Thanks, but no thanks: The influence of gratitude on consumer awareness of food waste

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Food waste is a major burden on the planet due its effect on increased greenhouse gas emissions (from landfill and lost production) and issues associated with food security. To reduce the human propensity to waste food, behaviour change studies have mostly focused on cognitive aspects of selection and consumption. However, evidence suggests emotional, rather than cognitive, appeals may be a fruitful avenue for reducing food waste. Yet linking food waste, emotions and framing remains an understudied research area. Our research undertakes three quantitative studies to examine the positive emotion (gratitude) as a message component to effect behavioral change. Study 1 demonstrated an advertisement with a 'gratitude for having' message led to higher intentions to reduce food waste when paired with loss framed implications (increased environmental damage) than when paired with gain framed implications (less environmental damage). In contrast, an advertisement with a 'gratitude for not having' message led to higher intentions to reduce food waste when paired with gain framed implications than when paired with loss framed implications. Studies 2 and 3 further showed that a 'gratitude for having' message was more effective when combined to loss framed implications, while 'gratitude for not having' message was more effective when combined to gain framed implications, to encourage participants to receive additional information and volunteer to help with food waste than when combined with gain framed implications. The research demonstrates that food waste reduction campaigns should pay attention to how messages are framed. Overall, this research builds on current theory involving food waste and behaviour change, presents a number of areas for future research and discusses managerial implications, particularly to improve social marketing and education campaigns.

1. Introduction

For many developed and developing nations, food waste is a major social and political issue that has a range of environmental, social, and economic implications. Estimates suggest that anywhere from thirty (FAO, 2011) to fifty percent (Stuart, 2009) of all food is sent to landfill. When this occurs, the food sent to landfill emits both carbon dioxide and methane (Papargyropoulou et al., 2014), which is a major environmental concern, given methane is twenty five times more potent as a heat-trapping gas than carbon dioxide (CO_2) (Yvon-Durocher et al., 2014). Here, novel strategies for CO_2 removal have included the use of waste (i.e., through nitrite-oxidizing bacteria intensification process) (Sepehri and Sarrafzadeh, 2019). Along with the environmental impact, food waste has major economic and social implications. For example, recent estimates have placed the global value of annual food waste at $1 trillion (Goldenberg, 2016). Not only is this an economic burden, but in countries like the United States, where more than one in ten people are considered 'food insecure' (U. S. Department of Agriculture Economic Research Service, 2018), there can be widespread social ramifications stemming from such waste.

In mid to high-income countries, more than forty percent of food is wasted at the consumer level (FAO, 2011). The environmental impact of household food waste originates from the production and supply of food rather than the disposal, given preventing waste avoids 4.2 tons of CO_2, while treating waste avoids 0.5 tons of CO_2 (Quested et al., 2011). It is imperative that governments and non-government agencies combat food waste by encouraging and equipping its citizen to reduce their food waste. The FAO (2011) suggests household food waste can be reduced through increased awareness. Parizeau et al. (2015) found that increased awareness of food waste and food wastes impact on the environment lead to lower food waste production. Current research on ways to reduce food waste (through information campaigns) is limited, focusing mainly on encouraging behavior change through (cognitive) information (Reynolds et al., 2019). While research has examined why consumers waste food, more insight is needed in encouraging food waste reduction in the consumer-oriented domain and focused at the household level (Reynolds et al., 2019; Russell et al., 2017).

Food waste is affected by individual as well as social, cultural, economic, and institutional factors (Parizeau et al., 2015; Visschers et al., 2016). Previous research has suggested educating consumers on topics like food planning and preparation (Pearson and Perera, 2018), the economic costs of food waste (Graham-Rowe et al., 2014) or labeling (La Barbera et al., 2014) may be instrumental in food waste reduction. These behavior change studies mostly focus on the cognitive aspects of food selection and consumption (i.e., education and information appeals) (Reynolds et al., 2019; Stöckli et al., 2018). However, research has found that there are (negative) emotional aspects of food consumption and its waste, with studies suggesting food waste induces feelings of guilt (Falasconi et al., 2019; Graham-Rowe et al., 2014; Parizeau et al., 2015; Quested et al., 2011; Jagau and Vyrastekova, 2017; Richter, 2017; Stefan et al., 2013), disgust (Waitt and Phillips, 2016; Watson and Meah, 2012), and anxiety (Evans, 2012; Graham-Rowe et al., 2014). Research has found that individuals have a bad conscience about food waste (as morally wrong and reprehensible) (Richter and Bokelmann, 2018) and those who felt guiltier about producing food waste also accumulated less food waste (Parizeau et al., 2015). Similarly, anticipated regret helps to predict intention to reduce household food waste (Graham-Rowe et al., 2015). Such results indicate food waste as also a social issue than simply an environmental or economic problem (Parizeau et al., 2015; Qi and Roe, 2016). Emotional, rather than cognitive, appeals in social

marketing campaigns may be a fruitful avenue to reduce consumer food waste. Specifically, Russell et al. (2017) suggested that emotions and food waste behaviour were a fruitful area for future research.

Our research focuses on ways to improve the effectiveness of social marketing communication messages through the use of gratitude. The findings can be used to increase efficiencies in the uses of resources and encourage sustainable consumption. Only one food waste study has examined the effect of priming individuals in information campaigns (through the use of self-affirmation) (Graham-Rowe et al., 2019) and our research expands upon the effectiveness of such techniques in combating food waste behaviors, and also focuses on emotions.

The use of emotions in advertising for both brand and social marketing campaigns is common. Negative emotions, such as fear, guilt, and disgust, may help induce an individual to change their behavior due to increased fear arousal (Carey et al., 2013), enhancing message persuasion (Morales et al., 2012). The use of negative emotional appeals, for example in drink-driving and smoking cessation campaigns, raises ethical questions about the manipulation of negative emotions (Hastings et al., 2004), as well as questions regarding the effectiveness of such appeals (Brennan and Binney, 2010). There is an emerging body of literature suggesting positive emotions can influence behavior (Cavanaugh et al., 2015; Septianto et al., 2019), such as love on prosocial behavior (Cavanaugh et al., 2015) and anticipating feelings of pride on self-regulation of vice foods (Patrick et al., 2009). These findings demonstrate that appeals using other discrete positive emotions might be used to encourage attitudes and behaviors relating to food waste reduction. In this case, our research focuses on gratitude.

The issue of food waste arises when consumers have abundant resources (e.g., food) but mismanage these resources, leading to food waste. Such mismanagement includes buying or cooking too much food and misunderstanding of best before and use by dates (Pearson et al., 2013; Silvennoinen et al., 2014). Being more mindful of what one is eating and throwing away has been suggested as a means to combat food consumption and waste (Bahl et al., 2016). This state of being more mindful and appreciative is associated with the emotion of gratitude (McCullough et al., 2002). Gratitude is extremely relevant in this particular context and can potentially be beneficial to increase consumers' awareness of food waste issues.

The current research develops a conceptual framework in which an emotional appeal (gratitude) is shown to increase consumers' awareness of food waste issues, depending on the associated congruent message framing (gain vs. loss). We differentiate two types of gratitude (gratitude for having vs. not having; Lee and Gershoff, 2013) and by drawing upon construal level theory (Liberman and Trope, 1998; Trope and Liberman, 2010), we further propose that gratitude 'for having' will increase the effectiveness of loss frames, whereas gratitude 'for not having' will increase the effectiveness of gain frames. This 'match-up' effect is mediated by processing fluency. We test our predictions across three experimental studies involving different outcomes, including consumer intentions, participation, and choice to receive information related to food waste issues. The paper begins with the conceptual development and hypotheses, followed by methodology and discussion.

2. Theoretical background

2.1. Understanding food waste

Given increasing environmental issues, many individuals are now engaging in pro-enviornmental behavior. Pro-enviornmental behavior may include activist behavior (i.e., being part of an environmental organization), 'good' behavior (i.e., recycling) and healthy or sustainable consumption behavior (i.e., cutting down on plastic) (Karp, 1996). Pro-enviornmental behavior occurs due to a combination of self-interest (i.e., health, reduction of guilt) and concern for others and the environment (Bamberg and Möser, 2007). Motivations to engage in environmental behavior are generally based on perceived cost and benefits, moral and normative concerns, and affect (Steg and De Groot, 2008). Researchers also acknowledge that institutional or environmental barriers limit the ability for individuals to act is a sustainable or healthy manner (Hoek and Jones, 2011; Kemper and Ballantine, 2017). Research demonstrates that numerous individual factors can influence pro-enviornmental behavior, such as demographic (i.e., age, gender), cognitive (i.e., knowledge), affective (i.e., values and attitudes), and dispositional (i.e., resources) factors (Thondhlana and Hlatshwayo, 2018). Due to alarming statistics about food waste (Stuart, 2009) and a lack of awareness by individuals about the enviornmental impact of food waste (Quested et al., 2011, 2013), this research focuses on combating the important pro-enviornmental behavior of food waste reduction.

