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Combining Two Outcome Frames to Promote Support for Obesity-Related Policies

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Abstract

Guided by construal level theory (CLT), this study investigates the interplay between two framing approaches that address outcomes of obesity-related policies. A randomized experiment ($N = 299$) was conducted with a 2 (gain- vs. loss-frame) X 2 (societal- vs. individual-frame) between-participants design. Consistent with CLT, frame combinations with consistent construal levels were more persuasive. Compared to a societal-loss frame, a societal-gain frame was perceived as a stronger argument, which in turn increased policy support. Participants were also more likely to engage in healthier diets and physical activity when messages highlighted societal-gain rather than societal-loss. This study offers important insights for combining multiple framing approaches in a persuasive message to improve policy support as well as individual health decisions.

Keywords: construal level theory, gain-loss framing, individual-societal framing, policy outcomes, obesity

Combining Two Outcome Frames to Promote Support for Obesity-Related Policies

Persuasion researchers have investigated the utility of message framing to address social issues that involve complex causal factors. Obesity, one of the biggest health threats to Americans (The State of Obesity, 2016), constitutes one such issue: it is potentially caused by factors ranging from the social environments (that can influence active and healthy living) to genetic predispositions, as well as individual decisions about diet and physical activity. Studies have thus examined messages that discretely emphasize obesity's distinct causes (*causal frames*), including societal-level factors like the affordability of food and individual-level factors such as poor dietary choices (e.g., Gollust, Lantz, & Ubel, 2009; Niederdeppe, Roh, Shapiro, & Kim, 2013; Niederdeppe, Shapiro, Kim, Bartolo, & Porticella, 2014; Sun, Krakow, John, Liu, & Weaver, 2016). These studies test how emphasis on different causal factors shapes individuals' judgments of both societal-level solutions (e.g., support for obesity policies) and individual-level solutions for obesity (e.g., exercise). However, little attention has been paid to messages that emphasize different outcomes from establishing or not establishing obesity-related policies (*outcome frames*).

It is critical to examine the effects of outcome frames, beyond causal frames, because people often rely not only on the causes of a social issue, but also on the expected outcomes of a solution in making policy decisions. To convince the public to support health-related policies, a message thus needs to present the expected outcomes of those policies, such as gain versus loss and individual versus societal outcomes. Although gain-loss framing has been mostly applied to individual health decisions, describing either positive or negative outcomes of (not) establishing a health policy can also give rise to divergent policy decisions; however, only few studies to date addressed gain-loss framed policy outcomes (e.g., Lee & Kim, 2016; Nan & Madden, 2014). Although policy making is a societal solution to obesity, it can also influence individuals' health decisions. Thus, highlighting either individual or

societal implications of a health policy can prompt different policy decisions. At the same time, because emphasizing a policy solution might reduce individuals' sense of responsibility in managing their weight (Gunlock, 2011; Henderson, Coveney, Ward, & Taylor, 2009), it would be beneficial to examine whether policy outcome frames also influence individual health decisions. Collectively, examining outcome frames could offer theoretical insights on how people weigh different outcome expectancies in forming policy and health decisions.

Moreover, persuasive messages promoting obesity-related policies may contain multiple frames that combine various outcome dimensions (i.e., gain-loss and societal-individual). Certain framing combinations may intensify or diminish message effects on audiences' cognitive responses, and hence, either contribute to or detract from the persuasive outcomes (Shah, Kwak, Schiomerbach & Zubric, 2004). For instance, in light of construal level theory (CLT; Trope & Liberman, 2003), construal level consistency of outcome frame combinations can make a message more effective in encouraging people to support policies and to engage in healthy behaviors. However, many framing studies to this point have focused on the relative persuasiveness of different frames based on a single framing approach (e.g., gain versus loss), while the interplay of multiple frames that combine various categories has seldom been explored (notable exception, Shah et al., 2004). Examining the interplay between multiple frame dimensions help us better understand the boundary conditions for the outcome frames and its underlying mechanisms.

Guided by CLT, this study thus aims to combine two outcome frame dimensions (gain-loss framing and individual-societal framing) in a message to identify which framing combinations have greater potential for improving support for obesity-related policies and individual decisions about diet and physical activity.

