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# Framing prefactual affective posts about vegetable consumption

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## Abstract

**Aims of the study.** Previous research has shown that message persuasiveness can depend on message framing. Through an experimental study, we investigated the effects of messages promoting vegetable consumption on recipients with different baseline intention to change their food choices. Persuasive messages were framed in terms of prefactual ("If... then") gain or non-loss. **Method.** A sample of young adult participants ($N = 94$) completed a questionnaire measuring their baseline intention to eat vegetables regularly. They were then presented with Facebook posts regarding the consequences of vegetable consumption. Posts were formulated as prefactuals and were focused either on the emotional positive outcomes that may be obtained through vegetable consumption (gain posts) or on the emotional negative outcomes that may be avoided through vegetable consumption (non-loss posts). After reading the posts, participants reported their attitude, anticipated regret and intention

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towards eating vegetables in the future. **Results**. According to their baseline intention to eat vegetables, participants were subdivided into three groups: *nonintenders, want-but-cannot and intenders*. *Want-but-cannot* participants (i.e., participants wanting to increase their vegetable consumption, but not feeling able to do so) reported more positive affective attitude, higher anticipated regret, and greater intention to eat vegetables after reading non-loss than gain posts. No differential effectiveness of gain and non-loss posts was found among *intenders* and *nonintenders*. **Conclusion.** Discussion focuses on the opportunity to vary the framing of persuasive messages on vegetable consumption according to receivers' baseline intention to change their eating behaviour.

**Keywords:** message framing, behaviour change, communication, intention, healthy eating behaviour

## Introduction

Vegetable consumption is associated with improvement in both physical and emotional health (World Health Organization, 2018). However, message interventions promoting vegetable consumption have been only partially successful so far (see Appleton et al., 2016 for a review) and further research on how to frame those messages in order to enhance their effectiveness is needed. In the present study, we explored whether framing messages on vegetable intake in terms of expected emotional *gains* (e.g., "If you eat vegetables, you will feel more relaxed") or *non-losses* (e.g., "If you eat vegetables, you will reduce anxiety") would make them more or less persuasive for receivers with different baseline intentions regarding vegetable consumption. We presented messages as online content (Facebook posts), a novel but already widespread format used to deliver health promotion messages (Park et al., 2011; Thackeray et al., 2011).

## Conceptual Framework

### *Message Framing to Increase Vegetable Consumption*

Past research on communication aimed at increasing healthy eating has shown that the way messages are framed impacts their persuasiveness (e.g., Dijkstra et al., 2011; Godinho et al., 2017). Message framing pertains to the choice of specific words, images, or presentation styles to convey a certain statement or recommendation (Chang et al., 2015; Chong & Druckman, 2007). A message can be framed by emphasizing different pieces of information in a way that is likely to attract receivers' attention and change their attitudes, emotions, intentions, and ultimately behaviours.

According to the self-regulatory model of message framing (Cesario, Corker, & Jelinek, 2013), a message can be framed at multiple levels, by stressing different features of the proposed behaviour. At the most basic level, the *hedonic consequences* level, a message can be framed to describe either the *gain* of adopting a behaviour (e.g., 'Increasing your vegetable intake improves your health') or the *loss* deriving from not adopting it (e.g., 'Not increasing vegetable intake damages your health'). This level of framing, in which messages differ as to their positive or negative valence, has been extensively investigated in the domain of health promotion (Gallagher & Updegraff, 2012; Mitchell et al., 2015). Research, however, has often yielded mixed or inconclusive results, partly due to the different characteristics of the promoted behaviour. While messages promoting a detection behaviour seem to be more effective when they are framed in terms of loss, messages promoting a prevention behaviour seem to be more effective when they are framed in terms of gain (e.g., Rothman & Salovey, 1997; Rothman et al., 2006). As vegetable consumption is a preventive-related behaviour, gain messages might be particularly suited to promote it. Consistently, Godinho et al. (2017) found that gain-framed messages on fruit and vegetable consumption were perceived as being higher in quality than loss-framed messages.

