On the Limits of Reframing Effects:
The Asymmetric Stickiness of Loss and Gain Frames

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Abstract
Citizens tend to form political preferences in a competitive information environment, where messages are framed and then reframed over time using different frames. Yet most studies focus on the influence of single-shot frames, ignoring the possibility of carryover effects. Moreover, the few studies examining over-time effects treat frames as interchangeable, ignoring the possibility that some frames are fundamentally "stickier" than others. We advance the literature by examining the relative stickiness of two frames that transcend policy and candidate messaging: loss and gain. We argue that loss frames tend to stick in the mind, continuing to shape preferences even in the face of a gain reframe. Four experiments show that loss frames have stickier effects than gain frames on people's policy and candidate preferences. Our results hold implications for political science, and for policy advocates and candidates, too: In a competitive information environment, early loss-frame adopters hold an advantage.

Framing is central to politics. How a policy issue or a candidate is defined, or framed, can have a dramatic influence on how citizens perceive that issue or candidate, thereby shaping political behavior in its many forms. And since frames are all around us, citizens rarely see an issue or candidate framed just once. Rather, they tend to see multiple frames over time. For example, a citizen scanning the morning headlines might see one news story that describes (frames) an economic policy by focusing on the number of jobs that it could save, and then encounter another story that describes (reframes) the same policy by focusing on the number of jobs that would still be lost. Given how common it is for citizens to encounter different frames in sequence, it seems crucial to understand not only how framing works but how *reframing* works. Yet, to date, most research on framing focuses on the effects of a single frame on citizens' current preferences.

Indeed, a rich literature on framing effects has been built around examining how the current frame that a person encounters influences that person's current preferences and decision-making (e.g., Nelson et al., 1997). Studies focused on single-shot frame effects implicitly assume that people tend to rely on information right in front of them rather than integrating information from the past. In other words, the framing literature is based largely on the assumption that when an issue or candidate is framed in one way and then reframed in another way, citizens shift their attention accordingly, responding to the current (re)frame. Scarce studies have examined the question of how frame *order* might matter. However, we have good reason to believe that at least some frames may have carryover effects; that is, that reframing might not always work.

The few studies that have begun to explore framing effects over time tend to support the notion that reframing is generally effective. These studies point in particular to recency effects, consistent with the assumption that people generally respond to the frame directly in front of

them (e.g., Chong & Druckman, 2010). By contrast, a few studies point instead to primacy effects, showing how certain conditions such as frame repetition can prompt people to lock in on the frame they saw first, thus mitigating the effects of later frames (e.g., Druckman et al., 2012; Lecheler & de Vreese, 2011). Of course, over-time framing effects can also hinge on the nature of the audience (e.g., Chong & Druckman, 2013). Yet, all extant studies of over-time framing effects treat frames themselves—implicitly, if not intentionally—as being interchangeable, ignoring the possibility that some frames may have stronger carryover effects than others.

We argue that some broad types of frames are fundamentally "stickier" than others, meaning that they become more cognitively entrenched, thus rendering citizens less susceptible to the effects of subsequent reframing attempts. In other words, a person's response to a frame directly in front of them may tend to be *conditioned* by whether or not that person previously saw the same issue or candidate described using a different type of frame. Specifically, we examine the relative stickiness of two types of frames that are pervasive in politics and, thus, of particular importance: loss and gain. We argue that whereas it is relatively easy to shift from thinking of an issue or candidate in terms of gain (e.g., jobs saved in a tough economy) to thinking of the issue or candidate in terms of loss (e.g., jobs lost), it is cognitively much more difficult to take an issue or candidate previously framed in terms of loss and reconceptualize it instead in terms of gain. Just as loss frames loom larger (Kahneman & Tversky, 1979), we expect that loss frames are also stickier than gain frames.

This seemingly simple idea—that not all frames are equal when it comes to carryover effects—has major implications for understanding the political behavior of citizens responding to encountered frames. In particular, if loss frames really are stickier than gain frames, it would suggest that message timing is especially important in policy issue and candidate campaigns. For

example, imagine an incumbent political candidate (Jane) and a challenger (John). Jane might frame her campaign by focusing either on the gains she has brought to her district (e.g., jobs saved) and/or on the losses the district would suffer under John. Meanwhile, John might either frame Jane's record in terms of loss (e.g., jobs lost) and/or frame his own campaign in terms of the gains he would deliver. Although both sets of gain and loss frames may be persuasive, both Jane and John might find greater electoral purchase by using their respective loss frames targeted at their opponent early on in the campaign, since once voters hear an aspect of a campaign framed in terms of loss, they will be less swayed by subsequent gain frames.

Framing Effects

Framing is an inherent part of the political process. Although in many cases frames are built strategically, in fact any attention paid to a political item must define that item in some way, focusing on one set of considerations at the necessary exclusion of alternative considerations (Gamson & Modigliani, 1987; Hänggli & Kriesi, 2012; McCombs et al., 1997; Scheufele, 1999).

Research focusing on contemporaneous framing effects has pointed to the importance of framing as a political mechanism. Experimental work has shown the effects of framing on citizens' judgments of policy issues (e.g., Boyle et al., 2006; Nelson et al., 1997), and these effects extend beyond the lab to studies of media framing (e.g., Baumgartner et al., 2008; Berinsky & Kinder, 2006; Iyengar, 1991; Pollock, 1994). Additionally, several studies point to the likely effects of framing candidates running for office (e.g., Druckman, 2001; Krosnick, 1988; Quattrone & Tversky, 1988; Scheufele & Tewksbury, 2007).

