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Close Encounters of Two Kinds: False Alarms and Dashed Hopes

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Abstract

?2 People are frequently exposed to potentially attractive events that are subsequently and unexpectedly reversed and
?3 to potentially painful events, which are also unexpectedly reversed. In the process of being returned to the initial asset position, does the sequence in which the positive and negative events occur matter? This issue of the combined effect of pleasurable and painful stimuli has received scant theoretical or empirical attention. We attempt to fill this lacuna in the literature by studying the retrospective evaluation of surprises that return individuals to their original economic state. Although such surprises do not change an individual's original economic state, we argue that the individual's psychological state changes, and the final affective state is, among other things, a function of the sequence in which the events occur.

From a theoretical standpoint, several perspectives can be brought to bear on the issue. For instance, one reading of mental accounting, based on prospect theory's value function, would predict that losses should dominate gains, and therefore, *regardless of sequence,* people should be unhappy when exposed to two economically equivalent outcomes of different signs. Conversely, the literature on intertemporal choice would suggest that a series that ends on an up note is preferred to a series that ends on a down note, because people like to defer gratification so that they may savor positive outcomes. Similarly, people apparently have a preference for ''happy endings.'' Finally, the extant literature on ''recency effects'' would predict that the last event in a series should have a disproportionate influence on overall affect.

Our model relies on a shift in the reference point to explain how a surprising reversal of an event will lead to a nonzero evaluation of the sequence. We suggest that people's reference points shift immediately but imperfectly after a stimulus is presented. Intuitively, this implies that the first stimulus will shift the reference point in its direction, as a result of which the evaluation of a sequence of events in which an initial event is unexpectedly reversed will be more favorable if the first event is a loss than if it is a gain. This model captures the unanticipated nature of the second event (i.e., the surprise element) by allowing the first event to move the reference point. Consequently, by the time the next event occurs the reference point has been updated, as a result of which the zero economic outcome of the sequence yields nonzero utility. We further posit that the magnitude of the reference point shift should be affected by the time elapsed between the two stimuli. Specifically, the reference point shifts gradually with time, until it is fully updated. Consequently, the final affective state of the sequence is also a function of the temporal distance between the two events.

The main predictions of the model were empirically supported first in a survey using a mall-intercept sample. Subsequently, we conducted a study of student subjects involving a coin-tossing game in which real money was at stake and in which subjects in one condition experienced the second outcome after a two-day delay. Our results from this second study supported the model's prediction regarding the impact of the elapsed time between the events. The experimental tasks involved surprising reversals of initial outcomes, thus ensuring that ''savoring/dread'' types of explanations (which require that subjects anticipate the second event) could not be operating. Finally, in a series of three follow-up studies, we tested the claim that the magnitude of outcomes would have an impact on observed affect, and consistent with our theory and contrary to recency predictions, we observed similar results across different magnitudes.

While theoretically interesting, we should also note that our research is of potential pragmatic significance. People's reactions to a series of events is of considerable interest to marketers desirous of generating enhanced attitude, affect, purchase intention, and the like without offering economic inducements such as rebates, coupons, or other costly discounts. Additionally, public policy officials may be interested in protecting people from being manipulated into purchasing a product simply because of changes in the sequence in which a series of offers is made by the merchant.
(*Framing; Surprises; Mental Accounting*)

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An applicant to graduate school opens her mail and reads a letter that says that she has been accepted into the school of her choice, only to realize that the letter is addressed to somebody else; there clearly has been a clerical error.

A passenger boarding an international flight looks for his passport in his briefcase and can't find it. A moment later, after a frantic search, he discovers it in his hip pocket.

Car dealers frequently draw customers into their establishment with the promise of an attractive advertised deal. However, upon arrival, the car buyer discovers that the deal does not apply to the model he wishes to buy. Nonetheless, after a few minutes of consultation with a "sales manager," the salesperson returns with the news that an exception has been made and the deal has been approved. The buyer is relieved. Why does the dealership not simply offer the deal on the buyer's preferred model in the first place?

1. Introduction

People are frequently exposed to potentially attractive events that are subsequently and unexpectedly reversed and to potentially painful events, which are also unexpectedly reversed. These events can occur because the individual makes an error or because somebody else makes an error. Such *surprising* reversals of initial events (both pleasant and unpleasant) form the focus of our inquiry. Specifically, we examine how people feel after being exposed to a series of two events of equal magnitude but opposite valence; such a sequence does not change the person's original economic state. Further, in the process of being returned to the initial asset position, does the sequence in which the positive and negative events occur matter? We argue that, following a series of events in which an initial event is subsequently reversed, an individual's psychological state changes, even though the individual's economic state has not changed, and the final affective state is, among other things, a function of the sequence in which the events occur.

This reversal of an initial event may occur because the first event simply did not occur (i.e., in the first and second of our opening vignettes, the applicant was not admitted to the graduate school of her choice, and the international passenger did not lose his passport), or because a second event of equal magnitude but opposite valence occurs (as in the third of our opening vignettes). However, in all situations the affected individual may evaluate the sequence of events as if both events had actually occurred. This issue of the combined effect of pleasurable and painful stimuli has received scant theoretical or empirical attention. We attempt to fill this lacuna in the literature by studying the retrospective evaluation of a sequence of events in which an initial event is surprisingly and unexpectedly reversed. Thus, the recipient of good news may find that the good news was intended for someone else, or the recipient of bad news may find that the bad news was delivered in error.

From a theoretical standpoint, several perspectives can be brought to bear on the issue. For instance, one reading of mental accounting, based on prospect theory's value function, would predict that losses should dominate gains, and therefore, *regardless of sequence,* people should be unhappy when exposed to two economically equivalent outcomes of different signs (cf. Thaler 1985). Conversely, the literature on intertemporal choice would suggest that a series that ends on an up note is preferred to a series that ends on a down note, because people like to defer gratification so that they may savor positive outcomes (Loewenstein and Prelec 1993, Prelec and Loewenstein 1998). Similarly, Ross and Simonson (1991) demonstrate that people have a preference for ''happy endings.'' Finally, the extant literature on ''recency effects'' would predict that the last event would have a disproportionate influence on overall affect. ?4

While our empirical observations are consistent with the ''happy endings'' perspective, we offer a mechanism for why this occurs that is different from the ''gain-savoring'' perspective available in the intertemporal choice literature. Our model applies to situations in which the second event is unexpected and is surprising; hence, the gain-savoring argument cannot apply because the second event is unanticipated. Rather, we invoke the notion of a labile refer-

ence point and argue that the first event induces a shift in the reference point, and this shift has implications for the retrospective evaluation of the entire sequence after the second event occurs. We offer a simple model for the proposed process and empirically test the key predictions in several studies.

While theoretically interesting, we should also note that our research is of potential pragmatic significance. People's reactions to a series of events is of considerable interest to marketers desirous of generating enhanced attitude, affect, purchase intention, and the like without offering economic inducements such as rebates, coupons, or other costly discounts. For instance, Kalwani and Yim (1992) observe that unfulfilled promotion expectations (i.e., unpleasant surprises) have an adverse effect on brand purchase probability, while unexpected promotions (i.e., pleasant surprises) have the opposite effect. Finally, public policy officials may be interested in protecting people from being manipulated into purchasing a product simply because of changes in the sequence in which a series of offers is made by the merchant.

The rest of our paper is organized as follows. First, we turn to a review of the literature that pertains to our topic of inquiry and develop a model and our hypotheses. Then, in the section that follows, we report on a series of studies designed to test our model and speak to alternative explanations. In the concluding section, we address the theoretical and practical implications of our research.

2. Literature Review and Conceptual Framework

We examine the literature on mental accounting (Thaler 1985, Thaler and Johnson 1990), as well as the literature on intertemporal choice (Loewenstein and Prelec 1993, Prelec and Loewenstein 1998), because of their apparent pertinence to our research question. However, our topic of inquiry has a different flavor. Specifically, while these other literatures focus on how individuals react to *anticipated* outcomes that have nonzero absolute outcomes (i.e., gains and losses), our interest is in a different class of problem, that of surprises that return individuals to their original economic state.

