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Across three studies, this research elucidates when loss- versus gain-framed messages are most effective in influencing consumer recycling by examining the moderating role of whether a more concrete or abstract mind-set is activated. First, in a field study, the authors demonstrate that loss frames are more efficacious when paired with low-level, concrete mind-sets, whereas gain frames are more effective when paired with high-level, abstract mind-sets. This is an important, substantive finding that persisted over a significant time span. In addition, in two additional laboratory studies, they find further evidence for this matching hypothesis, in which a pairing of loss- (gain-) framed messages that activates more concrete (abstract) mind-sets leads to enhanced processing fluency, increased efficacy, and, as a result, more positive recycling intentions. The findings have implications for marketers, consumers, and society as a whole.

*Keywords:* recycling, message framing, loss frame, gain frame, construal level, abstract thinking, concrete thinking

## It's the Mind-Set That Matters: The Role of Construal Level and Message Framing in Influencing Consumer Efficacy and Conservation Behaviors

Human beings and the natural world are on a collision course. Human activities inflict harsh and often irreversible damage on the environment and on critical resources. If not checked, many of our current practices put at serious risk the future that we wish for human society and the plant and animal kingdoms, and may so alter the living world that it will be unable to sustain life in the manner that we know. Fundamental changes

are urgent if we are to avoid the collision our present course will bring about.

— World Scientists Warning to Humanity 1992, signed by more than 1500 scientists from 69 countries, including 100 Nobel Prize laureates

As the preceding quotation suggests, consumers need to alter their consumption behaviors to avoid irreversible and devastating effects to the world. Consumption behaviors can be altered by transitioning from using and discarding resources to recycling them. Although recycling programs have been implemented in many cities around the world, people often do not recycle as often as they could (e.g., Schultz, Oskamp, and Mainieri 1995). One estimate suggests that U.S. consumers discard most materials (approximately 76%) after using them only once rather than recycling them (Environmental Protection Agency [EPA] 2009). The value of consumer recycling is realized in terms of not only environmental benefits (e.g., reduction of waste going

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to landfills, incineration, pollution) but also economic savings (EPA 2009).

Despite the pressing importance of recycling, prior research has produced equivocal results regarding what types of messages best encourage this consumer behavior. We set out to examine the most effective ways to encourage positive recycling intentions and behaviors through message framing. We draw on work that indicates that people can construe behaviors in ways that are more concrete or more abstract (e.g., Freitas, Gollwitzer, and Trope 2004; Vallacher and Wegner 1987) and suggest that consumer construal level (concrete vs. abstract) is an important determinant of the success of loss versus gain message framing. We propose this because a match of loss (gain) frames with concrete (abstract) mind-sets leads to greater fluency and perceived efficacy, which ultimately leads to positive recycling outcomes.

The current research makes important contributions, both theoretically and substantively, to the literature. Foremost, we clarify equivocal findings regarding whether loss or gain frames are more efficacious in influencing consumer behavior. We do so by demonstrating the important moderating influence of whether a more concrete or abstract mind-set is activated. In doing so, we extend work on framing effects (e.g., Kahneman and Tversky 1981) to show that loss frames are not always more impactful than gain frames. Second, we extend work that has proposed that high-level construals lead people to exert self-control in ways that favor delayed outcomes over immediate rewards (Fujita et al. 2006). In particular, we show that low-level construals can lead to greater self-control (in the form of recycling now to achieve greater collective outcomes in the future) when they are paired with loss-oriented frames. Third, we highlight a novel mechanism underlying the effects by showing that processing fluency and subsequent perceived efficacy mediate the results. This builds on prior work (e.g., Lee and Aaker 2004; Lee and Labroo 2004) by showing an important downstream consequence of fluency. In particular, subjective ease of processing can lead to perceptions of ease of action, which ultimately result in more positive conservation intentions and behaviors. Fourth, to achieve further understanding of the role of construal levels in moderating framing effects, we manipulate whether a more concrete or abstract mind-set is activated in several ways: by varying the information provided in an advertising appeal, varying temporal construal, and directly manipulating the consumer's mind-set. Finally, we provide a substantive contribution by identifying practical solutions to influencing consumer conservation activities. We do so in both a controlled experimental setting and a real-world context in which we show that subtle experimental manipulations can have an enduring impact on real recycling behaviors.

## CONCEPTUAL OVERVIEW

### *Message Framing and Conservation Behaviors*

One commonly used framework to predict consumer behaviors involves comparing messages that depict positively (or gain) framed messages (i.e., that highlight the positive consequences of engaging in a particular behavior) versus negatively (or loss) framed messages (i.e., that highlight the negative consequences if the behavior is not undertaken)

(e.g., Block and Keller 1995; Maheswaran and Meyers-Levy 1990; Shiv, Edell, and Payne 1997, 2004). Although research often finds evidence for the effectiveness of loss frames (e.g., Kahneman and Tversky 1981; Meyerowitz and Chaiken 1987), there are instances in which positive frames can be particularly influential (Maheswaran and Meyers-Levy 1990). Furthermore, prior work has suggested that loss frames are more persuasive than gain frames only under conditions of high issue involvement (Maheswaran and Meyers-Levy 1990), enhanced depth of processing (Block and Keller 1995), risky implications (Meyers-Levy and Maheswaran 2004), and illness-detecting (vs. illness-preventing) behaviors (Rothman and Salovey 1997).

The research discussed previously has largely examined health intentions and behaviors that are directly relevant for the consumer's own personal outcomes (e.g., neglecting to perform breast self-examination could have direct consequences for a person) rather than collective outcomes (e.g., neglecting to recycle plastics has more general consequences for society). As such, conservation activities such as recycling involve a unique self-control trade-off: In the short run, it would be more convenient for a person to simply discard materials without having to store, organize, and place them out for recycling, but in the long run, recycling positively affects collective well-being. Therefore, a person must engage in inconvenient behaviors that are a cost to the self in the short run to benefit the collective good in the long run. Thus, such behaviors do not fit well into frameworks that highlight consequences only for the individual, such as those that involve risky implications (Meyers-Levy and Maheswaran 2004) or prevention-detection behaviors (Rothman and Salovey 1997). We propose a framework that should not only predict self-oriented behaviors but also be effective in determining more other-oriented behaviors such as recycling.

Work specifically examining the role of framing in influencing prosocial conservation behaviors has produced mixed results. First, negatively framed messages from a personal acquaintance are most effective at influencing actual recycling behaviors (Lord 1994). However, positive frames lead to more favorable attitudes toward curbside recycling (Lord 1994; Obermiller 1995) and water conservation activities (Obermiller 1995). It remains unclear whether (or when) loss frames are more effective than gain frames in encouraging consumer conservation behaviors. Our research intent is to provide insight into this lack of clarity by identifying an important moderator—the mental construal level (or mind-set) embraced by the consumer—that elucidates when loss versus gain frames will be most effective in promoting conservation behaviors.

### *Moderating Role of Construal Level*

As outlined in the preceding section, we propose that one important moderator of when loss versus gain frames will be more effective in influencing consumer recycling is whether the act of recycling is considered at a low versus high level of construal. A low-level construal is more concrete in terms of specific, subordinate, and contextualized features, whereas a high-level construal is more abstract in that it represents events in terms of general, superordinate, and decontextualized features (Liberman and Trope 1998; Trope 1986, 1989). According to construal-level theory, any



action can be viewed at varying levels of abstraction, from low levels, specifying how it is performed, to high levels, specifying why it is performed (Freitas, Gollwitzer, and Trope 2004; Vallacher and Wegner 1987). In the case of conservation behaviors such as recycling, we could think about the behavior in terms of low-level processes and actions (e.g., "I will recycle by saving paper and aluminum cans") or high-level purposes (e.g., "I will recycle to help the environment").