This past research points to the fact that people respond differently to the same issue when it is framed using different pieces of information to define it, such as defining a Ku Klux

Klan rally as a matter of free speech vs. public safety (Nelson et al., 1997). Just as interestingly, framing effects have also been shown in the case of *equivalency* frames, where seemingly minor word differences used to present the same information elicits different judgments (Chong & Druckman, 2007b). A long line of prospect theory research points to the differential effects of gain and loss frames in citizens' evaluations of various scenarios. Gain frames (e.g., % lives saved) tend to elicit risk aversion, whereas loss frames (e.g., % lives lost) tend to induce more risk acceptance (Tversky & Kahneman, 1981; for reviews see Kühberger, 1998; Levin et al., 1998).

For example, in one of the classic experiments demonstrating the effects of gain vs. loss frames (Tversky & Kahneman, 1981), study participants in each of two conditions (gain vs. loss) were presented with two "programs" to address an unusual disease with the potential to affect 600 people. In both conditions, one program offered a certain outcome (200 people will be saved vs. 400 people will die), while the other program offered a risky outcome (a 1/3 probability that 600 people will be saved vs. a 2/3 probability that 600 people will die). The probabilistic outcomes of all four programmatic outcomes were, of course, equivalent. Yet people responded differently depending on the frame employed: participants in the gain condition tended to select the certain program, and participants in the loss condition tended to select the risky program. Thus, the same information tends to elicit a different response depending on whether it is framed in terms of gain or framed in terms of loss.

In practice, however, citizens rarely see an issue or candidate framed just once. Rather, they tend to see competing portrayals over time, with one frame being replaced by the next frame. Yet despite the prevalence of reframing in politics, most framing research examines the single-shot effects of current frames. Thus, the prevailing (if unintended) implication of this past

work is that citizens are influenced by the frame directly in front of them, with little or no residual influence from prior frames. Our question is: When something is reframed, is it always against a blank slate? Or do some frames stick, muting the effects of subsequent frames? Despite the significance of this question to political behavior research, very little work has examined reframing effects.

Reframing Effects

The few key studies that have begun to examine framing effects over time suggest that, in general, reframing works. In the core work from this research, Chong and Druckman (2010) suggest that citizens generally respond to the most proximate (i.e., current) frame. This idea supports Slovic's (1972) concreteness principle, which holds that people tend to rely on the most current information rather than referencing information from memory. Moreover, framing effects tend to be short-lived (Chong & Druckman, 2010; de Vreese, 2004).

Yet this same this literature shows that frame repetition matters, suggesting that frames carry at least some residual impact from one time point to the next. Most notably, in a multi-week mock news study, Druckman and colleagues (2012) find that citizens who received a different frame at Time 1 and Time 4 tend to responded to the most recent frame when they had no relevant frames in between. But when they either were exposed to the Time 1 frame repeatedly at Time 2 and Time 3 or had the opportunity to select their own news stories at Time 2 and Time 3, the effects of the Time 1 frame held through Time 4. Relatedly, Druckman and colleagues (2009) also find that the relative over-time impact of frames (and cues) depends on variance in citizens' styles of processing information, suggesting that at least some frames can stick for some people. Also, a study by Lecheleler and de Vreese (2011) shows at least one case

where framing effects can be surprisingly resilient over time. This body of work thus points to variance in reframing success.

Note that investigating reframing effects relates directly to the question of how individual framing effects are conditioned by competitive framing environments (Chong & Druckman, 2007a, 2007b). Past studies have shown that when frames compete simultaneously, the strongest and most endorsed frames will have the strongest effects (Chong & Druckman, 2007c; Druckman, 2001; Sniderman & Theriault, 2004). But citizens often experience frame competition in sequential rather than simultaneous form. It only makes sense, then, in considering frame competition in the full sense, to examine the forces that condition whether the effects of one frame are erased by reframing.

We take this line of investigation into over-time framing effects a step further by asking whether the *type* of frame used first can help explain the effectiveness (or ineffectiveness) of the reframe used second. At least in the case of the foundational distinction between gain and loss frames, we do not think that reframing always works or never works; it isn't that simple. Rather, we examine the idea that the utility of reframing is conditional on frame type. Specifically, we argue that loss frames are cognitively stickier than gain frames.

Asymmetric Frame Stickiness

We present a two-part theoretical argument about frame stickiness. First, we argue that some frames have carryover effects; that is, they are sticky. Second, we argue that loss frames have stronger carryover effects—that is, they are stickier—than gain frames.

There is good reason to believe that frames can have carryover effects on citizen perceptions of an issue or candidate, potentially overriding subsequent frame exposure. From

functional fixedness research in psychology, we know that once a person labels an object in one way (e.g., conceptualizing an object as a "box"), it can be very difficult to relabel it in another way (e.g., reconceptualizing it as a "shelf"). Applying this notion of labeling to the process of framing, we can imagine that some frames stick in people's heads, thereby muting the effects of subsequent frames. This idea contrasts with Slovic's (1972) concreteness principle of using the most current information. Yet it also supports the principle by suggesting that in those cases where an individual relies more on a prior (sticky) frame than on a current frame, she does so because the prior frame remains the most salient consideration; indeed, that's what makes it sticky.

If frames can have carryover effects, we should furthermore expect some frames to have stronger carryover effects than others. Even in studies of one-shot framing effects, we know that not all frames are created equal (e.g., Chong & Druckman, 2007c; Dardis et al., 2008). Linking the notion of variance in frame strength with the notion of frame carryover effects, we should expect different frames to have different degrees of stickiness, varying in their ability to override the effects of subsequent frames.