The term 'food waste' refers to all food and drink products that have been discarded, which were consumable at some point before disposal (Stefan et al., 2013). At a functional level, food waste can be further categorized into avoidable and non-avoidable food waste (Halloran et al., 2014), with estimates suggesting avoidable waste accounts for around 60 percent of all food discarded (Caswell, 2008). Food waste appears to be an understudied topic in sustainability and green consumption research (McCarthy and Liu, 2017), where questions still exist about the causes of food waste, the implications of such waste and the types of interventions required to effect positive behavioral change (for a full review see Schanes et al., 2018).

Food waste at the consumer level can occur due to several reasons. No doubt, some of this waste comes about because of natural spoilage (Silvennoinen et al., 2014), though research suggests this also occurs because consumers are concerned about (i.e., food safety) or misunderstand the meaning of 'best-before' dates (Khalid et al., 2019; Pearson et al., 2013; Silvennoinen et al., 2014; Williams et al., 2012), lack of food preparation (i.e., cooking or buying too much) (Di Talia et al., Pearson et al., 2013; Silvennoinen et al., 2014; Stefan et al., 2013), inproper storage (Di Talia et al., 2019; Khalid et al., 2019) or failure to appreciate the environmental consequences of food waste (Quested et al., 2013). Given food waste might occur at different stages of the consumer decision-making process (i.e., planning, preparation, storage) (Block et al., 2016), better interventions are needed for consumers in order to ensure consumer attitudes and behaviors are aligned with the desired social outcomes. While there are many reasons *why* consumers waste food, we have chosen to focus on *how* to reduce food waste through downstream social marketing efforts that "inform the unaware and entice the unengaged" (Pearson and Perera, 2018, p. 48).

2.2. What can be done to reduce food waste?

Social marketing campaigns for individual behavior change have been effective in reducing the use of alcohol, tobacco, and illicit drugs (Gordon et al., 2006), while also being effective at increasing the uptake of exercise and fruit and vegetables (Carins and Rundle-Thiele, 2014). Food waste interventions have utilized various techniques, including information campaigns, prompts, modeling, written commitments, feedback, rewards, and penalties

(Stöckli et al., 2018). For example, a major pilot campaign (Waste Not Want Not) gave out free recipe cards and tastings at a local Australian shopping center, handing out over 10,000 recipe cards and 5000 food samples (from a celebrity chef) in the process. This campaign reached over 250,000 people and resulted in a 41% increase in people indicating they avoid throwing away any fruit and vegetables (Social Marketing @ Griffith, 2018). Similar community social marketing campaigns have run in the U.K, U.S.A, Canada, and New Zealand. For example, the 'Love Food, Hate Waste' campaign in New Zealand, ran multiple events including a cooking contest, documentary screening, cooking master class and student Pizza night to raise awareness of food waste. Unfortunately, due to limited funding, food waste campaigns can also be short lived (Zamri et al., 2019).

A macro scale intervention study (Young et al., 2018) found that information provision via e-newsletter and Facebook increased food waste reduction. Similar effects were also found for the control group. Another example is the case of 'BinCam,' which uploads pictures of food waste to a Facebook community. Research suggests this technique has resulted in some food waste behavior change but not necessarily in the long term (Comber et al., 2013). Similarly, research focusing on canteens and restaurants shows plate size reduction, and social prompts can reduce food waste by 20% (Kallbekken and Sælen, 2013). Recent research found that consumers prefer social marketing campaigns which target leftover-reuse behavior and use technology (rather than door-knocking) (Kim et al., 2020). Most of the food waste reduction interventions are not grounded in theory or on social marketing techniques (Kim et al., 2019), which has been a common criticism of social marketing campaigns in general (Luca and Suggs, 2013). More research is needed that uses theory to enhance campaign appeals (i.e., through priming) and interventions based on behavior change theory (i.e., transtheoretical model of behavior change). Our research focuses on contributing to the former literature stream.

One commonality between these social marketing interventions is an emphasis on the cognitive aspects of food waste. The issue with this approach is that cognitive appeals alone may not be enough to change individual behaviors. Instead, in the sustainable consumption domain, there are environmental, cultural, and institutional barriers that may inhibit any food waste message even when knowledge is present (Hoek and Jones, 2011). Some research has suggested the potentials of emotions in the food waste context, with studies finding it to be associated with negative emotions. Parizeau et al. (2015) looked at a series of beliefs, attitudes and practices associated with food waste and found that over half of respondents felt guilty about producing (non-recyclable) waste, with over 85% feeling guilty about wasting food. Watson and Meah (2012) and Quested et al. (2013) also found individuals felt guilty about wasting food. Both Graham-Rowe et al. (2014) and Evans (2012) found that their participants felt 'bad' or 'anxious' when their behaviour resulted food waste with households trying to "ameliorate anxieties about its wastage" (Evans, 2012, p. 52). Similarly, in discussion and reflection on refrigeration practices with participants, such as food misplacement and forgotten leftovers that had gone off, Waitt and Phillips (2016) concluded that shame and disgust could be avenues to get individuals to reflect on their throwing away and storage practices. However, eliciting such negative emotions via messaging raises ethical questions (Hastings et al., 2004). The current research investigates how specific positive emotions such as gratitude can be elicited in individuals, thereby increasing the effectiveness of message framing in increasing consumers' awareness of food waste issues.

2.3. Gratitude as the catalyst

Gratitude is a positive emotion arising from an acknowledgment that a recipient has benefited as a result of someone or something other than themselves (McCullough et al., 2002). As a result, gratitude is premised on the fact the benefit received emanated from a benefactor, which motivates the recipient to reciprocate (Bartlett and DeSteno, 2006; McCullough et al., 2001). This occurs because gratitude indicates the recipient considers the benefactor as being thoughtful and that their actions show concern for the recipient's welfare. In turn, this motivates the recipient to form and maintain an interpersonal relationship with the benefactor (Algoe, 2012). Gratitude also makes the individual more willing or likely to engage in prosocial behaviors (Algoe, 2012; Bartlett and DeSteno, 2006; Ma et al., 2017).

We suggest gratitude is an important emotion that can help consumers reduce food waste due to a unique attribute other positive emotions don't possess. Gratitude makes consumers notice and appreciate the positives in life (Wood et al., 2010). This occurs because gratitude can create schemas in consumers that influence how they interpret a situation (Wood et al., 2008, 2010). When consumers feel grateful, they are more likely to perceive something they possess as being more valuable (Bridger and Wood, 2017; Palmatier et al., 2009; Wood et al., 2008). Gratitude enables consumers to appreciate what they possess. This is relevant to situations involving food waste, as the waste product comes about from mismanagement of current resources. In this case, food. We argue feeling gratitude can help consumers be more appreciative of their (food) possessions, which should increase their willingness to reduce food waste.

Prior research has coined a term related to this aspect of gratitude called "have" focus, which is defined as "a focus on what we have rather than what we lack" (Adler and Fagley, 2005, p. 82). Individuals acknowledge and appreciate "being with us" or "connected to us" (Adler and Fagley, 2005). For example, as individuals, we can be thankful for our health, our privilege, and our (tangible and intangible) possessions. In other words, we feel grateful for having an object or experiencing an event (i.e., gratitude for having). From a different perspective, recent research (Lee and Gershoff, 2013) has also argued that we can also be grateful for NOT having an object or NOT experiencing an event (i.e., gratitude for not having). We further argue that the distinction of gratitude for having (vs. not having) might lead consumers to employ different information processing methods.