2.1. Mental Accounting

Behavioral decision theory (BDT) is rooted in the empirical observation that the framing of an alternative affects its evaluation (Kahneman and Tversky 1979, Thaler 1980, Thaler 1985, Thaler and Johnson 1990, Linville and Fischer 1991, Prelec and Loewenstein 1998, Gourville and Soman 1998). Frames that emphasize gains are preferable to economically equivalent frames that emphasize losses. This preference has implications that are germane to the issue of the evaluation of multiple outcomes.

The prospect theory value function (Kahneman and Tversky 1979, Thaler 1985) is a central descriptive pillar of BDT and possesses three important properties (Kahneman and Tversky 1979, Thaler 1985, Thaler and Johnson 1990):

(1) It is defined separately for gains and losses in comparison to some reference point, suggesting that people respond to *changes* relative to the reference point, not absolute states. Consequently, as Linville and Fischer (1991) observe, a prospective salary of \$90,000 for someone making \$100,000 currently constitutes a pay cut (i.e., a loss) because the reference point is \$100,000.

(2) It is S-shaped; concave for gains and convex for losses (i.e., $v''(x) < 0$, $x > 0$; $v''(x) > 0$, $x < 0$). This property reflects the psychophysical principle of diminishing impact; a gain of \$100 after having earned \$10,000 has less impact than a gain of \$100 after having earned \$50.

(3) It is steeper for losses than it is for gains (i.e., $v(x) < -v(-x)$, $x > 0$). This property reflects the principle of ''loss aversion''; the *dis*utility associated with a loss is greater than the utility associated with a gain of the same magnitude.

In a seminal test of the implications of prospect theory for marketing, Thaler (1985) demonstrated that people whose multiple gains were *segregated* (acquired separately) were judged to be happier than people whose multiple gains were *integrated* (acquired simultaneously). Similarly, people whose multiple losses were *segregated* (suffered separately) were

judged to be unhappier than people whose multiple losses were *integrated* (suffered simultaneously); this prediction has, however, not received empirical support subsequently (Thaler and Johnson 1990, Linville and Fischer 1991). More pertinent to our inquiry, he further examined how people react to mixed outcomes. Consistent with the property of loss aversion, subjects judged individuals who had their mixed gains *integrated* (i.e., combined and presented as a small gain) to be happier than those who had their mixed gain segregated. (For mixed losses—a large loss and a small gain—the prospect theory value function prediction is ambiguous; large losses should be combined with smaller gains to create small losses unless the ratio between the large loss and small gain is substantial.)

In Thaler's (1985) work, the mixed outcomes that subjects evaluated were nonzero—either positive or negative. Furthermore, the individual events occurred in separate mental accounts. Yet, the principle of loss aversion that applied in that context can logically be extended to our research question, in which individuals are restored to their initial economic state through a surprising reversal of events (i.e., zero outcomes) in the same mental account. Because of loss aversion, the utility of losses and gains of equal magnitude should not cancel each other out but should yield overall disutility, if the two outcomes are segregated. If they are integrated, then the overall evaluation would be zero.

A second literature stream that is pertinent to our question about individuals' preferences for the order in which losses and gains occur is the literature on intertemporal choice. This literature speaks to individuals' preferences for a variety of anticipated economic as well as social outcomes over time.

2.2. Intertemporal Choice

The literature on intertemporal choice as it pertains to preferences for sequences of outcomes examines an apparent anomaly, that of ''positive time discounting.'' Specifically, from an economic standpoint, individuals should always rationally prefer the best outcome to occur first: Given the choice of earning $100,000 in the first year, $90,000 in the second, and $80,000 in the third—versus $80,000 in the first, $90,000 in the second, and $100,000 in the third—people should rationally always prefer the first series (Loewenstein and Prelec 1993, Loewenstein and Sicherman 1991). The logic for this is based on the notion of the time value of money. Larger, more positive outcomes, when they occur early in a series, are more valuable than when they occur later in a series. However, contrary to this normative prediction, people consistently seem to prefer an increasing series for wages (Loewenstein and Sicherman 1991) as well as for simpler monetary outcomes (Ross and Simonson 1991). This ''preference for happy endings'' persists even when subjects are informed about arguments for preferring positive time discounting (Loewenstein and Sicherman 1991).

Several explanations have been offered for the preference for delaying positive outcomes and for hastening negative outcomes. In one ingenious demonstration of subjects' preference for delayed gratification, Loewenstein (1987) elicited subjects' willingness to pay for (among other things) a kiss from a movie star of the subjects' choice either immediately, in 24 hours, in 3 days, in 1 year, or in 10 years and observed an inverted U-shaped response curve. People were willing to pay more for a kiss later rather than immediately (i.e., they preferred to defer a kiss), except when the kiss occurred 10 years later. He argues that people derive utility from the ''savoring'' of a positive outcome (and also suffer disutility from the dread associated with negative outcomes). In later work, Loewenstein and Prelec (1993) present a formal model that incorporates notions of savoring and dread (the preference for an improving series of outcomes) and ''. . . a desire to spread consumption evenly over time'' (p. 91).

Notice that *anticipation of the subsequent events is crucial to this explanation,* because anticipation yields savoring and dread. For example, Loewenstein and Prelec (1993) observed that only when a sequence is made salient do people defer good outcomes; when evaluated separately, good outcomes are not deferred. In other words, in our context, subjects need to be aware that a positive event will follow a negative event (or vice versa) for this explanation to be oper-

ative. Yet, as we will discuss when we develop our model, our argument rests on the premise that the second event is an unanticipated surprise, therefore savoring and dread cannot be operating.

2.3. Other Explanations

Other explanations for preferring improving sequences include recency effects (Miller and Campbell 1959) and contrast effects (Varey and Kahneman 1992). The recency effect in its simplest form (we term that ''simple recency'') posits that the most recent outcome in a sequence of outcomes has the largest impact on memory and consequently on perception. Thus, if events in a series were weighted, in the extreme case, simple recency would posit that the last event in the series would be weighted highest and all other events not at all. (Less extreme and more general cases would include what we discuss later under ''latent recency,'' in which the weight attached to more recent events that may not be the last event is larger than the weight attached to a less recent event.) Ross and Simonson (1991) observe that the recency effect is not a plausible explanation for the preference for happy endings because the observed crucial determinant of evaluations of experiences is the *trend* of events, not merely the last event (Varey and Kahneman 1992, Loewenstein and Prelec 1993). Furthermore, if recency is operative, sequences comprising events of large magnitude should yield stronger affect than sequences comprising events of small magnitude, but as we observe empirically, this does not occur.

The contrast effect, which is related to the notion of a labile reference point (Kahneman and Tversky 1979), relies on the comparison of the last event with previous events in the series, much like Helson's (1964) adaptation level argument, which also suggests that a stimulus is evaluated relative to the history of exposure to related stimuli. In effect, when exposed to a series of events, a shift of subjects' reference points is induced by events early in the series, changing the base from which subsequent events are evaluated.

In sum, according to the extant literature, how $\{-x, +x\}$ and $\{+x, -x\}$ events will be evaluated is not entirely clear. On the one hand, loss aversion suggests that all such events will be evaluated negatively if $(-x)$ and $(+x)$ are put into different mental accounts and will be evaluated the same as a zero outcome if they are put into the same mental account. On the other hand, savoring/dread and recency suggest that the sign of the last event will affect overall evaluation. However, there is no clear prediction on how *unanticipated reversals* of initial events will be evaluated. We offer a model that allows for such a prediction.

2.4. Model Development

Our model, like the contrast effect perspective, relies on a shift in the reference point to explain how a surprising reversal of an event will lead to a nonzero evaluation of the sequence. We apply prospect theory to our problem and suggest that people's reference points shift immediately but imperfectly after a stimulus is presented. Intuitively, this implies that the first stimulus will shift the reference point in its direction, as a result of which the evaluation of a sequence of events in which an initial event is unexpectedly reversed will be more favorable if the first event is a loss than if it is a gain. In the former case the reference point is shifted in the direction of the loss, whereas in the latter case the shift is in the direction of the gain. We term this phenomenon an ''order effect,'' to reflect different psychological end states as a consequence of the order in which equivalent information is encountered.