Two Framing Approaches to Address Obesity-Related Policy Outcomes

Gain and Loss Frames. Rooted in prospect theory (Kahneman & Tversky, 1979), the relative persuasiveness of a gain-loss frame has received considerable attention in the area of health communication. In the health context, a gain frame emphasizes positive outcomes resulting from compliance to health recommendations, whereas a loss frame highlights the negative outcomes from non-compliance. Applying this framework, messages endorsing obesity-related policies may emphasize either the benefits of those policies (e.g., “If laws require more public spaces to be set aside for exercise, people will be more encouraged to engage in physical activity”) or the negative outcomes that could result from failing to establish policies (e.g., “If laws do not require more public spaces to be set aside for exercise, people will not find adequate opportunities for physical activity”).

Because people are likely to take risks when an outcome is loss-framed and avoid risks when an outcome is gain-framed (Kahneman & Tversky, 1979), loss frames are typically considered more effective in promoting risky behaviors (e.g., disease detection behaviors such as cancer screening, possibly resulting in diagnosis of a disease), whereas gain frames are viewed as more effective for promoting riskless behaviors (e.g., disease prevention behaviors such as regular exercise; Edwards, Elwyn, Covey, Matthews, & Pill, 2001; Rothman & Salovey, 1997). However, meta-analytic studies have found little support for this proposition, with only small effects in limited contexts (O’Keefe & Jensen, 2006, 2007, 2009), leading health communication researchers to explore other moderators of the gain and loss framing effects. In the context of policy messages, in particular, Nan and Madden (2014) found that gain-loss framing interacts with message recipients’ cultural worldviews to form public opinions regarding the human papillomavirus (HPV) vaccine mandate. However, in addition to gain and loss, outcomes of (not) establishing policies can be framed in individual or societal terms (Holtzhausen & Zerfass, 2014; Nan, 2007). In this

study, we examine individual-societal outcome frames as a moderator of the gain-loss frames in the context of establishing obesity-related policies.

Individual and Societal Frames. Grounded in attribution theory (Iyengar, 1991), individual versus societal framing has often been used to understand the role of attributional biases in news framing effects. For instance, constructing social issues around specific instances and individuals has been theorized to heighten a sense of individual responsibility (Gamson & Modigliani, 1987; Iyengar, 1991). In contrast, emphasizing broader societal-level trends and conditions is thought to foster greater societal responsibility and collective action (Iyengar, 1991). We extend this line of research by operationalizing the individual-societal frame in terms of policy *outcomes*, beyond causal attributions.

As the causes of a social issue like obesity can be framed in either individual or societal terms, the outcomes of potential solutions, such as establishing policies to reduce obesity, can also be framed in individual and societal terms. For example, a societal outcome frame highlights the outcomes in relation to a society or community in general (e.g., “If laws require more spaces for exercise, *people* in the community will be more encouraged to do physical activity”) or in relation to individuals (e.g., “If laws require more spaces for exercise, *you* will be more encouraged to do physical activity”). However, only two studies (Nan, 2007; Shah et al., 2004) to date have examined societal-individual outcome frames despite their potential for offering important insights for designing policy messages.

Nan (2007) tested whether societal-individual outcome frames interact with social distance (distant versus proximal) in making a judgment regarding taking public transit. We extend this work in two important ways. First, we examine how societal-individual outcome framing interacts with another framing approach, gain-loss framing, to examine whether outcome frames work in combination to generate different persuasive outcomes. Nan (2007) examined how different framing dimensions interact with social distance, but not the

interplay between those framing dimensions. From the perspective of CLT, both gain-loss and individual-societal frames are associated with varying degrees of psychological distance. However, a direct test of the interplay of the two outcome frame dimensions has not been done under the CLT framework and this current study fill the gap. Although Shah et al. (2004) examined the interplay between two framing dimensions, it was not guided by the CLT and focused on the complexity of individual's thoughts as an outcome, but not persuasive outcomes. Because the present study examines whether the conditional framing effect applies to making a decision about societal solutions to obesity, beyond making personal decisions, it broadens the scope of framing effect, which had been predominantly applied to individual solutions and explained based on value function heuristics relevant to the self (Kahneman & Tversky, 1979).

Construal Level Theory and Conditional Framing Effects

According to CLT (Trope & Liberman, 2003), depending on psychological distance, information can be represented in more abstract, schematic, and decontextualized terms (high-level construal) or in more concrete, detailed, and contextualized terms (low-level construal). Psychological distance refers to “a subjective experience that something is close or far away from the self, here, and now” (Trope & Liberman, 2010, p. 440). For example, a distant-future event (e.g., retire in 30 years) is perceived as more abstract and high-level construal; a near-future event (e.g., retire next month) is thought more concrete and low-level construal. Such differences in psychological distance can influence evaluative judgments and information processing: individuals tend to process information and make judgments that are consistent with the construal levels in a message (Trope & Liberman, 2010). Thus, the greater psychological distance a person experiences in the message, the higher the level of construal effort that is needed to process it and the higher the level consequent judgments that

are influenced. In contrast, lower-level construals are more influential with smaller psychological distances.