2.4. Construal level theory: the binding agent

We build our arguments on the distinction between gratitude 'for having' and gratitude 'for not having' (Lee and Gershoff, 2013) based on construal level theory. According to construal level theory, individuals use high or low level construal to interpret objects and events (Liberman and Trope, 1998; Trope and Liberman, 2010). Low construal level refers to concrete representations of an event, while high construal level refers to abstract representations. Construal level theory suggests consumers with higher (vs. lower) construal levels will form mental representations of a distal (proximal) event in a more abstract (vs. concrete) way (Trope and Liberman, 2010). Prior research has demonstrated that these construal levels can be activated by different emotions (Chowdhry et al., 2015; Han et al., 2014; Yang and Zhang, 2018). For example, guilt (vs. shame) will draw a consumer's focus to specific behaviors (e.g., "I have done something wrong") and activates low construal level, whereas shame emphasizes an abstract view (e.g., "I am a bad person") and activates high construal level (Han et al., 2014).

Drawing from past research on emotion and construal level theory (Chowdhry et al., 2015; Han et al., 2014; Yang and Zhang, 2018), we predict that gratitude 'for having' versus gratitude 'for not having' should be associated with different construal levels. This is because when consumers construe something they have (vs not have), they think about objects or events differing on psychological distance (proximal vs. distal). When consumers feel grateful for something they possess, they are more likely to think of items or experiences they currently have. Such objects or events should be construed in a more psychologically proximal way because they 'themselves' possess such objects or experience the event (Baskin et al., 2014; Trope and Liberman, 2010). In contrast, when consumers feel grateful for something they do not have, they need to think more abstractly (for example, by thinking of others who have such items), leading them to think of items or experiences in a psychologically distal way. We predict that gratitude 'for having' will lead to low construal level, whereas gratitude 'for not having' will lead to high construal level.

The fact there are two types of gratitude means the goal framing of a message can have a profound influence on its effectiveness. The framing of messages, how a piece of information can be communicated differently, can influence judgments and decisions (McCormick and Seta, 2016). We focus on goal framing because the primary power of goal framing is that it can enhance an individual's ability to assess their behaviors (Levin et al., 1998; McCormick and Seta, 2016). Goal framing highlights whether behavior will result in positive (gain frame) or negative (loss frame) outcomes (Levin et al., 1998). If the goal of any food waste campaign is for individuals to reduce their waste, goal framing becomes a viable message strategy. Positive (gain) frames highlight the positive consequences of participating in a behavior, while negative (loss) frames concentrate on the negative consequences of not participating in a behavior (White et al., 2011). Negative events signal that some problems need to be addressed (Baumeister et al., 2001). Loss (vs. gain) frames should be associated with lower (vs. higher) construal levels (Chang et al., 2015; White et al., 2011).

Building on these findings, matching gratitude 'for having' and loss frames, both of which involve low construal levels, and matching gratitude 'for not having' and gain frames, which involve high construal levels, should enable a congruent processing style. A congruent processing style should, in turn, increase consumers' ability to process information (Lee and Aaker, 2004; Lee and Labroo, 2004). Research has demonstrated that fluency to process information in an advertisement can leverage favorable consumer evaluations (Lee and Aaker, 2004; Lee and Labroo, 2004; White et al., 2011). We predict that a match (vs. mismatch) of mindsets should lead to a congruent processing style and increase processing fluency, leading consumers to be more persuaded by the message. Formally, we propose that:

H1

Gratitude for having (vs. not having) will increase the effectiveness of loss (vs. gain) frames for increasing consumers' awareness of food waste issues.

H2

Processing fluency will mediate emotion effects on the effectiveness of gain and loss frames.

As such, three studies are conducted (see Fig. 1). Study 1 tests the argument that a match (vs. mismatch) between gratitude 'for having' and loss frames and between gratitude 'for not having' and gain frames will leverage the effectiveness of a food waste reduction ad. Study 2

examines that this effect is unique to gratitude and not to happiness (a general positive emotion). While Study 3 seeks to establish the mediating role of processing fluency.
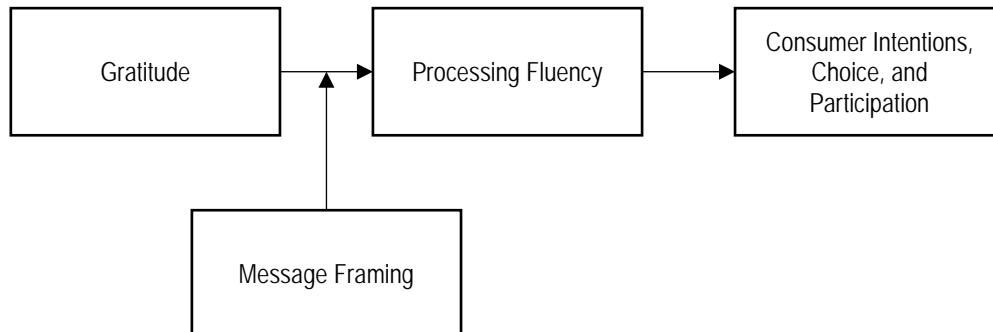

Figure 1. Conceptual Model

3. Study 1

Before conducting the main studies, we conducted a pilot study to establish our predictions that gratitude types can lead to different construal levels (see Appendix 1). As expected, we find that gratitude for having (vs. not having) leads to lower (vs. higher) construal levels. After establishing this, Study 1 seeks to provide evidence for Hypothesis 1 by measuring participants' intentions to reduce food waste. Consistent with Hypothesis 1, we predict a match (vs. mismatch) between gratitude appeals and message framing will increase consumer intentions. Different to the pilot study, we manipulate the emotions within the ad to provide practical implications for social marketers. As an additional analysis, we included demographic variables (age, gender, ethnicity, education, and income levels) as statistical controls for all three studies (see Appendix 2).

4. Methods

In this and all subsequent studies, participants were recruited with the assistance of a research agency in the United States, using a convenience sampling method (see Appendix 3 for demographic information of all three studies). Participants were invited to complete an online survey created in Qualtrics and were provided with a small incentive. Participants were restricted to participating in one of the three studies. They were randomly assigned to different treatment groups using the randomization function in Qualtrics. We did not specify any criteria in selecting the sample.

One hundred and sixty-three participants (72% male, $M_{age} = 31.99$, SD = 8.63) were recruited from an online panel for this study. Study 1 employed a 2 (emotion: gratitude for having, gratitude for not having) $\times$ 2 (framing: gain, loss) between-subjects design.

We developed four ads based on the emotion appeals and message framing. Specifically, the tagline in the gratitude for having condition was, "be grateful you have food on your table," whereas in the gratitude for not having condition the tagline was, "be grateful you don't go

hungry." To manipulate message framing, we provided similar information but differentiate its focus on gain or loss frames (see Appendix 4). For the focal dependent variable, we asked them (1) how likely they are to reduce their food waste after reading the ad and (2) how convinced they are that they should reduce their food waste. We collapsed these two items and created an index of intentions to reduce food waste ($\alpha = 0.85$).

As manipulation checks, we asked them how much they experienced different feelings on a 9-point scale (0 = not at all, 8 = extremely). The items to measure gratitude for having were, "grateful for something positive I have" and "appreciative for something positive I experience" ($\alpha = 0.95$). The items to measure gratitude for not having were, "grateful for something negative I don't have" and "appreciative for something negative I don't experience" ($\alpha = 0.94$). We also included two items as framing manipulation checks. On a 7-point scale (1 = not at all, 7 = extremely) we asked them the extent to which the ad focused on (1) what would be gained if people reduce their food waste and (2) what would be lost if people do not reduce their food waste (White et al., 2011).

5. Results and discussion

Manipulation Checks. We collapsed the items from emotion manipulation checks and formed gratitude 'for having' ($\alpha = 0.91$) and gratitude 'for not having' ($\alpha = 0.92$) scores. Two-way ANOVAs on gratitude 'for having' ($F(1, 159) = 4.77$, $p = .030$) and gratitude 'for not having' ($F(1, 159) = 7.94$, $p = .006$) scores revealed significant main effects of emotion (other effects were non-significant). As expected, participants in the gratitude 'for having' condition (M = 5.65) reported higher levels of gratitude 'for having' scores than did those in the gratitude 'for not having' condition (M = 4.90, $t(159) = 2.18$, $p = .030$). Participants in the gratitude 'for not having' condition (M = 4.89) reported higher levels of gratitude 'for not having' scores than did those in the gratitude 'for having' condition (M = 3.71, $t(159) = 2.82$, $p = .006$).