According to the self-regulatory model of message framing (Cesario et al., 2013), at the *outcome sensitivities* level, messages focused on pleasant consequences can be further differentiated by making a distinction between messages describing an actual *gain* (e.g., 'High vegetable intake *improves your health*') and messages describing a *non-loss* (e.g., 'High vegetable intake *reduces your illness risk*'). So far, the gain vs non-loss distinction has been much less investigated than the gain vs loss distinction, and non-loss framing has sometimes been confused with negative framing altogether (see Bosone & Martinez, 2017 for a review). A notable exception is a study by Dijkstra and colleagues (2011; Study 1) who found that gain-framed messages were more effective than non-loss-framed messages in promoting fruit and vegetable intake. The Authors tested the effects of gain and non-loss messages focused on health outcomes and formulated as factual statements (i.e., describing a causal relation between vegetable consumption and health outcomes). It is still to be understood, however, whether the superiority of gain-framed over non-loss-framed messages can be generalised to other samples and types of messages.

In the present research, we tested the effectiveness of gain vs non-loss messages focusing our messages on the emotional rather than physical consequences of vegetable consumption. Besides, we decided to formulate our messages in prefactual terms (i.e., "If… then…") rather than factual terms, presenting hypothetical future outcomes as the consequence of hypothetical present behav-

iour. These two choices were rooted on previous research results highlighting the advantages of prefactual messages in the healthy eating domain (Bertolotti et al., 2016).

As regards the stress on emotional rather than physical health, previous research has shown that messages describing the consequences of eating behaviour on emotional health (e.g., 'Vegetable intake helps reduce the risk of depression') can be more effective than the more commonly used messages describing the consequences on physical health (e.g., 'Vegetable intake helps reduce the risk of cancer'; Carfora et al., 2016). This may be because consumer behaviour is often driven by the desire to realize psychological end-states of being (Gutman, 1982). In addition, these messages evoke future emotional states that are easily understandable and accessible to receivers, compared to more complex and distant medical notions (e.g., disease incidence and prevalence). Therefore, in the present study we decided to test whether the superiority of gain-framed messages over non-loss messages observed by Dijkstra et al. (2011) with messages on physical health would still hold with messages focused on emotional health.

As regards the choice of messages formulated in prefactual (i.e., "if… then") terms, past research has shown that anticipating the future consequences of a given diet in prefactual terms drives the intention to change eating behaviour significantly (Bertolotti et al., 2019), the more so when the anticipated consequences regard emotional well-being (Bertolotti et al., 2016). However, in previous research, prefactual messages were framed as losses and the eating behaviour focused on in the messages was meat consumption. Research on the effects of prefactual messages framed in terms of gain vs non-loss and focused on vegetable consumption is therefore missing so far.

### *The Moderating Role of Receivers' Intention*

The relative effectiveness of gain and non-loss messages can be influenced by receivers' individual differences, for example differences in baseline intention to eat healthy. Previous research has widely shown that the effect of persuasive communication regarding eating behaviour largely depends on receivers' initial intention to enact the suggested behaviour (e.g., Conner & Norman, 2015; Mann et al., 2004). Several studies have examined initial intention both as a continuum variable and as a discrete variable composed of two or more stages, finding a discontinuity of prediction patterns as people move through stages (Sutton, 2000). The most applied distinction is the dichotomy between *nonintenders*, that is, individuals who are satisfied with their current behaviour, and *intenders*, that is, individuals who intend to change their eating behaviour (e.g., Lippke et al., 2009; Schwarzer, 2008). However, not all

individuals who intend to change their eating behaviour necessarily engage in plans on how to enact this intention. Consistently, both the Transtheoretical Model (Prochaska et al., 1993) and the Health Action Process Approach (Schwarzer 1992; 2001) consider the existence of intermediate categories between *intenders* and *nonintenders* (Brug et al., 1997; Ma et al., 2002). One of these intermediate categories is made up by individuals who are motivated to act but perceive that the obstacles they must face up are too high to be overcome. These individuals are highly motivated but feel they are not able to transform such motivation into a stable intention to change (Schwarzer & Luszczynska, 2007). To sum up, besides the traditional categories of *nonintenders* and *intenders*, a further intermediate category can be identified, the *"want-but-cannot"* category, including people who would like to change their behaviour, but feel they are not able to do so.