With regard to gain and loss frames in particular, the general human tendency to prioritize potential negatives over potential positives (Baumeister et al., 2001) leads loss frames to have stronger effects than gain frames in a static context (Kahneman & Tversky, 1979). And just as loss frames loom larger than gain frames in a one-shot context, we expect loss frames to be stickier, too. Specifically, over time people should process the negative stimuli of loss frames more deeply and remember them better than the positive stimuli of gain frames (Fiske, 1980; Hansen & Hansen, 1988; Öhman et al., 2001; Peeters & Czapinski, 1990; Pratto & John, 1991). Consider a scenario in which an outcome initially construed as a potential gain (e.g., the chances

of surviving) may also involve a loss (e.g., the chances of dying). This new loss information warrants urgent attention. However, in reverse, when finding that an outcome initially construed as a potential loss may also involve a gain, it would be dangerous to shift attention entirely to the gain, ignoring the initial loss information. Together, these ideas suggest more stickiness of loss frames than gain frames.

Hypothesis: *A loss frame should have a stronger muting influence on people's responses to a subsequent gain frame then the muting influence that a gain frame has on people's responses to a subsequent loss frame. That is, loss frames should be stickier than gain frames.*

Experimental Tests

An initial test of our theory that loss frames are stickier than gain frames can be achieved by replicating a classic gain vs. loss framing study but with a twist of reframing. When sixty-three undergraduate participants were presented with Tversky and Kahneman's (1981) scenario in which "the U.S. is preparing for the outbreak of an unusual disease, which is expected to kill 600 people" and were asked to choose between mathematically identical certain and risky "programs," participants responded exactly as prospect theory would predict: 38% of participants who saw the programs framed in terms of gain (lives saved) chose the safe option, whereas 61% who saw the loss frame (lives lost) chose the risky option. Further consistent with one-shot framing research, when the group that had initially seen the gain frame was then presented with a loss frame, 56% responded to the loss frame right in front of them by selecting the risky program. In other words, prior exposure to the gain frame seemed barely to mute the effect of reframing under a loss frame. However, the group that saw a loss frame first did *not* significantly

budge when the scenario was reframed in terms of gain, with 53% again selecting the risky program (see AUTHORS 2013 for more details). Prior exposure to a loss frame thus appears to mute the effects of reframing via a gain frame, at least in the abstract case of "program" options.

This initial test supports the intuition behind our theory, but tells us very little about whether our expectations apply to more concrete political scenarios. Specifically, if some frames have effects that are stickier than others, we want to know whether these asymmetric carryover effects hold in the case of citizens' perceptions of explicit policy issues and candidate options.

In the four studies below, we test our theory of asymmetric frame stickiness in a range of political contexts, each one involving a Time 1 frame and then a Time 2 frame. Study 1 tests our hypothesis as applied to preferences for two policy options involving teachers' jobs. Then we shift to a candidate context. Study 2 uses the same "unusual disease" options described above in the abstract "program" context, but this time the options are presented as policy options proposed by opposing candidates. Next, in order to test whether the mechanism at work is truly the cognitive mechanism we have claimed it is, Study 3 replicates the Time 1 portion of our second study, but this time instead of presenting the opposite frames at Time 2 we ask participants to perform a simple math problem presented using the opposite frame and then time how long it takes them to perform the calculation. If loss frames are truly cognitively stickier than gain frames, mentally converting from loss to gain should take longer than converting from gain to loss. Finally, in Study 4 we test our hypothesis of asymmetric stickiness in the context of preferences for an incumbent candidate vs. a challenger candidate, with participants given the incumbent's track record on a jobs program framed in terms of gains vs. losses.

Importantly, each of the studies below presents participants with a Time 2 frame in quick succession of a Time 1 frame. Although we might expect consistency pressures to mute the

effects of reframing after such a short time period, this concern does not affect our ability to test for *asymmetry* in reframing effects, comparing gain-to-loss vs. loss-to-gain. Still, future work should examine variance in decay effects of initial frame stickiness over time.

Additionally, note that each of the reframing studies presented here utilizes equivalency frames. While our theory warrants additional testing in the context of non-equivalent frames, these equivalency frames offer in some sense a more stringent test of our theory. That loss frames override the effects of subsequent gain frames, even when the information presented at both time points is identical, supports the notion of frame stickiness. By demonstrating this phenomenon and testing the cognitive mechanism purported to underlie it, we help advance the framing literature beyond a primary focus on single-shot framing effects and toward an understanding of reframing and its limits.

Study 1

If some frames wield effects that can linger, then people's attitudes toward a given policy issue might be shaped not only by the current frame but also by the frame previously experienced. Furthermore, if some frames have stronger carryover effects than others, then we would expect that people's responses to a current frame might depend on the *type* of frame previously experienced. Specifically, if loss frames are stickier than gain frames, then reframing a policy issue from loss to gain should have a muted effect on people's risk preferences, compared to reframing from gain to loss. We tested this hypothesis by measuring subject participants' risk preferences for policy options after an initial frame (gain vs. loss) and then again after a reframe (loss vs. gain).

Method

Eighty-seven undergraduates (55 female, 32 male) participated in the experiment for course credit. All materials were presented on the computer using MediaLab. Participants read materials adapted from the classic framing scenario described above (Tversky & Kahneman, 1981), but this time asking them to "imagine that the State of [AUTHOR'S STATE] is confronting budget cuts in K-6 public schools that are expected to affect 600 teachers' jobs, which would in turn impact class size and quality of instruction." Participants were asked to consider two possible policy options that had been proposed to address the issue. For some participants, the policy options were first framed in terms of gains (teachers saved) and subsequently reframed in terms of losses (teachers lost), whereas others saw the policies framed first in terms of losses, and then in terms of gains.