We further posit that the magnitude of this order effect should be affected by the time elapsed between the two stimuli. Specifically, the reference point shifts gradually with time, until it is fully updated (Strahilevitz and Loewenstein 1998, Gourville and Soman 1998). Consequently, the order effect should become more severe as the temporal distance between the two events becomes larger.

A Simple Model. Following Tversky and Kahneman (1992), we apply the prospect theory value function to our problem and define the value of an event of magnitude x:

$$v(x) = \begin{cases} x^{\alpha} & \text{for } x \geq 0 \\ -\lambda(-x)^{\beta} & \text{for } x < 0, \end{cases} \qquad (1)$$

where x is an outcome ($x > 0$), α and β determine the curvature of the value function in gains and losses, respectively; $0 < \alpha \leq \beta < 1$; and λ is the loss aversion coefficient, $\lambda \geq 1$. Alternative formulations that incorporate other functional forms also ought to yield the results we find; however, in light of the substantial theoretical and empirical justification associated with the prospect theory value function, we choose that formulation so as to situate our model in a well-developed extant theoretical perspective.

?6 **Value of a Gain Followed by Loss** $\{v_{t1}(x_{t0}, -x_{t1})\}$. Define a gain $\{x\}$: $x \geq 0$. Define the amount by which the reference point moves after the first event to be m: $m = \mu x$, where μ represents the coefficient of shift, $0 \leq \mu \leq 1$. This parameter represents the degree to which an event shifts the current reference point. When $\mu = 0$, the reference point has not moved at all, and when $\mu = 1$, the reference point has moved completely to the new state of wealth. The shift coefficient should be a function of both time (t) and event magnitude (x), such that it increases in t but decreases in x. Conceptually, the shift coefficient is such that the time required to completely shift the reference point is proportional to the event magnitude. For example, if the amount of time required to completely shift the reference point to $x = 1$ is t, the amount of time required to completely shift the reference point to $x = 10$ should be $10t$. The shift coefficient can be written as follows:

$$\mu = \begin{cases} \dfrac{ct}{x} & \text{for } t \leq \dfrac{x}{c} \\ 1 & \text{for } t > \dfrac{x}{c}, \end{cases} \tag{2}$$

?7 where $c > 0$ is a constant. Note that when $t > x/c$, $\mu = 1$; this implies that sufficient time has elapsed for the reference point to be completely updated. As a result, people's evaluation of the zero economic outcome will be equivalent to their evaluation of the second event alone. Because this is equivalent to a simple recency effect, we will focus on the cases where $t \leq x/c$ in the discussion that follows.

Now, consider a sequence of events according to which a gain $\{x\}$ occurs at time t_0 and a loss $\{-x\}$ occurs at time t_1. According to our model, by time t_1, the reference point has shifted by an amount m in the direction of x:

$$m = \mu x. \tag{3}$$

In general, the utility of any economic outcome is evaluated relative to a reference point (Thaler 1985, Kahneman and Tversky 1979). Thus, the psychological value of an economic outcome X (which may comprise several sub-outcomes) can be written as $v(X - R)$. This X may be positive, zero, or negative. Now, in our formulation, when the second event $\{-x\}$ occurs, the economic outcome of the sequence is zero, but the reference point has shifted by m. From this updated reference point ($R = m$), the sequence $\{x, -x\}$, which has an economic outcome (X) $= 0$, has a utility of

$$\begin{aligned} v_{t1}(x_{t0}, -x_{t1}) &= v(X-R) = v(0-m) = v(0-(\mu x)) \\ &= v(-\mu x), \end{aligned} \tag{4}$$

where X stands for the real economic outcome and ?8 R stands for the reference point against which X is evaluated. Because $0 \leq \mu \leq 1$ and $x > 0$, $\{-\mu x\}$ is a nonpositive outcome for all $\mu \geq 0$. Thus, from Equation (1), the value of the sequence comprising a gain followed by a loss of equal magnitude when there is shift of m in the reference point after the first event is

$$v_{t1}(x_{t0}, -x_{t1}) = v(-\mu x) = -\lambda(\mu x)^{\beta}. \tag{5}$$

Substituting Equation (2) in Equation (5) above, we get

$$v_{t1}(x_{t0}, -x_{t1}) = -\lambda\left(\frac{ct}{x}x\right)^{\beta} = -\lambda(ct)^{\beta}. \tag{6}$$

Value of a Loss Followed by a Gain $\{v_{t1}(-x_{t0}, x_{t1})\}$ Define a loss $\{-x\}$: $x \geq 0$. Define the amount by which the reference point moves after the first event to be m': $m' = \mu(-x)$. Now, consider a sequence of events according to which a loss $\{-x\}$ occurs at time t_0 and a gain $\{x\}$ occurs at time t_1. By time t_1, the reference

point has shifted by an amount m' in the direction of $-x$:

$$m' = -\mu x.$$

In our formulation, when the second event $\{x\}$ occurs, the economic outcome of the sequence is zero, but the reference point has shifted by m'. From this updated reference point ($R = m'$), the sequence $\{-x, -x\}$ which has an economic outcome $(X) = 0$, has a utility of

$$v_{t1}(-x_{t0}, x_{t1}) = v(X - R) = v(X - m') = v(0 - (-\mu x)) = v(\mu x). \quad (7)$$

Because $0 \leq \mu \leq 1$ and $x > 1$, $\{\mu x\}$ is a nonnegative outcome for $\mu > 0$. Thus, from Equation (1), the value of the sequence comprising a loss followed by a gain of equal magnitude when there is shift of m' in reference point after the first event is

$$v_{t1}(-x_{t0}, x_{t1}) = v(\mu x) = (\mu x)^{\alpha}. \quad (8)$$

Substituting Equation (2) in Equation (8), we get

$$v_{t1}(-x_{t0}, x_{t1}) = (\mu x)^{\alpha} = (ct)^{\alpha}. \quad (9)$$

THEOREM 1. *$v_{t1}(-x_{t0}, x_{t1}) \geq 0 \geq v_{t1}(x_{t0}, -x_{t1})$.*

PROOF. Because $\lambda \geq 1$, $c > 0$ and $t \geq 0$, from Equation (6) $v_{t1}(x_{t0}, -x_{t1}))$ is always nonpositive. It is zero only when $t = 0$. Similarly, from Equation (9), $v_{t1}(-x_{t0}, x_{t1})$ is always nonnegative. It is zero only when $t = 0$. Note that the inequality holds even if the values of t are different in Equations (6) and (9). The substantive implication is that a loss followed by a gain (i.e., a false alarm) *always* produces some positive utility, and a gain followed by a loss (i.e., a dashed hope) *always* produces some negative utility. Therefore, a false alarm *always* makes people happier than a dashed hope.[1,2] □ ?9

Insights from the Model. The order effect is captured by the following equation:

$$v_{t1}(-x_{t0}, x_{t1}) - v_{t1}(x_{t0}, -x_{t1}) = (ct)^{\alpha} - (-\lambda(ct)^{\beta}) = (ct)^{\alpha} + \lambda(ct)^{\beta}. \quad (10)$$

Consistent with our discussion above, we prove in Appendix 1 (Lemma 1) that the order effect increases with the amount of time elapsed between the two events (for $t \leq x/c$). Intuitively, this means that after the first event occurs, the reference point will shift gradually until it is fully updated. As a result, the zero economic outcome will appear increasingly more favorable if the first event is a loss and increasingly more unfavorable if the first event is a gain. Thus, a loss followed by a gain will be evaluated more positively—and a gain followed by a loss more negatively—with the passage of time, which leads to an enhanced order effect. ?10

Substantively, our model captures the unanticipat-

[1]For simplicity, the model assumes that the retrospective evaluation occurs at the same time as the second event. In reality, however, the evaluation happens shortly after the second event. Nevertheless, this simplification was adopted for two important reasons. First, the temporal distance between the evaluation and the second event is shorter than that between the first and second event in our experimental context. Second, and more importantly, because the two events are in the same mental account, they are edited before being evaluated, and the second event ought to close the mental account that is opened by the first event, producing a zero economic outcome. Thus, the temporal distance between the second event and evaluation only reduce the overall evaluation of a sequence by shifting the reference point towards zero. In other words, the magnitude of the utility of a false alarm and the disutility of a dashed hope will decline over time. This is consistent with the intuition that a false alarm or a dashed hope that occurred a long time ago has relatively little impact on today's happiness level. However, our main predictions, as well as the auxiliary predictions in Footnote 4, are not affected by this simplification.