We propose the effect of message framing on conservation intentions and behaviors will be moderated by whether a person is considering the act of recycling in terms of more concrete actions (e.g., "How will I go about recycling?") or high-level purposes (e.g., "Why will I go about recycling?"). We anticipate that a loss-framed message will be particularly effective when paired with a mind-set that engages lower-level, concrete thinking whereas a gain-framed message will be particularly effective when matched with a mind-set that engages high-level, abstract thinking. By their nature, loss frames highlight the negative consequences of not engaging in a particular action, and research shows negative events and states tend to serve as a signal to the person that there is some threat or problem that needs to be addressed (e.g., Baumeister et al. 2001; Schwartz and Bless 1991), which leads to mobilization toward action (Taylor 1991). As such, loss frames should activate lower construal levels, which work well when paired with a mind-set that also activates a more concrete construal level. However, we propose that gain frames will lead to a broader-level reaction. That is, they activate more abstract, distal, and higher-level thinking. Thus, matching gain frame and a high level of construal should activate a similar mode of thinking and lead to more positive recycling intentions and behaviors. In summary, we propose that losses and low-level construals, both of which involve concrete manners of thinking should enable a congruent processing style. Gains paired with high-level construals, both of which are at a higher level of abstraction, should also enable a congruent processing style.

#### *Mechanism Underlying the Effects*

Following from the preceding discussion, we propose that a match with a loss (gain) and more concrete (abstract) thinking will lead to enhanced fluency or ease of understanding and processing meanings (Lee and Aaker 2004; Lee and Labroo 2004). Prior research suggests that the ability to process information fluently can influence consumer evaluations (Lee and Aaker 2004; Lee and Labroo 2004), purchase intentions (Labroo and Lee 2006), and choices (Novemsky, Dhar, and Schwarz 2007). We further extend this research by making the novel prediction that this subjective ease of processing will lead to perceptions of ease of engaging in the act of recycling, or self-efficacy (e.g., Bandura 1977). According to Wood and Bandura (1989, p. 408), "self-efficacy refers to beliefs in one's capabilities to mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands." Perceptions of efficacy have been shown to translate into positive behaviors in numerous domains such as dealing with phobias and anxieties (Bandura, Reese, and Adams 1982), overcoming alcohol and drug abuse (Newcomb and Harlow 1986), and quitting smoking (DiClemente 1981). Further-

more, previous research has shown that people with a strong sense of self-efficacy are more persistent than their low-self-efficacy counterparts in the face of barriers to action (Bandura and Cervone 1983; Bernier and Avaré 1986). We suggest that a match in messaging leads to fluency, which results in greater perceived self-efficacy. Thus, perceptions of ease of processing translate into perceptions of ease of engaging in the behavior, resulting in more positive recycling intentions and behaviors.

#### *Relationship to Prior Research*

We believe that the current framework, though sharing some theoretical similarities with at least two past lines of research, is conceptually distinct. First, Labroo and Patrick (2009) find that positive moods lead to more abstract construals, while negative moods lead to more concrete construals. One possibility, then, is that our manipulation of message framing is simply a proxy for mood. However, evidence suggests that message framing is conceptually distinct from mood. Indeed, research on mood and framing has found mixed results. Wegener, Petty, and Klein (1994) find that people in negative moods are more responsive to loss frames, while those in positive moods are more responsive to gain frames. In contrast, Keller, Lipkus, and Rimer (2003) find that people in positive moods are more persuaded by loss frames, while those in negative moods are more persuaded by gain frames. Thus, we do not simply view loss versus gain framing as a proxy for negative versus positive mood. Moreover, our findings do not support the notion that our effects are due to mood, given the null effects for measures of mood incorporated in our studies.

Second, Lee, Keller, and Sternthal (2010) find that people who are primed with a promotion focus are more likely to construe information at abstract levels, while those primed with a prevention focus are more likely to construe information at concrete levels. Moreover, they find that a match of regulatory focus and construal level leads to more positive attitudes, something that is driven by processing fluency as a result of perceived engagement (i.e., assessed by the items "motivated," "felt right," "felt wrong"). Although this approach has some similarities to the current research, we do not view loss versus gain framing as simply being a proxy for the adoption of a prevention versus promotion focus, respectively. Indeed, prior work has demonstrated that regulatory focus and message framing can be manipulated orthogonally (e.g., Forster, Higgins, and Idson 1998; Lee and Aaker 2004). Furthermore, in our studies, we do not find that regulatory focus moderates or mediates our effects.

#### *The Current Research*

The current studies demonstrate that messages framed as losses (gains) paired with low-level (high-level) construals result in more positive recycling behaviors (Study 1) and intentions (Studies 2 and 3). We begin by demonstrating that a match of loss (gain) frames with concrete (abstract) mind-sets positively influences consumer recycling behaviors in a field experiment (Study 1). In Study 2, we examine our hypotheses in a more controlled laboratory setting and vary temporal construal. Study 3 highlights the mechanism underlying the results by showing that processing fluency and subsequent perceived efficacy mediate these findings.

### STUDY 1

In Study 1, we examine the notion that loss frames are particularly effective when paired with low-level, concrete information whereas gain frames are particularly effective when paired with high-level, abstract information. We manipulated the construal level (concrete “how” vs. abstract “why” messages) of the appeal and the message frame (loss vs. gain), alongside a baseline group, and examined actual consumer behaviors in a city-run recycling program, which were measured at three time intervals. We worked in partnership with the City of Calgary (population of approximately 1.1 million people) in conjunction with its marketing campaign around a newly implemented recycling program. The city allowed us to examine the effect of a marketing message in subsamples in a city neighborhood and worked with us to create appropriate stimuli and measurement protocols. Following from the preceding framework, our key prediction was as follows:

*H<sub>1</sub>*: Compared with those in the baseline condition, consumers presented with (a) a concrete “how” construal in combination with a loss-framed message will exhibit more positive recycling behaviors and (b) an abstract “why” construal in combination with a gain-framed message will exhibit more positive recycling behaviors.

We also examined whether the changes in recycling behaviors, as a result of the marketing messages, persisted over time. If a match with message frame and construal level leads to increases in perceived efficacy, the preceding discussion suggests that a likely consequence is the persistence of these behaviors not only one week but also six months after the implementation of the marketing message.

#### Method

*Participants.* We assigned 390 households in a North American metropolitan neighborhood to one of five conditions (four manipulated conditions and one baseline condition). The sample sizes across conditions ranged from 75 to 81 households.

*Stimuli.* Marketing materials were prepared in partnership with the City of Calgary’s Waste and Recycling services department to ensure that branding elements were consistent with other communications about the recycling program. A two-sided door hanger, printed on recycled paper, was generated. One side of the hanger presented the construal manipulation, which highlighted “the ways (reasons) to make a difference” to vary a focus on how (why) people might recycle. On the reverse side of the hanger was the frame manipulation, which delivered either a loss-framed or gain-framed message (Appendix A). Thus, the materials created four conditions—loss/how, loss/why, gain/how, and gain/why—which we compared with a baseline condition.

