - Anders, namelijk …
    - Ik wil geen plantaardige opties gebruiken

Intenties

Hieronder staan een aantal uitspraken. Geef per uitspraak aan in hoeverre u het ermee eens bent. *(1 = helemaal mee oneens, 2 = mee oneens, 3 = een beetje mee oneens, 4 = niet mee eens of oneens, 5 = een beetje mee eens, 6 = mee eens, 7 = helemaal mee eens)*

1. Ik ga proberen om vaker plantaardig te eten het komende jaar
2. Ik heb de intentie om vaker plantaardig te eten het komende jaar
3. Ik ben van plan om vaker plantaardig te eten het komende jaar

Gevoel van samenwerken

- In hoeverre heeft u het gevoel dat vaker plantaardig eten iets is dat u samen met andere Nederlanders doet? *(1 = helemaal niet, 2 = niet, 3 = nauwelijks, 4 = een beetje, 5 = redelijk, 6 = in hoge mate, 7 = in zeer hoge mate)*
- In hoeverre heeft u het gevoel dat mensen vaker plantaardig eten om een gemeenschappelijk doel te bereiken (bijv. het tegengaan van klimaatverandering)? *(1 = helemaal niet, 2 = niet, 3 = nauwelijks, 4 = een beetje, 5 = redelijk, 6 = in hoge mate, 7 = in zeer hoge mate)*
- In hoeverre ervaart u een gevoel van saamhorigheid met andere Nederlanders door vaker plantaardig te eten? *(1 = helemaal niet, 2 = niet, 3 = nauwelijks, 4 = een beetje, 5 = redelijk, 6 = in hoge mate, 7 = in zeer hoge mate)*

Gevoel van sociale druk

- In hoeverre voelt u zich onder druk gezet om vaker plantaardig te eten? *(1 = helemaal niet, 2 = niet, 3 = nauwelijks, 4 = een beetje, 5 = redelijk, 6 = in hoge mate, 7 = in zeer hoge mate)*
- In hoeverre heeft u het gevoel dat u gemanipuleerd wordt om vaker plantaardig te eten? *(1 = helemaal niet, 2 = niet, 3 = nauwelijks, 4 = een beetje, 5 = redelijk, 6 = in hoge mate, 7 = in zeer hoge mate)*

Gevoel van vrije keuze

- In hoeverre heft u het gevoel dat u vrij kunt kiezen om vaker plantaardig te eten? *(1 = helemaal niet, 2 = niet, 3 = nauwelijks, 4 = een beetje, 5 = redelijk, 6 = in hoge mate, 7 = in zeer hoge mate)*
- In hoeverre heeft u het gevoel dat u zelf kunt beslissen om vaker plantaardig te eten? *(1 = helemaal niet, 2 = niet, 3 = nauwelijks, 4 = een beetje, 5 = redelijk, 6 = in hoge mate, 7 = in zeer hoge mate)*

Huidige norm

- Welk percentage Nederlanders denkt u dat een poging doet om vaker plantaardig te eten? *(Open vraag)*
- Hoeveel Nederlanders doen een poging om vaker plantaardig te eten? *(1 = geen, 2 = weinig, 3 = een aantal, 4 = redelijk veel, 5 = veel)*
- De meeste mensen eten elke dag ontbijt, lunch en avondeten. Dit betekent dat ze in een gemiddelde week 21 maaltijden eten. Hoe vaak denk je dat **degenen die een poging doen om vaker plantaardig te eten**, kiezen voor een maaltijd zonder dierlijke producten? Dus: hoeveel van deze 21 maaltijden zijn plantaardig in een gemiddelde week? *(Open vraag)*

Huidige eetpatroon

- Hoe vaak kiest u op dit moment voor plantaardige opties? Denk terug aan afgelopen maand en bedenk hoe vaak u ongeveer dierlijke producten hebt vervangen voor plantaardige opties *(1 = dagelijks, 2 = 5 tot 6 dagen per week, 3 = 3 tot 4 dagen per week, 4 = 1 tot 2 dagen per week, 5 = 1 tot 3 keer per maand, 6 = minder dan 1 keer per maand, 7 = nooit).*
- Welke beschrijving past het beste bij uw huidige eetpatroon?