Although early research on CLT was mostly about temporal distance (Liberman & Trope, 1998; Trope & Liberman, 2000, 2003), later studies address various dimensions of psychological distance including spatial distance (physically close vs. far), social distance (in-group vs. out-group, self vs. other), and probabilistic distance (real vs. hypothetical events) (Trope & Liberman, 2010). Individuals indeed adopt a broad treatment of construals, including information external to their minds such as persuasive message contents (Nan, 2007). Prior research shows that gain and loss frames are associated with different construal levels – positive outcomes (gain frames) are associated with high-level construals, whereas negative outcomes (loss frames) are associated with low-level construals (e.g., Nan, 2007; Eyal, Liberman, & Trope, 2004; Pennington & Roese, 2003; White, MacDonnell, & Dahl, 2011).

Typically, desirable end goals of an action are positive (e.g., building an exercise facility to improve health); but to implement the action, negative attributes are found (e.g., costs). Thus, Eyal et al. (2004) suggest that negative attributes are subordinate to positive attributes because “the subjective importance of cons depends on the existence of pros more than the importance of pros depends on the existence of cons” (p. 781). Also, Liberman and Trope (1998; Trope & Liberman, 2003) suggest that high-level construals are about desirability while low-level construals are about feasibility. Combined, because positive attributes of an action are about desirability, they are considered high-level construals; as feasibility includes restrictions to implement an action, negative attributes of an action are considered low-level construals.

Building on this, studies suggest that gain frames (positive outcomes) are better matched with high-level construals and loss frames (negative outcomes) are with low-level

construals. For instance, one study showed that positive outcomes mattered more when participants made an evaluative judgment on a distant event (two weeks later) as compared to a proximal event (on the same day) (Pennington & Roese, 2003). In another study, messages endorsing recycling behavior became more persuasive when gain frames were matched with high construal levels (e.g., why people should recycle) and when loss frames were matched with low-construal levels (e.g., how to recycle) (White et al., 2011). Because why people should recycle is a question about desirability, it is associated with high-level construals; how to recycle is a question on feasibility, thus it relates to low-level construals. Nan (2007) also found that persuasiveness of gain frames increased when people made judgments about socially distant entities (e.g., others), as opposed to proximal ones (e.g., selves), although differences in social distance did not have an impact on the persuasive impact of a loss frame.

Prior studies also suggest construal level difference between an individual frame and a societal frame (Nan, 2007; Shah et al., 2004; Spence & Pidgeon, 2010). Because societal outcomes are relatively abstract and decontextualized as compared to personal implications, a societal frame is associated with higher construal levels than an individual frame (Nan, 2007). In one study, for instance, an individual frame produced more detailed and concrete descriptions of a given issue than did a societal frame (Shah et al., 2004). In another study, an individual frame increased the personal relevance of a message, suggesting a narrower psychological distance (and a lower-level construal) when an individual frame is used instead of a societal frame (Spence & Pidgeon, 2010). Nan (2007) also found increased persuasiveness from a societal frame when matched with socially distant entities (e.g., others) as compared to proximal ones (e.g., selves), although no effect was found in an individual frame.

In light of the above mentioned differences in construal levels (and psychological distance), we propose a conditional effect between the two outcome framing dimensions:

gain-loss framing and individual-societal framing. Specifically, we expect that a gain frame (vs. loss frame) will be more persuasive when psychological distance increases with a societal frame; the reverse is expected when psychological distance decreases with an individual frame. When reading a message framed in societal terms, a higher level of construal effort is required to process the message. Thus, a gain frame should appear more persuasive than a loss frame, because the gain frame is consistent with the higher construal level required. The opposite should apply when reading a message emphasizing individual level consequences. We thus propose the following two hypotheses on perceived argument strength and obesity-related policy support.

Hypothesis 1 (H1). When focused on individual outcomes, a loss frame will (a) be perceived as more persuasive, and (b) lead to greater support for obesity-related policies than a gain frame.

Hypothesis 2 (H2). When focused on societal outcomes, a gain frame will (a) be perceived as more persuasive, and (b) lead to greater support for obesity-related policies than a loss frame.