*Procedure.* Pairs of trained raters who were blind to the hypotheses and condition conducted household-level measurement for each of the five conditions. They took ratings of recycling behaviors three times. The initial measurement provided a baseline of behavior at Time 1 (T1), before distribution of the marketing materials (i.e., our manipulation). The following week, door hangers were delivered to each randomly assigned subsection of the neighborhood (loss/how, gain/how, loss/why, and gain/why), while the baseline condition received no message. During the third week, the

raters took Time 2 (T2) measurements. Finally, the raters took the same measurements again six months after the preliminary ratings (T3).

At all three times, raters were provided with a detailed coding manual and training on the measures in advance of completing their ratings. The five sections were divided between two pairs of raters: One pair completed three sections, and the other pair completed two sections. When raters disagreed on a score, they discussed their differences and came to an agreement.

*Measures.* At all three times, the raters took the same measures. They evaluated whether the household participated by placing their bin out with materials in it to be collected (0 = no, 1 = yes; see Schultz 1999). Furthermore, the raters measured bin volume using a measuring stick that was the precise height of the bin. Then, they recorded the height of the materials on a 1–20 scale. This height measurement was used to calculate the actual volume of recycled materials (using a volume calculator for a pyramid with rectangular base), according to the dimensions of the standardized bin (the maximum volume was 201,543.73 cm). They evaluated the variety of materials by totaling the number of categories of materials that raters observed inside the bin according to the categories the city identified (from 1 to 5; plastic, paper/cardboard, glass, metal, and beverage containers). Finally, raters took a measure of following instructions, which was of particular concern to the City of Calgary. Raters recorded whether the cart was located correctly (0 = incorrect, 1 = correct), the lid was closed properly (0 = incorrect, 1 = correct), and the cart had sufficient space around it to permit the truck to access it (0 = incorrect, 1 = correct). The raters summed these three measures to create an index of following instructions. Finally, we recorded the square footage of each household. We assumed this measure would serve as a proxy for both income and the number of members in a household and used this as a covariate in the analyses. All our rating measures showed excellent inter-rater reliability at all time points (see Table 1). We achieved between-pair reliability by having all raters evaluate a small subset of 16 households on all measures, which also demonstrated excellent reliability.

#### Results

*Recycling participation between T1 and T2.* The raters coded participation by household over time as follows: participation decreased over time (–1: participation occurred at T1 but not at T2), remained consistent over time (0: no participation at both time points, or participation at both time points), or increased over time (1: no participation at T1 and participation at T2; see Hoegg and Cooke 2009). A one-way analysis of covariance (ANCOVA) using condition to predict participation, controlling for household square footage, revealed a significant main effect ( $F(4, 381) = 4.20, p < .01$ ). Planned contrasts revealed that people in the loss/how condition ( $M = .20$ ) exhibited significantly greater participation over time than those in the baseline condition ( $M = -.027; t(381) = 3.00, p < .01$ ). People in the gain/why condition exhibited greater participation over time than those in the baseline condition ( $M = .16; t(381) = 1.99, p < .05$ ). The loss/why ( $M = .11; t(381) = 1.70, p < .09$ ) and the gain/how ( $M = -.05; t(381) = 1.03$ , not significant [n.s.]) conditions

Table 1  
RECYCLING PARTICIPATION, VOLUME, VARIETY, AND FOLLOWING INSTRUCTIONS AND A FUNCTION OF EXPERIMENTAL  
CONDITION (STUDY 1)

A: T2 – T1 Differences								
Condition	Participation M (Cohen's d)	$\kappa$	Volume M (Cohen's d)	$\alpha$	Variety M (Cohen's d)	$\alpha$	Instructions M (d)	$\alpha$
Loss/how	.20** (.31)	.97***	28,799.14** (.30)	1	.545** (.27)	1	.54** (.25)	1
Gain/why	.16* (.20)	1***	17,091.88* (.21)	.99	.533* (.26)	1.0	.48* (.23)	1
Loss/why	.11 (.17)	.95***	12,481.14 (.26)	.98	.381 (.19)	.97	.36 (.17)	.97
Gain/how	-.05 (.11)	1***	3006.66 (.04)	1	.001 (.04)	1	-.19 (.10)	1
Baseline	-.27	.96***	-7777.87	1	-.091	.99	-.03	1
B: T3 – T1 Differences								
Condition	Participation M (Cohen's d)	$\kappa$	Volume M (Cohen's d)	$\alpha$	Variety M (Cohen's d)	$\alpha$	Instructions M (d)	$\alpha$
Loss/how	.16** (.35)	.99***	2382.43* (.26)	.99	.467** (.31)**	1	.40** (.30)	1
Gain/why	.07* (.25)	1***	18,085.62* (.23)	.99	.342* (.25)*	.98	.20* (.22)	1
Loss/why	.00* (.16)	.96***	8627.49 (.16)	.98	-.205 (.06)	.99	.03 (.16)	1
Gain/how	-.10 (.50)	1***	3006.66 (.11)	1	-.138 (.08)	.98	-.34 (.02)	1
Baseline	-.14	.96***	-1435.11	1	-.367	.97	-.41	1

\* $p < .05$ , as compared with the baseline condition.

\*\* $p < .01$ , as compared with the baseline condition.

\*\*\* $p < .001$ , as compared with the baseline condition.

Notes: Cohen's d represents the effect size of the comparison against the baseline group. Cohen's kappa represents within-pair interrater reliability for categorical variables, and Cronbach's alpha represents within-pair interrater reliability for continuous variables. Participation is coded as -1 (decrease over time), 0 (constant over time), and 1 (increase over time). Volume is reported in centimeters cubed. Variety is recorded on a 1–5 scale, and following instructions is reported on a 1–3 scale.

did not significantly differ from the baseline group (refer to Table 1).

*Recycling volume between T1 and T2.* To examine the effect of condition across the pre- and posttest measures of recycling volume, we conducted a 5 (condition)  $\times$  2 (time: T1 vs. T2) mixed-model ANCOVA, using time as the repeated measure and controlling for square footage of the household. The results revealed the anticipated significant two-way interaction ( $F(4, 381) = 2.44, p < .05$ ). Examination of the differences across time in each condition indicated that the loss/how ( $t(381) = 2.63, p < .01$ ) and gain/why ( $t(381) = 1.97, p < .05$ ) conditions reflected significant improvement in recycling volumes over time, while the loss/why ( $t(381) = 1.73, p < .09$ ), gain/how ( $t(381) = -.42$ , n.s.), and baseline ( $t(381) = 1.65, p > .10$ ) conditions did not result in significant changes in recycling volumes over time.

To examine relative improvement in recycling volume in our manipulated conditions compared with the baseline condition, we calculated a difference score (T2 – T1 volume). As anticipated, people in the loss/how condition recycled a significantly greater volume across time ( $M = 28,766.14 \text{ cm}^3$ ) than those in the baseline condition ( $M = -7,777.87 \text{ cm}^3$ ;  $t(381) = 2.92, p < .01$ ). In addition, those in the gain/why condition exhibited greater recycling volume over time ( $M = 17,091.88 \text{ cm}^3$ ) than the baseline group ( $t(381) = 1.99, p < .05$ ). The loss/why ( $M = 12,481.14 \text{ cm}^3$ ;  $t(381) = 1.61, p > .10$ ) and the gain/how ( $M = 3006.66 \text{ cm}^3$ ;  $t(381) = .86$ , n.s.) conditions did not significantly differ from the baseline group.