[2]Following the logic of Footnote 1, using different shift coefficients for gains and losses will not change the model qualitatively. Because at t_1 the second event closes the mental account and is added to the first event, the shift of the reference point due to the second event is irrelevant to the directional predictions. Thus, a positive shift coefficient for the first event is the only condition necessary for our model to work.

ed nature of the second event (i.e., the surprise element) by allowing the first event to move the reference point. Consequently, by the time the next event occurs the reference point has been updated, as a result of which the zero economic outcome of the sequence brings about a nonzero utility. Notice that this is a key conceptual distinction between our focus and that of the savoring and dread literature (Prelec and Loewenstein 1998). For savoring and dread, people need to anticipate the second event so as to derive utility from the prospect of future consumption. In our problem, the reverse is true. It is critical that people *not* anticipate the second event so that they may be surprised by the reversal of the first event. If people are aware that a second outcome is going to undo the first, the reference point will likely not shift after the first event. Thus, the Prelec and Loewenstein (1998) model is likely to apply when both events are known or anticipated, whereas the current model is likely to apply when the second event is a surprise.

2.5. Hypotheses

Based on the empirical observations available in the literature and our model based on labile reference points, we expect that a loss-followed-by-gain series will yield more favorable evaluations than an equivalent gain-followed-by-loss series. Specifically, we should observe that subjects will be happier when a sequence follows a $\{-x, +x\}$ pattern, as opposed to a $\{+x, -x\}$ pattern ($x > 0$). Furthermore, because of changes in the shift coefficient (μ), this order effect should increase with the passage of time.[3]

This suggests the following principal refutable predictions:

HYPOTHESIS 1. *Two events of equal magnitude but different valence will make people happier when the first event is negatively valenced and the second event is positively valenced, relative to when the order of events is reversed.*

HYPOTHESIS 2. *The order effect predicted in Hypothesis 1 should increase as the time elapsed between the two event increases.*

We now turn to a description of our attempts to empirically examine these predictions.[4]

3. Methodology, Analysis, and Results

Overview

In the first study, we examined the main effect of event order (Hypothesis 1) and replicated it across two settings that represented different event magnitudes. We then conducted a second study to test the impact of time on the order effect (Hypothesis 2). While both studies provided support for our argument, one alternative explanation for our findings is a recency explanation. Therefore, we next conducted a series of studies to eliminate recency as a rival explanation for our results.

3.1. Study I: Testing Hypothesis 1

The first study comprised a 2 (loss first versus gain first sequence) between-subjects factorial design for two separate experimental settings that was fielded on a mall-intercept sample of 80 adults by a professional marketing research firm. Respondents read a description about Mr. A, who in the first setting was planning to purchase a new car and was shopping for auto insurance (here, the magnitude of events was large); in the second setting, Mr. A was planning to

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[3]Hoch and Loewenstein (1991) offer a conceptual approach from which some of our predictions can be derived. For instance, a gain followed by a loss should produce a disutility of $-v(x(1-\mu)) + v(-x\mu)$. The utility of a loss followed by a gain can be written as $v(\mu x) - v(-x(1-\mu))$. Thus, consistent with our prediction, a loss followed by a gain makes people happier than a gain followed by a loss. However, our model offers additional insights such as the relationship between the order effect and time between events without the imposition of additional assumptions (e.g., $\mu < 0.5$), which would be necessary in the Hoch and Loewenstein (1991) model and which, according to our formulation, may not be tenable (because μ increases from 0 to 1 over time).

[4]Our model also makes three other predictions. As discussed earlier, (i) a false alarm always makes people happier and (ii) a dashed hope always makes people less happy, relative to the status quo. Third, assuming the same value of c for losses and gains (see Equations (6) and (9)), the disutility generated by a dashed hope should always be larger than the utility generated by a false alarm, because of loss aversion. In the interest of brevity, we do not provide details of formal tests of these predictions (but see Footnote 6).

Table 1 Summary of Univariate Results for Study I (*F*-values of Order Effect)

Magnitude	Happiness	Purchase Intention	Attitude	Perceived Value	Perceived Fairness
Large	10.64* (0.22)	3.07	9.00* (0.19)	2.49	1.31
Small	24.72** (0.39)	21.51** (0.36)	53.62** (0.59)	23.87** (0.39)	25.91** (0.41)

Note: (1) Degrees of freedom for all tests are (1, 38). (2) Figures in parentheses are the effect size estimate η^2 (Rao and Monroe 1989). *$p \leq 0.01$; **$p < 0.001$.

renew his subscription to a popular national newsmagazine (here, the magnitude of events was small). Mr. A receives a quote for $350 for auto insurance that is subsequently raised to $450 and then reduced to $350 ($45 for the magazine subscription, a $10 increase over his current $35 subscription, that is subsequently reversed) in the loss followed by gain condition. Similarly, in the gain-followed-by-loss condition, Mr. A receives a quote for $350 for auto insurance that is subsequently discounted by $100 and then increased back to $350 (for the magazine subscription, he receives a $10 discount on his current $35 subscription, which is subsequently reversed). These changes in rates occur for specific reasons in each condition. For the insurance rate discount reversal, Mr. A is discovered to have had a driver's license for less than three years, but after a conversation with a supervisor, the requirement is waived. For the magazine subscription discount reversal, Mr. A's student status is found to have expired, but after a conversation with a supervisor the requirement is waived (see Appendix 2 for a sample stimulus and some of the measures of dependent variables).

The stimuli were designed to assure that the initial asset position and the final asset positions were identical in auto insurance and magazine subscription conditions, respectively. However, the percentage changes in each condition differed. For instance, in the loss-followed-by-gain condition (price increase of $100 or $10 followed by a price decrease of $100 or $10) the subject perceives a 29% increase followed by a 22% decrease. In the gain-followed-by-loss condition, a 29% decrease is followed by a 40% increase. Yet, notice that in both conditions if the subject had focused on percentage changes alone, and not on the magnitude ($100 or $10), increases were always greater than the decreases and, because of loss aversion, a mental accounting-based prediction should still be that the subject should be unhappy in both conditions. However, that is not our prediction.

Subjects were first asked to indicate their judgment of the relative happiness of Mr. A before versus after the loss and gain (or gain and loss) occurred. To test the behavioral consequences of the order effect, they also responded to several seven-point scale measures including a single-item measure for purchase intention and multi-item measures for attitude toward the offer (five items, Cronbach's $\alpha = 0.97$; Burton and Lichtenstein 1988); perceived offer value (four items, Cronbach's $\alpha = 0.89$, Berkowitz and Walton 1980); offer fairness (three items, Cronbach's $\alpha = 0.86$; Oliver and Swan 1989), as well as demographic items; and the believability of the scenarios. Overall, subjects found the scenarios believable (5.3 on a seven-point scale where 1 = ''very unbelievable'' and 7 = ''very believable''). They were 75% female, ranged in age from 18 to 60, and their median household income was between $50,000 and $75,000.