In the present research we decided to make a distinction among *nonintenders*, *intenders*, and *want-but-cannot* individuals regarding vegetable consumption, moving from the assumption that these three categories are characterized by different cognitions, perceived barriers, and readiness for change (e.g., Lippke et al., 2009; Schwarzer, 2008). Following previous research on how individual differences among receivers moderate the effects of message framing (e.g., Bertolotti et al., 2019; Henry et al., 2006; van't Riet et al., 2010), we expected to find differences in the degree to which *nonintenders*, *intenders*, and *want-but-cannot* would be persuaded by gain versus non-loss-framed messages describing the emotional health outcomes of vegetable consumption. We expected *intenders* to be especially motivated by gain messages, which highlight the prospective benefits of a behaviour they already would feel able to undertake. Conversely, we expected *want but cannot* participants to be especially motivated by non-loss-framed messages, which put a stress on the avoidance of potential risks of a behaviour they would not feel fully ready to undertake.

## Objectives and hypothesis

In the present research, we tested the effectiveness of prefactual gain vs non-loss messages focused on the emotional health consequences of eating vegetables. We based our first hypothesis on the results of Dijkstra et al.'s study (2011), who found a superiority of gain- over non-loss-framed messages. Thus, we hypothesised that:

**H1)** Prefactual messages promoting vegetable consumption are more persuasive when they frame the effects of increased vegetable intake on emotional health in terms of gain (i.e., the benefits of increased vegetable intake) than

when they frame these effects in terms of non-loss (i.e., the risks avoided with increased vegetable intake).

As discussed above, the relative effectiveness of gain and non-loss messages can be influenced by receivers' individual differences, and in the present research we distinguished among *nonintenders*, *intenders*, and *want-but-cannot* individuals (e.g., Lippke et al., 2009; Schwarzer, 2008). Following the above-discussed research on how individual differences among receivers moderate the effects of message framing, we formulated the following hypothesis.

**H2)** Gain-framed messages are more persuasive than non-loss-framed messages among *intenders* (**H2a**), whereas non-loss-framed-messages are more persuasive than gain-framed messages among *want-but-cannot* participants (**H2b**).

We had no specific hypothesis regarding the effectiveness of gain-framed and non-loss-framed messages among *nonintenders*.

## Method

### *Participants and Procedure*

A convenience sample of participants ($N = 94$; 45 males, 49 females; *mean* age = 27.69, $SD = 12.17$) was invited to complete an online questionnaire. The exclusion criterion was following a specific diet. Then, participants were randomly assigned to two conditions (gain condition: $N = 47$; non-loss condition: $N = 47$) and received a link to access a private group on Facebook, where they were invited to accurately read a list of posts published on the group homepage. After reading all posts, participants were invited to complete a second questionnaire.

### *Measures and Procedures*

#### Pre-manipulation Measures

At the beginning of the first questionnaire, participants reported their age and gender and read a definition of "regular vegetable intake" (USDA/USDHHS, 2010), that is, at least two servings of vegetables per day.

*Baseline intention to eat vegetables.* Participants' baseline intention to eat vegetables was assessed with the following question: "In the next month, do you intend to eat more vegetables? Please choose one of the following answers". Participants could choose among three answers: "No, I do not intend to do so" *(nonintenders)*, "I would like to do so, but I feel that it is impossible for me" *(want-but-cannot)*, and "Yes, I intend to do so" *(intenders)*.

### Message Framing Manipulation

All participants were invited to access a private group on Facebook and read five posts (approximately 14 words each) describing the positive consequences on emotional health of eating at least two portions of vegetables a day. Participants in the gain condition read five online posts emphasising how eating vegetables is associated with positive emotional reactions, such as mood stability, relaxation, happiness, and tranquillity (e.g., "If you eat at least two portions of vegetables a day, you will feel more relaxed"). Participants in the non-loss condition read five online posts emphasising how eating vegetables is associated with preventing negative emotional reactions, such as mood swings, anxiety, sadness, and depression (e.g., "If you eat at least two portions of vegetables a day, you will reduce anxiety"). The content of all messages was based on scientific evidence (World Health Organization, 2018).