*Recycling variety between T1 and T2.* To examine the effect of condition across the pre- and posttest measures of recycling variety, we conducted a 5 (condition)  $\times$  2 (time: T1 vs. T2) mixed-model ANCOVA, controlling for square footage. The results revealed the anticipated significant two-way interaction ( $F(4, 381) = 3.04, p < .01$ ). Examination

of the differences across time in each condition indicated that, as predicted, the loss/how ( $t(381) = 2.58, p < .05$ ) and gain/why ( $t(381) = 2.78, p < .05$ ) conditions reflected a significant improvement in recycling variety over time. In addition, the loss/why condition reflected significant improvement in recycling variety over time ( $t(381) = 2.54, p > .05$ ). The gain/how ( $t(381) = .17$ , n.s.) and baseline ( $t(381) = 1.36$ , n.s.) conditions did not result in significant changes in recycling variety over time.

To examine relative improvement in recycling variety in our manipulated conditions as compared with the baseline condition, we calculated a difference score (T2 – T1 variety). As anticipated, those in the loss/how condition recycled a significantly greater variety of materials across time ( $M = .55$ ) than did those in the baseline condition ( $M = -.09$ ;  $t(381) = 2.64, p < .01$ ). Moreover, those in the gain/why condition exhibited greater recycling variety over time ( $M = .53$ ) than the baseline group ( $t(381) = 2.56, p < .05$ ). The loss/why group ( $M = .38$ ;  $t(381) = 1.93, p < .06$ ) exhibited a marginal increase in recycling variety over time. The gain/how group ( $M = .001$ ) did not differ from the baseline group ( $t(381) = .41$ , n.s.).

*Following instructions between T1 and T2.* A 5 (condition)  $\times$  2 (time: T1 vs. T2) mixed-model ANCOVA on the following instructions index revealed a significant two-way interaction ( $F(4, 381) = 3.71, p < .01$ ). Examination of the differences across time within each condition indicated that, as we predicted, the loss/how ( $t(381) = 2.89, p < .01$ ) and gain/why ( $t(381) = 2.35, p < .05$ ) conditions reflected significant improvement in following instructions over time. The loss/why condition also reflected significant improvement in following instructions over time ( $t(381) = 2.70, p < .01$ ). The gain/how ( $t(381) = .82$ , n.s.) and baseline ( $t(381) = 1.27$ , n.s.) conditions did not result in significant changes in following instructions over time.



To examine relative improvement in following instructions over time, we calculated a difference score ( $T2 - T1$ ). People in the loss/how condition ( $M = .53$ ) showed greater improvement in following instructions than did those in the baseline condition ( $M = -.03$ ;  $t(381) = 2.44, p < .05$ ). Moreover, those in the gain/why condition exhibited improvement in following instructions over time ( $M = .48$ ;  $t(381) = 2.22, p < .05$ ). The loss/why ( $M = .36$ ;  $t(381) = 1.68, p < .09$ ) and gain/how ( $M = -.19$ ;  $t(381) = .94, n.s.$ ) conditions did not differ from the baseline group.

**Recycling behaviors at Time 3.** To examine whether the changes in participation were maintained over a longer time period, we used the same analyses we used for Times 1 and 2 for Time 3 (T3) across all recycling behaviors. Specifically, we contrasted differences for T1 and T3 for recycling participation, volume, variety, and following instructions. The results for these analyses mirrored those obtained at the T2 measurement (for specific means and tests of significance, see Table 1). Importantly, the key conditions of loss/how and gain/why maintained significant improvements over the baseline for volume, variety, and instruction measures, while the other conditions did not (see Table 1 and Figure 1). For recycling participation, people in the loss/how and gain/why conditions exhibited greater participation over time than those in the baseline condition, as did those in the loss/why condition. For this variable, the gain/how condition did not significantly differ from the baseline group.

### Discussion

Study 1 provides support for our matching hypothesis with actual consumer recycling behaviors. Matching frame with mind-set (e.g., loss with how, gain with why) yields the most substantive improvements in consumer recycling across our measures of participation, volume, variety, and following instructions, as compared with the baseline. This was true one week after the implementation of the marketing message, and the effects were maintained six months later. It is particularly telling that we found behavioral support for our theoretical framework given that consumers must filter through a considerable amount of promotional

clutter each day, especially given the T1–T3 delay. That the expected results were achieved by our manipulation, delivered on a single occasion among competing messages, and were maintained over time demonstrates the value of this approach.

One noteworthy result that emerged in Study 1 is the finding that the loss/why condition exhibited marginal to significant effects on the measures of actual recycling behaviors at T2. However, this combination did not seem to be as effective as the loss/how or the gain/why conditions in influencing recycling, particularly when considering the T3 results. Some research indicates evidence for a negativity bias, wherein people more heavily weight negative rather than positive aspects of information (Rozin and Royzman 2001; Tversky and Kahneman 1981). However, our findings suggest that in the long run, matching frame (both positive and negative) with construal level can lead to more positive recycling behaviors.

### STUDY 2

In Study 1, we find behavioral support for the notion that loss (gain) frames are more effective when paired with low-level, concrete (high-level, abstract) marketing appeals. We use Study 2 to extend our results in a controlled laboratory setting using a different framing manipulation. This enables us to be more confident that it is framing per se that is important and not the particular execution of the frame used in Study 1 driving the effects. In addition, we manipulated construal level by varying temporal construal. According to temporal construal theory (Liberman and Trope 1998), more distant future events are construed in terms of high-level features, whereas more proximal future events are construed in terms of low-level features. Researchers have shown that temporal orientation (whether the focus is on short- or long-term goals and events) can also activate concrete versus abstract mind-sets, respectively (Forster, Friedman, and Liberman 2004; Wakslak et al. 2008). Accordingly, we propose that combining proximal (distal) temporal information with a loss (gain) will lead to more positive recycling intentions:

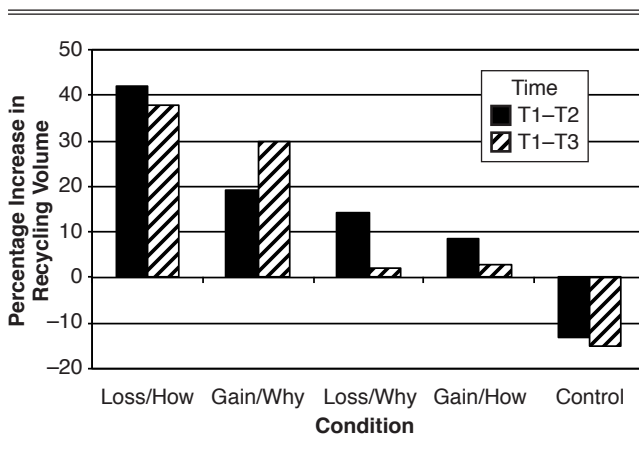
- H<sub>2</sub>: When exposed to (a) a proximal temporal construal, consumers will report greater recycling intentions in response to a loss-framed than a gain-framed message, and (b) a distal temporal construal, consumers will report greater recycling intentions in response to a gain-framed than a loss-framed message.

### Method

One hundred nineteen undergraduate students took part in a 2 (message frame: loss vs. gain)  $\times$  2 (temporal construal: proximal vs. distant) between-subjects experimental design. Participants were led to believe they were looking at marketing materials regarding their city's new recycling program, and they viewed an advertising proof from the City of Calgary. In the temporally proximal condition, participants read, "Recycle for a better Calgary Today," and in the temporally distant condition, participants read, "Recycle for a better Calgary Tomorrow." A pretest confirmed that this led to more proximal versus distal thoughts, respectively.