Analysis and Results. Data from both settings were submitted to a MANOVA on the five dependent variables, which indicated that there was a significant effect of order (Wilks $\lambda = 0.722$, $F(5, 34) = 2.616$, $p < 0.05$ for auto insurance (large magnitude); Wilks $\lambda = 0.393$, $F(5, 38) = 10.51$, $p < 0.001$ for magazine subscription (small magnitude)). Because the multivariate analysis yielded significant results, univariate analyses of variance results on each of the five dependent variables for large and small magnitudes, respectively, are summarized in Table 1. In general, the effect of the order in which events were encountered is significant on all dependent variables when the stimulus used small magnitude events. For large

Table 2 Cell Means (Standard Deviations) for Study I

Dependent Variable	Magnitude	Happiness		Purchase Intention		Attitude		Perceived Value		Perceived Fairness	
		$(-x, x)$	$(x, -x)$	$(-x, x)$	$(x, -x)$	$(-x, x)$	$(x, -x)$	$(-x, x)$	$(x, -x)$	$(-x, x)$	$(x, -x)$
Mean	Large	8.35	3.08**	5.15**	4.25	4.80*	3.34*	3.97	3.24**	4.61**	4.06
(SD)		(6.43)	(1.71)	(1.53)	(1.71)	(1.58)	(1.50)	(1.50)	(1.36)	(1.46)	(1.57)
Mean	Small	9.85**	2.85**	6.05**	3.85	5.60**	2.48**	4.45	2.29**	5.54**	3.14*
(SD)		(3.32)	(2.35)	(1.54)	(1.46)	(1.47)	(1.22)	(1.30)	(1.49)	(1.34)	(1.60)

Note: (1) Degrees of freedom for all tests are 19. (2) $(-x, x)$ = loss followed by gain, and $(x, -x)$ = gain followed by loss. **Significantly different from the midpoint ($p < 0.01$). *Significantly different from the midpoint ($p < 0.05$).

magnitude events, happiness and attitude showed significant order effects. (The other three dependent variables were directionally correct though not significant.) Consistent with Hypothesis 1, mean ratings for happiness were significantly higher ($p < 0.001$) when a loss was followed by a gain, relative to when a loss was preceded by a gain, for both small and large magnitudes.

Furthermore, as reported in Table 2, the mean differences between the loss-followed-by-gain condition scores and gain-followed-by-loss condition scores were all in the hypothesized direction (mean differences: happiness = 5.27 on a 15-point scale, purchase intention = 0.90, attitude toward the deal = 1.46, perceived value = 0.73, and perceived fairness = 0.55, all on seven-point scales for large magnitude; 7.00, 3.20, 3.12, 1.16, 2.40 were the values, respectively, for small magnitude). Besides, all but six of the cell means are different from the midpoint 4, with the loss-followed-by-gain sequence producing positive affect and behavioral intention and the reverse order producing negative affect and behavioral intention (Table 2).[5]

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Discussion. The results of this first study are noteworthy because they unambiguously demonstrate that the phenomenon we examine is real with respect to respondent perceptions. Real-world subjects consistently responded differently when they evaluated a sequence of events that was economically neutral but varied in the order in which the events were presented. Consistent with our original premise, subjects' reference points apparently moved following an event. As a consequence, subjects who evaluated a sequence comprising a negative outcome that was followed by an unexpected positive outcome attributed greater happiness to the protagonist than subjects exposed to a sequence comprising identical events but in the opposite order.[6] Furthermore, this shift in the reference point has implications beyond the subjective state of well-being. Attitudes toward the deal, perceptions of value and fairness, and purchase intention are all seemingly affected in the same manner as happiness. Finally, if recency had been operative, subjects in the large magnitude condition (insurance) should have displayed stronger effects because they would have been influenced by the last (most recent) large event. However, the results are opposite to the recency prediction. Finally, the observed tendencies are generally stronger when the magnitude of events is small (the magazine subscription rate reversal scenario) relative to when the magnitude of events is large (the auto insurance premium reversal scenario).

Two limitations of this study should be noted. First, much like other studies in this tradition, our experimental subjects judged the happiness and behavioral intention of other people. We are concerned with the potential artifactuality of these stimuli be-

[5]The order effect was replicated in a separate study (not reported here) for three kinds of stimuli—monetary, social, and academic ($p < 0.0001$).

[6]The three predictions in Footnote 4 were supported in all but one instance. Specifically, a false alarm made people happy (but this was not supported for the large event), and a dashed hope made people unhappy relative to the status quo (see Table 2 for the significance levels). Also, the disutility of a dashed hope was larger than the utility of a false alarm (i.e., 3.08 and 2.85 are further away from the midpoint than 8.35 and 9.85, respectively; $p < 0.001$).

cause subjects are asked to function as naïve psychologists and judge the reactions of other people. This clearly is not a debilitating concern because many other impactful papers (cf. Thaler 1985) follow this method. Yet, we reasoned that an alternative methodology that triangulated with this approach would lend more credence to our results. Consequently, we conducted a second study in which the losses and gains were personally experienced and the amount of time that the subject ''owned'' the gain or loss was manipulated. This time manipulation allowed for a test of Hypothesis 2. A second limitation lies in the fact that magazine subscription purchases and auto insurance purchases are not similar. Thus, the differences observed between the two settings could be driven by differences in magnitudes or differences in product contexts. This confound is addressed in a third set of studies where we also eliminate recency as a rival explanation for our findings.

3.2. Study II: Testing Hypothesis 2

One hundred and thirty undergraduate students in a marketing principles class participated in this study in exchange for course credit. The study involved a two-stage ''game.'' Subjects were given an initial $4 endowment with which to play the game. In the game, one subject ''played'' with another. The game involved predicting the outcome of a coin toss. If a subject called correctly, s/he won $1 from the person who tossed the coin; otherwise, s/he lost $1 to the person tossing the coin. Two iterations of the game were played, as a result of which each player had the opportunity to toss once. The order of tossing and calling was determined by a number printed on the instruction sheet (1 = toss first and 2 = toss second) handed out to subjects in random order. This procedure yielded the following set of possible outcomes: win-win, win-lose, lose-win, and lose-lose. Of particular interest to us were the win-lose and lose-win conditions.

There were two conditions in which the game was played. In the first (no delay condition), both iterations occurred one after the other. In the second (delay condition), the second iteration occurred after a two-day delay. Thus, after the first coin toss, subjects kept their winnings, noted their win/loss data on a card (in the form of an IOU), wrote down their names, and turned that information in to the experimenter. Subjects did not know at this point in time that they were going to play the game again two days later. The next time the game was conducted, subjects were given back their cards (to remind them of the outcome from the previous iteration) and asked to play with the same person again. According to Hypothesis 2, subjects who had had an opportunity to shift their reference points would show a stronger order effect than subjects who had not had such an opportunity do so.

Table 3 Happiness Means (Standard Deviations) from Study II

No Delay				Two-Day Delay			
(x, x)	$(-x, x)$	$(x, -x)$	$(-x, -x)$	(x, x)	$(-x, x)$	$(x, -x)$	$(-x, -x)$
10.58 (2.73)	8.65 (2.11)	9.53 (2.19)	7.15 (2.48)	11.66 (2.54)	10.15 (2.19)	7.62 (2.57)	7.13 (3.38)

Note: (x, x) = gain followed by gain, $(-x, x)$ = loss followed by gain, $(x, -x)$ = gain followed by loss, $(-x, -x)$ = loss followed by loss.

Subjects recorded the results of each play and responded to the dependent measures and demographic items after both iterations of play. The instrument itself was distributed after the conclusion of the game to prevent subjects from reading the questions before or during the game. The dependent variable included an item on happiness in which subjects indicated on a 15-point scale whether they were happier or less happy after the game was played as compared to before the game began.

Results. The results from this study are reported in Table 3. Our focus is on the comparison between subjects exposed to a loss followed by an equivalent gain, and subjects exposed to a gain followed by an equivalent loss (n = 20 in each condition under no time delay, and n = 13 in each condition under time delay). The multiple gain and multiple loss subjects (a natural consequence of the game over which we had no control) are not germane to our hypotheses, but we report those data as well in the interest of completeness and because they show that simple recency is not a viable rival explanation.