### Post-manipulation Measures

The second questionnaire included the following measures (adapted from Carfora et al., 2016).

*Attitude*. Participants' attitude towards vegetable intake was measured with seven items using a 7-point semantic differential scale (e.g., "During the next month, eating at least two servings of vegetable is/would be…bad-good, harmful-helpful, boring-fun, unsatisfying-satisfying, etc."). Cronbach's α was 0.94.

*Anticipated Regret*. Participants were asked to state their agreement with 5 items measuring the regret they could feel in the future for not eating enough vegetables (e.g., "If I do not eat at least two servings of vegetable per day in the next month, this will bother me"). Answers were given on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Cronbach's α was 0.92.

*Future Intention to Eat Vegetables*. Participants were asked to indicate their intention to eat vegetables in the following month using three items (e.g., "During the next month, I intend to eat at least two servings of vegetables per day"). Answers were given on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Cronbach's α was 0.95.

## Results

### *Preliminary Analysis*

Overall, the items showed sensible variation and were not unduly skewed. To check if randomization was successful, we used a MANOVA with gain versus non-loss framing as the independent variable, and baseline intention and age as dependent variables. The results did not show any significant effect of condition in baseline intention ($p > 0.05$). A Chi-square test did not show any

significant differences in gender ($p > 0.05$) across conditions. Thus, the preliminary findings confirmed that the two conditions were matched on baseline variables.

On average, after reading the health posts receivers reported a high positive attitude towards eating vegetables, $M = 5.12$; $SD = 1.61$, an intermediate level of anticipated regret related to not following this nutritional recommendation, $M = 3.98$; $SD = 1.50$, and a high future intention to eat vegetables, $M = 4.92$; $SD = 1.87$.

*Baseline intention*

Using answers to the baseline intention items, we categorized 38 participants as *nonintenders*, 17 participants as *want-but-cannot*, and 39 participants as *intenders*. Table 1 shows the means and SDs of the study variables for participants at each level of baseline intention.

*Main analysis*

To test our predictions on the differential persuasiveness of gain or non-loss posts depending on receivers' baseline intention, we performed a 2 (message frame: gain, non-loss) × 3 (baseline intention: *nonintender, want-but-cannot, intender*) between-participants MANOVA on the three dependent variables (attitude, anticipated regret, future intention).

Results showed a strongly significant main effect of baseline intention, $F(6,162) = 7.96$; $p < 0.001$, $\eta_p^2 = 0.22$, and of the interaction between baseline intention and message frame, while message frame had no significant main effect. Post-hoc univariate tests showed that the effect of baseline intention was significant for all dependent variables, attitude, $F(2,87) = 7.43$; $p < 0.001$, $\eta_p^2$

**Table 1.** *Means and standard deviations (in parentheses) of the dependent variables as a function of baseline intention and message framing.*

| | Baseline Intention | | | | | |
|---|---|---|---|---|---|---|
| Message Framing | Nonintenders | | 'Want-but-cannot' | | Intenders | |
| | Gain | Non-Loss | Gain | Non-Loss | Gain | Non-Loss |
| 1. Attitude | 5.73 (1.45) | 5.69 (1.45) | 2.97 (0.50) | 4.79 (0.93) | 4.89 (2.06) | 5.31 (0.99) |
| 2. Anticipated Regret | 4.89 (1.49) | 4.03 (1.05) | 1.83 (0.91) | 3.53 (1.39) | 4.12 (1.50) | 3.94 (1.45) |
| 3. Future Intention | 5.71 (1.63) | 6.06 (1.07) | 1.44 0(.69) | 3.21 (1.50) | 5.27 (1.63) | 4.87 (1.39) |

