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RESEARCH ARTICLE

Adding Dynamic Norm to Environmental Information in Messages Promoting the Reduction of Meat Consumption

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ABSTRACT

Research has shown that dynamic norm information can promote pro-environmental actions (i.e. information indicating that a growing number of people are behaving pro-environmentally). Yet, the question remains whether adding dynamic norm information would increase the effectiveness of information on the environmental consequences of behavior. We compared the effects of environmental information with versus without dynamic norm information on encouraging reductions in meat consumption, and whether effects would depend on receivers' intrinsic motivation. We also explored whether message effectiveness would vary according to receivers' intrinsic motivation to reduce meat consumption. In total 197 volunteers participated in a one-month messaging intervention through a chatbot. Results showed that both environmental and environmental + dynamic norm messages increased positive attitude towards reducing meat consumption, and decreased meat consumption. These effects were still present at follow-up (i.e. one month after the intervention stopped). Interestingly, both messages particularly persuaded receivers with a relatively weak intrinsic motivation to reduce meat consumption, while environmental only messages were even counterproductive in receivers with a relatively strong intrinsic motivation. These results advance our comprehension of the effects of messages aimed at reducing meat consumption.

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Meat reduction; environment message; intrinsic motivation; dynamic norm; attitude change

Introduction

The production and consumption of meat have major negative environmental impacts, such as climate change, global biodiversity loss, and pollution of air, water, and land (e.g. Tilman & Clark, 2014). To mitigate these problems, it is important to promote reductions in meat consumption among large portions of the population and over prolonged periods of time (IPCC, 2014). Many governmental and social initiatives are trying to promote reductions in meat consumption. Generally, such initiatives do not scientifically test the effects of their communication, particularly not in the long-term effects.

The present research aimed to test whether providing information on the negative environmental consequences associated with meat consumption would encourage people to reduce their consumption of white, red, and processed meat in the short- and long-term. We further tested whether adding information on the dynamic norm, i.e. informing receivers that a growing number

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of people are reducing meat consumption, would enhance the effect of the environmental information. Hence, we compared the effectiveness of providing environmental information alone versus providing such information combined with information on a dynamic norm. In the following paragraphs, we elaborate on why both types of information can be effective in reducing meat consumption, by influencing attitudes and behaviors related to meat consumption. Moreover, we explain why the strength of participants' intrinsic motivation towards reducing meat consumption may affect the effectiveness of both types of messages.

Is environmental information on reduced meat consumption effective?

The Theory of Planned Behavior (TPB; Ajzen, 1991) assumes that the performance of a behavior is determined by people's intention to perform it, which in turn is predicted by their attitude (i.e. behavioral beliefs concerning behavioral outcomes and their positive or negative evaluations), subjective norm (i.e. normative beliefs about common behaviors and expectations of other people, and individual motivation to comply with them) and perceived behavioral control (i.e. control beliefs about the presence of factors that may enable or obstruct the performance of the behavior).

As to people's attitude, the TPB model proposes that the provision of information can change receivers' behavioral beliefs, which in turn may stimulate favorable attitudes and then behavior change. As to subjective norm, this social factor can be further differentiated in descriptive and injunctive norm (Fishbein & Ajzen, 2011). Descriptive norm regards the perception of how much a behavior is typically performed by others. Injunctive norm regards the perception of how approved a behavior is. Even though Fishbein and Ajzen's TPB model (2011) supported the idea of a separation between attitude and subjective norm, the chance that subjective norm strongly influences attitude is supported by several studies in the domain of sustainable behaviors (e.g. Han & Kim, 2010; Ryan, 1982; Ryu & Jang, 2006; Shin & Hancer, 2016). This might be due to the fact that observing and then conforming with the behaviors of a reference group may often imply getting to share their attitudes. Therefore, in the present study we verified whether the provision of information on the consequences of producing meat would differently influence attitude, and then behavior, when combined (or not) with information on normative behaviors.

In the context of reducing meat consumption, most informational interventions have aimed to change beliefs on either health benefits (e.g. Bertolotti et al., 2020; Carfora et al., 2020a) or animal welfare (Kunst & Haugestad, 2018; Kunst & Hohle, 2016; Tian et al., 2016; Tian et al., 2020). Research on informational interventions referring to the environmental risks associated with meat consumption is, however, still scarce. As showed by a recent systematic literature review (Harguess et al., 2020), only six of 27 studies tested the effects of information that referred to the negative environmental consequences of meat consumption and produced inconsistent results. Some of them showed that information on the environmental consequences was not effective in changing the intention to reduce meat intake (Palomo-Vélez et al., 2018; Vainio et al., 2018). Yet, some other studies indicated that environmental information was indeed effective in encouraging individuals' intention to reduce meat consumption (Cordts et al., 2014; Graham & Abrahamse, 2017; Stea & Pickering, 2019). Importantly, none of these studies evaluated the effectiveness of environmental messages on self-reported behavior. More recently, scholars have found that providing people with environmental information resulted in more positive attitudes towards reducing meat and, in turn, in lower self-reported meat consumption (Carfora et al., 2019a, 2019b; Wolstenholme et al., 2020).

In the present research we aimed at contributing to this debate by evaluating the effects of environmental information provision on attitudes towards reducing meat consumption, as well as on self-reported consumption of meat.

Do dynamic norms promote reduction in meat consumption?

Providing information on the environmental consequences of meat consumption may not always be effective in inducing people to reduce meat consumption, as this communicative strategy only

targets behavioral beliefs and does not consider other relevant beliefs about engaging in a recommended behavior, such as normative beliefs. Providing information on the descriptive norm regarding the reduction of meat consumption can be effective because people often assume that if most people behave in a certain way, it is probably the most sensible thing to do (Abrahamse & Steg, 2013). Providing descriptive norm information alongside information on the environmental consequences associated with meat consumption might therefore strengthen the intention to reduce one's meat consumption.

However, providing descriptive norm information is usually particularly effective when the promoted behavior is already common (Cialdini & Goldstein, 2004). When the promoted behavior is not common, providing descriptive norm information is likely to be less effective, as the salient norm would be that most people do not engage in the desired behavior. For example, in the case of promoting the use of public transportation rather than commuting by car, the descriptive norm is that actually most people commute by car. Because people are motivated to follow the norm, they may therefore be less likely to travel by public transport (Cialdini & Goldstein, 2004). In the context of reductions in meat consumption, the advisable behavior of eating less meat is not (yet) the norm, as most people typically do consume meat. Thus, referring to the descriptive norm would imply that only a minority reduces their consumption of meat, which could demotivate receivers to reduce their meat consumption. In sum, providing descriptive norm information is likely to be particularly effective when the target behavior is typically performed by many others, which is not the case regarding the reduction in meat consumption.

A way to circumvent this problem may be to refer to a dynamic norm, which has been recently introduced as a strategy to increase adherence to advisable but not (yet) common behavior (Sparkman & Walton, 2019). Dynamic norm information involves communicating that increasingly more people are beginning to engage in the desired behavior. For example, a dynamic norm message could state that "a growing number of people is acting pro-environmentally," even if the overall percentage of people who act pro-environmentally is still low. If an individual is told that the number of people engaging in the desired behavior is increasing, they are more likely to conform to that "norm" even if it is followed only by a minority (Dagogo-Jack et al., 2014). The effect of reference to dynamic norms has been attributed to making people aware of the fact that a collective change in behavior is about to happen. Specifically, compared to a static norm (i.e. a norm related to the current behavior of the majority), a dynamic norm leads individuals to anticipate a changing world and signals that the target behavior is perceived as increasingly important and is increasingly seen as the most sensible thing to do, which can motivate behavior change (Sparkman & Walton, 2017).