We used the happiness scores in the mixed out-

come conditions as the dependent variable to run an analysis of variance. We observe a significant order x delay interaction effect ($F_{1,62} = 9.12$, $p < 0.005$), as predicted in Hypothesis 2, and therefore do not further interpret the nonsignificant main effects. An examination of the simple effects in each delay condition reveals the nature of the interaction. In the no-time-delay condition, the cell means are not significantly different. However, in the time-delay condition, consistent with the results of Study I, subjects who lost and then gained were significantly happier than those who gained and then lost ($p < 0.05$). Furthermore, notice that in the delay condition the mean score in (x, x) is larger than in $(-x, x)$ ($p < 0.05$). This pattern would not have been observed if subjects were focusing only on the most recent event, having forgotten the event that occurred two days earlier. (The symmetric condition for losses, i.e., $\{-x, -x\} < \{x, -x\}$ is directionally *not* supportive of a simple recency explanation, though statistically not significant, because of the high variance associated with the $\{-x, -x\}$ condition.) Similarly, and again contrary to what would be expected under simple recency, in the no-delay condition, $(x, x) > (-x, x)$ ($p < 0.01$) and $(-x, -x) < (x, -x)$ ($p < 0.05$).

Finally, and consistent with our observation in Study I, in the two-day delay condition the mean scores in the loss-followed-by-gain condition are higher than the midpoint, while the opposite is true for the gain-followed-by-loss condition. Apparently, the two-day delay had shifted the subjects' reference points and the second outcome was evaluated relative to the new reference point, while in the no-delay condition the reference point had not moved sufficiently to yield the predicted order effect.[7]

In summary, in the first study, we established that the order of the events produced a systematic effect on people's happiness, so that a loss followed by a corresponding gain makes people happier, and a gain followed by a corresponding loss makes people less happy than an integrated zero-outcome does. (We also found preliminary evidence that the order effect diminishes with the magnitude of the events.) In the second study, we found support for the impact of elapsed time between the two events on the order effect. After a time delay, subjects' reference points seemingly move further and, consequently, the order effect is more pronounced. We also find compelling evidence that the observed effects are being driven by something other than a mere evaluation of the last event (i.e., a simple recency effect).

We now turn to our third set of studies, in which we eliminate recency and latent recency as rival explanations. While recency posits that only the most recent event has an impact on peoples' affective state, latent recency postulates that all events have an impact on peoples' affective state, with the most recent event having the greatest impact, the second most recent event having second greatest impact, and so on. Because our findings in Studies I and II can be explained by a recency-based mechanism, we need to be able to distinguish whether our explanation of a labile reference point, or such a recency effect, is operative.

3.3. Eliminating Recency Explanations

When a second event surprisingly reverses a preceding event, the shift of the reference point can follow one of the three patterns. First, the reference point may not move at all between the two events (i.e., $\mu = 0$). In that case, both false alarms and dashed hopes should either yield disutility because of loss aversion or simply cancel each other out (depending on whether the events are coded into different or the same mental account). Second, the reference point may move completely between the two events (i.e., $\mu = 1$). This implies that only the second event has an impact on affect, which is empirically equivalent to simple recency. Therefore, assuming the value function retains its functional form after the reference point shifts, a pleasant surprise should make people as happy as a single event that has the same (positive)

[7]Clearly, in Study I, the absence of a time delay did not dampen the movement of the reference point as it did in this study. We speculate that in that study, subjects were reacting to events that happened to Mr. A, and there was an implicit time frame encompassing those events. Consequently, subjects may have attributed a vicarious shift in the reference point to Mr. A. As one anonymous reviewer astutely observed, real-time evaluations as in Study II may yield different ratings, relative to evaluations of ''remembered'' events (Ratner et al. 1999).

magnitude as the second event. Similarly, an unpleasant surprise should make people as unhappy as a single (negative) event that has the same magnitude as the second event in the surprise.

The last possibility that our model offers is that the reference point moves partially after the first event, i.e., $0 < \mu < 1$. Thus, both events will affect people's happiness, but the second event will have a larger impact. Consequently, a loss followed by a gain should make people less happy than a pure gain, and a gain followed by a loss should make people less unhappy than a pure loss (i.e., our model should dominate a simple recency explanation). Note further that according to our model, after an adequate amount of time, the reference point will be completely updated (i.e., μ becomes 1). This special case is empirically equivalent to the simple recency effect.

To empirically examine the issue, we conducted an experiment (Study IIIa) with the following four conditions: pure gain, pure loss, loss followed by gain (i.e., a pleasant surprise), and gain followed by loss (i.e., an unpleasant surprise). Gains and losses in all conditions had the same magnitude of \$10. As discussed above, the three possible reference point shifts predict different results in the four conditions.

Forty subjects in an introductory marketing class participated in this experiment in exchange for course credit. The subjects were randomly assigned to one of the experimental conditions, with 10 subjects each. The stimuli for the four conditions described a trip by Mr. A to the grocery store, where he either fortuitously discovers \$10 (pure gain), searches for \$10 that he does not find (pure loss), or searches for \$10 in a wallet that is subsequently discovered in the back seat of his car (loss followed by a gain), or finds \$10 in the back seat of his car but discovers his wallet is missing \$10 (gain followed by a loss). Subjects indicated on a 1–15 scale whether Mr. A was happier before or after the event(s) occurred, with 1 anchored at much happier before and 15 much happier after.

The cell means and standard deviations are summarized in Table 4 below. First, consistent with Hypothesis 1, a pleasant surprise yields happiness ($11.7 > 8$, $p < 0.001$, where 8 is the midpoint of the scale), while an unpleasant surprise yields unhappiness ($5.80 < 8$, $p < 0.01$). Furthermore, a pleasant surprise yields less happiness than a pure gain ($11.7 < 14.0$, $p < 0.05$), while an unpleasant surprise yields less unhappiness than a pure loss ($5.80 > 2.00$, $p < 0.01$). These results provide compelling evidence that a simple recency effect cannot account for our results.

Table 4 Happiness Means (Standard Deviations) from Study IIIa

	(Last) Outcome	
	Gain	Loss
Pure	14.0 (1.20)	2.00 (1.60)
Surprise	11.7 (3.90)	5.80 (3.80)

Our next task was to eliminate latent recency as a rival explanation for our results. One way in which this can be assessed is to examine whether the order effect varies depending on the magnitude of the events. According to recency explanations, as the magnitude of events increases, the order effect should be stronger because the size of the gain or loss associated with the ultimate (in the case of simple recency) or penultimate (in the case of latent recency) event will influence affect (Appendix 3). This ought to be captured by an order x magnitude interaction, such that the simple effect for a small magnitude event should be smaller than a simple effect for a large magnitude event. The *absence* of an order x magnitude interaction would suggest that latent recency is not operative as a rival explanation.

To examine this issue, and consistent with Studies I and II, we used a between-subjects factorial design comprising two levels of order (loss followed by gain versus gain followed by loss) times two levels of magnitude (small (\$20) versus large (\$100)) in our next study (IIIb). Pretesting confirmed that our student subjects perceived that \$20 was a significantly smaller amount of money than \$100 ($p < 0.05$). Student subjects enrolled in marketing principles classes evaluated a series of events that occurred to Mr. A. on a 15-point scale (1 = very unhappy, 15 = very happy). Mr. A experienced events in the following order in each of the four conditions: $\{x, -x, Y\}$, $\{-x, x, Y\}$, $\{X, -X, Y\}$, and $\{-X, X, Y\}$, where $Y > X > x$ (i.e., $150 > 100 > 20$). Subjects evaluated how Mr. A felt after experiencing a gain or a loss that was reversed and

Table 5 Happiness Means (Standard Deviations) from Study IIIb

	Order	
Magnitude	$(-x, x)$	$(x, -x)$
Small	12.36 (2.31)	11.21 (2.08)
Large	11.89 (1.64)	10.64 (1.69)

Table 6 Happiness Means (Standard Deviations) from Study IIIc

	Order	
Magnitude	$(-x, x)$	$(x, -x)$
Small	10.67 (2.29)	9.33 (1.91)
Large	9.67 (2.94)	7.94 (2.25)

then experiencing a relatively large gain (comprising a promotional check from the local phone company with no strings attached). This sequence of events allows us to examine the effect of reversing small and large events, as well as to assess whether the last positive outcome (Y) exerts an influence on the dependent variable consistent with a simple recency explanation. If a simple recency effect were operating, all cells should yield the same result because the last outcome is the same in all cells. Furthermore, if a *latent recency effect* were operating, according to which earlier events in a series have a nonzero (though diminishing in temporal distance) impact, then the third and fourth cells should yield the largest deviations from the midpoint, because the second last events and the first events in those cells are the largest (when compared to the second last events and the first events in the first two cells).