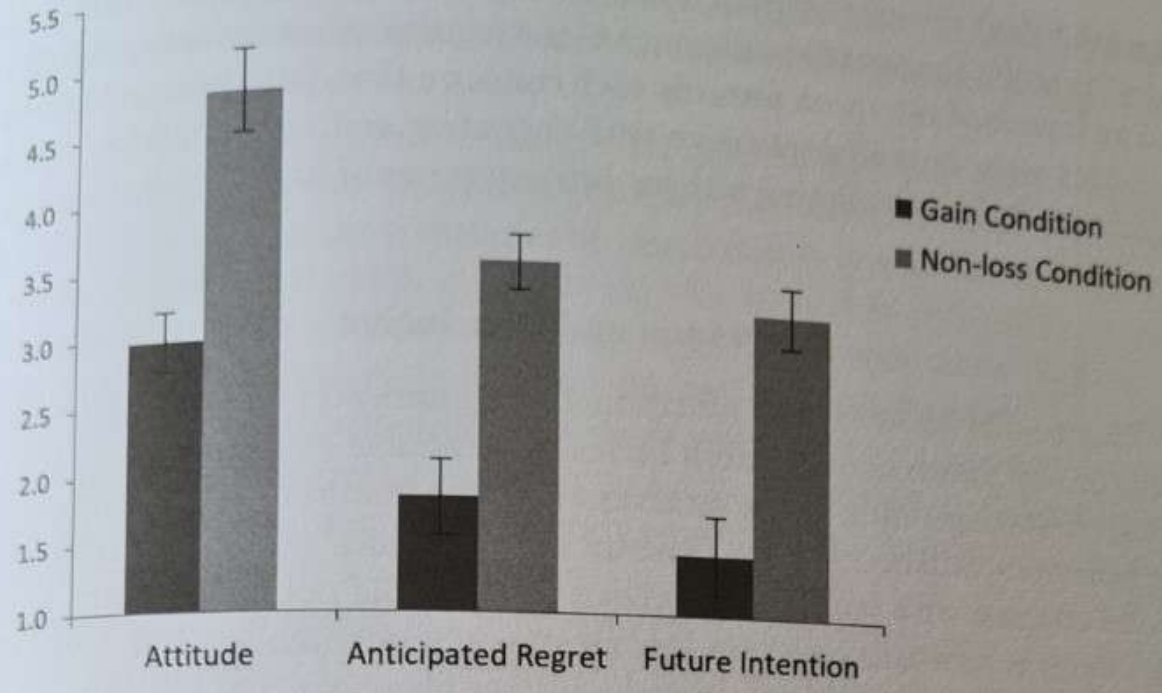


Figure 1. *The effects of message framing on attitudes, anticipated regret and future intention in the case of 'want-but-cannot' participants.*

= 0.15, anticipated regret, $F(2,87) = 8.85$; $p < 0.001$, $\eta_p^2 = 0.18$, and future intention, $F(2,87) = 31.22$; $p < 0.001$, $\eta_p^2 = 0.43$. In all cases, *want-but-cannot* participants were less convinced by the messages than *nonintenders* and *intenders*, who did not differ between each other.

Univariate tests also showed that the message frame × baseline intention interaction effect was significant for anticipated regret, $F(2,87) = 4.57$, $p < 0.01$, $\eta_p^2 = 0.10$, and future intention, $F(2,87) = 2.94$, $p < 0.05$, $\eta_p^2 = 0.07$, while it only approached significance for attitude, $F(2,87) = 2.13$, $p < 0.15$, $\eta_p^2 = 0.05$. Post-hoc *t*-tests with Bonferroni correction showed that *want-but-cannot* participants' attitudes towards vegetable consumption were more positive after reading non-loss posts, $M = 4.79$; $SD = 0.45$, than after reading gain posts, $M = 2.97$; $SD = 0.61$, $t(15) = 4.40$, $p < 0.001$. *Want-but-cannot* participants also reported higher anticipated regret after reading non-loss, $M = 3.53$, $SD = 0.41$, than gain posts, $M = 1.83$; $SD = 0.56$; $t(15) = 2.67$, $p < 0.01$, and higher future intention after reading non-loss, $M = 3.21$; $SD = 0.44$, than gain posts, $M = 1.44$; $SD = 0.59$; $t(15) = 2.72$, $p < 0.01$. No significant differences in attitudes, anticipated regret, and future intention were instead found among *intenders*, $t(39) < 0.79$, $p > 0.05$, and *nonintenders*, $t(32) < 1.93$, $p > 0.05$.