For all participants, one policy had a certain outcome, and the other had a mathematically-equivalent but uncertain outcome. For instance, participants in the gain-first/loss-second condition initially read that Policy A would save 200 teachers (a certain outcome), whereas Policy B had a 1/3 chance of saving 600 teachers and a 2/3 chance of saving no teachers (an uncertain outcome).

We then asked participants to rate their preference for the policies by moving a slider along an unmarked 100-point scale from *Completely Favor Policy A* to *Completely Favor Policy B*, and to rate their attitude toward each policy independently from *Very Negative* to *Very Positive*, again on continuous unmarked scales to minimize any consistency pressures that participants might otherwise feel when asked to report their opinions twice in a single session.[1]

[1] See LeBoeuf and Shafir (2003) (2003) for a discussion of how consistency pressures can influence choice in a similar paradigm. Note that both continuous and dichotomous measures have been employed frequently in framing research (Kühberger, 1998).

Next, participants read "additional information" about the two policies that simply reframed the prior information using the opposite frame.[2] In other words, the information presented at the two time points was mathematically identical, but the language used to describe the two policies switched either from gains to losses or from losses to gains. For instance, the gain-first/loss-second condition now read that "whereas Policy A is sure to result in a full 400 teachers being lost, Policy B has a 33% chance of resulting in no teachers being lost."

Participants then rerated their policy preferences using the same three scales. The three preference ratings were averaged at each time-point into a measure of relative preference for the risky versus safe policy (α's = .72 and .78 at Times 1 and 2, respectively).

Results

Four participants knew about framing effects from a previous course or study, which could potentially influence their responses, and one person did not complete the rating task. These participants were excluded from the dataset, and analyses were conducted on the remaining 82 participants.[3]

To test whether loss-to-gain reframing (vs. gain-to-loss reframing) has a muted impact on preferences, we needed to compare the absolute extent of change across time in the two framing conditions (gain-first/loss-second vs. loss-first/gain-second). Our hypothesis was not that the *direction* of the change in preference from Time 1 to Time 2 should be different depending on framing; we already know that it should be if people's preferences depend on the current frame. Rather, we hypothesized that the *size* of the change in preference should differ, indicating that people's preferences also depend on a past frame. To unconfound the direction and size of the

[2] See appendix for complete language used in each study.
[3] The results do not change if all participants are included.

change in preference, we therefore reverse-coded the policy preference measure in the loss-first/gain-second condition so that higher numbers in both conditions were more in line with the Time 2 frame (i.e., the risky policy option for a loss frame; the safe policy option for a gain frame). This recoding allowed us to test whether the absolute extent of change from one time point to the next was different between conditions (see Figure 1; means below are reported on the original scale for ease of interpretation).

A 2 (framing order: gain-first vs. loss-first) x 2 (time-point: Time 1 vs. Time 2) mixed-design ANOVA with repeated measures on the second factor yielded a significant main effect of framing order, $F(1, 80) = 4.39$, $p = .04$, $\eta_p^2 = .05$, and a significant main effect of time-point, $F(1, 80) = 29.72$, $p < .0001$, $\eta_p^2 = .27$. More importantly, these effects were qualified by the predicted two-way interaction between framing order and time-point, $F(1, 80) = 6.81$, $p = .01$, $\eta_p^2 = .08$, indicating that those who saw the gain frame first exhibited significantly greater change in response to the reframing at Time 2, compared to those who saw the loss frame first.

We conducted follow-up paired t-tests to explore this interaction further. When the policies were initially framed in terms of gains and then reframed in terms of losses, participants' initial preference for the safe option at Time 1 (M = 38.99, SD = 17.45) shifted quite substantially toward the risky option at Time 2 (M = 53.36, SD = 16.99), $t(39) = 4.47$, $p < .0001$. Thus, when the gain frame came first, participants' preferences seemed to depend strongly on the current frame. In contrast, those who saw the policies described first in terms of losses and then in terms of gains showed a much smaller change in preference from the first time-point to the second (M = 51.75, SD = 12.05 vs. M = 46.69, SD = 10.77), $t(41) = 3.07$, $p < .01$ (see Figure 1). In other words, when the loss frame came first, its effect seemed to linger, so that subsequent reframing had a muted effect on preference.

Study 2

In political science, the notion of framing effects has developed most strongly in the context of policy issues. Yet the practical implications of these effects are just as pivotal for the framing of political candidates (Devitt, 1997; Fridkin & Kenney, 2005). Thus, it is important to know whether the phenomenon of asymmetric frame stickiness demonstrated in Study 1 applies to the context of candidates, too. We tested this idea using Tversky and Kahneman's classic framing scenario (1981) with the same twist as in Study 1, assessing participants' risk preferences at Time 1 after seeing an initial frame and then again at Time 2 after seeing a reframe. In Study 2, however, we attributed the risky and certain programs to two candidates running for president.

Method

Eighty-six undergraduates (59 female, 27 male) participated in the experiment for course credit. The procedure was similar to Study 1, with the following changes.

Participants were asked to "imagine that the U.S. is preparing for the outbreak of an unusual disease, which is expected to kill 600 people" and were told that "two candidates currently running for President have each described the program they would adopt as President to combat the disease."

As in Study 1, some participants saw the candidates' programs first framed in terms of gains (lives saved) and subsequently reframed in terms of losses (lives lost), whereas others saw the programs framed first in terms of losses, and then in terms of gains. For all participants, one candidate proposed a safe program that had a certain outcome, and the other proposed a risky program that had a mathematically-equivalent but uncertain outcome.