Some initial evidence suggests that dynamic norm information indicating that more and more people are reducing their meat consumption increases interest in reducing meat consumption and the frequency of choosing a meatless lunch (Sparkman & Walton, 2017). Similarly, incorporating dynamic-norm messaging into restaurant and web-based menus modestly increases the orders of vegetarian dishes (Sparkman et al., 2020). Recent research by Sparkman et al. (2021) included two studies to compare the effects of referring to dynamic norm to reduce meat consumption. In both studies, researchers compared a "reduce appeal" (i.e. encouraging readers to reduce their meat consumption), an "eliminate appeal" (i.e. encouraging to completely give up eating meat), and a "no appeal" control condition. Study 1, conducted with an online convenience sample, showed that both appeals initially increased participants' favorable attitude towards reducing meat consumption and the intention to eat less meat. However, only the "reduce appeal" decreased self-reported meat consumption. Study 2, conducted with a nationally representative sample, confirmed that both appeals increased attitudes and intentions. Despite this, none of the treatments impacted on meat consumption one month and two months after the end of the experiment.

The question remains whether dynamic norm information would have any added effects when combined with information on the negative environmental consequences of meat consumption. That is, would addressing an additional type of belief (i.e. normative beliefs) enhance the impact of information aimed to change individuals' behavioral beliefs? In the present research we aimed

at extending previous work by comparing the effects of environmental messages with versus without including a reference to dynamic norm on attitudes towards reduction in meat consumption, as well as self-reported reduction in meat consumption. By targeting an additional (social) belief, the inclusion of dynamic norm might increase a positive attitude towards reducing meat consumption, beyond the already beneficial effects of focusing messages on the environment.

Does intrinsic motivation influence the effects of environmental and dynamic norm information?

When behaviors have a clear moral dimension, it may be warranted to include moral motivational factors in the TPB model (Fishbein & Ajzen, 2011). Consistently, some studies have shown that the inclusion of moral motivation in the TPB contributes to a better prediction of pro-environmental food choices (e.g. Carfora et al., 2021a). Intrinsic motivation to protect the environment may be an important indicator of moral motivation for acting pro-environmentally (Steg, 2016; Van der Werff et al., 2013). Intrinsic motivation reflects an internal drive to engage in a behavior because this is in line with one's values, principles, and personal norms (Steg, 2016). Thus, when people are intrinsically motivated, they engage in the behavior because it is personally meaningful and the right thing to do. Intrinsic motivation is argued to be a durable source of motivation for consistent and sustained behavior over time (Van Der Linden, 2015).

In the present study, we argue that people with different levels of intrinsic motivation would react differently to environmental messages promoting a reduction of meat consumption. For example, we might observe that providing information on the environmental consequences of meat consumption alone and combined with dynamic norm information would be more likely to result in positive attitudes towards reduction in meat consumption and lead to higher reduction in self-reported meat consumption. Moreover, we might also observe that receivers with stronger intrinsic motivation to develop a more positive attitude towards reducing meat consumption following the messages and, consequently, reduce meat consumption more than individuals with weaker intrinsic motivation. This might be more evident after exposure to environmental information + dynamic norm than after exposure to environmental information alone, because people with strong intrinsic motivation might be already rather motivated in reducing meat consumption to protect the environment, even if they still eat meat. They simply may need an extra motivation to initiate a behavioral change. Suggesting that others have initiated to reduce meat consumption may lead these people to perceive that these others, like themselves, care about reducing their meat consumption due to the negative consequences on the environment, and this may make the information provided more relevant and persuasive to them. Moreover, people with strong intrinsic motivation may believe that the dynamic norm reflects the norm within the ingroup, and norms from ingroup are more motivating than norms from an outgroup (Goldring & Heiphetz, 2020). Basing on these considerations, we explored whether information on environmental consequences alone or information combined with a dynamic norm message would differentially affect receivers with different levels of intrinsic motivation, as regards their engagement in reduction in meat consumption.

The present study

Extending previous research, we tested three hypotheses.

First, we tested the effectiveness of two informational conditions. One intervention was aimed to change behavioral beliefs related to the negative environmental consequences of excessive meat consumption (e.g. "If the intensive production of meat continues, the environmental risks associated with desertification, caused by the cultivation of cereals for animal feed, will be inevitable"). Another intervention focused on the same environmental beliefs, but with the novel addition of a reference to normative beliefs, specifically referring to a dynamic norm ("If the intensive

production of meat continues, the environmental risks associated with desertification, caused by the cultivation of cereals for animal feed, will be inevitable. The number of people who eat little meat is growing, to avoid the desertification of the planet"). Specifically, we wanted to consider whether both interventions would affect attitudes, because providing information on environmental impact (i.e. targeting behavioral beliefs) is likely to change the evaluations of pros and cons of meat consumption, and thus attitudes. We also wanted to test whether both interventions would directly influence meat reduction. To the best of our knowledge, the current study was the first to test whether combining dynamic norm information to a messaging intervention on the environmental consequences of meat consumption would have a stronger influence on attitude and behavior (i.e. self-reported consumption of red, white, and processed meat).

To enhance the likelihood that both interventions would be effective, we also consider their frequency, duration, and message formulation. Regarding the frequency and duration of messaging, our messages were sent for one month every other day. This type of repeated exposure could help participants to elaborate messages without leading to message habituation. Moreover, our messages were formulated in prefactual (i.e. "If … then … ") terms. This prefactual formulation may stimulate participants' evaluation of the environmental consequences of eating meat (Carfora et al., 2019a; Carfora et al., 2019b; Wolstenholme et al., 2020). Exposure to prefactual messages triggers prefactual thinking, namely, future-directed imagination which induces an expectation about how a current situation may be changed by altering the antecedent conditions (Byrne, 2016). Reading prefactual messages may therefore be likely to induce receivers to expect that they can change future events and reach a goal by modifying their current behavior.

In sum, we expected that targeting on behavioral beliefs on both interventions would be effective in increasing a positive attitude towards reducing meat consumption and decreasing self-reported meat consumption from T1 (Time 1) to T2 (Time 2) (**Hypothesis 1 – H1**).

Second, we hypothesized that targeting both behavioral and normative beliefs, by adding dynamic norm information that an increasing number of people is reducing their meat consumption to reduce environmental problems, would increase the effectiveness of informational messages in changing attitudes and encouraging the reduction of meat consumption, compared to information on the environmental consequences of meat consumption alone. This could be the case because such combined informational messages would strengthen behavioral beliefs even more by targeting normative beliefs to engage in behaviors by communication that others are increasingly reducing their meat consumption to protect the environment. Thus, we hypothesized that information on the environmental consequences associated with meat consumption combined with dynamic norm information would lead to a more positive attitude towards reducing meat consumption and a greater decrease in self-reported meat consumption, compared to exposure to information on the environmental consequences alone (**Hypothesis 2 – H2**).

Third, as supported by a vast literature that tested the TPB (e.g. Teng et al., 2015), persuasive communication is assumed to induce attitude change, which may in turn lead to a change in behavior. Therefore, we tested whether changes in attitudes would mediate the effect on behavior, given that we expected that both interventions were likely to change behavior by trying to change attitudes. Hence, we expected that an increased positive attitude from T1 to T2 would explain the possible reduction of self-reported meat consumption from T1 to T2 (**Hypothesis 3 – H3**).

Based on the afore mentioned literature, we also posited two research questions.