- Veganistisch (geen dierlijke producten eten zoals vlees, vis, kaas, zuivel of eieren)
- Bijna veganistisch (geen vlees of vis eten en maximaal 2 dagen per maand zuivel of eieren)
- Vegetarisch (geen vlees of vis eten)
- Bijna vegetarisch (maximaal 2 dagen per maand vlees of vis eten)
- Flexitarisch/parttime vegetarisch (geen vlees of vis eten voor minimaal 3 dagen per week)
- Pesco-vegetarisch (geen vlees eten, maar wel vis)
- 1 dag per week vegetarisch
- Alleseter

Demografische gegevens

- Wat is uw leeftijd (in jaren, in getallen)? *(open vraag)*
- Met welk geslacht identificeert u zich het meest? *(1 = vrouw, 2 = man, 3 = non-binair, 4 = anders)*
- Welk niveau was uw hoogst afgeronde opleiding? *(1 = basisschool, 2 = VMBO, 3 = Havo/VWO, 4 = MBO, 5 = Propedeuse HBO/WO, 6 = Bachelor HBO/WO, 7 = Master, 8 = Kandidaats/PhD*

Appendix B

Pilot Study questionnaire

Definitie plantaardig

(Deze definitie werd op iedere nieuwe pagina van de vragenlijst herhaald)

Plantaardig = zonder dierlijke producten zoals vlees, vis, kaas, zuivel en eieren. Denk hierbij aan het gebruik van vleesvervangers, sojamelk of bonen. Ook het weglaten van dierlijke producten kunt u zien als een plantaardige optie.

Static norm conditie

- Schat het percentage mensen dat probeert om vaker voor plantaarde opties te kiezen (*open vraag).*

Dynamic norm conditie

- Schat het percentage mensen dat begonnen is met proberen om vaker voor plantaardige opties te kiezen. *(Open vraag).*

Measures

Eigen consumptie

- Hoe vaak kiest u op dit moment voor plantaardige opties? *(1 = dagelijks, 2 = 5 tot 6 dagen per week, 3 = 3 tot 4 dagen per week, 4 = 1 tot 2 dagen per week, 5 = 1 tot 3 keer per maand, 6 = minder dan 1 keer per maand, 7 = nooit).*
- Welke plantaardige opties gebruikt u? *(meerdere antwoorden mogelijk)*
    - Vleesvervangers
    - Visvervangers
    - Plantaardige melk (sojamelk, havermelk, amandelmelk, etc.)
    - Plantaardige yoghurt of kwark
    - Plantaardige kaas
    - Het weglaten van vlees en zuivel (bijv. een pastasaus met alleen groente)
    - Anders, namelijk…
- Hoe is uw eigen consumptie van plantaardige opties veranderd in de afgelopen 5 jaar? *(1 = heel sterk gedaald, 2 = sterk gedaald, 3 = een beetje gedaald, 4 = gelijk gebleven, 5 = een beetje gestegen, 6 = sterk gestegen, 7 = heel sterk gestegen)*

- In de komende 5 jaar verwacht ik dat mijn eigen consumptie van plantaardige opties… *(1 = heel sterk daalt, 2 = sterk daalt, 3 = een beetje daalt, 4 = hetzelfde blijft, 5 =een beetje stijgt, 6 = sterk stijgt, 7 = heel sterk stijgt)*

Interesse

- Hoe geïnteresseerd bent u om vaker voor plantaardige opties te kiezen? *(1 = helemaal niet, 2 = niet, 3 = nauwelijks, 4 = een beetje, 5 = redelijk, 6 = in hoge mate, 7 = in zeer hoge mate)*

Nederlandse consumptie

- Hoe denkt u dat de consumptie van plantaardige opties in Nederland is veranderd in de afgelopen 5 jaar? *(1 = heel sterk gedaald, 2 = sterk gedaald, 3 = een beetje gedaald, 4 = gelijk gebleven, 5 = een beetje gestegen, 6 = sterk gestegen, 7 = heel sterk gestegen)*
- In de komende 5 jaar, verwacht ik dat de Nederlandse consumptie van plantaardige opties *(1 = heel sterk daalt, 2 = sterk daalt, 3 = een beetje daalt, 4 = hetzelfde blijft, 5 =een beetje stijgt, 6 = sterk stijgt, 7 = heel sterk stijgt)*

Huidige eetpatroon

- Wat sluit het beste aan bij uw huidige eetpatroon?
    - Veganistisch (geen dierlijke producten eten zoals vlees, vis, kaas, zuivel of eieren)
    - Bijna veganistisch (geen vlees of vis eten en maximaal 2 dagen per maand zuivel of eieren)
    - Vegetarisch (geen vlees of vis eten)
    - Bijna vegetarisch (maximaal 2 dagen per maand vlees of vis eten)
    - Flexitarisch/parttime vegetarisch (geen vlees of vis eten voor minimaal 3 dagen per week)
    - Pesco-vegetarisch (geen vlees eten, maar wel vis)
    - 1 dag per week vegetarisch
    - Alleseter

Demografische gegevens

- Wat is uw leeftijd (in jaren, in getallen)? *(open vraag)*

- Met welk geslacht identificeert u zich het meest? *(1 = vrouw, 2 = man, 3 = non-binair, 4 = anders)*
- Welk niveau was uw hoogst afgeronde opleiding? *(1 = basisschool, 2 = VMBO, 3 = Havo/VWO, 4 = MBO, 5 = Propedeuse HBO/WO, 6 = Bachelor HBO/WO, 7 = Master, 8 = Kandidaats/PhD*