Two-way ANOVAs on gain ($F(1, 159) = 32.55$, $p < .001$) and loss ($F(1, 159) = 30.07$, $p < .001$) scores revealed significant main effects of framing (other effects were non-significant). Results revealed that participants who viewed gain frames (M = 5.31) reported higher gain scores than those who viewed loss frames (M = 3.67, $t(159) = 5.71$, $p < .001$). Participants who viewed loss frames (M = 5.84) reported higher loss scores than those who viewed gain frames (M = 4.51, $t(159) = 5.48$, $p < .001$). The emotion and message framing were successfully manipulated for the intended conditions.

Intentions to Reduce Food Waste. To test Hypothesis 1, we conducted a two-way ANOVA with emotion, framing, and their interaction as independent variables and consumer intentions as the dependent variable. There were non-significant main effects of emotion and framing; as expected, there was a significant interaction effect ($F(1, 159) = 13.39$, $p < .001$). Participants in the gratitude 'for having' condition showed higher intentions to reduce food waste when the ad was framed using loss messages (M = 5.67) than gain messages (M = 4.94, $t(159) = 2.14$, $p = .034$). Among participants in the gratitude 'for not having' condition, the ad with gain frames (M = 5.79) was more effective than loss frames (M = 4.78, $t(159) = 3.04$, $p = .003$; see Fig. 2). These findings provided evidence for Hypothesis 1 by demonstrating that the match (vs. mismatch) between gratitude 'for having' and loss frames and between gratitude 'for not having' and gain frames can encourage consumers intentions to reduce their food waste.
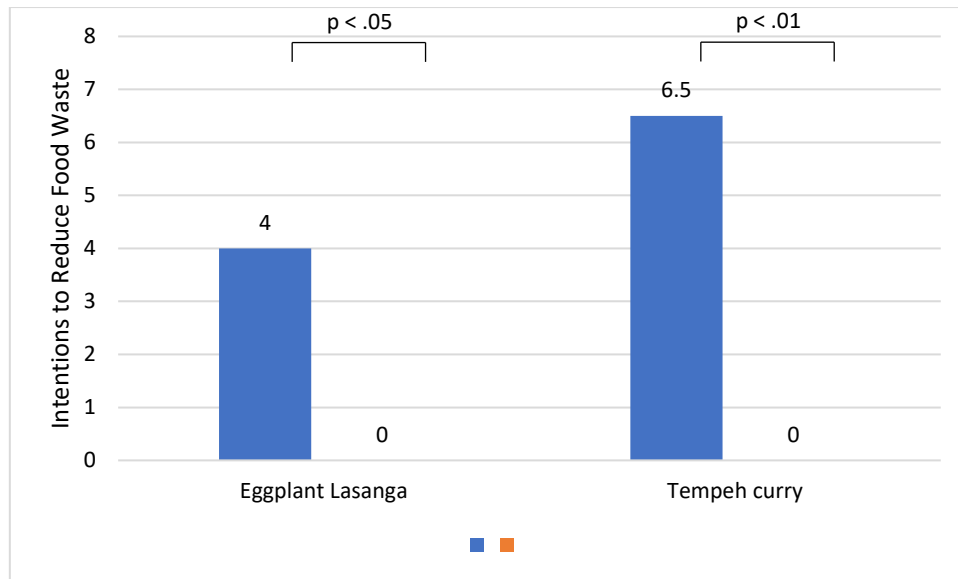
Figure 2. Intentions to Reduce Food Waste by Emotion and Framing Conditions (Study 1)

Legend. A 9-point scale was used (0 = not at all, 8 = extremely). Statistically significant

difference was set at p < .05.

6. Study 2

Study 2 extends the findings of Study 1 by using a different wording in the manipulation task and using a different dependent measure. Rather than measuring behavioral intentions, we use a behavioral measure as a proxy for measuring the effectiveness of the message. We measured participants' choice to receive addition information related to food waste issues (without additional compensation). We also included happiness for having and not having as control conditions to demonstrate that our effects are unique to gratitude (vs. other positive emotions).

7. Methods

Four hundred and forty-eight participants (54% male, M_{age} = 37.66, SD = 12.10) were recruited from an online panel for this study. Study 2 employed a 4 (emotion: gratitude for having, gratitude for not having, happiness having, happiness not having) × 2 (framing: gain, loss) between-subjects design.

This study employed similar procedure to Study 1 with some exceptions. First, we included happiness 'for having' and happiness 'for not having' conditions. We also changed the wording of the ads to add confidence on our findings. In the having condition, we used, "you have food in your cupboard," whereas in the not having condition, "your cupboard isn't empty." As emotion manipulation checks, we measured gratitude ("grateful" and "appreciative"; α = 0.94), fear ("fearful" and "anxious"; α = 0.88), and hope ("hopeful" and "optimistic"; α = 0.94) on a 7-point scale (1 = not at all, 7 = extremely). We also asked the extent to which participants focused on "something positive they have" (1 = not at all, 7 = extremely).

Second, for the focal dependent variable, participants were asked whether they would like to "know more about the issue of food waste and how each of us can participate to deal with this issue" (1 = yes, 0 = no). They were explicitly told if they select yes, we would ask for their personal email so we could send them more information about the matter. At the end of this survey, they would be redirected to an external website related to this issue (savethefood.com).

8. Results and discussion

Manipulation Checks. Two-way ANOVAs on the levels of gratitude, happiness, fear, and hope only revealed a significant main effect of emotion on the level of gratitude ($F(3, 440) = 4.25$, $p = .006$) but not fear and hope. Participants in the gratitude 'for having' condition (M = 4.68) reported higher levels of gratitude than did those in happiness 'for having' (M = 4.10, $t(440) = 2.42$, $p = .016$) and happiness 'for not having' conditions (M = 4.28, $t(440) = 2.88$, $p = .004$). Participants in the gratitude 'for not having' condition (M = 4.68) reported higher levels of gratitude than did those in happiness 'for having' (M = 4.10, $t(440) = 2.11$, $p = .035$) and happiness 'for not having' conditions (M = 4.28, $t(440) = 2.58$, $p = .010$). There was a non-significant difference on the levels of gratitude among participants in the gratitude 'for having' and 'not having' conditions ($M_{gratitude-have}$ = 4.68, $M_{gratitude-have}$ = 4.60, $t(440) = 0.33$, $p = .740$). These findings suggested that any differences on the dependent variable cannot be accounted for the differences on the levels of gratitude or other positive emotions (fear and hope).

Two-way ANOVA also revealed significant main effects of emotion on the self-reported focus ($F(3, 440) = 4.58$, $p = .004$) such that participants in the gratitude 'for having' condition (M = 4.93) reported higher levels of focus on something positive they have than participants in gratitude 'for not having' (M = 4.24, $t(440) = 2.98$, $p = .003$) and happiness 'for not having' conditions (M = 4.22, $t(440) = 2.18$, $p = .030$). Participants in the happiness 'for having' condition (M = 4.80) reported higher levels of focus on something positive they have than participants in gratitude 'for not having' (M = 4.24, $t(440) = 2.28$, $p = .023$) and happiness 'for not having' conditions (M = 4.22, $t(440) = 2.18$, $p = .030$).

Two-way ANOVAs on gain ($F(1, 440) = 31.33$, $p < .001$) and loss ($F(1, 440) = 21.15$, $p < .001$) scores revealed significant main effects of framing (other effects were non-significant). Results revealed that participants who viewed gain frames (M = 5.11) reported higher gain scores than those who viewed loss frames (M = 4.17, $t(440) = 5.60$, $p < .001$). Participants who viewed loss frames (M = 5.34) reported higher loss scores than those who viewed gain frames (M = 4.60, $t(440) = 4.60$, $p < .001$). The emotion and message framing were successfully manipulated for the intended conditions.

Consumer Choice. We conducted a logistic regression analysis with emotion (2 = gratitude for having, 1 = gratitude for not having, −1 = happiness for not having, 2 = happiness for having), framing (1 = gain, 0 = loss), and their interaction as independent variables, and the proportion of consumers choosing to receive additional information as the dependent variable. As predicted, we found a significant interaction effect between emotion and framing (Wald = 13.61, $p = .004$). Follow-up tests revealed that participants in the gratitude for having condition were more likely to choose to received additional information after viewing the ad with loss frames (proportion = .47) than with gain frames (proportion = .22; Wald = 7.36, $p = .007$). Participants in the gratitude 'for not having' condition were more likely to choose to received additional information after viewing the ad with gain frames

(proportion = .48) than with loss frames (proportion = .30; Wald = 3.45, p = .063). There were non-significant differences among participants in the happiness 'for having' condition (proportion in gain frames = 0.24; proportion in loss frames = 0.19) and among participants in the happiness 'for not having' condition (proportion in gain frames = 0.13; proportion in loss frames = 0.18; see Fig. 3). These findings provided further support for Hypothesis 1.