Participants rated their preference for the candidates at each time-point by moving a slider along the same three unmarked 100-point scales used in Study 1. The three preference ratings were averaged into a measure of relative preference for the risky versus safe candidate at each time-point (α's = .64 and .72 at Times 1 and 2, respectively). Finally, we asked participants "If you had to vote right now, which candidate would you pick?" to provide a measure of voting intentions for the risky versus safe candidate.

Results

Three participants knew about framing effects from a previous course or study, which could potentially influence their responses, and one person did not complete the rating task. These participants were excluded from the dataset, and analyses were conducted on the remaining 82 participants.[4]

To test whether loss-to-gain reframing (vs. gain-to-loss reframing) has a muted impact on candidate preferences, we again reverse-coded the preference measure in the loss-first/gain-second condition so that higher numbers in both conditions indicated greater preference for the option normatively consistent with the Time 2 frame (i.e., the risky candidate for a loss frame; the safe candidate for a gain frame). We then conducted a 2 (framing order: gain-first vs. loss-first) x 2 (time-point: Time 1 vs. Time 2) mixed-design ANOVA with repeated measures on the second factor to examine whether the size of the change in participants' candidate preferences from one time point to the next depended on which frame they saw first.

There was no effect of framing order and a significant main effect of time-point, $F(1, 80) = 40.52$, $p < .0001$, $\eta_p^2 = .34$,). More importantly, the predicted two-way interaction emerged

[4] The results do not change if all participants are included.

between framing order and time-point, $F(1, 80) = 5.46$, $p = .02$, $\eta_p^2 = .06$, indicating that those who saw the gain frame first exhibited significantly greater change in response to the reframing at Time 2, compared to those who saw the loss frame first. Consistent with past research on framing effects, when the candidates' programs were initially described in terms of gains, participants showed a relative preference for the safe candidate (M = 42.59, SD = 12.77); when the language shifted from gains to losses, participants' preferences swung dramatically toward the risky candidate (M = 54.80, SD = 14.38), $t(40) = 6.24$, $p < .0001$. In contrast, those who saw the candidates' programs described first in terms of losses and then in terms of gains showed a much smaller change in preference from the first time-point to the second (M = 53.58, SD = 16.15 vs. M = 47.92, SD = 16.29), $t(40) = 2.81$, $p < .01$ (see Figure 2).

We next examined our voting intention measure to see how reframing might affect voting behavior. A chi-square analysis on voting intentions for the safe versus risky candidate revealed a significant effect of framing order, $\chi^2(1) = 7.94$, $p = .006$.[5] Follow-up one-sample chi-square tests indicated that when the language switched from gains to losses, the risky candidate won by a landslide, $\chi^2(1) = 10.76$, $p = .001$ (see Table 1), consistent with the notion that people's voting behavior should reflect the current frame. In contrast, when the language switched from losses to gains, there was a statistical tie between the two candidates, $\chi^2(1) = 0.40$, $p = .53$, suggesting that the initial loss frame had a lingering effect on participants' voting behavior.

Study 3

Whereas Studies 1 and 2 demonstrated the basic phenomenon of loss frames having a muting effect on subsequent gain frames, but not vice versa, Study 3 offered a test of our notion that these effects are the product of it being mentally more difficult to transition from thinking of

[5] One participant did not vote, reducing the total N for this analysis to 81.

policy issues or candidates in terms of loss to thinking of them in terms of gain. Here, participants read about the two candidates' programs used in Study 2 and then saw a simple math problem that required converting a program's outcomes from the initial frame (e.g., lives saved) to a different frame (e.g., lives lost). To compare the degree of cognitive difficulty in reconceptualizing from gain to loss vs. from loss to gain, we recorded the time it took participants in each condition to solve the math problem. If it is indeed harder to transition from thinking in terms of loss to thinking in terms of gain than vice versa, it should take participants longer to convert from losses to gains than from gains to losses.

Method

Eighty-nine undergraduates (70 female, 19 male) participated for course credit. The procedure was similar to Study 2, with the following changes.

The first part of the procedure was identical to that employed in Study 2: Participants read about two political candidates who had each proposed a program designed to combat an unusual disease, framed in terms of either gains (gain-first condition) or losses (loss-first condition). To ensure that participants read the materials and actually thought about the issue in terms of the initial frame, we asked them to rate their candidate preferences as in Study 2.[6]

Next, participants saw information about a third candidate, called Candidate C, who was proposing a third possible program. In the gain-first condition, they read that Candidate C's program would result in 100 people being saved, and were asked to calculate how many would die. In the loss-first condition, they read that Candidate C's program would result in 100 people dying, and were asked to calculate how many would be saved. Thus, in order to solve the math problem, all participants needed to perform the same simple calculation: 600 - 100 = 500.

[6] We again replicated the well-established effect of initial frame on program preferences.

However, whereas those in the gain-first condition needed to reconceptualize the issue in terms of losses in order to solve the problem, those in the loss-first condition needed to reconceptualize it in terms of gains.

We measured the time it took participants to solve the math problem as our key dependent variable, by recording in MediaLab the number of milliseconds it took for each participant to select the correct answer to the problem from five multiple-choice options.