Some scholars have raised concerns that emphasizing policy solutions to obesity may undermine individuals' motivation to engage in healthy diet and physical activity (Brownell et al., 2010; Balco, 2005), by treating personal and societal solutions as incompatible. Studies have found, however, that addressing societal solutions can have positive effects on individual motivation to engage in healthy behavior (Williams-Piehota et al., 2004; Coleman, Thorson, & Wilkins, 2011), even when ignoring the notion of personal responsibility in a message (Niederdeppe et al., 2013). One interesting, unexplored question that arises, then, is whether and how messages addressing different policy implications can influence individuals' decisions about diet and physical activity. We pose a research question to

examine whether the patterns are consistent with those related to perceived argument strength and policy support.

Research Question 1 (RQ1). Do individual and societal frames interact with gain and loss frames to shape intentions to engage in healthier dietary practices and physical activities?

Method

Participants and Procedure

We conducted an experiment administered on the Internet using a 2 (gain vs. loss frame) X 2 (societal vs. individual frame) between-participants design. A total of 299 participants were recruited from the Qualtrics online panel. Participants' ages ranged from 18 to 65 ($M = 43.74$; $SD = 13.13$), and 50.8% were male. A majority of the participants were non-Hispanic White (76.9%), followed by non-Hispanic Black (11.7%), Hispanic (8.4%), Asian (2.3%), and other (.6%).

After submitting their informed consent, participants reported their political party affiliation and regulatory focus¹ to serve as control variables. Because political party affiliation can influence policy support and processing framed messages (e.g., Lee & Kim, 2016), we recruited relatively equal numbers of Republicans ($n = 150$) and Democrats ($n = 149$) and randomly assigned them to a condition.

Participants were randomly assigned to one of four message conditions and reported their perceived argument strength, support for obesity-related policies, and intentions to engage in healthy diet and physical activity.

Stimuli Messages

We developed four messages with the combination of two outcome framing dimensions: a societal gain frame ($n = 76$), a societal loss frame ($n = 71$), an individual gain frame ($n = 73$), and an individual loss frame ($n = 79$). All messages discussed the prevalence

of obesity in the US and addressed societal responsibility to resolve the issue. However, in providing reasons for policy support, each message condition highlighted a different outcome from establishing (or not establishing) policies that had been proposed by health experts to reduce obesity (Brescoll, Kersh, & Brownell, 2008; Niederdeppe, et al., 2013). Appendix A presents these four message conditions.

Gain and Loss Frames. Participants in the gain frame condition read a list of positive outcomes (benefits) from establishing obesity-related policies (e.g., “If laws require more public spaces to be set aside for exercise, including parks and sidewalks, you will be more encouraged to engage in physical activity”). Those in the loss frame condition read a list of negative outcomes (costs) from failing to establish those policies (e.g., “If laws do not require more public spaces to be set aside for exercise, including parks and sidewalks, you will not find safe spaces to engage in physical activity”). Previous work on gain-loss framing in policy messages has used similar manipulations (e.g., Lee & Kim, 2016; Nan, 2007, 2012).

Individual and Societal Frames. Individual- and societal-framed messages emphasized different levels of outcomes from establishing (or not establishing) obesity-related policies. For example, in the individual frame, the outcomes from establishing policies were framed at the individual level (e.g., “If laws require more public spaces to be set aside for exercise, including parks and sidewalks, *you* will be more encouraged to engage in physical activity”). In the societal frame, the argument emphasized the outcomes from establishing (or not establishing) policies for the people in the community (e.g., “If laws require more public spaces to be set aside for exercise, including parks and sidewalks, *people in the community* will be more encouraged to engage in physical activity.”). Similar manipulations of individual-societal framing have been used in previous studies (e.g., Nan, 2007; Shah et al., 2004).

O'Keefe (2003) states that “when message variations are defined in terms of intrinsic features, message manipulation checks are unnecessary” (p. 251-252). We thus did not perform separate manipulation checks because both types of framing manipulation fall under the intrinsic message features. Studies on these two types of message framing typically do not conduct manipulation checks (Nan, 2007; Nan, 2012; Nan et al., 2016; Quick, Kam, Morgan, Liberona, & Smith, 2015).