First, we were interested in analysing whether changes in attitudes and meat consumption after message exposure would remain stable over time, i.e. one month after the end of the message intervention (**Research Question 1 – RQ1**). Over that period participants received no messages. Yet, as we could not control whether relevant other factors would change in this period (e.g. exposure to other environmental information), we decided to investigate this aspect with caution, without formulating a hypothesis regarding the long-term effect of the intervention. We compared the long-term effect of the intervention (i.e. one month after intervention ended) to a baseline level before the intervention took place and to the short-term effect (i.e. immediately after intervention). In this

way, we aimed at addressing one of the major limitations of most of the previous studies testing the effects of message interventions, namely, not including a follow-up to test whether message effects are still present in the long-term, after the intervention ended (but see Sparkman et al., 2021).

Second, we explored whether an individual's levels of intrinsic motivation to reduce their consumption of meat would influence the effects of both message conditions on attitudes towards reduction in meat consumption and self-reported meat consumption, both in the short- and the long-term (**Research Question 2 – RQ2**).

Method

Sample and procedure

As past studies reveal inconsistent results, we expected a small effect size, so we aimed to recruit a sufficient large sample to enable us to find a significant effect. Using GPower 3.1, we conducted a sample size estimation considering a small *Cohen's d* effect size (ES = 0.20). With an alpha = 0.05, power = 0.80, number of groups = 2 (message conditions), number of measurements = 3 (1 measure at 3 time points), and $p = .05$ the projected sample size needed was approximately N = 244, and specifically about 122 participants per group. On this basis, we aimed to have an initial sample size of 250.

In October 2019, 250 Italian young adults between 18 and 30 years of age were invited to participate as volunteers in a study on public communication. This age group was chosen to avoid the lack of digital skills affecting the research results. Among the eligible participants, those who provided their contact details to participate (N = 220) were informed by email about the study procedure and were asked to fill out online questionnaires, after providing written consent (see Supplement – Procedure).

At T1, participants in each condition completed the first questionnaire. After completing the questionnaire, participants were randomly assigned to one of the two experimental conditions using an automatic randomization sequence. Participants received a link to a chatbot for smartphone, a computer program designed to simulate conversation with human users over the Internet. When accessing the chatbot, participants received an automatic welcome message ("Thank you for your participation in this research. This is a private chat used to deliver information and instructions for our study. I am a virtual assistant, and I cannot respond to your messages. If you experience any problems with this chat, please contact XXX"). Next, every other day at 9:30 and for a period of 31 days (between T1 and T2) participants received one persuasive message focused on the environmental consequences of eating meat (see section below).

At T2, that is, at the end of the one-month intervention period, all participants completed the same questionnaire they had completed at T1. At T3, that is, one month after the end of the intervention period, they completed the same questionnaire for the last time. Finally, participants received feedback on the aims of the study.

Figure 1 shows the flow of participants throughout the study. At Time 1, among 197 participants who accessed the questionnaire, 187 completed the questionnaire and correctly accessed the chatbot (mean age = 20.85, *SD* = 2.85; age range: 18–29; F = 118; M = 66; undeclared = 3). At T2 a total of 185 participants (mean age = 20.57, *SD* = 2.04; F = 116; M = 96; undeclared = 3) filled in the second questionnaire. At T3 a total of 165 participants (mean age = 20.62, *SD* = 2.07; F = 100; M = 62; undeclared = 3) filled in the third questionnaire.

Measures at time 1

Questionnaire at T1 included several measures. Below, we report the measures relevant to the present paper.

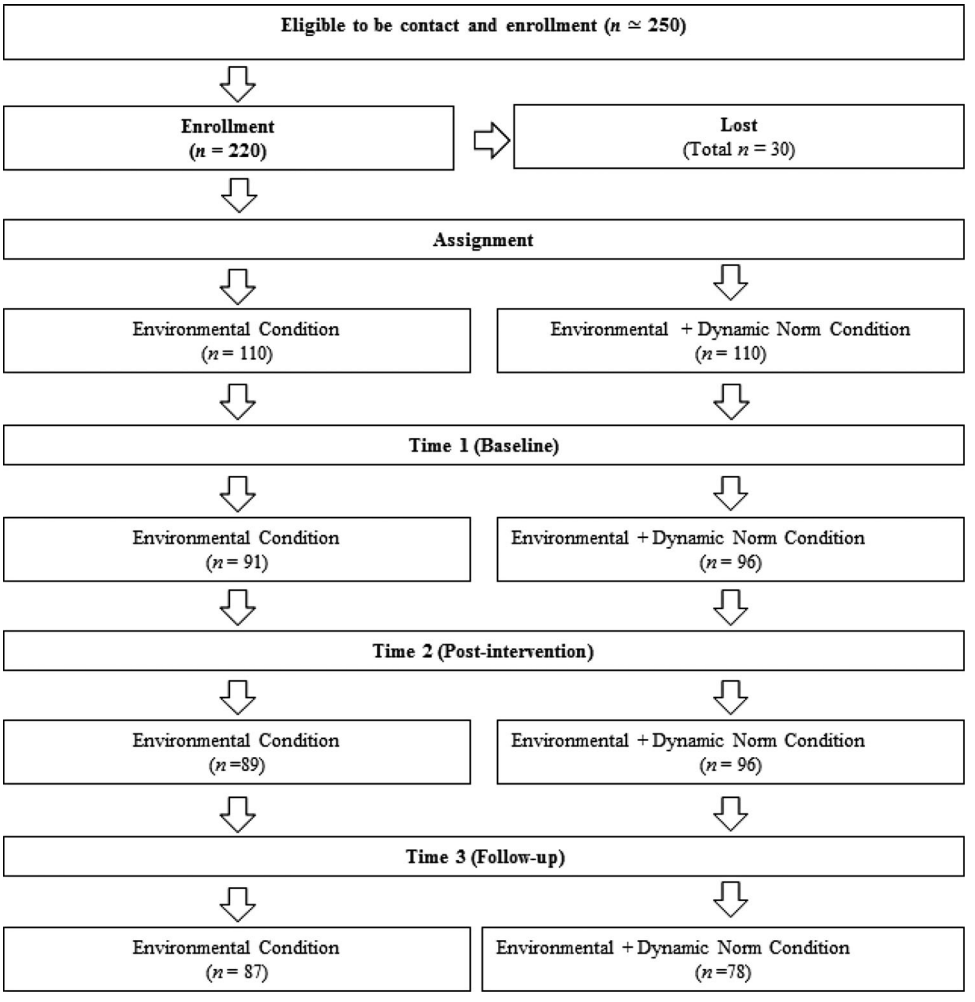

Figure 1. Flow Chart of Participants' Recruitment.

Intrinsic motivation towards reducing meat consumption. Participants' intrinsic motivation was assessed at Time 1 (baseline) with four items using a Likert scale ranging from "completely disagree" (1) to "completely agree" (7): "Reducing my consumption of meat means acting in line with my own principles"; "Reducing my consumption of meat is the right thing to do"; "Reducing my consumption of meat is meaningful to me"; "Reducing my consumption of meat means acting in line what I find important" (Zeiske, 2021). These items formed a reliable scale ($\alpha = 0.93$), so we computed mean scores on the items. Higher values indicated a stronger intrinsic motivation.

Attitude towards reduced meat consumption. Participants' attitude towards reduced meat consumption was assessed using a semantic differential scale ranging from "1" to "7." ("Reducing meat consumption is … bad – good; disadvantageous – advantageous; unpleasant – pleasant; boring – funny; negative – positive; unsatisfactory – satisfactory; fool – wise"; Carfora et al., 2020b). These items formed a reliable scale ($\alpha_{T1} = 0.91$), so we computed mean scores on the items. See Table 1 for means and standard deviations. Higher values indicated a more positive attitude towards reduced meat consumption.