Results

Two participants knew about framing effects from a previous course or study, which could potentially influence their responses, and one person took longer than 30 seconds to respond (a value that was clearly outside the distribution of response times and more than 3 SDs above the mean). Six participants chose the incorrect answer to the math problem (rendering the number of seconds it took them to choose that answer meaningless as an indicator of time required to calculate the correct number). These participants were excluded from the dataset, and analyses were conducted on the remaining 80 participants.[7]

To test whether it took participants longer to solve the simple math problem when it required mentally converting from losses to gains (vs. gains to losses), we log-transformed our response time measure to reduce skewness (Ratcliff, 1993) and conducted an independent samples t-test on the resulting scores (means and standard deviations are reported in seconds rather than the transformed metric for ease of interpretation). As predicted, participants took significantly longer to solve the math problem in the loss-first condition (M = 10.53 seconds, SD

[7] Unsurprisingly, significance declines if all participants are included. It is also interesting to note that 5 out of the 6 participants who chose the incorrect answer to the simple math problem were in the loss-first condition, consistent with the notion that mentally converting from losses to gains may be more difficult than converting from gains to losses.

= 4.91) than in the gain-first condition (M = 8.65 seconds, SD = 3.74), $t(78) = 1.98$, $p = .05$, $\eta^2 = .05$ (see Figure 3).

Study 4

In Study 2, we saw that having political candidates' programs framed first in terms loss significantly muted the subsequent effects of reframing the programs in terms of gain (but not vice versa). Specifically, shifting from gains to losses resulted in a landslide victory for our fictitious candidate with the risky program, but shifting from losses to gains produced a statistical tie between the risky and certain candidate-backed programs. This finding has several potential implications for studies of election behavior, including research on the advantage that incumbents tend to enjoy (e.g., Bartels, 1996; Cover, 1977; for reviews, see Carson et al., 2007; Huber et al., 2012). Incumbent candidates, of course, represent the less risky option for voters; "the devil you know." Thus, building from prospect theory, we should expect voters to be more likely to stick with the incumbent when in the domain of gains but more likely to take a chance on the challenger when in the domain of losses. If our hypothesis about loss frames being stickier than gain frames is correct, then framing an incumbent's record in terms of loss should have a muting impact on subsequent reframing in terms of gain. We test this notion in Study 4.

Method

82 participants (45 female, 37 male) between the ages of 18 and 66 ($M = 34.49$, $SD = 12.80$) completed the study online in exchange for payment through Amazon's MTurk platform (Berinsky et al., 2012). In contrast to the procedures already described, this procedure presents participants with information about the outcomes associated with a single candidate—

specifically, the percentage of jobs saved (lost) under the administration of "the current Governor of an important state [who] is running against an opponent."

In the first part of the procedure, participants were told that "when the current Governor took office, statewide budget cuts were expected to affect 10,000 jobs, which would in turn affect the state and national economies." In the gain-first condition, participants read that under the current Governor's leadership, 40% of these jobs had been saved, whereas in the loss-first condition, participants read that 60% of these jobs had been lost. Participants were then asked to rate how they felt about the election on a 100-point continuous, unmarked scale from "Completely Favor Current Governor" to "Completely Favor Opponent," as well as how likely they would be to vote for the current governor (from Not at All to Extremely) and how likely they would be to vote for the opponent (also from Not at All to Extremely). Responses to the second item were reverse-coded so that higher numbers on each of the three scales indicated a greater preference for the opponent. The three scales were then averaged to form a composite measure of preference for the opponent (vs. incumbent; $\alpha = .86$).

Next, participants read "additional information" that simply reframed the prior information using the opposite frame, pointing out that 60% (40%) of the jobs in question have been lost (saved). Thus, as in Study 1, the information presented at the two time points was mathematically identical, but the language used to describe the governor's administration switched either from gains to losses or from losses to gains.

Participants then rerated their attitudes toward the current governor and the opponent using the same three scales from Time 1, which were again used to calculate a composite measure of preference for the opponent (vs. incumbent; $\alpha = .89$).

Results

Due to a computer error, the dependent variable failed to fully record for three participants. For two of these participants, all but one of the six items recorded successfully and we averaged the successfully-recorded items to impute dependent variable values for each of them. For the third participant, only one of the six items were recorded and imputing was not possible; analyses were conducted on the resulting sample of 81 participants.[8]

As in Study 1, we wanted to test whether the absolute extent of change from one time point to the next was different between the two framing conditions (gain-first/loss-second vs. loss-first/gain-second), and so we again reverse-coded our dependent measure in the loss-first/gain-second condition so that higher numbers in both conditions indicated an evaluation that was more consistent with the Time 2 frame (i.e., more positive toward the opponent when the incumbent's record was framed in terms of losses; more negative toward the opponent when the incumbent's record was framed in terms of gains).

A 2 (framing order: gain-first vs. loss-first) x 2 (time-point: Time 1 vs. Time 2) mixed-design ANOVA with repeated measures on the second factor yielded a significant main effect of time-point, $F(1, 79) = 29.07$, $p < .0001$, $\eta_p^2 = .27$. More importantly, this effect was qualified by the predicted two-way interaction between framing order and time-point, $F(1, 79) = 4.26$, $p = .04$, $\eta_p^2 = .05$, indicating that those who saw the gain frame first exhibited significantly greater change in response to the reframing at Time 2, compared to those who saw the loss frame first.

We conducted follow-up paired t-tests to unpack this interaction further. When the incumbent's record was initially framed in terms of gains and then reframed in terms of losses, participants' initial preference for the incumbent ($M = 35.36$, $SD = 15.57$) shifted dramatically

[8] Completely removing the two participants with the two missing items from the analyses did not substantially change the pattern of results reported here, although significance declined slightly. Including the two participants but calculating the dependent measures based on the four items that successfully recorded for everyone also did not change the results. Thus, the particular method of addressing the partially missing data for these two participants does not appear to affect our findings.

toward the more risky opponent at Time 2 (M = 54.33, SD = 19.82), $t(33) = 4.79$, $p < .001$. In contrast, those who saw the incumbent's record described first in terms of losses and then in terms of gains showed a far smaller shift in preference from the first time-point to the second (M = 65.30, SD = 21.56 vs. M = 56.84, SD = 20.69), $t(46) = 2.61$, $p = .01$ (see Figure 4).