Measures

Perceived Argument Strength. Six items were adopted from Zhao, Strasser, Cappella, Lerman, and Fishbein (2009) to measure perceived argument strength on 5-point scales (1 = *strongly disagree*; 5 = *strongly agree*). From the original 9-item scale (Zhao et al., 2009), we removed three semantically similar items to shorten the length of the questionnaire. Items that measured perceived argument strength include: “This message gives a reason for supporting obesity policy that is believable,” and “This message gives a reason for supporting obesity policy that is important to me.” Items were averaged to create a perceived argument strength scale (Cronbach’s Alpha = .91, $M = 3.51$, $SD = .92$).

Policy Support. Participants rated on 5-point scales how much they supported each of ten policies proposed by health experts to reduce obesity (Brescoll et al., 2008; Niederdeppe et al., 2013) (1 = *strongly oppose*; 5 = *strongly support*). Policies included “Require restaurants to list the calorie count and fat content of all items on their menus,” and “Create a government-funded public education campaign on healthy eating and exercise.” Responses were averaged to create a policy support scale (Cronbach’s Alpha = .89; $M = 3.56$; $SD = .84$).

Diet and Exercise Intentions. Participants reported the extent to which they were likely to engage in healthy diet and regular exercise on 5-point scales (1 = *very unlikely*; 5 = *very likely*; Niederdeppe et al., 2013; Smith-McLallen & Fishbein, 2009). Items included how likely they would (1) have five or more servings of fruits and vegetables on most days,

(2) exercise at least three times during most weeks, and (3) control diet to lose weight in the next year. The three items were averaged to create an index of diet and exercise intentions (Cronbach's Alpha = .72; $M = 3.72$; $SD = .96$).

Regulatory focus. Fourteen items measured participants' regulatory focus on 5-point scales (1 = *not at all true of me*; 5 = *very true of me*; Lockwood, Jordan, & Kunda, 2002). In line with the theoretical conceptualization in prior research (Higgins, 1998; Yi & Baumgartner, 2009; Lockwood et al., 2002), a principal component analysis (PCA) extracted two factor solutions: (1) prevention focus, e.g., "In general, I am focused on preventing negative events in my life" (eigenvalue = 2.45, Cronbach's Alpha = .73, $M = 3.22$, $SD = .73$), and (2) promotion focus, e.g., "I typically focus on the success I hope to achieve in the future" (eigenvalue = 5.16, Cronbach's Alpha = .88, $M = 3.82$, $SD = .75$).

Analytic Approach²

A preliminary analysis revealed a strong correlation between perceived argument strength and policy support ($r = .79$, $p < .001$). To examine H1 and H2, we thus ran a multivariate analysis of covariance (MANCOVA) with two framing conditions as predictors, regulatory focus as a covariate, and both perceived argument strength and policy support as the dependent variables. On the other hand, we used an ANCOVA to examine RQ1 because diet/exercise intention was only modestly correlated with perceived argument strength ($r = .34$) and policy support ($r = .35$). We further examined significant interactions with focused post-hoc tests (Hayes, 2005). Perceived argument strength has been suggested as an important mediator of persuasive outcomes (e.g., Dillard, Shen, & Vail, 2007). As a post-hoc analysis, we thus examined whether the conditional framing effects are mediated via perceived argument strength onto policy support or healthy diet/physical activity (mediated moderation) using the PROCESS macro for SPSS (Preacher & Hayes, 2008).

Results

Interplay between Gain-Loss and Individual-Societal Frames

H1 & H2. A MANCOVA revealed a marginally significant interaction between gain-loss framing and societal-individual framing at the multivariable level, Wilks' Lambda = .98, $F(2, 291) = 2.61, p = .08, \eta^2 = .02$. At the univariate level, there was a significant interaction between gain-loss framing and societal-individual framing on (a) perceived argument strength, $F(1, 293) = 5.00, p = .03, \eta^2 = .02$, and (b) obesity-related policy support, $F(1, 293) = 4.11, p = .04, \eta^2 = .01$ (Figure 1). In the individual frame condition, although there was no gain-loss framing difference on argument strength ($p = .23$), the loss frame ($M = 3.69, SE = .09$) led to marginally higher policy support than the gain frame ($M = 3.46, SE = .09$), $F(1, 148) = 2.95, p = .08, \eta^2 = .02$. Thus, H1a was not supported and H1b was supported.

In the societal frame condition, the gain frame was perceived as a stronger argument ($M = 3.63, SE = .10$) than the loss frame ($M = 3.35, SE = .10$), $F(1, 143) = 4.22, p = .04, \eta^2 = .02$, but there was no gain-loss framing difference in terms of policy support ($p = .20$). Thus, H2a was supported and H2b was not supported.