9. Study 3

Study 3 increases confidence in the findings using a different dependent measure and testing the underlying mechanism (H2). We ask participants to participate (without additional compensation) in a task related to reducing food waste. We conceptualize that higher participation levels means the message is more effective in persuading consumers to reduce their food waste.

10. Methods

Two hundred and forty-one participants (52% male, M_{age} = 35.57, SD = 11.22) were recruited from an online panel for this study. Study 3 employed a 3 (emotion: gratitude for having, gratitude for not having, control) × 2 (framing: gain, loss) between-subjects design.

This study employed similar procedure and materials to those of Study 1 with three exceptions. First, we included one control condition (i.e., no emotion taglines) to simplify our model in testing the underlying mechanism. This is also because we have demonstrated in Study 2 that our predictions were unique to gratitude (vs. other positive emotions such as happiness). Second, we used a different behavioral measure as the dependent variable. After reading the ad, we asked participants whether they were willing to participate in an additional task from City Harvest (a non-for-profit organization working to reduce food waste in New York City), that would take 5 min without additional compensation (yes = 1, no = 0). A higher proportion of participants choosing to participate in this task would reflect more effective ads. At the end of the survey, if participants answered yes to the question, they would need to complete an additional task in which they evaluated past ads that have been used by City Harvest. Third, to measure processing fluency, we used a 7-point scale, with five bipolar items ("incomprehensible-comprehensible," "difficult-easy," "unclear-clear," "disfluent-fluent," "effortful-effortless; " α = 0.94) (Graf et al., 2018).

11. Results and discussion

Manipulation Checks. We initially formed gratitude 'for having' (α = 0.93) and gratitude 'for not having' (α = 0.89) scores. Two-way ANOVAs on gratitude 'for having' (F(2, 235) = 4.82, p = .009) and gratitude 'for not having' (F(2, 235) = 4.26, p = .015) scores revealed significant main effects of emotion (other effects were non-significant). As expected, participants in the gratitude 'for having' condition (M = 5.48) reported higher levels of gratitude 'for having' scores than did those in gratitude 'for not having' (M = 4.72, t(235) = 1.94, p = .054) and control conditions (M = 4.28, t(235) = 3.06, p = .002). Participants in the gratitude 'for not having' condition (M = 4.51) reported higher levels of gratitude 'for not having' scores than did those in gratitude 'for having' (M = 3.33, t(235) = 2.90, p = .004) and control conditions (M = 3.81, t(235) = 1.72, p = .087).

Two-way ANOVAs on gain (F(1, 235) = 52.94, p < .001) and loss (F(1, 235) = 24.96, p < .001) scores revealed significant main effects of framing (other effects were non-

significant). Results revealed that participants who viewed gain frames (M = 5.56) reported higher gain scores than those who viewed loss frames (M = 3.97, $t(235) = 7.28$, $p < .001$). Participants who viewed loss frames (M = 5.50) reported higher loss scores than those who viewed gain frames (M = 4.36, $t(235) = 5.00$, $p < .001$). The emotion and message framing were successfully manipulated for the intended conditions.

Participation in a Follow-up Survey. We conducted a logistic regression analysis with emotion (1 = gratitude for having, 0 = control, −1 = gratitude for not having), framing (1 = gain, 0 = loss), and their interaction as independent variables, and the participation level as the dependent variable. As predicted, we found a significant interaction effect between emotion and framing (Wald = 8.19, $p = .017$). Participants in the gratitude 'for having' condition (proportion = .69) were more likely to participate after viewing the ad with loss frames, as compared to those in gratitude 'for not having' (proportion = .42, Wald = 6.32, $p = .012$) and control conditions (proportion = .48; Wald = 3.97, $p = .046$). Participants in the gratitude 'for not having' condition (proportion = .68) were more likely to participate after viewing the ad with gain frames, as compared to those in gratitude 'for having' (proportion = .50; Wald = 5.02, $p = .025$) and control conditions (proportion = .58; Wald = 3.07, $p = .080$; see Fig. 4). These findings provided further support for Hypothesis 1.
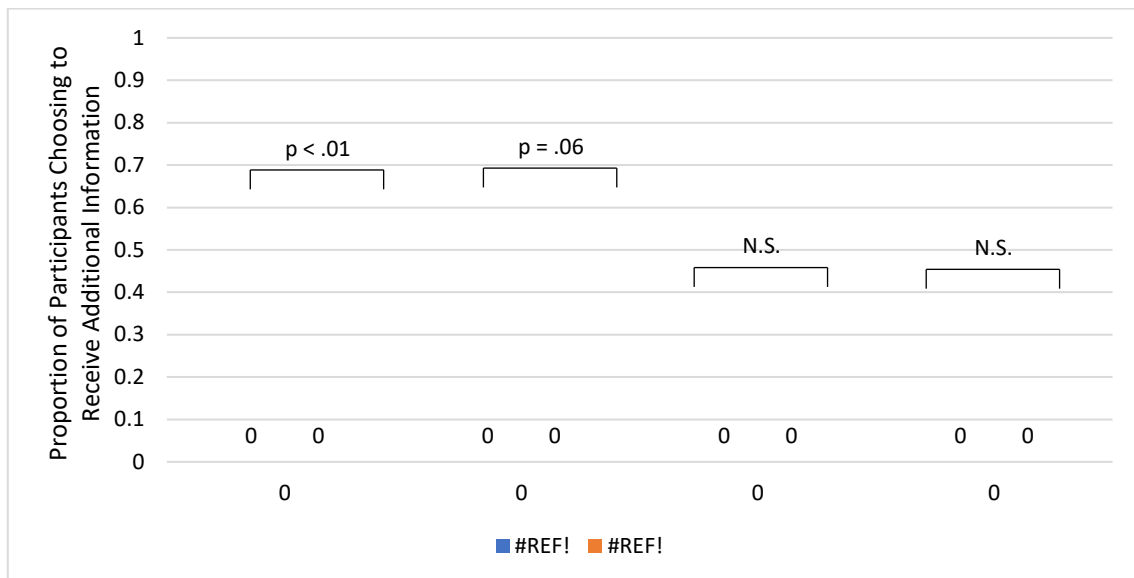

Figure 3. Proportion of Participants Choosing to Receive Additional Information by Emotion

and Framing Conditions (Study 2)

Legend. Proportions of participants among experimental groups were calculated and compared (0 = 0% of participants in that experimental group did not choose to receive additional information, 1 = 100% of participants in that experimental group chose to receive additional information). Statistically significant difference was set at p < .10.
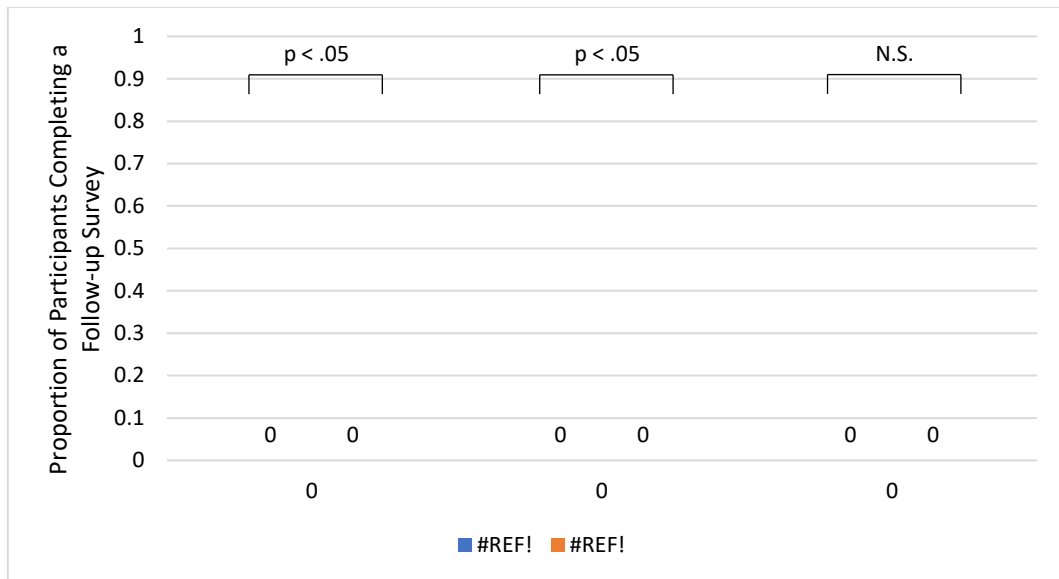
Figure 4. Proportion of Participants Completing a Follow-up Survey by Emotion and