Self-reported meat consumption. Participants were asked to report their red, processed and white meat consumption over the previous week ("How many servings of red meat have you eaten in the

Table 1. Means and Standard Deviations of Dependent Variables in Each Condition at Time 1 (Baseline), Time 2 (Post-Intervention) and Time 3 (Follow-Up).

	Environmental Condition		Environmental + Dynamic Norm Condition		Total	
Time	Attitude toward Reduced Meat Consumption *M (SD)*	Meat Consumption *M (SD)*	Attitude toward Reduced Meat Consumption *M (SD)*	Meat Consumption *M (SD)*	Attitude toward Reduced Meat Consumption *M (SD)*	Meat Consumption *M (SD)*
1	4.18 (1.32)	10.59 (4.22)	4.00 (1.40)	10.64 (4.19)	4.14 (1.37)	10.62 (4.19)
2	4.73 (1.11)	9.82 (3.80)	4.39 (1.21)	9.74 (4.58)	4.56 (1.17)	9.78 (4.20)
3	4.51 (1.29)	6.95 (4.33)	4.41 (1.21)	6.90 (3.75)	4.58 (1.16)	6.93 (4.05)

previous week? *Red meat includes all meat that becomes dark when it is cooked and that is obtained from slaughter animals, such as veal, beef or pork*"; "How many servings of white meat have you eaten in the previous week? *White meat includes all meat that is pale when cooked, and that is obtained from barnyard animals, such as chicken*"; "How many servings of processed meat have you eaten in the previous week? *Processed meat includes all meat that undergoes processing such as salting, maturing and smoking. It includes both cold meats (e.g. cured and cooked ham, bresaola, bacon and speck) and cured meats (e.g. mortadella, sausage, bratwurst)*"; adapted from Carfora et al., 2019a). A sum score was calculated to obtain the total consumption of meat. Higher values indicated higher meat consumption.

Messaging intervention

During the one-month intervention (between T1 and T2) all participants received persuasive messages (i.e. intervention) via a private chatbot every other day. Thus, sixteen messages were sent in each condition. The full list of messages is reported in Appendix A (Supplement). Participants in the *environmental (ENV)* information condition received messages focused on the environmental consequences of producing and eating meat (e.g. "If the livestock industry is reduced, the widespread deforestation, caused by the need for pastures, will be avoided"). Participants in the *environmental + dynamic norm (ENV + DYN)* information condition received the same messages but with the addition of information on the dynamic norm (e.g. "If the livestock industry is reduced, the widespread deforestation, caused by the need for pastures, will be avoided. To avoid deforestation, more and more people are reducing their consumption of meat"). Messages were formulated in prefactual style, that is a conditional ("if … then") proposition about an action-outcome linkage that may (or may not) take place in the future (e.g. "If I take action X, it will lead to outcome Y"; Bertolotti et al., 2020; Carfora et al., 2021b). In all conditions, we presented the consequences of reduced or excessive meat consumption by emphasizing gains (e.g. "If the consumption of food of animal origin and the related environmental damages are reduced, the possibility of living in a healthier environment will increase"), non-losses (e.g. "If the livestock industry is reduced, the widespread deforestation, caused by the need for pastures, will be avoided"), non-gains (e.g. "If the world population continues to adopt a diet based on the meat consumption, the chance to limit the use of chemical fertilizers, needed to meet the feed demand of livestock farming, will be lost"), and losses (e.g. "If livestock farming continues to grow consuming huge amount of water, the earth's water resources will be severely compromised").

Measures at time 2

In the questionnaire at T2, we again measured attitude ($\alpha_{T2} = 0.90$) and meat consumption, using the same scales employed at T1 (Table 1). We also included some scales to assess participants' evaluation of the messages received through the chatbot, to ensure that the conditions did not differ on

message relevance, involvement, and trust (adapted from adapted from Godinho et al., 2016). Means and standard deviations of the message evaluation variables across conditions are reported in Supplement – Table 3.

Message relevance was assessed with three items using a Likert scale ranging from "completely disagree" (1) to "completely agree" (7): "Messages were relevant"; "Messages were complete"; "Message were appropriate." The three items were used to compute a single message relevance index. Higher values indicated a greater perception of the messages as relevant ($\alpha = 0.77$; $M = 4.71$; $SD = 1.10$).

Message involvement was measured with three items using a Likert scale ranging from "completely disagree" (1) to "completely agree" (7): "Messages got me involved in what they had to say"; "Messages were interesting"; "Messages seemed relevant to me." Higher values indicated a more positive evaluation of the messages ($\alpha = 0.83$; $M = 4.27$; $SD = 1.23$).

Message trust was assessed with three items on a 7-point Likert scale ranging from "not at all" (1) to "completely" (7): "The information is credible?"; The information is reliable"; "The information was truthful." The three items were used to compute a single message evaluation index. Higher values indicated a more positive evaluation of the messages ($\alpha = 0.87$; $M = 3.38$; $SD = 6.67$).

Measures at time 3

At T3, we again measured attitude ($\alpha_{T3} = 0.90$) and meat consumption, using the same scales employed at T1.

Results

Preliminary analysis

All analyses were conducted in SPSS 23. Table 1 reports the mean and SD of the dependent variables (attitude and behavior) at Times 1, 2, and 3. To check if randomization was successful, we used multivariate analysis of variance (MANOVA), testing if there were differences between the ENV and ENV + DYN conditions on attitude, intrinsic motivation, meat consumption, and age at T1. Results did not show any significant main effect of message conditions ($p > .185$, $\eta p^2 > 0.01$) on these variables. Chi-square also did not show any significant differences in gender ($p = .134$) across different conditions. This suggests that randomization was adequate, with the two message conditions being comparable on the baseline variables.

Regarding dropouts (Figure 1), only two participants of the ENV condition dropped out at post-test (T2). This low rate of dropout in our one-month intervention allowed us to assert that dropouts did not differ in condition, attitudes, intrinsic motivation and meat consumption from the remaining sample.

At T3, i.e. one month after the end of the intervention, we had instead a higher number of dropouts, namely $n = 4$ in the ENV condition and $n = 18$ in the ENV + DYN condition. We therefore run a logistic regression to verify if the difference in the number of dropouts at T3 was determined by participants' values of the study variables at T1 (intrinsic motivation, attitude, meat consumption) and/or their interaction with condition (coding: dropouts = 0; completes = 1; ENV = 0; ENV + DYN = 1). Results confirmed that the number of dropouts was lower in the ENV condition than in the ENV + DYN condition, $B = -9.29$; $S.E = 03.08$; $Wald(1) = 9.13$, $Exp(B)$ 000, 95%CI = 0.00, 0.38, $p = .003$. Also, participants were more likely to drop out in the ENV + DYN condition when they had a relatively weak intrinsic motivation at T1 ($B = 1.405$; $S.E = 0.61$; $Wald(1) = 5.28$, $Exp(B)$ 4.05, 95%CI = 1.23, 13.37, $p = .021$). Participants' attitude at T1, the amount of meat consumption at T1 and their respective interactions with condition did not predict dropouts (Supplement – Table 1 and 2). Thus, the dropout at follow-up was selective only on condition and intrinsic motivation.