The manipulation of message frame either highlighted a gain-framed ("Think about *what will be gained* if you recycle") or a loss-framed: ("Think about *what will be lost* if you don't recycle") message. The dependent measure was

Figure 1  
PERCENTAGE INCREASE IN RECYCLING VOLUME BETWEEN  
TIMES 1 AND 2 AND TIMES 1 AND 3 (STUDY 1)



participants' recycling intentions (see Appendix B). We adapted the intention items from White and Peloza (2009) and averaged them to create a recycling intentions index ( $\alpha = .914$ ). Participants also completed manipulation checks for framing and temporal construal (Appendix B). In addition, we wanted to test regulatory focus (e.g., Lee, Keller, and Sternthal 2010) as an underlying mechanism and had participants complete an individual measure to assess prevention ( $\alpha = .78$ ) and promotion ( $\alpha = .87$ ) focus (Lockwood, Jordan, and Kunda 2002). Finally, participants completed demographic measures and a suspicion probe. The demographic variables did not predict or interact with other independent variables to predict significant variance in the dependent variable. Participants were not aware of the experimental hypotheses in this or any of the subsequent studies.

### Results and Discussion

**Manipulation checks.** A 2 (message frame: loss vs. gain)  $\times$  2 (temporal construal: proximal vs. distant) analysis of variance (ANOVA) on the loss frame manipulation check item revealed only a main effect for message frame ( $M_{\text{loss}} = 4.21$ , and  $M_{\text{gain}} = 2.50$ ;  $F(1, 116) = 23.88$ ,  $p < .001$ ). Similar analysis on the gain frame manipulation check also revealed only a main effect for message frame ( $M_{\text{loss}} = 3.50$ , and  $M_{\text{gain}} = 4.41$ ;  $F(1, 116) = 11.31$ ,  $p < .05$ ). A 2 (message frame: loss vs. gain)  $\times$  2 (temporal construal: proximal vs. distant) ANOVA on the distant temporal construal manipulation check item revealed only a main effect for temporal construal ( $M_{\text{distant}} = 4.92$ , and  $M_{\text{proximal}} = 3.95$ ;  $F(1, 116) = 6.76$ ,  $p < .05$ ). An ANOVA on the proximal manipulation check item revealed only a main effect for temporal construal ( $M_{\text{distant}} = 3.83$ , and  $M_{\text{proximal}} = 4.93$ ;  $F(1, 116) = 11.31$ ,  $p < .05$ ). Examination of the construal-level index revealed that participants reported more abstract thoughts when the temporal construal was distant ( $M = 2.58$ ) than proximal ( $M = .57$ ;  $F(1, 116) = 6.56$ ,  $p < .05$ ). Moreover, participants reported marginally more abstract thoughts in response to gain ( $M = 2.15$ ) than loss ( $M = .88$ ) frames ( $F(1, 116) = 3.01$ ,  $p < .09$ ). Thus, the manipulations of message frame and temporal construal were successful.

**Recycling intentions.** A 2 (message frame: loss vs. gain)  $\times$  2 (temporal construal: proximal vs. distant) ANOVA on intentions revealed the predicted interaction ( $F(1, 116) = 9.88$ ,  $p < .01$ ). When temporal construal was more proximal, participants reported more positive recycling intentions in response to the loss frame ( $M = 6.40$ ) than the gain frame ( $M = 5.76$ ;  $t(116) = 2.29$ ,  $p < .05$ ). When temporal construal was distant, participants reported more positive recycling intentions in response to the gain frame ( $M = 6.30$ ) than the loss frame ( $M = 5.60$ ;  $t(116) = 2.26$ ,  $p < .05$ ). The main effects for message frame ( $F(1, 116) = .02$ , n.s.) and temporal construal ( $F(1, 116) = .37$ , n.s.) did not reach significance. Figure 2 presents the results.

We also examined the potential moderating role of regulatory focus. If our effects are driven by regulatory focus, we might expect an interaction between regulatory focus and construal level to predict recycling intentions or a three-way interaction between construal level, framing, and regulatory focus. Using linear regression, we entered framing, construal level, and the mean-centered prevention-focus index and all the interaction terms as predictors of recycling intentions. No interactions with prevention focus emerged

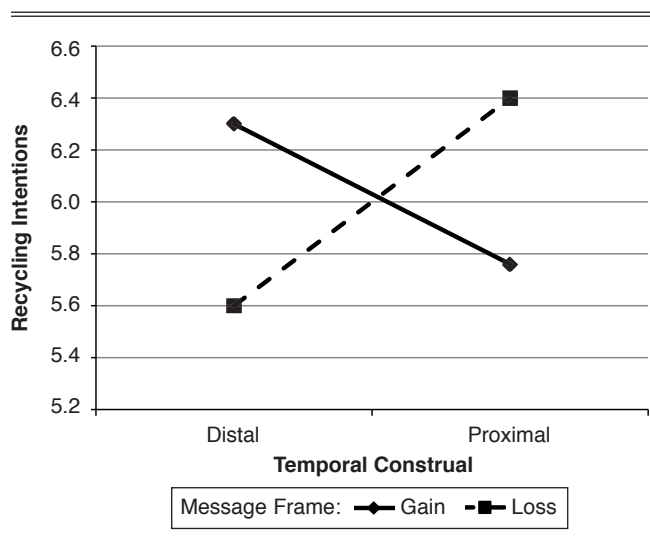
(all  $ps > .40$ ). A similar analysis using the mean-centered promotion-focus index, framing, construal level, and all the interaction terms as predictors also revealed no significant interactions with promotion focus (all  $ps > .80$ ). We also note that our manipulations did not predict any main effects or interactions using prevention or promotion foci as dependent variables (all  $ps > .20$ ).

Taken together with the results from Study 1, Study 2 suggests that loss (gain) frames work best when the consumer activates a mind-set at a low (high) level of abstraction. This was the case using different executions of the message frame manipulation and when manipulating construal level by varying the information in an advertising appeal (Study 1) and varying temporal construal (Study 2). The findings suggest that both loss and gain frames can be efficacious in influencing consumer recycling intentions and behaviors and the consumer's mind-set (i.e., concrete versus abstract) determines which message frame will be most effective. The current study suggests that the effects do not seem to be related to regulatory focus; therefore, in the next study, we turn to highlighting the process underlying our effects.

### STUDY 3

The results of the previous studies provide evidence for our matching hypothesis wherein matching a loss frame with concrete information and a gain frame with abstract information are particularly effective in influencing recycling behaviors and intentions. The goal of Study 3 is to further highlight the mechanism driving these effects. As discussed in detail previously, we believe that a pairing of a loss (gain) frame with a more concrete (abstract) mind-set will lead to enhanced fluency or ease of understanding and processing meanings (Lee and Aaker 2004). We explicitly test this processing account in Study 3 and propose that a match between message frame (loss/how and gain/why) leads to enhanced processing fluency. A potential outcome of enhanced processing fluency is a feeling of ease, which

Figure 2  
THE INFLUENCE OF MESSAGE FRAME AND TEMPORAL  
CONSTRUAL ON RECYCLING INTENTIONS (STUDY 2)



in turn may lead to enhanced self-efficacy (i.e., the belief that the self is capable of performing in a certain manner to attain a particular goal; Bandura 1977). Such feelings of efficacy may then lead to greater recycling intentions and behaviors. Thus:

H<sub>3</sub>: The benefit of a match between message frame and advertising appeal (loss/how and gain/why) on recycling intentions is mediated by a processing fluency to efficacy pathway (interaction → processing fluency → efficacy → recycling intentions).