Framing Conditions (Study 3)

Legend. Proportions of participants among experimental groups were calculated and compared (0 = 0% of participants in that experimental group did not complete a follow-up survey, 1 = 100% of participants in that experimental group completed a follow-up survey). Statistically significant difference was set at $p < 0.05$.
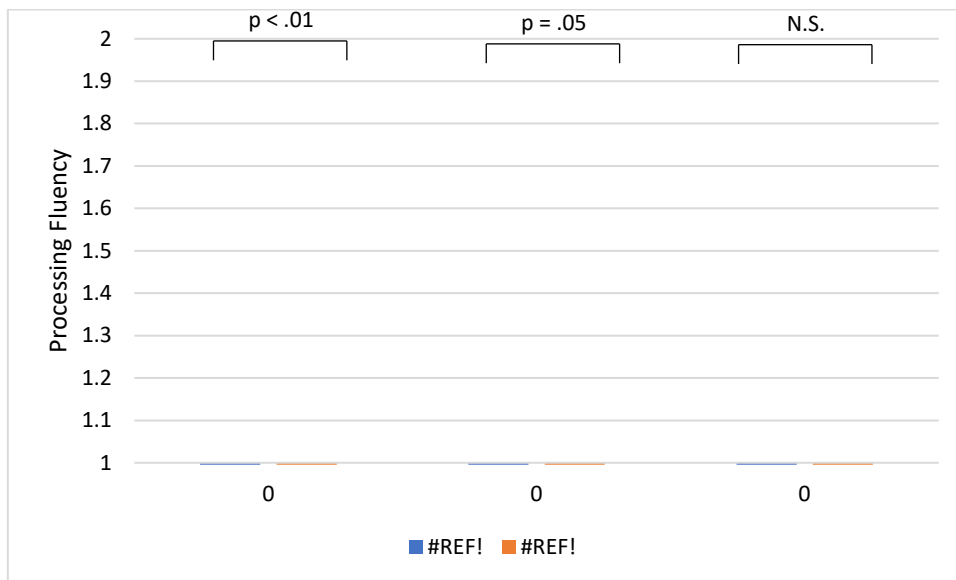

Figure 5. Processing Fluency by Emotion and Framing Conditions (Study 3)

Legend. A 7-point scale was used (1 = [the average of] incomprehensible, difficult, unclear, disfluent, and effortful, 7 = [the average of] comprehensible, easy, clear, fluent, and effortless). Statistically significant difference was set at $p < 0.05$.

Moderated Mediation Analysis. Fig. 5 describes processing fluency across different conditions. The patterns were consistent with our predictions and with participation levels across the conditions (the dependent variable). A two-way ANOVA on the level of processing fluency revealed a significant interaction between emotion and framing ($F(2, 235) = 5.19$, $p = .006$). In the gain frame condition, participants in the gratitude 'for not having' condition (M = 5.94) reported higher levels of processing fluency as compared to those in gratitude 'for having' (M = 5.25, $t(235) = 1.93$, $p = .055$) and control (M = 5.31, $t(235) = 1.75$, $p = .081$) conditions. In the loss frame condition, participants in the gratitude 'for having' condition (M = 6.10) reported higher levels of processing fluency as compared to those in gratitude 'for not having' (M = 5.23, $t(235) = 2.66$, $p = .008$) and control (M = 5.49, $t(235) = 1.85$, $p = .066$) conditions (see Fig. 5).

To test Hypothesis 2, consistent with our conceptual model, we conducted a moderated mediation analysis using PROCESS Model 7 with 5000 resamples (Hayes, 2017; Hayes et al., 2017). Because we have a multi-categorical variable as our independent variable, PROCESS automatically created dummy coding to examine three analyses: (1) gratitude 'for having' versus control, (2) gratitude 'for not having' versus control, and (3) gratitude 'for having' versus gratitude 'for not having'.

First, we examined the indirect effect of gratitude 'for having' versus control, moderated by framing, on the participation level via processing fluency. The indirect effect was significant for loss frames (B = 0.1918, SE = 0.1073, 95% CI excluded zero [0.0344, 0.4539]) but not for gain frames (95% CI included zero [-0.3296, 0.1161]). Second, we examined the indirect effect of gratitude 'for not having' versus control, moderated by framing, on the participation level via processing fluency. The indirect effect was significant for gain frames (B = −0.1611, SE = 0.1083, 95% CI excluded zero [-0.4310, −0.0002]) but not for loss frames (95% CI included zero [-0.0703, 0.3469]. Finally, the indirect effect of gratitude 'for having' versus gratitude 'for not having' was significant for gain frames (B = 0.1442, SE = 0.0671, 95% CI excluded zero [0.0418, 0.298]) and loss frames (B = −0.1130, SE = 0.0745, 95% CI excluded zero [-0.2880, −0.0002]; see Appendix 5 for full mediation results). These findings provided evidence for Hypothesis 2.

12. Discussion

Our research examined how we can increase consumers food waste intentions using social marketing ad appeals. We examine the effectiveness of different gratitude appeals (gratitude for having vs. not having) and message framing (gain vs. loss). Study 1 tests the argument that a match (vs. mismatch) between gratitude 'for having' and loss frames and between gratitude 'for not having' and gain frames will leverage the effectiveness of a food waste reduction ad. As expected, we find that participants who viewed an ad with gratitude 'for having' (vs. not having) and loss (vs. gain) frames exhibit higher levels of intentions to

reduce food waste. Study 2 further shows that our findings by showing that our effects are unique to gratitude and not to happiness (a general positive emotion). We also used a behavioral measure (i.e., choice to receive additional information about food waste issues). Study 3 extends the findings of Studies 1 and 2 using another behavioral measure (i.e., participation in a follow-up survey). Study 3 not only provides further support for Hypothesis 1, but also establishes the mediating role of processing fluency.

These findings provide important theoretical implications. First, this research contributes to the literature on gratitude and consumer behavior by differentiating different types of gratitude. Through differentiating gratitude, we make a significant contribution as most research on gratitude has typically conceptualized this emotion from a unidimensional perspective (Bartlett and DeSteno, 2006; McCullough et al., 2002). This research extends the work of Lee and Gershoff (2013), which differentiates gratitude 'for having' something positive and gratitude 'for not having' something negative. Our research supports this strand of research by demonstrating that framing gratitude in different ways ('having' vs 'not having') has an impact on consumers, and when paired with congruent processing styles (low vs high construal levels) can be more effective for increasing behavior intentions. We test the downstream effects these two types of gratitude have on increasing consumers' intentions and interest in reducing food waste. This is significant because most research in social marketing utilizes negative emotional appeals (Brennan and Binney, 2010; Hastings et al., 2004). Our findings are novel and innovative as they highlight how a discrete positive emotion (gratitude) can be used to change behavior.

Second, results of this research establish processing fluency as the mediating factor which underlies the emotion effects. Consumers have higher levels of processing fluency due to a congruent processing style arising from different types of gratitude and message framing. That is, gratitude 'for having' (vs. not having) activates low (vs. high) construal levels, which matches with loss (vs. gain) frames. Labroo and Patrick (2009) (happiness vs sadness), Han et al. (2014) (guilt vs shame), and Chowdhry et al. (2015) (disgust vs sadness) all found that positive (negative) valenced emotions are associated with more (less) abstract construal. As such, previous research typically examines how different, discrete emotions (e.g., guilt, shame, disgust) can differentially influence construal levels (Chowdhry et al., 2015; Han et al., 2014). Our findings also contribute to the literature of construal level because we identify, uniquely, how the same emotion (gratitude), depending on its focus (i.e., having vs. not having), can lead to differential construal levels.

Third, this research contributes to the literature of message framing by identifying the moderating role of emotions on the effectiveness of gain and loss frames. Previous studies have identified how gain and loss frames might have differential influence in the context of personal issues such as health problems (Meyers-Levy and Maheswaran, 2004; Rothman et al., 2006; Rothman and Salovey, 1997). The current research extends the importance of message framing in encouraging pro-environmental behaviors such as food waste reduction. The moderating role of emotions on message framing is also an important addition to the literature because prior works in this area typically examine cognitive factors (e.g., mindsets) (Chang et al., 2015; White et al., 2011).