Discussion

The four experiments presented offer consistent support for our expectation that loss frames are stickier than gain frames. These results hold both theoretical and practical implications for political behavior research. In particular, the finding that some frames have carryover effects strong enough to counteract current frames, at least in the short term, suggests that future studies—both in and out of the lab—should account for the role not only of contemporaneous frame competition but also of frame sequencing.

Naturally, these findings raise as many questions as they answer. Of particular note, we have not addressed the rate at which loss and gain frames decay over time. Whereas gain frame effects appear to be outweighed by loss frames presented just moments later, additional work is required to test just how long the effects of an initial loss frame tend to linger in people's minds, strong enough to mute the effects of subsequent gain frames. Additionally, our theory of asymmetric reframing effects hinges on the central notion that people tend to prioritize negative information over positive information—thereby leading loss frames both to loom larger and to stick longer than gain frames. However, we have not estimated the degree of relative strength between the two frames, instead presenting participants with equal amounts of both positive (gain) and negative (loss) information. In line with past research showing an asymmetrical s-shaped value function of loss and gain effect sizes, our findings suggest that greater exposure to

gain frame is required to counteract a lesser exposure to loss frame. For instance, in Study 2 overall, participants showed a greater relative preference for the risky candidate at Time 2 (M = 51.36, SD = 15.66) compared to Time 1 (M = 48.08, SD = 15.49). More research is needed to examine the particular value curve associated with gain-to-loss vs. loss-to-gain reframing.

Recognizing its limits, our study nonetheless holds strategic implications for policy advocates and political candidates. Specifically, our finding that loss frames are stickier than gain frames suggest that elites should capitalize on loss frames early. Of particular interest are the potential ramifications for understanding of how prospect theory maps on to candidate messaging strategy (e.g., Druckman et al., 2009; McDermott et al., 2008). Certainly, in the context of a raging campaign or a policy debate, one side's use of a loss frame is often countered by a loss frame from the opposition. But our findings point to the distinct advantages of being an early adopter of loss frames. Especially for incumbent-party candidates and status quo policy supporters, framing the discussion around accomplished gains may be an effective strategy only for as long as the opposition does not reframe the discussion in terms of loss.

Table 1. Number of votes for the safe versus risky candidate in Study 1 as a function of framing order condition.

	Candidate A (Safe)	Candidate B (Risky)
Gain First/Loss Second	10	31
Loss First/Gain Second	22	18

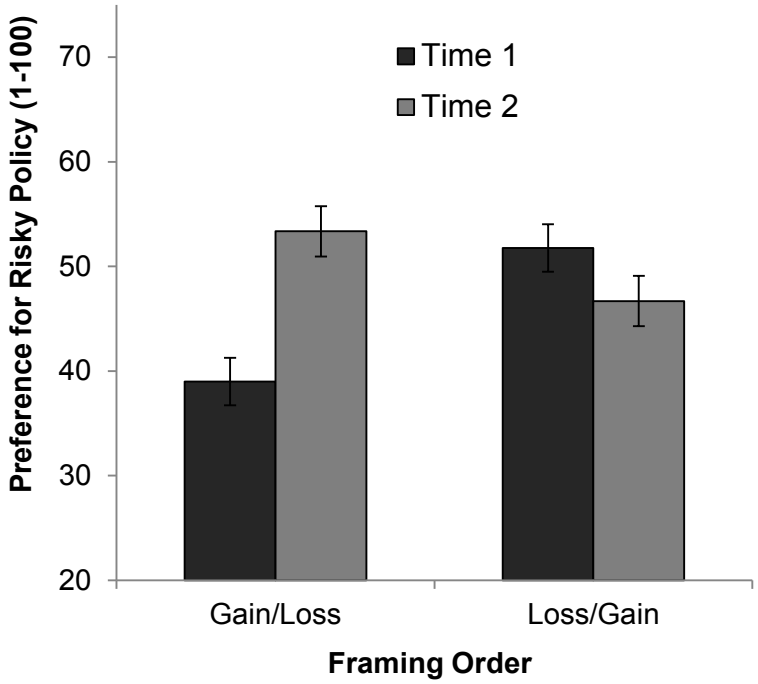

Figure 1. Preference for the risky (vs. safe) policy as a function of framing order (gain-first/loss-second vs. loss-first/gain-second) and time point (Time 1 initial framing vs. Time 2 reframing) in Study 1. Error bars indicate one standard error above and below the mean. Means are graphed on the original scale for ease of interpretation; using the reverse coding in our analysis allows for the comparison of the size of the difference between the first two bars and the size of the difference between the last two bars to see if the absolute size (rather than direction) of the reframing effect differs between conditions.