Message evaluation

As shown by variables mean scores, the messages were engaging, deeply elaborated, and perceived as credible. We also checked if there were differences in the evaluation of the messages in the four message conditions using a MANOVA. Multivariate effects ($F(3,161) = 1.36$ $p > .254$, $\eta p^2 > 0.02$) showed that participants perceived the messages as relevant, involving and credible in both the ENV and the ENV + DYN conditions. Means and standard deviations of the message evaluation variables are reported in Supplement – Table 3.

Effects of messages on attitude and meat consumption at time 2

We then examined the effects of both interventions on attitude and meat consumption at T2 (**H1)** and whether the ENV + DYN condition was more effective compared to the ENV condition (**H2**). First, we conducted a 2 (ENV vs. ENV + DYN condition) X 2 (T1 vs. T2) ANOVA with attitude as dependent variable, with repeated measures on the last factor. Results showed a significant main effect of time effect on attitude, $F(1,183) = 10.71$; $p = .001$, $\eta p2 = 0.06$. T-test comparisons ($t = 3.28$; $df = 184$; $p = 0.001$; *95%CI*: 0.42, 0.68; *Cohen's* $d = 0.33$) showed that participants had a more favorable attitude towards reducing meat consumption at T2 ($M = 4.56$; $SD = 1.17$) than at T1 ($M = 4.14$; $SD = 1.37$). We also found a significant condition effect, $F(1,183) = 4.98$; $p = .001$, $\eta p2 = 0.027$, indicating that ENV only resulted in a greater positive attitude toward reducing meat consumption compared to ENV + DYN condition. However, the interaction between message condition and time was not significant, $F(1,183) = 0.06$; $p = .811$, $\eta p2 = 0.01$. Therefore, there were no differences in the extent to which both interventions resulted in a more positive attitude towards reducing meat consumption in T2 as compared to T1.[1]

We then conducted a 2 (ENV vs. ENV + DYN condition) X 2 (T1 vs. T2) ANOVA with meat consumption as dependent variable, with repeated measures on the last factor. Results showed a significant main effect of time, $F(1,183) = 3.76$; $p = .053$, $\eta p2 = 0.02$, and T-test comparisons revealed that meat consumption at T2 was lower ($M = 9.78$; $SD = 4.20$) than meat consumption at T1 ($M = 10.62$; $SD = 4.19$; $t = -1.9$; $df = 184$; $p = .053$; *95%CI*: 0.84, 1.70; *Cohen's* $d = 0.20$). However, we did not find either a significant main effect of type of message, $F(1,183) = 0.00$; $p = .971$, $\eta p2 = 0.00$, nor a significant interaction between message condition and time, $F(1,183) = 0.03$; $p = .872$, $\eta p2 = 0.00$. This suggest that both conditions reduced meat consumption to the same extent.[2] Figure 2 reports the mean scores on attitudes and meat consumption across the two-time points for each condition, while Figure 3 shows the changes in attitudes and meat consumption from T1 to T2.

In sum, these results supported our **H1**, showing that both the provision of information on the environmental consequences of meat consumption and the combination of environmental information with dynamic norm information were effective in increasing positive attitudes towards reducing meat consumption and decreasing meat consumption. However, we did not find support for **H2,** as the environmental information combined with dynamic norm did not lead to a more positive attitude towards reducing meat and a greater decrease in self-reported meat consumption, as compared to environmental information alone.

The predictive role of changed attitude

We then tested our **H3**, that is whether changed attitude from T1 to T2 would explain changed meat consumption from T1 to T2. To do so, we ran a regression analysis, calculating a difference score (the difference between T2 and T1) for both attitude and behavior. In the regression analysis, changed meat consumption (meat consumption at T2 – meat consumption at T1) was regressed on changed attitude (attitude at T2 – attitude at T1), controlling for message condition (ENV = 0; ENV + DYN = 1). The results showed that the more positive change in attitude, the more reduction

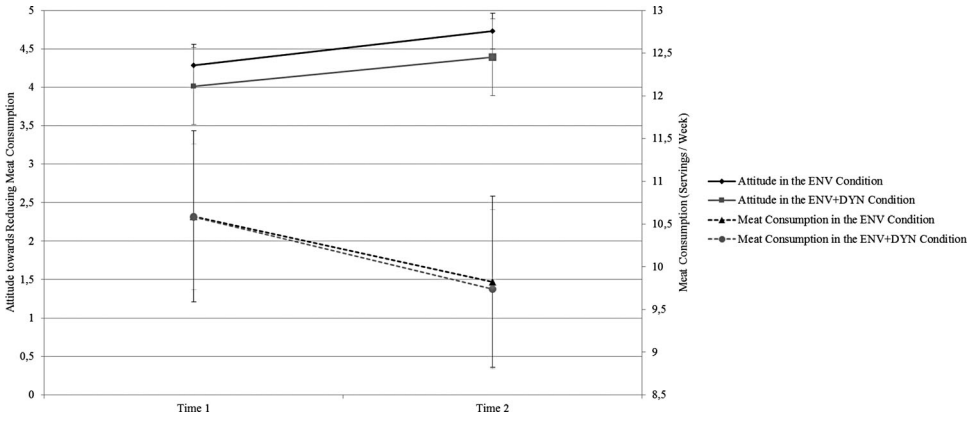

Figure 2. Effects on Attitudes and Meat Consumption by Message Conditions Across Time 1 and Time 2.
Note: ENV Condition, Environmental Condition; ENV+DYN Condition, Environmental+Dynamic Norm Condition.

in meat consumption ($\beta = -0.74$; $p = .003$). Message condition did not explain changes in self-reported meat consumption ($\beta = -0.18$; $p = .827$). Thus, changes in attitude fully explained the reduction in meat consumption, independent of the message conditions. Thus, we confirmed our **H3**, according to which the observed reduction in meat consumption at T2 was associated with an increase of a positive attitude towards reducing meat consumption at T2. This result could be probably attributable to the fact that adding dynamic norm information had no additional effects, and then full effect of intervention ran via attitudes.

Effect of messaging intervention on attitude and behavior over time

Comparison between time 1 and time 3

To explore the effect of the provision of information over time (**RQ1**), we conducted a 2 (ENV vs. ENV + DYN condition) X 2 (T1 vs. T3) ANOVA on attitude with repeated measures on the last

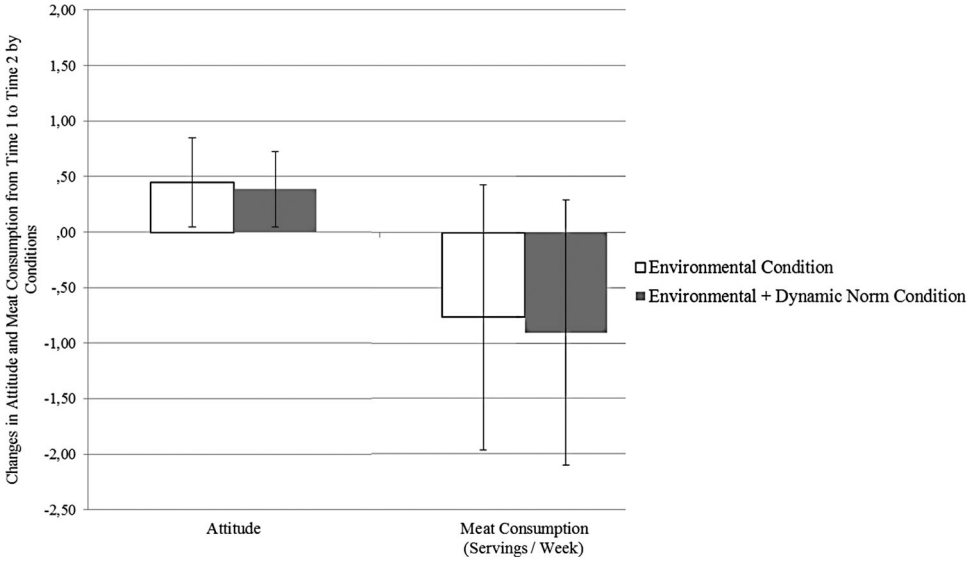

Figure 3. Changes in Attitude and Meat Consumption in Message Conditions from Time 1 to Time 2.