RQ1. Using an ANCOVA, there was a significant interaction between gain-loss framing and individual-societal framing on diet and physical activity intentions, $F(1, 293) = 5.98, p = .02, \eta^2 = .02$ (Figure 1). In the societal frame condition, the gain frame ($M = 3.84, SE = .11$) led to higher healthy diet and physical activity intentions than the loss frame ($M = 3.52, SE = .11$), $F(1, 143) = 4.25, p = .04, \eta^2 = .03$. We observed no gain-loss frame difference in the individual frame condition ($p = .20$).

Test of Mediated Moderation

Using the PROCESS macro for SPSS (Model 8; Figure 2), we examined whether perceived argument strength mediates the conditional effect of gain-loss framing (mean centered; gain frame = ref.) by individual-societal framing (mean centered; societal frame = ref.) on policy support. Controlling for the regulatory focus, perceived argument strength was

positively associated with policy support, $b = .69$, $SE = .03$, $t = 20.16$, $p < .001$, and was a significant mediator of the conditional framing effect on policy support (the index of moderated mediation = $-.31$, 95% $CI = [-.59, -.04]$). The conditional indirect effect of gain-loss framing was significant only in the societal frame condition (95% $CI = [-.39, -.01]$), but not in the individual frame condition (95% $CI = [-.06, .32]$).

In addition, we examined whether perceived argument strength mediates the conditional framing effects on diet/physical activity intentions (Figure 3). Controlling for the regulatory focus, perceived argument strength was positively associated with diet/physical activity intentions, $b = .26$, $SE = .06$, $t = 4.43$, $p < .001$, and was a mediator of the conditional framing effect on diet and physical activity intentions (the index of moderated mediation = $-.11$, 95% $CI = [-.26, -.03]$). Consistent with the pattern on policy support, the conditional indirect effect of gain-loss framing was significant only in the societal frame condition (95% $CI = [-.17, -.01]$), but not in the individual frame condition (95% $CI = [-.02, .13]$).

Discussion

This study examined the conditional effects of the two outcome frame dimensions (gain-loss and individual-societal) on promoting support for obesity-related policies and individuals' intentions to engage in healthier diets and physical activity. The overall pattern of results supports the broader theoretical argument advanced in this study. We demonstrate that outcome frames work in combination to generate different cognitive responses and persuasive outcomes depending on the consistency in construal levels between the two outcome frame dimensions.

This study contributes to the message framing literature in several ways. First, this is one of the few studies that examines the framing of policy outcomes beyond addressing causal attributions or individual outcomes in message frames. Outcome framing research has only recently begun to encompass policy implications (Lee & Kim, 2016; Nan & Madden,

2014), despite its potential utility at improving public support for health policies. Secondly, we examined the interplay between multiple frames that combine various outcome categories, thus giving attention to the inherently intersecting contexts of prominent policy messages. Our findings suggest that a combination of certain frames has better persuasive effects than others, making it important for practitioners to design policy messages strategically. Lastly, this study approached the issue of conditional framing effects from the perspective of CLT and extended its implications to making a judgment about societal solutions, beyond individual ones. This research thus opens up a promising avenue for future studies by suggesting the viability of a construal level explanation for the relative persuasive effects of different outcome frames on both societal and individual solutions.

Combining Two Framing Approaches to Improve Persuasive Outcomes

Prior studies have frequently focused on testing framing effects with a single framing approach. In this study, we investigated whether frames have distinct effects when used in combination with other frame dimensions. Guided by CLT, we found a significant interplay between gain-loss framing and societal-individual framing on persuasive outcomes. Specifically, compared to a societal loss frame, a societal gain frame was perceived as a stronger argument, which resulted in increased support for obesity-related policies and diet/physical activity intentions.

Several researchers have suggested that gain frames and societal frames constitute higher level construals, whereas loss frames and individual frames represent lower level construals. It has been argued, furthermore, that matched construal levels can produce better persuasive effects (e.g., Nan, 2007; Eyal et al., 2004; Pennington & Roese, 2003; Shah et al., 2004; Spence & Pidgeon, 2010). When a message addresses the societal implications of establishing obesity-related policies, message recipients thus require a higher level of construal effort to process the message. In this case, a gain frame appears to be more

persuasive than a loss frame as it is consistent with the construal level made salient by the message addressing societal implications of obesity policies.