This research focused on framing effects of the promotional aspect of a social marketing campaign and shed light on numerous ways communications can be improved. Social marketers in governmental agencies, not-for-profits, and organizations need to pay attention to how they frame food waste behavior and the relatively 'new' message about the need for

reduction. Only recently has the impact of food waste entered mainstream media and public awareness. While many individuals are still unaware or unconcerned about food waste (Quested et al., 2011, 2013), messages that enter the public eye must be persuasive enough to motivate behavior change. Given this lack of knowledge about food waste, information, and education campaigns, such as downstream social marketing initiatives (e.g., Carins and Rundle-Thiele, 2014), are still incredibly relevant.

The findings suggest in order to increase awareness about food waste, social advertising messages should frame messages with a focus on what individuals can gain from the sustainable behavior as well as elicit gratitude 'for something they have'. This research also highlights campaigns targeting food waste reduction need to go beyond simple information campaigns and focus on how the message is framed. While social marketers and other promoters of healthy and sustainable consumption have long been interested in framing effects (Daellenbach and Parkinson, 2017; Kemper and Ballantine, 2019), the research presented here shows that eliciting different forms of gratitude can be matched to different message framings. These findings can potentially be extended to other pro-environmental behaviors such as recycling, use of plastics and charitable donations; this is an area for future research.

Utilizing positive emotions in promoting sustainable consumption offers a divergence from the shame, fear and guilt messages which are usually contained in social marketing messages (Brennan and Binney, 2010; Hastings et al., 2004). Such negative emotions in campaigns can backfire and cause unnecessary emotional overload (Brennan and Binney, 2010). Ethical implications for social marketers around eliciting negative emotions (Hastings et al., 2004) can now be replaced about discussions on the ability to elicit positive emotions, such as gratitude but also other emotions such as love and compassion (Cavanaugh et al., 2015; Peter and Honea, 2012; Septianto and Soegianto, 2017), and their subsequent effects on sustainable consumption and prosocial behavior.

While informational campaigns are just one means to encourage behavior change, other initiatives may also result in behavior change through social interaction. For example, face-to-face interactions, such as through active participation in waste minimisation exercises in the home (Fahy and Davies, 2007) and community events or interactions, such as signing commitments to reduce waste through an online community or the BinCam community on Facebook (Stöckli et al., 2018). Regardless of the intervention, a 'one-size' fits all approach will not work, and messages need to be tailored to individual segments. Our research suggests one way to do so is through the use of emotion. Such an approach may appeal to many consumers as emotions have been shown to play a role in increasing food waste prevention intentions (Schanes et al., 2018). Based on our findings, avenues to display both information and gratitude appeals in advertisements may be worthwhile. For example, posters and flyers may be placed in school cafeterias, hospitals, and restaurants, which could become regulated or encouraged by the government, similar to government regulated hygiene initiatives (i.e., washing hands, safe cooking). Overall, the research tests and replicates the findings across three different dependent variables which measure commitment to reduce food waste (intentions to reduce food waste, choice to receive additional information related to food waste issues, and participation in an additional task) to reduce potential social desirability bias. While self-reported intentions might be more prone to social desirability bias due to its direct measure nature, asking participants to participate in a task and their choice to receive additional information related to food waste issues would be a more indirect, real behavior measure (Fisher, 1993). The research did not directly measure behavior change, instead

focusing on food waste intentions and behavioral proxy. The attitude-behavior gap is common in sustainable consumption and stipulates that knowledge and awareness of unsustainable behavior do not necessarily result in behavior change due to several factors, most notable, suitable infrastructure and supportive norms and practices (Hoek and Jones, 2011; Shove, 2010). We used a behavioral proxy (asking for further information and completing an additional survey) to try to overcome this limitation. Nevertheless, future research is needed on the impact of social marketing campaigns on actual food waste behaviors.

This research focused on household food waste, that is, food prepared at home rather than food prepared by companies (Pearson and Perera, 2018). Future research should examine the effects of framing on social marketing efforts in the restaurant domain as well as expanding on research which has examined the effect of behavioral interventions to reduce food waste in cafeterias (Pirani and Arafat, 2016), school canteens (Boschini et al., 2020), restaurants (Sakaguchi et al., 2018) and retail and wholesale stores (Teller et al., 2018). It would be of import to investigate whether our findings can be replicated in a real-life context in reducing food waste (e.g., by conducting a field experiment in a buffet restaurant).

In line with the findings from this study, there is a role for downstream social marketing efforts (Dibb and Carrigan, 2013) in trying to minimize food waste. Such initiatives are likely to have maximum effect when paired with other education (i.e., food nutrition and cooking classes), community (i.e., waste facilities) and policy measures (i.e., packaging restrictions) (Kemper and Ballantine, 2017; Schanes et al., 2018). Given the complex layers involved, more research is needed on what (i.e., policy, education, social marketing), where (i.e., micro, meso, macro) and how (i.e., framing effects, packaging restrictions) initiatives (Kemper and Ballantine, 2020) should be placed in order to target the whole food production and consumption system for food waste reduction. Policy approaches must consider the different avenues towards fighting food waste and its consequences. Approaches may not only be related to awareness of food waste issues, but also food waste disposal and redistribution, either to individuals in need or waste facilities. Here, other emotions may play a role in encouraging behavior change, such as, altruism, empathy, and guilt which are associated with charitable giving (Andreoni et al., 2017). Thus, future research opportunities exist in this area.

In conclusion, it is important to note many consumers have limited awareness of food wastage, in general (WRAP, 2006). While the perceptual barrier is low awareness of food waste, it means many consumers believe their level of waste is low (Graham-Rowe et al., 2014), and they lack understanding about the consequences of food waste (Quested et al., 2011). Many individuals may 'tune out' information campaigns about food waste as they believe it does not apply to them. Future research should address this barrier in-depth to understand the triggers towards identifying one's own possibly problematic food waste behaviors.

13. Conclusion

The research demonstrates that food waste reduction campaigns should pay attention to how messages are framed. The research finds that participants who viewed an advertisement with gratitude 'for having' (vs. not having) and loss (vs. gain) frames exhibit higher levels of intentions to reduce food waste, which is unique to gratitude and not to happiness (i.e., a general positive emotion). Further, the findings establish the mediating role of processing

fluency. The research has important theoretical implications; contributing to the literature on gratitude and consumer behavior by differentiating different types of gratitude, establishing processing fluency as the mediating factor which underlies emotion effects and identifies the moderating role of emotions on the effectiveness of gain and loss frames. Overall, this research highlights that campaigns targeting food waste reduction, and behavior change campaigns in general, need to focus on how the message is framed and match frames to related emotions.

CRediT authorship contribution statement

Felix Septianto: Conceptualization, Validation, Data curation, Formal analysis, Methodology, Writing - original draft, Writing - review & editing, Visualization. **Joya A. Kemper:** Conceptualization, Writing - original draft, Writing - review & editing, Visualization. **Gavin Northey:** Conceptualization, Writing - original draft, Writing - review & editing, Visualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix 1. Pilot Study

Eighty-three participants (70% male, Mage = 32.98, SD = 10.94) were recruited from an online panel to complete this pilot study. The demographic information for participants recruited is available in Appendix 1. The study employed a one-factor, two-level (emotion: gratitude for having, gratitude for not having) between-subjects design.

This study consisted of two ostensibly unrelated tasks. In the first task, which served as the emotion manipulation task, participants were asked to recall and write about an experience when they felt grateful for having something positive or for not having something negative. This emotion priming method was validated by prior research (Han et al., 2014; Lee and Gershoff, 2013; Septianto et al., 2018), allowing us to draw causal effects with a high internal validity.

As manipulation checks, we asked them how much they experienced different feelings on a 9-point scale (0 = not at all, 8 = extremely). The items to measure gratitude for having were, "grateful for something positive I have" and "appreciative for something positive I experience" ($\alpha = 0.95$). The items to measure gratitude for not having were, "grateful for something negative I don't have" and "appreciative for something negative I don't experience" ($\alpha = 0.94$).

Afterward, they completed ten items of Behavior Identification Form (BIF) as a measure of construal level (Vallacher and Wegner, 1989). Specifically, participants were asked to choose one of two possible explanations of different behaviors. For example, the behavior of "making a list" can be identified as "getting organized" (high construal level, coded as 1) or "writing things down" (low construal level, coded as 0). Thus, higher BIF scores reflect higher construal levels (Septianto, 2016).