Finally, we wanted to rule out the role of other variables as potential explanations for our effects. We measure and test the role of involvement and mood (Labroo and Patrick 2009) and again examine regulatory focus (Monga and Zhu 2005) as competing mechanisms that underlie the relationships identified. In addition to the possibility that regulatory focus may account for our findings (as discussed previously), it may be that a match of message frame with construal level leads to greater involvement, which then leads to more positive recycling intentions. Given that previous research has shown that positive moods are associated with more abstract thinking (Patrick and Labroo 2009), we also wanted to rule out mood as a potential explanation for our findings.

### Method

One hundred seven undergraduate students took part in a 2 (message frame: loss vs. gain) × 2 (appeal type: how vs. why) between-subjects experimental design. In this study, participants viewed one of the loss/how, loss/why, gain/how, or gain/why versions of the marketing materials used in Study 1. We included the same measures of recycling intentions ( $\alpha = .921$ ) and manipulation check items for message frame used in Study 2. In addition, participants completed a measure of processing fluency (“difficult to process/easy to process,” “difficult to understand/easy to understand,” and “difficult to comprehend/easy to comprehend”;  $\alpha = .94$ ; Lee and Aaker 2004) and a measure of perceived efficacy (“I feel that by recycling I can make a difference,” “I feel that I know how to go about recycling,” and “I believe that I know what steps I will take to recycle”;  $\alpha = .84$ ). Next, participants completed measures of message involvement (“not at all involved/very involved,” “skimmed it quickly/read it carefully,” and “paid little attention/paid a lot of attention”;  $\alpha = .89$ ; Lee and Aaker 2004), positive moods (e.g., happy, pleased, enthusiastic;  $\alpha = .90$ ), and negative moods (e.g., sad, upset, disappointed;  $\alpha = .91$ ). Finally, participants reported whether they experienced more of a prevention focus (“I am focused on preventing negative outcomes,” “I am motivated to avoid negative outcomes,” and “I am motivated to prevent being a failure”;  $\alpha = .71$ ) or a promotion focus (“I am focused on achieving positive outcomes,” “I am motivated to attain positive outcomes,” and “I am motivated to be a success”;  $\alpha = .76$ ).

### Results

**Manipulation check.** A 2 (message frame: loss vs. gain) × 2 (appeal type: how vs. why) ANOVA on the loss frame manipulation check item revealed only a main effect for message frame ( $M_{\text{loss}} = 5.89$ , and  $M_{\text{gain}} = 3.85$ ;  $F(1, 104) = 39.45$ ,  $p < .001$ ). Similar analysis on the gain frame manipulation

check also revealed only a main effect for message frame ( $M_{\text{loss}} = 4.48$ , and  $M_{\text{gain}} = 5.50$ ;  $F(1, 104) = 9.51$ ,  $p < .01$ ).

**Recycling intentions.** A 2 (message frame: loss vs. gain) × 2 (appeal type: how vs. why) ANOVA on recycling intentions revealed the predicted interaction ( $F(1, 104) = 8.96$ ,  $p < .01$ ). As we anticipated, when presented with a “how” appeal, participants reported more positive recycling intentions in response to the loss frame ( $M = 6.54$ ) than the gain frame ( $M = 5.96$ ;  $t(104) = 2.07$ ,  $p < .05$ ). When presented with a “why” appeal, participants reported more positive recycling intentions in response to the gain frame ( $M = 6.49$ ) than in response to the loss frame ( $M = 5.78$ ;  $t(104) = 2.54$ ,  $p < .05$ ; see Figure 3). The main effects for both message frame ( $F(1, 104) = .09$ , n.s.) and appeal type ( $F(1, 104) = .27$ , n.s.) did not reach significance.

### The Mediatorial Role of Processing Fluency and Perceived Efficacy

We propose that the interaction between frame and appeal type is mediated by fluency to predict efficacy and that, in turn, efficacy mediates the effect of fluency on recycling intentions. We used structural equation modeling to test for mediation (Iacobucci, Saldanha, and Deng 2007; Wu and Zumbo 2007; see also White and Willness 2009). The model in Figure 4 depicts our predicted mediated moderation effect (Baron and Kenny 1986), whereby the indirect effect of the interaction (between message frame and appeal type) on recycling intentions is mediated by fluency and, in turn, perceived efficacy. The model exhibited excellent fit (comparative fit index = .987, goodness-of-fit index = .990, normed fit index = .982, root mean square residual = .025, and consistent Akaike information criterion = 116.79).

When we examined the model without the inclusion of the mediators, we found that the relationship between the interaction term and recycling intentions was statistically significant ( $\beta = .45$ ,  $p < .01$ ). When we included the mediators in the model, the interaction term significantly predicted fluency ( $\beta = .28$ ,  $p < .05$ ), which in turn predicted

Figure 3  
THE INFLUENCE OF MESSAGE FRAME AND ADVERTISING APPEAL ON RECYCLING INTENTIONS (STUDY 3)

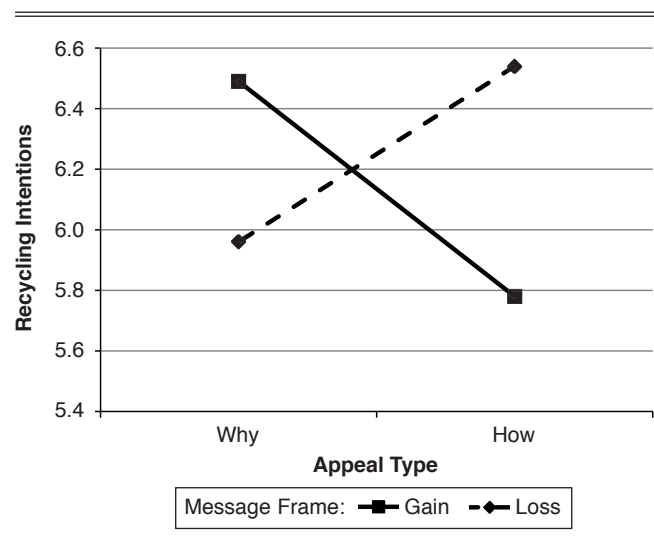
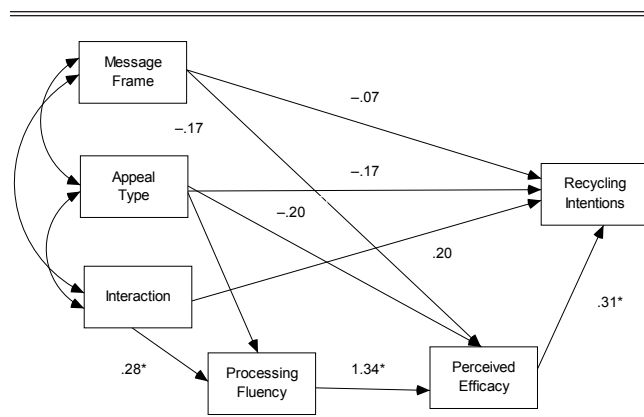




Figure 4  
MEDIATED MODERATION MODEL (STUDY 3)



\*The path is statistically significant at least  $p < .05$ .