Although there is sufficient evidence that psychological distance influence construal level and its downstream consequences, less is known about its specific mechanisms. According to White et al. (2011), when a gain frame is matched with high level construals and a loss frame is matched with low level construals, people find it easier to process and understand the information, thus increasing the persuasive effects. In particular, ease of information processing results in perceived ease in engaging in the recommended practice (i.e., self-efficacy). In light of this, when people read a message about obesity-related policies in a societal gain frame (vs. societal-loss), they may be more likely to process the message easily and perceive themselves to be capable of engaging in healthier diets and regular physical activities, thus increasing their intentions to perform these behaviors.

At the same time, Shah et al. (2004) suggested that societal gain frames generate more complex cognitive models by motivating individuals to think about a given issue or by increasing associations with existing mental structures. This is possibly because the matched construal levels in societal gain frames (vs. the mismatched levels in societal loss frames) prompt more complex cognitive models, leading to better persuasion. On the other hand, greater cognitive complexity may not always lead to persuasion because people can elaborate on a message in a biased manner. In fact, when the message emphasized individual consequences, a loss frame improved obesity-related policy support than a gain frame; but the difference did not reach a significance level. This limited impact could be attributed to negative elaboration based on individuals' motivations to reject the personal relevance of obesity-related policies when faced with an individual frame.

Some researchers have argued that emphasizing societal causes and solutions of obesity might reduce individuals' sense of responsibility in managing their weight (Gunlock,

2011; Henderson et al., 2009). However, studies have provided counter-evidence to this claim (Niederdeppe et al., 2013; Williams-Piehota et al., 2004; Coleman et al., 2011). Although our messages focused on policy solutions, the messages also explained how policies help individuals to make decisions regarding weight management, such as the example that requiring more public spaces to be set aside for exercise encourages people to engage in more physical activity. This implied effect of policies on individuals' diet/physical activities in a message might have influenced participants' motivation to engage in healthier diets and regular exercise, particularly when there is a construal level match in message frames (e.g., societal-gain). Combined, our findings suggest that formulating a policy message that is congruent with individuals' construal levels can also encourage them to engage in responsible health practices.

Limitations and Future Research

There are several study limitations worth noting. First, although our findings are compatible with the theoretical propositions of CLT, this study does not serve as a direct test of CLT because no specific mechanism was examined. Besides the above explained, the societal frame could have amplified the perceived gains, whereas the individual frame could have heightened the perceived risk, leading to different persuasive outcomes. Future work should directly test potential mechanisms whereby the two different frames jointly form individuals' judgments and message processing. Second, we used a single message to examine the conditional framing effects of policy messages. In particular, our message conditions in common addressed societal responsibility to resolve obesity as we aimed to test framing effects within policy messages. Policy messages inherently advocate for societal responsibility and solutions, while they can emphasize different levels of policy outcomes either at the individual or societal level. To further examine the conditional framing effects, future studies might consider including a message focusing on individual solutions to

compare its effects to those of a message addressing policy solutions. Because the use of a single message is subject to certain limitations (Jackson & Jacobs, 1983), future studies should employ multiple messages within various policy contexts to replicate the findings reported here.

Conclusion

Policy messages often highlight societal implications beyond individual level outcomes. In such cases, gain frames appear to have a persuasive advantage over loss frames at encouraging public support for collective action to resolve obesity. Even when a message emphasizes societal outcomes, people are still able to infer individual-level implications from the message, thus deciding to engage in healthier diets and physical activity. In contrast, when emphasizing individual consequences in policy messages, a loss frame is likely to be more persuasive than a gain frame at improving policy support. This study highlights the importance of considering construal level consistency when combining multiple framing approaches in a policy message.

Endnote

1. Regulatory focus refers to the way an individual approaches pleasure but avoids pain. According to Higgins (1998), there are two separate and independent self-regulatory orientations: (1) prevention focus, referring to whether or not individuals are motivated to prevent undesirable outcomes, and (2) promotion focus, referring to whether or not individuals are motivated to pursue desirable outcomes. Cumulative evidence in prior research suggests that the message recipient's self-regulation style moderates the framing effect by changing how messages are processed and interpreted (e.g., Cesario, Corker, & Jelinek, 2013; Covey, 2014; Yi & Baumgartner, 2009). Therefore, the present study accounts for regulatory focus in examining its hypotheses and research question.

2. We first checked the success of random assignment by comparing participant profiles between conditions. Using a series of analyses of variance (ANOVA) and chi-square tests, we found no significant difference in terms of demographic (age, gender, race/ethnicity, education, income), political affiliation, and regulatory focus between message conditions; thus, randomization was deemed successful. Study results did not differ by political party affiliation and controlling this factor did not influence the results. However, regulatory focus did influence our study results such that the inclusion of regulatory focus improve our hypothesis testing. Thus, we report results controlling for regulatory focus, but without party affiliation.