factor. Again, results showed significant multivariate main effect of time, $F(1,163) = 8.89$; $p = .003$, $\eta p2 = 0.05$. T-test comparison ($t = 4.12$; $df = 164$; $p = .001$; *95% CI*: 0.44, 0.65; *Cohen's d* = 0.42) showed that participants had a more favorable attitude towards reducing meat consumption at T3 ($M = 4.58$; $SD = 1.16$) than T1 ($M = 4.14$; $SD = 1.37$). We found neither a significant main effect of condition, $F(1,163) = 0.02$; $p = .887$, $\eta p2 = 0.00$, nor a significant interaction effect, $F(2,162) = 1.13$; $p = .289$, $\eta p2 = 0.01$[3], indicating that attitudes towards reducing meat consumption were more positively in the long term as well, to a similar extent in both conditions.

Then, we conducted a 2 (ENV vs. ENV + DYN condition) X 2 (T1 vs. T2) ANOVA, with meat consumption as dependent variable and repeated measures on the last factor. Results showed a strong main effect of time, $F(1,163) = 79.21$; $p = .001$, $\eta p2 = 0.33$. Specifically, meat consumption at T3 was lower ($M = 6.90$; $SD = 3.75$) than meat consumption at T1 ($M = 10.62$; $SD = 4.19$; $t = -11.31$; $df = 164$; $p = .001$; *95% CI*: −0.36, −3.05; *Cohen's d* = 0.89). Again, we did not find a significant main effect for condition, $F(1,163) = 0.03$; $p = .870$, $\eta p2 = 0.00$, or a significant interaction between message condition and time, $F(1,163) = 0.10$; $p = .753$, $\eta p2 = 0.00$, suggesting that both types of messages reduced meat consumption to a similar extent, also in the long term.

Comparison between time 2 and time 3

To assess changes from T2 to T3, we conducted a 2 (ENV vs. ENV + DYN condition) X 2 (T2 vs. T3) ANOVA on attitude, with repeated measures on the last factor. In this case, results showed neither a significant main effect of time, $F(1,162) = 0.00$; $p = .989$, $\eta p2 = 0.00$, nor a significant main effect of condition, $F(1,162) = 0.18$; $p = .668$, $\eta p2 = 0.00$, nor an interaction effect between time and condition, $F(1,162) = 3.13$; $p = .079$, $\eta p2 = 0.02$. This suggests that attitudes towards reducing meat consumption did not change in the long term, relative to immediately after the intervention.

Then, we conducted a 2 (ENV vs. ENV + DYN condition) X 2 (T2 vs. T3) ANOVA on meat consumption, with repeated measures on the last factor. Findings showed that there was a significant main effect of time, $F(1,163) = 41.17$; $p = .001$, $\eta p2 = 0.20$. T-test comparison, $t = -7.86$; $df = 164$; $p = .001$; *95%CI*: −2.85, −2.13; *Cohen's d* = 0.64, showed that participants consumed less meat at T3 ($M = 6.90$; $SD = 3.75$) than at T2 ($M = 9.74$; $SD = 4.58$), suggesting that both interventions had stronger impact on meat consumption in the long term compared to the short term. As above, we did not find significant effects of condition, $F(1,163) = 0.00$; $p = .956$, $\eta p2 = 0.00$, nor an interaction between message condition and time, $F(1,163) = 0.03$; $p = .859$, $\eta p2 = 0.00$.[4]

The above findings indicate that both types of messages led to an increase in positive attitude towards reducing meat consumption, which remained stable over time. Moreover, both types of messages produced a reduction in meat consumption, which was even more noticeable in the long term.

The moderating role of intrinsic motivation

We then explored whether the effects of both types of messages would depend on participants' intrinsic motivation to reduce meat consumption to address our **RQ2**. For this analysis, we calculated a difference score (the difference between Time 2 and Time 1) for both attitude and behavior. Given that changed attitude explained changed behavior, we ran a moderated mediation model including changed attitude as a mediator and intrinsic as a moderator (Model 7 of the PROCESS macro for SPSS; Hayes & Preacher, 2013). Results showed a total moderated mediation. In both conditions, meat consumption decreased because participants had more positive attitudes towards reducing meat consumption, particularly among participants with a relatively weak intrinsic motivation, though the impact was higher for ENV only condition. The interaction effect also suggests that ENV only condition may be counterproductive for those with a relatively strong intrinsic motivation, because participants had less positive attitude towards reducing meat consumption

Table 2. Moderated Mediation Regression Output Time2-Time1.

	b	se	*t*	*p*	95%*CI*	*F*	*df*	*p*	R^2
DV = Change in Attitude towards Reducing Meat Consumption						25.39	3,181	.001	0.30
Condition	−1.96	0.60	−3.29	.001	[−3.14, −0.79]				
Intrinsic Motivation	−1.50	0.26	−5.81	.001	[−2.00, −0.99]				
Condition*Intrinsic Motivation	0.56	0.16	3.53	.001	[0.25, 0.87]				
Conditional Effects of Condition on Change in Attitude at Different Levels of Intrinsic Motivation									
	Intrinsic Motivation	**Effect**	**Boot SE**	**95%*CI***					
	2.14	−0.76	0.30	[−1.36, −0.16]					
	3.51	0.00	0.21	[−0.42, 0.43]					
	4.87	0.77	0.30	[0.16, 1.37]					
	b	**se**	***t***	***p***	**95%*CI***	***F***	***df***	***p***	R^2
DV = Change in Meat Consumption						4.63	2,182	.010	0.05
Condition	−0.18	0.84	−0.22	.83	[−1.85, 1.48]				
Change in Attitude towards Reducing Meat Consumption	−0.74	0.24	−3.04	.003	[−1.22, −0.26]				
	Index of Moderated Mediation	**Boot SE**	**95%*CI***						
Change in Attitude towards Reducing Meat Consumption	−0.42	0.17	[-.80; −0.12]						
Conditional Indirect Effects of Condition on Change in Meat Consumption at Different Levels of Intrinsic Motivation									
Mediator: Change in Attitude towards Reducing Meat Consumption	**Intrinsic Motivation**	**Effect**	**Boot SE**	**95%*CI***					
	2.14	0.56	0.29	[0.12, 1.26]					
	3.51	−0.00	0.16	[−0.32, 0.34]					
	4.87	−0.57	−0.28	[−1.31, −0.12]					

and had a lower meat reduction, whereas the ENV + DYN condition did not show this backfire effect (Table 2; Figure 5).

These results answered our **RQ2**, showing that the environmental and dynamic norm information combined has a larger desired effect on attitudes and behavior for receivers relatively weak in intrinsic motivation, compared to those with a relatively strong intrinsic motivation. Moreover, we showed that the ENV condition seems to have a backfire effect on attitude and behavior, compared to the ENV + DYN condition. Finally, compared to the ENV only condition, the ENV + DYN condition seems to prevent this backfire effect for participants with a relatively stronger intrinsic motivation (Figure 4).