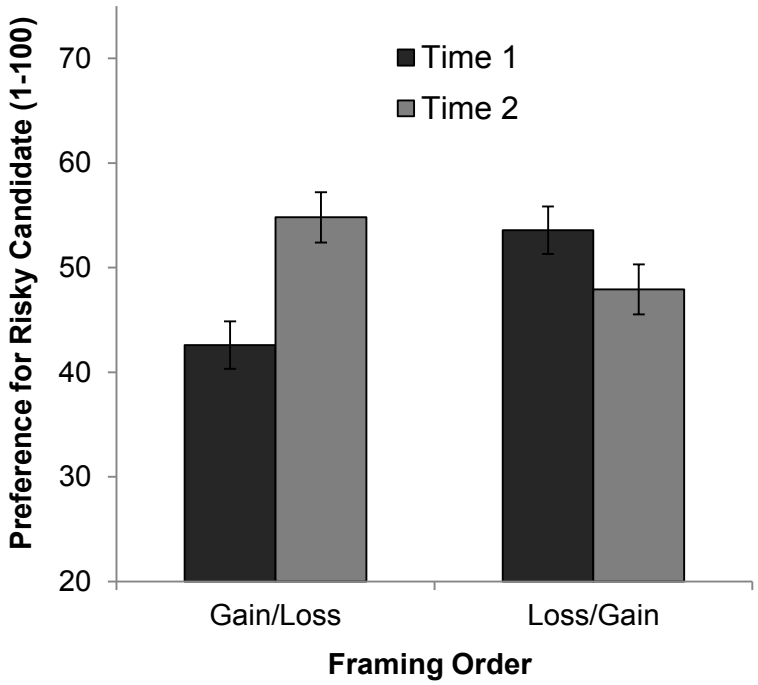

Figure 2. Preference for the risky (vs. safe) candidate as a function of framing order (gain-first/loss-second vs. loss-first/gain-second) and time point (Time 1 initial framing vs. Time 2 reframing) in Study 2. Error bars indicate one standard error above and below the mean. Means are graphed on the original scale for ease of interpretation; using the reverse coding in our analysis allows for the comparison of the size of the difference between the first two bars and the size of the difference between the last two bars to see if the absolute size (rather than direction) of the reframing effect differs between conditions.

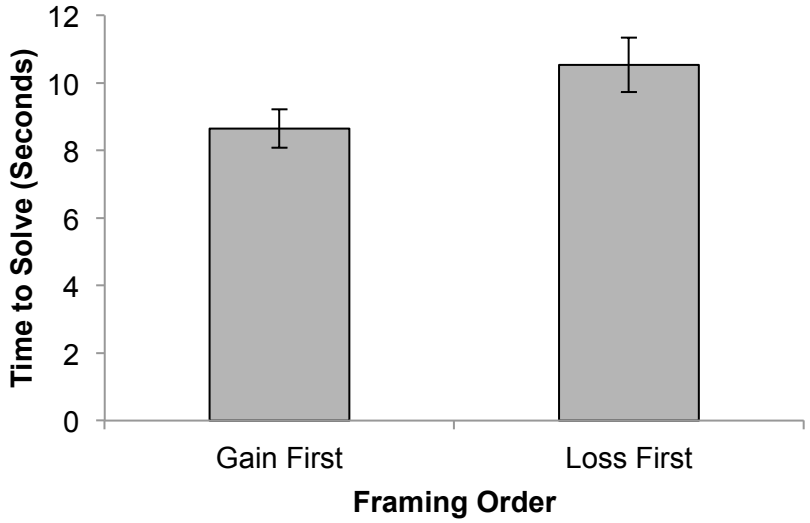

Figure 3. Time in seconds to solve math problem requiring participants to switch from gain to loss or from loss to gain. Error bars indicate one standard error above and below the mean.

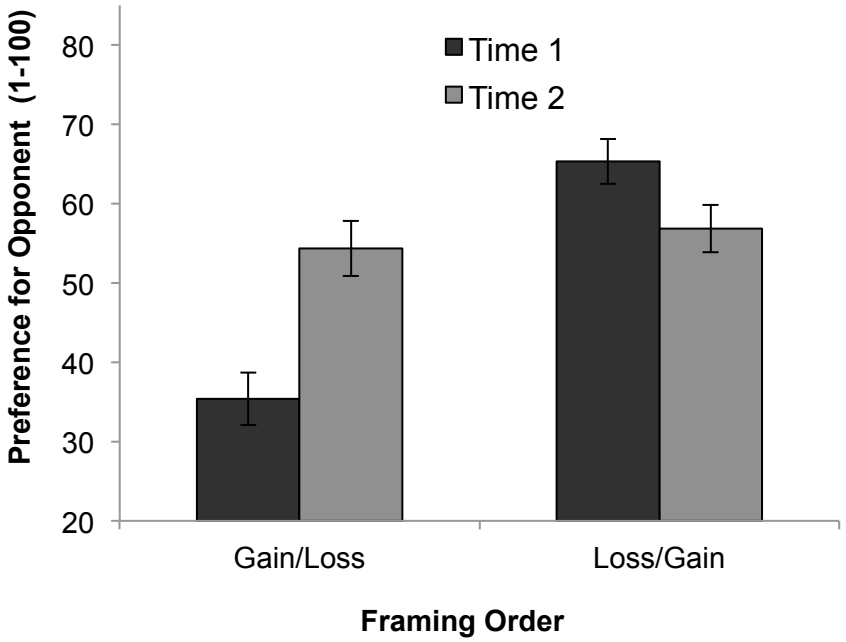

Figure 4. Preference for the opponent (vs. incumbent) candidate as a function of framing order (gain-first/loss-second vs. loss-first/gain-second) and time point (Time 1 initial framing vs. Time 2 reframing) in Study 4. Error bars indicate one standard error above and below the mean. Means are graphed on the original scale for ease of interpretation; using the reverse coding in our analysis allows for the comparison of the size of the difference between the first two bars and the size of the difference between the last two bars to see if the absolute size (rather than direction) of the reframing effect differs between conditions.

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