Notes: In estimating the model, we predicted a mediated moderation effect (Baron and Kenny 1986). As such, we allowed the main effects for both message frame and appeal type to predict recycling intentions both directly and indirectly through the proposed mediators (Wu and Zumbo 2007).

perceived efficacy ( $\beta = 1.14, p < .05$ ), which predicted recycling intentions ( $\beta = .31, p < .05$ ). Furthermore, including the mediators in the model led the original relationship between the interaction term and recycling intentions to fall from significance ( $\beta = .20, p > .16$ ). Thus, as we predicted in  $H_4$ , the indirect effect of the interaction (between message frame and advertising appeal) on recycling intentions was mediated by a processing fluency  $\rightarrow$  perceived efficacy pathway. We also examined the pathway by conducting two Sobel tests. The indirect effect of the interaction term on efficacy by means of fluency was significant ( $z = 2.05, p < .05$ ), and the indirect effect of fluency on recycling intentions by means of efficacy was significant ( $z = 2.27, p < .04$ ; Baron and Kenny 1986; Sobel 1982).

We also tested other potential models. A model in which the interaction between message frame and advertising appeal on intentions was mediated by an efficacy  $\rightarrow$  fluency pathway was not a viable alternative model. In particular, when we define the model in this way, the perceived efficacy to processing fluency link was not statistically significant ( $p = .12$ ). However, we also examined the interaction  $\rightarrow$  fluency  $\rightarrow$  intentions  $\rightarrow$  efficacy pathway. This model also exhibited excellent fit (comparative fit index = .990, goodness-of-fit index = .992, normed fit index = .985; root mean square residual = .022, and consistent Akaike information criterion = 116.20). In addition, the mediation analysis (conducted as previously mentioned with our proposed model) showed that the fluency  $\rightarrow$  intentions pathway also mediated the indirect effect of the interaction (between message framing and construal level) on efficacy as an outcome.

We also considered consumer involvement, positive mood, and negative mood as potential mediators of the effects. In all cases, the interaction between message frame and appeal type did not significantly predict the potential mediator: involvement ( $F(1, 104) = .98, n.s.$ ), positive mood ( $F(1, 104) = .28, n.s.$ ), and negative mood ( $F(1, 104) = .76, n.s.$ ). In addition, the interaction between message frame and appeal type did not significantly predict prevention ( $F(1, 104) = .01, n.s.$ ) or promotion ( $F(1, 104) = .19, n.s.$ ) focus.

## Discussion

The results of Study 3 shed light on the process underlying the effects. The findings suggest that the mechanism underlying our matching effect, in which a match of loss/concrete and gain/abstract lead to favorable intentions, is related to both processing fluency and perceived efficacy. That is, a match in terms of message frame and appeal type leads to enhanced subjective ease of processing, which in turn predicts enhanced perceptions of efficacy and subsequent increases in positive recycling intentions. This is a novel finding, showing that ease of processing can lead to enhanced perceptions of ease of doing. Other potential mediators such as involvement, mood, and regulatory focus did not readily account for the results. However, it is noteworthy that one alternative model also could account for our findings. In particular, an interaction  $\rightarrow$  fluency  $\rightarrow$  recycling intentions  $\rightarrow$  efficacy pathway also seemed to be an acceptable model to explain the results. It may be that efficacy leads to intentions, or it may be that forming an intention can enhance efficacy. We return to this issue in the next section.

## GENERAL DISCUSSION

Across three experiments, this research highlights the conditions under which consumers will be more (or less) likely to report positive intentions toward recycling and actually engage in recycling behavior. Providing support for our matching hypothesis, we show a strong interplay between message framing and the consumer's construal-level mind-set. Our results indicate that a message framed as a negative loss (rather than a positive gain) matched with a more concrete mind-set produces more positive consumer recycling intentions and behaviors. Furthermore, we find that a message framed as a gain matched with a more abstract mind-set is also highly effective in fostering consumer action. We show this effect by manipulating whether a more concrete or abstract mind-set is activated in several different ways—varying the information provided in an advertising appeal, manipulating temporal construal, and varying the consumer's mind-set.

## Theoretical Implications of the Research

Importantly, this research also provides a deeper understanding of how a specific match in message framing and construal level provides the identified benefits. We highlight a novel mechanism underlying the effects by showing that processing fluency and perceived efficacy motivate the effects. This builds on prior work (e.g., Lee and Aaker 2004) by showing an important downstream consequence of fluency. In particular, subjective ease of processing can lead to perceptions of ease of action and greater willingness to engage in recycling. Consumers seem to have an easier time with the matched promotional message and, in turn, feel more confidence in their abilities to meet the call to action that has been made with respect to recycling behaviors.

Our a priori prediction was that the interaction between message frame and construal level would predict fluency, which would predict efficacy, which would then predict recycling intentions. We found evidence for the acceptability of such a model. However, an alternative model also could account for our findings. In Study 3, an interaction  $\rightarrow$  fluency  $\rightarrow$  recycling intentions  $\rightarrow$  efficacy pathway also is a reasonable model. This result is indeed significant because



it may be that efficacy leads to intentions, or it may be that forming an intention to act can subsequently enhance efficacy. We prefer the former model because of the intuitive fit between ease of processing and ease of doing (i.e., efficacy), which could in turn lead to actual recycling intentions. However, processing fluency can also lead to more favorable attitudes (Lee and Labroo 2004), and as such, the fluency  $\rightarrow$  recycling intentions pathway is a reasonable proposition. Certainly, this is something for researchers to consider in the future.

An additional theoretical issue that arises in the current research of whether our framing manipulation is simply a proxy for prevention–promotion focus. Indeed, past research has shown that gain frames can be more influential when a promotion focus is adopted and loss frames can be more influential when a prevention focus is adopted (Cesario, Grant, and Higgins 2004). However, our results suggest that framing can have effects apart from regulatory focus, given that regulatory focus did not have any mediating or moderating effects. More in-depth examination of the nature of our framing effects would be an interesting direction for further research, which we also discuss in the section “Directions for Further Research.”

#### *Actionable Implications of the Research*

We provide a substantive applied contribution by identifying practical solutions to influencing consumer conservation activities. Marketers wanting to influence conservation behaviors would do well to ensure a match with frame and construal level. Our field experiment, conducted in a large metropolitan city in conjunction with civic public works, indicates behavioral support for our theoretical framework. Importantly, six months after the manipulations took place, the loss/how and gain/why messages maintained their positive effects on recycling behaviors relative to the baseline group. That the expected results were achieved and maintained over a substantial time period, in response to a manipulation that was delivered on a single occasion, points to the potential value of this approach.

An additional practical implication of the current research lies in our findings from Study 2. If marketers want to influence consumer behaviors that are to occur in the near future, appeals that focus on losses are likely to be effective. In contrast, if the behavior is to occur in the distant future, appeals that focus on gains will likely be more effective. That is, if the marketer is constrained by timing, a match of frame with temporal construal is likely to be a successful persuasion strategy.