Discussion

In the present study, we tested whether adding dynamic norm information enhanced effects of information on environmental consequences, both alone and combined with communicating a dynamic norm that more and more people are reducing their meat consumption to reduce environmental problems. The study particularly analysed the effects of these interventions on attitudes towards reductions in meat consumption and the levels of self-reported meat consumption both

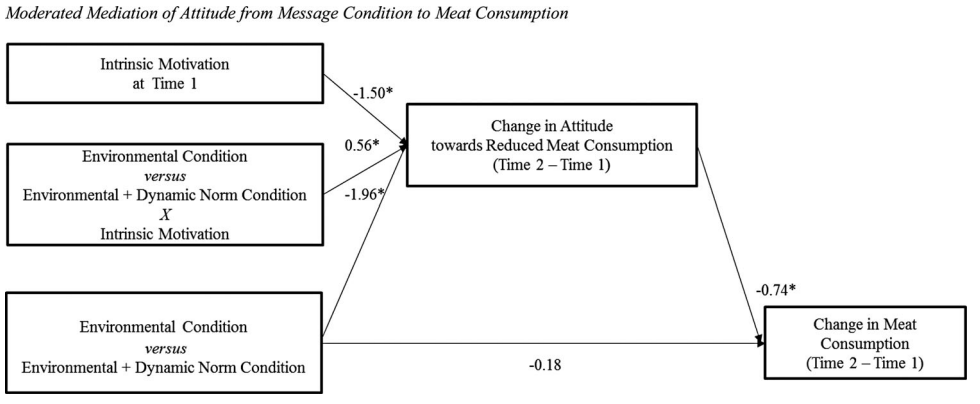

Figure 5. Moderated Mediation of Attitude from Message Condition to Meat Consumption.
Note. All values indicated B coefficients. *$p<.05$.

in the short term (immediately after the intervention) and in the long term (one month after the intervention took place). Moreover, we explored whether the effects of the intervention depended on strength in intrinsic motivation.

Our findings confirmed that both interventions were effective in increasing people's positive attitudes towards reduction in meat consumption as well as decreasing self-reported consumption of meat (**H1**). Importantly, receivers did not increase their positive attitude towards reducing meat consumption immediately after the intervention stopped at T2, but also reduced their meat consumption in the long term, one month after the intervention stopped. Contrary to what we expected (**H2**), adding dynamic norm information to environmental information did not increase message effectiveness. Indeed, the provision of environmental information alone was equally effective in

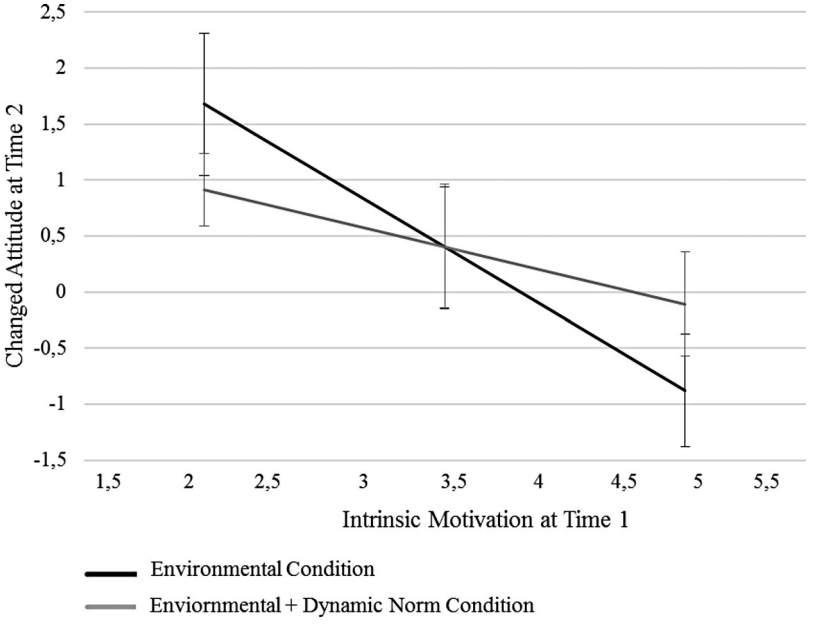

Figure 4. Moderation of Intrinsic Motivation on the Effect of Message Condition on Changed Attitude towards Reducing Meat Consumption at Time 2.

increasing the receivers' positive attitude towards reducing meat consumption and self-reported reductions in meat consumption in the short term.

The above finding suggests that a simpler and shorter (prefactual) message focused on the belief that reducing meat consumption protects the environment is as effective as a more complex message additionally communicating normative beliefs related to changes in the behavior of other people (the dynamic norm). Our finding is in line with recent studies showing that the frequent provision of informational messages is effective in motivating behavior change in the case of meat reduction (Carfora et al., 2019a). It seems that such frequent provision of information on the environmental consequences of meat consumption is generally enough in stimulating individuals to modify their behavior, and additionally providing dynamic norm information emphasizing that more people are considering reducing their meat consumption because this would reduce environmental motivation may not be necessary, as this does not seem to provide an additional source of motivation to reduce meat consumption. This finding opens an interesting debate about the effectiveness of referencing to dynamic norms in decreasing meat consumption. A previous study (Sparkman & Walton, 2017) showed that a dynamic norm message was more effective in increasing participants' interest in eating less meat than a static norm message. However, in that case the authors did not explicitly provide information targeting the beliefs that reducing meat has positive consequences for environmental protection. Our results suggest that the addition of a dynamic norm to such environmental information does not seem to strengthen the effect of a message which clearly states environmental consequences of behavior. To better understand the potential of the dynamic norm information, future studies might compare the effects of a dynamic norm message only, environmental information only, and the combination of both to understand the relative effectiveness of dynamic norm information.

Importantly, we confirmed that the intervention effects on attitude and meat reduction remained stable over time (**RQ1**). Particularly, we showed that attitudes towards reducing meat consumption did not change in the long term, relative to immediately after the intervention. This could suggest that targeting behavioral beliefs brought about an immediate change in the participants' attitude. Furthermore, our findings that there was a stronger reduction at T3 compared to T2 and T1 may be attributable to the fact receivers needed more time to reflect on the information and translate this into consistent actions. The strong effects of our intervention on behavior, which seem to be even stronger in the long term, is an important contribution to the current literature, given the scarcity of studies on the effect of environmental messages and dynamic norm messages on behavior.

Regarding the role of receivers' intrinsic motivation, we found that participants with a relatively weak intrinsic motivation to reduce their consumption of meat were persuaded more by both message types, than those with a relatively strong intrinsic motivation. Probably, when people have a weaker intrinsic motivation, the environmental information alone or combined with an information on dynamic norm is more novel and more motivating to reduce their consumption of meat. This evidence, that also people with a relatively weak intrinsic motivation can be persuaded by both the messages, is very reassuring given that a recent study (Silvi & Padilla, 2021) on 28 European states found that information campaigns targeting the awareness of the consequences of not performing a pro-environmental behavior is not effective with individuals who do not feel highly responsible for protecting the environment. Apparently, providing more frequent environmental information may persuade particularly those who are not strongly motivated themselves.

Interestingly, among participants with a relatively high level of intrinsic motivation we observed a backfiring effect when we provided information on the environmental problems caused by meat consumption only, but not when we additionally provided dynamic norm information (**RQ2**). Indeed, for individuals with a relatively strong intrinsic motivation to reduce their consumption of meat the results suggest that repeated provision of environmental information alone resulted in less positive attitudes and more meat consumption. Highly motivated people probably already feel quite committed to reducing their meat consumption and aware of the negative effects that

meat production has on the environment. As such, they may be almost bothered by our environmental messages. Based on the current findings, we should probably avoid exposing people who are strongly motivated with frequent environmental messages from a long informational campaign, as such practice can backfire.