To sum up, as expected *want-but-cannot* participants were more convinced by non-loss messages than by gain messages. Exposure to non-loss messages

increased their positive attitude towards vegetable consumption, their anticipated regret for the negative outcomes of inadequate consumption of vegetables and an increased intention towards such consumption. Both gain and non-loss messages were instead persuasive with *intenders* and *nonintenders*, with no significant differences between these two categories of participants.

## Discussion and Conclusion

Our results showed that nutritional communication framed in terms of gains or non losses deriving from increased vegetable consumption has differential effects depending on the receivers' baseline intention to change their eating behaviour. Differently from Dijkstra and colleagues' results (2011; Study 1), and in contrast with our first hypothesis (H1), we did not find a general preference for gain messages over non-loss messages. Both *intenders* and *nonintenders* were equally affected by gain and non-loss messages, and therefore we did not confirm our H2a regarding the higher preference of gain-framed messages among intenders. We did, however, find an important difference for a specific sub-group of participants, the *want-but-cannot*, who were more persuaded by non-loss posts than by gain posts. This was in support of our H2b hypothesis.

Our results are consistent with previous research suggesting that people perceiving difficulties in engaging in a specific behaviour can be persuaded by messages proposing the correct behaviour as an opportunity to avoid health risk (Schwarzer, 2008). For the first time, the present study has extended these results to the area of healthy food choice, showing that the sub-group of *want-but-cannot* receivers are more easily convinced by non-loss than by gain posts. In the case of the *want-but-cannot* receivers, the greater effects of non-loss posts were observed on attitude, anticipated regret and future intention to eat vegetables, which are the main factors in determining healthy eating behaviour (Godin, et al. 2010). Thus, in this sub-group of participants the non-loss posts stimulated a greater change in the main psychological domains related to eating behaviour, that is cognition, emotion and planning. The positive effects on anticipated regret for not eating vegetables regularly is particularly important, given that this emotion plays an important role in changing health behaviour (Brewer, 2016; Carfora et al., 2018), including eating vegetables (Carfora et al., 2016).

Our study has some potential limitations that future studies might usefully address. First, our results are to be interpreted cautiously, due to the small sample size that cannot be seen as representative of the general population. Second, as we did not have a control condition in which participants did not receive any message or read a neutral message, we were able to assess only the *relative* effectiveness of the two types of messages. Third, although the mes-

sage frame × baseline intention was statistically significant, the effect size was small. Therefore, future research should further test the practical and theoretical implication of the present study.

The results of the present research offer new insights that future research could further explore. An in-depth investigation of other receivers' individual characteristics that might influence the effectiveness of non-loss messages is certainly desirable (van Dijk et al., 2012). An individual difference variable that could be usefully considered is receivers' temporal orientation (Kees et al., 2010), that is, the tendency to focus on the past, present or future. We might hypothesize that future-oriented individuals would be more sensitive to non-loss posts, given their greater tendency to act in the present in order to avoid long-term negative consequences. Another possible relevant variable may be receivers' utilitarian vs. hedonic motivation (Lombardi et al., 2017), that is, the predisposition to engage in a behaviour for rational necessity or fun. In this case, we might expect that hedonists are more sensitive to gain rather than non-loss posts on emotional consequences. Finally, future studies could test whether non-loss affective messages fit well with *want-but-cannot* receivers also in the case of other nutritional or health recommendations, such as low red meat intake or daily physical activity.

Our results also have practical implications. They suggest that online posts about nutrition delivered on social networks can be framed in a way that fits the receivers' baseline intention. More technological innovation and public policy efforts should be devoted to engaging receivers in healthy habits by framing messages that accurately fit with their characteristics. To send such tailored messages to the right audience via social networks, public authorities could create chatbots able to automatically select and send different messages to different receivers.

In conclusion, our results confirmed the promising results of combining different message frames with further individual characteristics. Future studies may deepen this fit between receivers and message framing to produce a detailed classification of what frames are more persuasive for different types of receivers. A process which is much needed to increase the persuasive effectiveness of communication aimed at modifying eating behaviour.

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