#### *Directions for Further Research*

Our investigation provides seed for several research opportunities. One remaining question is this: What is it about loss versus gain frames that drives our effects? It seems that regulatory focus (e.g., Lee, Keller, and Sternthal 2010) did not play a moderating (Study 2) or mediating (Study 3) role in the current studies, but researchers could further examine the nature of the framing effects demonstrated in the current studies. The way we operationalize the framing manipulation in the current studies enhances external validity given that these are the types of frames marketers commonly use. However, the frames used in the current studies confound valence quality and motivational

anchor (see also Brendl, Higgins, and Lemm 1995). “Valence quality” refers to the positivity–negativity of the frame. In our case, the loss frames are negatively valenced and the gain frames are positively valenced. “Motivational anchor” refers to whether the frame is positioned around preventing negative or promoting positive outcomes. Thus, our loss frames are prevention focused and our gain frames are promotion focused. One direction researchers could take is to disentangle the respective effects of valence quality and motivational anchor. Research in our lab has begun to examine this issue by orthogonally manipulating valence quality and motivational anchor (e.g., Brendl, Higgins, and Lemm 1995; Monga and Zhu 2005). Using a 2 (valence quality: negative vs. positive)  $\times$  2 (motivational anchor: prevention vs. promotion)  $\times$  2 (mind-set: concrete vs. abstract) between-subjects experimental design ( $n = 188$ ), we found that while valence significantly interacted with mind-set in expected ways to predict recycling intentions, motivational anchor (prevention vs. promotion) did not. Importantly, our effects were driven by the same meditational pathway shown in Study 3. Although this is preliminary work, it would be interesting to further examine the driver of our matching effects.

Given the important role of efficacy in this research, it would also be useful to investigate other means of enhancing consumer efficacy with respect to conservation promotions. For example, would influencing consumer perceptions of barriers toward recycling moderate our results (e.g., Lindsay and Strathman 1997)? In addition, would the effects of loss frames be enhanced by increasing the perceived severity of consequences of failure to recycle? Or would a more moderate degree of severity be most effective, as the fear appeals literature would suggest (Ray and Wilkie 1970)? Further research could examine these possibilities.

Another potential direction for further research lies in the examination of the downstream consequences of positive consumer recycling behaviors. In particular, some recent research has shown that when people engage in environmentally friendly consumption, they subsequently act in selfish and irresponsible ways because ethical consumption gives them “license” to do so (Mazar and Zhong 2010). A question is whether similar effects arise in the domain of recycling (“If I recycle, does that give me license to engage in other ethically irresponsible behaviors such as turning up the thermostat or generating more garbage in other ways?”) However, it seems equally likely that people may have engaged in other environmentally friendly behaviors to be congruent. Moreover, consumers may not have increased garbage production given that they would have to increase consumption to simultaneously increase garbage and recycling. It seems likely, then, that garbage volumes would also have been reduced in our sample, though we did not measure this. Further research could examine such possibilities.

In addition, an issue that arose in our field study was that although the loss/why condition led to positive recycling behaviors immediately after the manipulation (one week after the implementation of the intervention), this effect did not persist over longer periods of time (six weeks after the implementation of the intervention). A possibility is that the loss framing works well when people are considering (and acting) in more proximal circumstances, which Study 2 corroborates. Another possibility is that that loss framing in

general increases attention, and therefore people become more ready to act in the moment. In contrast, because a match (loss/how or gain/why) increases efficacy, it acts through a more motivational route and not simply attention to information, thus leading to more persistent outcomes over time. This is another promising research avenue.

Our investigation focused on behaviors with which consumers were fairly familiar, but it would be useful to examine the effectiveness of this matching strategy for relatively unfamiliar behaviors (e.g., organic composting). It also

seems likely that matching message frame with mind-set would be effective in encouraging other positive consumer behaviors, such as charity donation, purchasing fair-trade products, and so on. In addition, investigation is warranted into the efficacy of our matching hypothesis for reducing undesirable consumer behaviors such as littering, drinking and driving, and eating unhealthy foods. The current research is an important first step toward showing that it is not just the message framing but also the consumer's mind-set that is important when the message is considered.

## Appendix A

### EXPERIMENTAL MATERIALS (STUDIES 1 AND 3)

#### *A: Loss/How Version*

### Think about what will be lost in our community if we don't keep recycling.

- By not participating in the Blue Cart program, **we waste over 60,000 tonnes of paper** – the equivalent of **1.68 billion litres of water every year**.
- If we don't recycle, **we will lose over 10,000 school buses full of plastic** every year to the landfills.
- If Calgarians fail to recycle with the Blue Cart program, **we will lose over one million trees each year**.
- If we don't use materials more than once, **we will not conserve our natural resources**.

see over



blue cart  
recycling



Protecting what's precious.  
Land. Air. Water.



THE CITY OF  
**CALGARY**  
WASTE & RECYCLING SERVICE

calgary.ca/bluecart | call 3-1-1

### Think about ways to make a difference.



- Remember, **no sorting required**.
- Recycle paper, cardboard, magazines, metal cans and aluminum foil products, plastics labelled 1–7, and beverage containers such as milk and juice boxes.
- Please don't place mixed materials in the bin (e.g., products made with more than one type of material) and do remember to remove lids and caps from containers.
- Set out the cart by 7 a.m. on your garbage day in the same general location as your garbage.



2009-1085  

 Printed on recycled paper

Appendix A  
Continued

B: Gain/Why Version

### Think about what will be gained in our community if we keep recycling.

- By participating in the Blue Cart program, **we will save over 60,000 tonnes of paper** – the equivalent of **1.68 billion litres of water every year.**
- When we recycle, **we save over 10,000 school buses full of plastic** every year from the landfills.
- If Calgarians recycle with the Blue Cart program, **we will save over one million trees each year.**
- When we use materials more than once, **we conserve our natural resources.**

see over



**blue cart  
recycling**



Protecting what's precious.  
Land. Air. Water.



THE CITY OF  
**CALGARY**  
WASTE & RECYCLING SERVICES

calgary.ca/bluecart | call 3-1-1

### Think about reasons to make a difference.

- Recycling will save our precious air, land and water resources.
- Recycling contributes to your community.
- Participation can double the amount of material Calgary recycles.
- Recycling turns materials into new products, rather than ending up in the landfill.



2009-1005  
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## APPENDIX B

### Recycling Intentions Measure

- “How likely are you to use The City of Calgary’s recycling program?”  
(1 = “highly unlikely,” and 7 = “highly likely”)
- “How inclined are you to use The City of Calgary’s recycling program?”  
(1 = “not very inclined,” and 7 = “very inclined”)
- “How willing are you to use The City of Calgary’s recycling program?”  
(1 = “very unwilling,” and 7 = “very willing”)

### Manipulation Checks

#### Gain/loss

- “To what extent did the advertisement focus on what would be gained if people do recycle?”
- “To what extent did the advertisement focus on what would be lost if people do not recycle?”

#### Temporal construal

- “To what extent did the advertisement focus on thinking about making changes for a better Calgary today?”
- “To what extent did the advertisement focus on thinking about making changes for a better Calgary tomorrow?”



Participants also completed an open-ended-listing of thoughts that went through their mind while evaluating their recycling intentions. Participants' open-ended statements were coded for the number of concrete and abstract thoughts reported as an additional check for mind-set by counting the number of more concrete, or "how"-oriented, thoughts (e.g., "I will recycle newspapers," "I will participate in the Blue Cart program") and recording the number of more abstract, or "why"-oriented, thoughts (e.g., "Recycling is good for the community," and "I will recycle because my family wants me to"). We created a difference score of abstract minus concrete thoughts (construal-level index).

#### *Mind-Set Manipulation*

**Concrete, "how" mind-set.** We are particularly interested in your thoughts about recycling. In particular, we are interested in your thoughts about *how* you would recycle. For example, *what actions would you take, what specific products would you recycle, etc.?* Please take some time below to explain *how* you would go about recycling.

**Abstract, "why" mind-set.** We are particularly interested in your thoughts about recycling. In particular, we are interested in your thoughts about *why* you would recycle. For example, *what are the underlying reasons for recycling, for what purpose would you recycle, etc.?* Please take some time below to explain *why* you would go about recycling.

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