We conducted an independent sample t-test to examine the levels of gratitude across two conditions. As expected, results revealed that participants in the gratitude for having condition (M = 6.96) reported higher levels of gratitude for having scores than did those in the gratitude for not having condition (M = 5.22, $t(81) = 3.69$, $p < .001$). In contrast, participants in the gratitude for not having condition (M = 6.88) reported higher levels of gratitude for not having scores than did those in the gratitude for having condition (M = 4.79, $t(81) = 3.92$, $p < .001$). These results showed that the emotion manipulation task successfully elicited the intended emotion states.

As predicted, an independent sample t-test on the BIF scores revealed that participants in the gratitude for not having condition (M = 7.42) exhibited higher levels of BIF than those in the gratitude for having condition (M = 5.76, $t(81) = 2.65$, $p = .010$). These findings supported our predictions that the two gratitude types are associated with different construal levels. Specifically, gratitude for having (vs. not having) is associated with lower (vs. higher) construal levels. Building on these findings, we conducted two main studies to test our main hypotheses on the match (vs. mismatch) between gratitude types and message framing on the effectiveness of encouraging consumers to reduce food waste.

Appendix 2. Demographic variables as statistical controls

As an additional analysis, we included demographic variables (age, gender, ethnicity, education, and income levels) as statistical controls. If these demographic variables explained our predicted patterns between emotion and message framing, then including demographic variables as statistical controls in the model should attenuate the interaction effect between emotion and framing. As expected, for Study 1 we found non-significant effects of all demographic variables and a significant interaction between emotion and framing ($F(1, 154) = 13.10$, $p < .001$), indicating that our prediction was consistent across participant with different demographic background.

For Study 2, we found a significant effect of ethnicity (Wald = 4.90, $p = .0.27$); however, the interaction between emotion and framing remained significant (Wald = 9.86, $p = .007$). These results suggested that while different ethnicity might influence consumer choice to receive additional information, this did not explain our predicted interaction effect.

For Study 3, including demographic variables as statistical controls revealed significant effects of ethnicity (Wald = 5.14, $p = .023$) and education level (Wald = 8.49, $p = .004$). However and as expected, the interaction between emotion and framing remained significant (Wald = 15.58, $p = .001$). Thus, while participants with different ethnic background and education levels might differentially choose to participate in the follow-up survey, these demographic differences did not influence our main prediction.

Appendix 3. Participants' Demographics

	Pilot Study	Study 1	Study 2	Study 3
Sample Size	83	163	448	241
Gender				
Male	70%	72%	54%	52%
Female	30%	28%	46%	48%
Education				
Less than High school	0%	1%	0%	0%
High School or equivalent (e.g., GED)	12%	22%	21%	19%
Trade/technical/vocational training	12%	12%	16%	16%
Bachelor's degree	66%	53%	51%	50%
Post-graduate qualification	10%	12%	12%	15%
Ethnic Background				
Caucasian	44%	46%	71%	65%
African American	5%	7%	10%	6%
Native Hawaiian or Other Pacific Islander	1%	0%	0%	1%
Asian	43%	36%	8%	22%
Native American or Alaska Native	0%	6%	2%	2%
Hispanic or Latino	5%	2%	8%	3%
Other	2%	3%	1%	1%
Annual Household Income				
Less than $15,000	8%	11%	6%	10%
$15,000 ~ $24,999	16%	18%	11%	10%
$25,000 ~ $34,999	19%	19%	12%	15%
$35,000 ~ $49,999	18%	16%	19%	15%
$50,000 ~ $84,999	19%	26%	30%	29%
$85,000 ~ $99,999	10%	6%	11%	9%
Greater than $100,000	10%	4%	11%	12%

Appendix 4. Samples of Stimuli

Appendix 4. Samples of Stimuli

Gratitude for Having – Gain Message (Studies 1 and 3)

WASTED!

**BE GRATEFUL <u>YOU DON'T GO HUNGRY</u>
DON'T WASTE FOOD!**

40% of all food ends up in landfill – this causes methane to leak into the atmosphere.

Methane is 20 times more damaging to the environment than CO2.

WASTING FOOD means:
- Risk global temperature surpassing the 2°C threshold
- Hasten rising sea levels
- Endanger our bio-diversity and wildlife

Gratitude for Not Having – Loss Message (Studies 1 and 3)

WASTED!

**BE GRATEFUL <u>YOU HAVE FOOD IN YOUR CUPBOARD</u>
DON'T WASTE FOOD!**

40% of all food ends up in landfill – this causes methane to leak into the atmosphere.

Methane is 20 times more damaging to the environment than CO2.

NOT WASTING FOOD means:
- Keep rising global temperature below the 2°C threshold
- Delay rising sea levels
- Save our bio-diversity and wildlife

Gratitude for Having – Gain Message (Study 2)

WASTED!

**BE HAPPY <u>YOUR CUPBOARD ISN'T EMPTY</u>
DON'T WASTE FOOD!**

40% of all food ends up in landfill – this causes methane to leak into the atmosphere.

Methane is 20 times more damaging to the environment than CO2.

WASTING FOOD means:
- Risk global temperature surpassing the 2°C threshold
- Hasten rising sea levels
- Endanger our bio-diversity and wildlife

Happiness for Not Having – Loss Message (Study 2)

Appendix 5. Full Mediation Results (Study 3)

Model: Gratitude for Not Having vs. Control

Antecedent	Processing Fluency (M)				Helping Behavior (Y)			
	Coeff	SE	t	p	Coeff	SE	z	p
Constant	5.526	0.192	28.833	<0.001	−1.797	0.584	−3.075	0.002
Emotion (X)	0.308	0.260	1.185	0.237	−0.025	0.328	−0.077	0.939
Processing Fluency (M)	–	–	–	–	0.342	0.095	3.586	<0.001
Message Framing (W)	−0.038	0.194	−0.204	0.838	–	–	–	–
X × W	−0.778	0.238	−3.270	0.001	–	–	–	–
Dummy Variable (Gratitude Having)	0.253	0.411	0.615	0.539	0.276	0.567	0.486	0.627
Model Summary	$R^2 = 0.046$				Cox & Snell's $R^2 = 0.063$			
	$F(4,236) = 2.86, p = .024$				$p = .001$			

Model: Gratitude for Having vs. Control

Antecedent	Processing Fluency (M)				Helping Behavior (Y)			
	Coeff	SE	t	p	Coeff	SE	z	p
Constant	5.526	0.192	28.833	<0.001	−1.797	0.584	−3.075	0.002
Emotion (X)	0.561	0.263	2.130	0.034	0.251	0.328	0.764	0.445
Processing Fluency (M)	–	–	–	–	0.342	0.095	3.586	<0.001
Message Framing (W)	−0.040	0.194	−0.204	0.838	–	–	–	–
X × W	−0.778	0.238	−3.270	0.001	–	–	–	–
Dummy Variable (Gratitude Not Having)	0.253	0.411	−3.344	0.615	0.276	0.567	0.486	0.627
Model Summary	$R^2 = 0.046$				Cox & Snell's $R^2 = 0.063$			
	$F(4,236) = 2.86, p = .024$				$p = .001$			

Model: Gratitude for Having vs. Gratitude for Not Having

Antecedent	Processing Fluency (M)				Helping Behavior (Y)			
	Coeff	SE	t	p	Coeff	SE	z	p
Constant	5.687	0.150	37.843	<0.001	−1.597	0.551	−2.899	0.004
Emotion (X)	0.435	0.163	2.666	0.008	0.113	0.164	0.692	0.489
Processing Fluency (M)	–	–	–	–	0.331	0.093	3.556	<0.001
Message Framing (W)	−0.114	0.197	−0.576	0.565	–	–	–	–
X × W	−0.776	0.241	−3.219	0.002	–	–	–	–
Dummy Variable (Control)	−0.230	0.208	−1.105	0.270	−0.103	0.284	−0.362	0.717
Model Summary	$R^2 = 0.049$				Cox & Snell's $R^2 = 0.061$			

Model: Gratitude for Not Having vs. Control

	Consequent							
	Processing Fluency (M)				**Helping Behavior (Y)**			
Antecedent	**Coeff**	**SE**	**t**	**p**	**Coeff**	**SE**	**z**	**p**
	$F(4,236) = 3.05, p = .018$				$p = .002$			