Fifty-six student subjects enrolled in marketing principles classes participated in the study in exchange for course credit, yielding 14 responses per condition. The results provide strong support for an order effect ($F_{(1,51)} = 7.03$, $p < 0.02$), but there was no evidence of either a magnitude effect or an order x magnitude interaction (both p's > 0.40). Thus, we can empirically dismiss recency and latent recency as possible rival explanations for our findings. The absence of a stronger effect under high magnitudes eliminates latent recency, and the absence of statistically equivalent happiness scores in all four cells eliminates simple recency as a possible explanation for our findings (Table 5).

While Study IIIb seemingly eliminates the possibility that recency and/or latent recency might be operative, we considered the possibility that the relative size of the last event (Y) might play a role in subjects' evaluations. So we conducted another study (IIIc), using a design and stimuli identical to those used in Study IIIb, except that the values of x, X, and y were changed so that $X > x > y$ (i.e., $100 > 20 > 15$). Sixty students enrolled in marketing principles classes participated in the study in exchange for course credit and provided responses summarized in Table 6. The overall ANOVA was significant ($F_{(3,56)} = 3.56$, $p < 0.02$) and both magnitude and order are significant ($p < 0.05$ or better), while there is no magnitude x order interaction ($p > 0.40$). Parenthetically, we should note that the difference in the magnitude of the last event in Studies IIIb and IIIc yielded different magnitude effects, suggesting a role for the context provided by the ultimate event on the evaluation of previous events in a series.

Based on this series of studies, it seems apparent that the order effect is real, and it does not vary with the event magnitudes. These empirical findings are not explained by either a simple recency explanation or by a latent recency explanation. The only remaining explanation (i.e., $0 < \mu < 1$) is the movement of the reference point model that we offer.

4. General Discussion

Summary

Using a formal framework, we demonstrate through several studies that a series of events in the same mental account that do not change an agent's economic well-being can nevertheless change her psychological state. A loss-followed-by-gain sequence is preferred to a corresponding gain-followed-by-loss sequence, even if both sequences are economically equivalent. Furthermore, as we predict, this order effect will be enhanced as the temporal distance between the two events increases.

The explanation we offer—that the actor's reference point is labile—is different from extant perspectives.

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In particular, the literature on intertemporal choice offers a ''gain-savoring'' explanation for a preference for positive outcomes later rather than earlier in a series. Although we do not test for the savoring-and-dread explanation explicitly, our model relies on the unexpected reversal of an initial event. Conceptually, therefore, our substantive and theoretical focus is different from the savoring-and-dread perspective, according to which agents derive utility (or disutility) from the anticipation of expected events. While the lability of the reference point has been implicitly implicated in several decision-making contexts, such as the endowment effect (Strahilevitz and Loewenstein 1998), this research is a first attempt at applying the notion to the evaluation of multiple outcomes.

Theoretical Implications

The area of consumer decision making has attracted considerable theoretical and empirical scrutiny over the past several decades. We contribute to this literature in several important ways. First, we document that the evaluation of a sequence of mixed outcomes events depends on the order of events in the sequence, not merely on a summation of the separate evaluations of the stimuli in the sequence. Second, we provide a theoretical explanation for this order effect.

The issue of the labile reference point is central to our thesis. We posit that individuals' reference points can shift with the passage of small amounts of time (Strahilevitz and Loewenstein 1998). Furthermore, according to the literature, these reference points are seemingly affected by prior expectations. Casey (1995), for instance, observes that because next month's salary is highly expected (it is almost certain), receiving the paycheck is not perceived as a gain, but not receiving one is perceived as a loss. Clearly, even prior to receiving the paycheck, the reference point may have moved to accommodate a future event (see also Hoch and Loewenstein 1991).

Our model is in the same spirit as the Hoch and Loewenstein (1991) model but with some important differences. While we rely on the notion of a shift in the reference point, as they do, we provide an explicit mechanism for the shift in the reference point, as a consequence of which we are able to predict how the time interval between events interacts with the order of the sequence. In fact, our predictions and empirical findings run counter to results that can be derived from that model, according to which, (a) the effect of changing the sequence increases with magnitude (consistent with a recency effect), (b) the effect of changing the sequence increases with the time interval only under certain model parameters (see Footnote 3), and (c) a loss-gain sequence is always preferable to a pure gain.

Managerial Implications

The framework we offer has potential applicability to several topics of interest to marketing scholars and practitioners. In the arena of pricing, where prices are frequently raised and lowered over time; in the arena of promotions, where discounts and product premiums are offered and withdrawn over time (e.g., Sears' Super-Saturday sale); and in the arena of personal selling, where salespeople offer product enhancements and bundle options that are subsequently withdrawn, our perspective offers a means of assessing consumer reactions to such actions when they are unanticipated.

In light of our findings that affective as well as behavioral intention components of consumer behavior are potentially influenced by the sequence in which multiple events are presented, merchants can influence consumer perceptions and behavior simply by altering the order in which they present information, while simultaneously ensuring themselves of no economic costs such as the costs associated with discounts, coupons, and other inducements to purchase. While our findings also suggest that the provision of the second piece of positive information should be delayed as much as possible to enhance the positive affect produced by the loss-followed-by-gain order, this is a potential recipe for disaster. Customers may exit the market or may use the intervening time period to get progressively angrier about experiencing the initial disappointment. Our model is not rich enough to capture the role of emotions that are experienced as a consequence of the initial event that may attenuate the order effect.

While the consequences of an order effect may

sometimes be desirable from a managerial perspective, from a public policy standpoint, regulators may be interested in protecting consumers from being manipulated by the order in which information is presented. Clearly, consumer utility is not enhanced though their resistance to market-based persuasion may be reduced if they are exposed to a loss/gain sequence of offers.

Beyond the arena of marketing, the theory and empirical findings can be applied to several other contexts that deal with information provision to a host of publics. Accountants, financial analysts, and stockbrokers provide information to stockholders and can potentially influence psychological well-being by varying the sequence in which they present mixed information. The government provides information to the electorate on a host of issues ranging from the economic consequences of policy initiatives to the beneficial effects of a new drug. Also, public interest and lobbying groups, as well as arms of the executive branch, provide information to Congress that has implications for how their performance is evaluated and their budgets are allocated. All of these information provision scenarios in which multiple items are presented in a series are subject to ''framing'' effects. In other words, the information purveyor can choose to present information that enhances the audience's sense of well-being, its evaluation of the information or its purveyor, and its resistance to subsequent appeals. Clearly, audiences need to be educated about the consequence of such framing effects so that their economic interests are protected. Our research is supportive of the casual observation that suggests that surprising ''bad news, good news'' sequences are hedonically efficient.

5. Conclusions and Future Research

The rate at which losses and gains shift the reference point might vary, just as discount rates associated with losses and gains vary (Loewenstein and Prelec 1992). While not consequential for the current research, this extension may yield further testable predictions. For example, the current model predicts that the disutility of a dashed hope is larger than the utility of a false alarm, because of loss aversion (see Footnote 4). If the shift rate of the reference point is slower for losses than for gains, this effect should be stronger and should be further enhanced with an increase in the temporal distance between the two events in a surprise sequence. Furthermore, the retrospective evaluation of the entire sequence may depend not only on the nature of the sequence (a dashed hope or a false alarm) but also on how long ago it occurred; dashed hope related disutility may linger relatively longer than the utility associated with a false alarm.

Second, as one anonymous reviewer observed, our model applies equally well to a series of surprises that *do not* necessarily return the individual to the status quo. Such surprises change the evaluation of preceding events (Kahneman and Miller 1986). Thus, in contexts such as the service recovery arena (e.g., Gaeth et al. 1997), quality perceptions after a product failure is corrected may be as high as when the product performed satisfactorily in the first place. Future research may reveal whether moving a customer from a negative to a positive state through service recovery that is surprising (e.g., upgrading a hotel guest who is erroneously informed that her reserved room is unavailable) yields higher satisfaction than upgrading a guest who has a smooth check-in. Clearly, the emotional consequences of the initial failure will play a significant role (e.g., when an airline passenger is bumped off a flight that s/he was taking to attend a child's first piano recital) in the overall evaluation post-service recovery. However, the precise mechanism of the process and the nature of the interaction between emotions and dashed hopes versus false alarms are rich avenues of formal inquiry.