However, this is not the case when dynamic norm information is additionally provided. This result suggests that dynamic norm information may buffer or prevent the counterproductive effect that we found when people with a strong intrinsic motivation were exposed to the environmental information only. These results suggest that providing only environmental information may decrease a motivation to reduce meat consumption in people who perceive meat reduction as an in-group norm (Goldring & Heiphetz, 2020). From this perspective, a behavior would be considered as worth being enacted by strongly intrinsically motivated people if their in-group does engage in that behavior. In other words, people with a relatively strong intrinsic motivation are more likely to assume that the norm is shared by the social group to which they feel they belong. Learning that more and more people are aspiring to the same environmental goal helps strongly intrinsically motivated people to infer that the change they desire is relevant for their in-group.

Limitations and suggestions for future research

The present research has some limitations that future research might address. First, the sample was restricted to Italian young adults and had a bias in terms of participants' gender (i.e. a mainly female sample). Moreover, our sample size was slightly underpowered to robustly test our hypothesized moderation effect (Gelman, 2018; Perugini et al., 2018; Simonsohn, 2015). Thus, interactions should be interpreted with caution and future research should replicate our design and test the robustness of our findings in larger and different (including representative population) samples.

Second, our use of an experimental chatbot did not allow us to include a measurement of meat consumption in the app programming and we thus measured it with a self-report measure of meat consumption. Future studies could insert the chatbot into a mobile app that allows to use a dietary record approach, asking participants to record the meat consumed at the time of the eating occasion. By avoiding reliance on memory, this type of measurement could provide more accurate information than if the respondents were recalling weekly portions of meat as we did in the present study (Thompson & Subar, 2017). Moreover, our chatbot did not allow us to log whether participants accessed and read the messages sent to them. However, given that we found the effects, it is likely they read messages frequently. To further support our findings, future research should make use of more sophisticated technologies capable of providing such relevant information.

Third, we cannot exclude the risk of self-selection bias as participants were invited for a study on public communication. In addition, at Time 3 (i.e. one month after the end of the intervention) there was a selective attrition based on baseline intrinsic motivation and condition. Our study seems to suggest that those with a relatively weak intrinsic motivation were more likely to drop out, especially when people received environmental information and dynamic norm information. This observed selective attrition implies that we should be careful when trying to generalize the results of a long-term effect of the intervention to participants with weaker intrinsic motivation in the condition in which they received both types of information. However, given that between T2 and T3 participants did not receive messages and we did not control for intervening factors, future studies should offer stronger evidence of the generalizability of this selective attrition.

Fourth, the present study did not include a control condition, meaning that we cannot be sure whether our results are not due to naturally occurring changes. However, the effect sizes in changes in meat consumption observed in our study are larger than those found in other studies which can serve as a control condition (Carfora et al., 2019a; Muschalik et al., 2020; see Supplement). Therefore, it seems likely that the reductions in self-reported meat consumption can be attributed to our messaging intervention. Still, these limitations suggest the need to consider this study only as a first attempt to combine environmental information and dynamic norm messages in a longitudinal

study. Future studies might therefore verify these outcomes using a double-blind design, including a control condition, a representative sample, and alternative measures of meat consumption.

Fifth, in the present study we did not completely apply the assumptions of the TPB model. We did not verify whether our messages directly influenced participants' subjective norm and whether participants' perceived control in reducing meat consumption influenced the observed reduction of self-reported meat consumption. Moreover, we did not control whether this reduction was determined by an increase of participants' intention to eat less meat. Given the results obtained in this first study on the combined effects of leveraging attitudinal and normative beliefs, future studies could investigate the link between these TPB variables in greater detail.

In future studies, researchers might test further potential interaction effects between messages and other receivers' characteristics. For example, future studies might consider the role of receivers' ascription of responsibility (i.e. the feeling of being responsible for the negative impact of the non-implementation of pro-environmental behaviors), given that people with a low feeling of responsibility may be less likely to reflect on the implications of the information for their own behaviors. Also, message interventions of the type employed here might be extended to also test their effectiveness to promote other pro-environmental behaviors, with respect to which collective change is highly desirable. Finally, future studies might verify the stability of the attitudinal and behavioral changes observed by us over a period longer than one month.

The repeated provision of messages on the environmental consequences associated with (reduced) meat consumption can be deemed to be a very promising intervention as meat consumption has a significant environmental impact. In the current study, we found that such a relatively simple and low-cost intervention can lead to significant reductions in self-reported meat consumption. Thus, the practical implications of our results include the possibility to use the messages on environmental consequences associated with (reduced) meat consumption to promote a reduction of meat consumption in young adults. For example, they may be used to deliver recommendations via online communication within promotion campaigns. Institutions might adopt automatic chatbots for sending environmental messages, as we did in the present study, to prompt sustainable food choices. Additionally, referencing to a dynamic norm may only be more effective for individuals with a relatively strong intrinsic motivation. It is important to note that people in our study voluntarily participated in this intervention, which means they provided consent to receiving such messages. From an ethical perspective, voluntary participation and requesting consent from participants when implementing these types of interventions in practice is also warranted.

In sum, we found that repeated provision of messages on the environmental consequences associated with (reduced) meat consumption, with and without the additional provision of dynamic norm information, is effective in positively changing people's attitudes towards reducing their meat consumption and in turn also leading to significant reductions in self-reported meat consumption. Moreover, we found that such a repeated messaging intervention is effective in changing attitudes and self-reported meat consumption not only in the short-term, but also in the long-term after the intervention has ended. Next, we found that both our messages are particularly effective for people with a relatively weak intrinsic motivation, while additionally referencing to a dynamic norm prevents the counterproductive effect of the environmental information in individuals with a relatively strong intrinsic motivation to reduce their consumption of meat.

Notes

1. To control the levels of attrition across conditions, we also ran a mixed model analysis including partial data from those who dropped out from the survey, finding essentially the same results (see Supplement - Results).
2. As we did not include a control condition, we examined whether the changes in attitudes and meat consumption across time differed from other studies that can serve as a reference point (see Supplement - Results). Comparing partial eta square (Lakens, 2013), we found that the levels of change over time detected in our study were higher than those of other studies that measured attitude and meat consumption over time either without exposing participants to any kind of intervention or comparing an environmental message condition

to reduce meat consumption with a control condition. This suggests that the observed effects were likely due to the exposure to the messages, and not to other factors that could have caused a shift in diet. Although the studies used as a comparison had roughly the same study period and methods, this comparison must be interpreted with caution, because the demographics of the studies differed (for details, see Supplement – Results).

3. A mixed model analysis including partial data from those who dropped out from the survey shows essentially the same results (see Supplement - Results). These findings suggested that both interventions resulted in more positive attitude towards reducing meat consumption and decreased meat consumption at T3 compared to T1, and that there was no difference across condition.
4. A mixed model analysis including partial data from those who dropped out from the survey finds instead that at Time 2 participants in the ENV condition had a marginally more positive attitude towards reducing meat consumption than participants in the ENV+DYN condition, *Estimate*: 0.49; *Std Error* = 0.25; *df* = 346; t = 1.92; $p = 0.055$; *95&CI:* -0.01, 0.99, suggesting that the different values of attitude at Time 2 in the two conditions disappeared over time (see Supplement - Results)

Disclosure statement

No potential conflict of interest was reported by the author(s).

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