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Figure 1. Interaction between gain-loss frame and individual-societal frame conditions on (a) argument strength, (b) policy support, and (c) diet and physical activity intentions. Accounted for regulatory focus. * $p < .05$, + $p < .10$ denotes comparisons between gain and loss frames.

Figure 2. Test of Mediated Moderation on Policy Support. Unstandardized coefficients [confidence intervals] after adjusting for the regulatory focus (Model 8). (a) The interaction between gain-loss frames and individual-societal frames ($B = -.45$, $CI = [-.85, -.05]$). (b) The residual direct effect of gain-loss frames no longer depend on the moderation of individual-societal frames ($B = -.06$, $CI = [-.29, .18]$).

Figure 3. Test of Mediated Moderation on Healthy Diet and Physical Activity Intentions.

Unstandardized coefficients [confidence intervals] after adjusting for the regulatory focus

(Model 8). (a) The interaction between gain-loss frames and individual-societal frames ($B = -.45$, $CI = [-.84, -.05]$). (b) The residual direct effect of gain-loss frames no longer depend on the moderation of individual-societal frames ($B = -.39$, $CI = [-.80, .01]$).

Appendix A. Message Conditions

Obesity—everybody knows it's bad and that it's everywhere.

Currently, one in three US adults is obese, bringing forth a possible health toll, including high blood pressure, Type 2 diabetes, heart disease and stroke. Another third of Americans are overweight. The solution to the problem sounds deceptively simple – take in fewer calories a day, while cranking up the calorie-burning process with regular exercise.

However, public health experts emphasize that it's not just a matter of individual decision to eat less or work out more. Societal and environmental factors beyond the control of individuals also contribute to increased obesity rates by reducing the likelihood of healthy eating and active living behaviors.

Rates of obesity are highest among people living in poor neighborhoods. Health expert Dr. Howard Smith says, “People who live in neighborhoods where the majority of stores sell food with high calories and low nutritional value, such as fast food restaurants or convenience stores, are much more likely to be obese.” Several other scientific studies have supported the idea that people's neighborhoods, including not having convenient or safe places to exercise, and being exposed to many advertisements selling high-calorie foods, are associated with the development of obesity-related diseases.

Many different policy ideas have been proposed to address the problem of obesity in the US.

[Gain-Frame]

Why should we establish policies to resolve obesity? There are many *benefits* [you; people in the community] may experience if obesity policies are established:

1. If laws require more spaces for exercise, including parks and sidewalks, [you; people in the community] will be more encouraged to do physical activity.
2. If restaurants are required to provide information about the calorie count and fat content of all items on their menus and to use the healthiest ways of cooking, [your; people in the community's] intake of calorie will reduce.
3. If grocers are required to add a surcharge to high-sugar and high-fat foods and to use the revenues to reduce their prices for fresh fruits and vegetables, [you; people in the community] will buy healthy food at lower prices.
4. If tax credits are provided for gym memberships or nutritional counseling, [your; people in the community's] use of gym or nutritional counseling will increase.
5. If a government-funded public education campaign on healthy eating and exercise is created, [you; people in the community] will learn more about healthy eating and exercise.
6. If the sale of local foods across the community is supported, [you; people in the community] will be able to use healthy local foods.

[Loss-Frame]

Why should we establish policies to resolve obesity? There are many *costs* **[you; people in the community]** may experience if obesity policies are not established:

1. If laws do not require more spaces for exercise, including parks and sidewalks, **[you; people in the community]** will not find safe spaces for physical activity.
2. If restaurants are not required to provide information about the calorie count and fat content of all items on their menus and to use the healthiest ways of cooking, **[your; people in the community's]** intake of calorie will not reduce.
3. If grocers are not required to add a surcharge to high-sugar and high-fat foods and to use the revenues to reduce their prices for fresh fruits and vegetables, **[you; people in the community]** will continue to buy healthy food at high prices.
4. If tax credits are provided for gym memberships or nutritional counseling, **[your; people in the community's]** use of gym or nutritional counseling will not increase.
5. If a government-funded public education campaign on healthy eating and exercise is not created, **[you; people in the community]** will not be able to learn about healthy eating and exercise.
6. If the sale of local foods across the community is not supported, **[you; people in the community]** will not be able to use healthy local foods.