Third, our model focused on certain events. However, as Frederick and Loewenstein (1999) observe, the reference point is more rigid under high uncertainty than under low uncertainty. Our model can be adapted to include a parameter that captures the role of uncertainty. The shift coefficient μ which is currently a function of both time (t) and event magnitude (x), can be written as

$$\mu = \begin{cases} \dfrac{ct}{x^{\gamma}} & \text{for } t \le \dfrac{x^{\gamma}}{c} \\ 1 & \text{for } t > \dfrac{x^{\gamma}}{c}, \end{cases}$$

where $c > 0$ is a constant and $\gamma \geq 1$. Conceptually, γ captures the degree of disbelief about the first event, which would be higher when there is uncertainty attached to the event.

Our empirical efforts were limited to laboratory and field experiments using a limited set of stimuli. Clearly, expanding the set of stimuli to other marketing settings that involve product attributes would be a worthwhile endeavor. Testing the limits of our model by considering stimuli that comprise multiple accounts (e.g., gas mileage and power of an automobile) that may not be comparable on the same metric and, therefore, not as amenable to yielding a neutral outcome, would be an interesting avenue for future research. Therefore, if events in separate mental accounts that are evaluated on separate metrics yield an end-state that is better or worse than the starting position, the surprising nature of the reversal should nevertheless yield a more favorable evaluation for a loss-gain sequence than a gain-loss sequence, and vice versa, *ceteris paribus.* Finally, whether and how magnitude differences might yield differences in order effects on affect, and the incorporation of regret and relief into such a model, would be interesting topics for further research.

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Appendix 1 A Model Implication

LEMMA 1. *$v_{t1}(-x_{t0}, x_{t1}) - v_{t1}(x_{t0}, -x_{t1})$ increases in t.*

PROOF. $v_{t1}(-x_{t0}, x_{t1}) - v_{t1}(x_{t0}, -x_{t1}) = (ct)^{\alpha} + \lambda(ct)^{\beta}$. (10)

The first derivative of the above expression with respect to time t is

$$\frac{\partial((v_{t1}(-x_{t0}, x_{t1}) - v_{t1}(x_{t0}, -x_{t1}))}{\partial t} = \alpha c(ct)^{\alpha-1} + \lambda\beta c(ct)^{\beta-1}.$$

Because $0 < \alpha \leq \beta < 1$, $c > 0$, $t \geq 0$, and $\lambda \geq 1$, every single term on the R.H.S. is nonnegative. The first derivative is zero only when $t = 0$. Thus, $v_{t1}(-x_{t0}, x_{t1}) - v_{t1}(x_{t0}, -x_{t1})$ increases in t. □

Appendix 2 Sample Stimuli and Dependent Variables for Study I

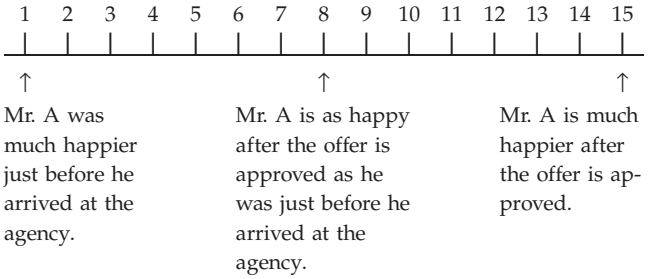
Loss Followed by Gain, Large Magnitude Condition

Mr. A is planning to buy a new car and trade in his old car next week. So he is shopping for a new auto insurance package. One day he receives a letter in the mail from Ace Insurance Company offering him a free quote. He calls the company and gets an estimate of $350 for six months, which seems to be a reasonable price for him. The agent makes an appointment with him for the paperwork.

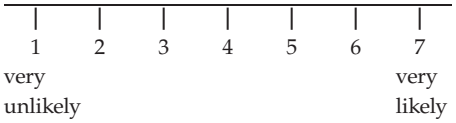
The next week, after Mr. A buys the car he goes to the agency for the paperwork. Everything goes smoothly until the agent notices that his driver's license is less than three years old. He has had a license for two years and six months. The agent tells him that they usually mail the letter only to people with three or more year's driving experience, so she assumed that he met this condition. Her calculation shows that with less than three year's driving experience the premium would be $450 for six months. She apologizes for the mistake and for not being able to give him the special offer.

Before Mr. A leaves, the agent asks if she can call him the following day: She wants to talk with her supervisor to see if there is anything she can do. The next day, she leaves a message with the good news that, as a special offer, the $350 offer has been approved.

1. Indicate on the following scale whether you think Mr. A is happier *after* the offer is approved **or** just *before* he arrived at the agency on the previous day.



2. How likely is it that Mr. A is going to purchase his car insurance from this agent of Ace Insurance?



Appendix 3 Derivation of Predicted Differences in the Order Effect for Different Magnitudes Under Latent Recency

According to latent recency (or a backward discounting model), all events are discounted over time, but the discount associated with the most recent event will be smaller than that associated with the second most recent event, and so on. Consequently, if a series comprises several events, the influence the most recent event exerts on overall evaluations is larger than the influence of the second last event.

Define the discount factors for $\{-x\}$ and $\{x\}$ to be $d_1(t)$ and $d_2(t)$, respectively. According to latent recency, $d_1(t)$ and $d_2(t)$ are monotonically decreasing in time t, and they do not vary for different values of x. A special case of this is $d_1(t) = d_2(t)$ (see Footnote 2).

Now, suppose the first event occurs at time t_0, the second event at t_1, and the series is evaluated at time t_2. Let $T_1 = t_2 - t_1$, and $T_2 = t_2 - t_0$. We have $T_1 < T_2$. A special case of this is $t_1 = t_2$ (see Footnote 1). We will show that, if backward discounting/latent recency is operative, the order effect should increase for large magnitude for the more general case first, when $d_1(t) \neq d_2(t)$, and $t_1 \neq t_2$.

$$v_{t2}(-x_{t0}, x_{t1}) = d_1(T_2)^*v(-x) + d_2(T_1)^*v(x)$$

$$v_{t2}(x_{t0}, -x_{t1}) = d_2(T_2)^*v(x) + d_1(T_1)^*v(-x).$$

Thus,

$$\begin{aligned} &v_{t2}(-x_{t0}, x_{t1}) - v_{t2}(x_{t0}, -x_{t1}) \\ &= d_1(T_2)^*v(-x) + d_2(T_1)^*v(x) - d_2(T_2)^*v(x) - d_1(T_1)^*v(-x) \\ &= (d_2(T_1) - d_2(T_2))v(x) + (d_1(T_1) - d_1(T_2))(-v(-x)). \end{aligned} \quad (11)$$

Because $T_1 < T_2$, and $d_1(t)$ and $d_2(t)$ are monotonically decreasing in time t,

$$d_1(T_1) > d_1(T_2) \Rightarrow d_1(T_1) - d_1(T_2) > 0$$

$$d_2(T_1) > d_2(T_2) \Rightarrow d_2(T_1) - d_2(T_2) > 0.$$

Thus, both terms on the R.H.S. of Equation (11) are positive.

For any monotonic function of v, both $v(x)$ and $(-v(-x))$ increase with x. For example, using prospect theory's value function,

$$v(x) = x^{\alpha}, \quad \text{and} \quad (-v(-x)) = \lambda x^{\beta},$$

both of which increase in x. Because $d_1(t)$ and $d_2(t)$ do not vary for different values of x according to latent recency, the order effect should increase with the event magnitude. The same conclusion holds for the special case when $d_1(t) = d_2(t)$ and $t_1 = t_2$. This conclusion is not predicted by our model and is not supported by the empirical evidence provided in Studies IIIb and IIIc.

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