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Yesterday's News: A Temporal Discontinuity in the Sting of Inferiority

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Abstract

Reactions to other people who get desirable outcomes should be a simple function of how much one desires those outcomes. Four studies ($N = 4{,}978$) suggest that one's reactions depend on the temporal location of outcome acquisition: Observers care more (e.g., feel more envy) right before, versus right after, other people have identical experiences (Studies 1, 2a, and 2b). For example, participants' envy in February rose as Valentine's Day approached (as a peer's enviable date loomed in the future) but abruptly plateaued come February 15 onward (after the date occurred). Further, the passing of time specifically assuaged the pain of comparison (whereas positive reactions, such as feeling inspired, remained high; Studies 3a, 3b, and 3c); therefore, taking a past perspective can be used to regulate negative emotions in the present (Study 4). Time asymmetrically shapes the experience of upward comparison, despite other people's desirable outcomes indeed being achieved. Other people's good lives sting less if they have already lived them.

Keywords

time, past/future, life experience, envy, social comparison, open data, open materials, preregistered

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Two coworkers book identical Maui vacations, slightly apart: Today, as you sit and stew in the office, one just returned, whereas the other just departed. Which stings more? Normatively, people's reactions should be equally painful because the object of desire remains unchanged. If you long for Resort Y or Luau Z, your envy for other lucky vacationers need not depend on whether they have had the experience or are about to have it—in both cases, they get the thing you want. Decades of research on social comparison highlight the experience itself as driving people's reactions to the experiencer, with highly valued experiences eliciting stronger reactions than less-valued experiences as long as other comparative dimensions do not differ (e.g., similarity and distance; Festinger, 1954; Tesser, 1991; Trope & Liberman, 2010). In principle, identical trips taken by identical coworkers should sting the same; that one has just occurred, whereas the other soon will, should not matter.

In practice, however, these comparisons may feel different despite conveying identical information. Some studies have suggested that other people's superior experiences may sting more once they happen. Only a past outcome has truly been realized, at which point the lucky individuals can count the thing as theirs. There is no more hoping the experience will not come to pass or any chance to thwart it, and this closed door on corrective action can amplify its impact (Kunda, 1990; Markman & Beike, 2012). However, even more studies suggest the converse: Other people's superior experiences may sting more before they happen. The future looms large. People think more about the future than the past (Smallwood, Nind, & O'Connor, 2009) and often experience more emotion when prompted to imagine events in the future than in the past—not only more general arousal (Caruso, Gilbert, & Wilson, 2008; D'Argembeau & Van der Linden, 2004; Van Boven & Ashworth, 2007) but also specific emotions, such as feeling more regret for future than for past missed opportunities (Shani, Danziger, & Zeelenberg, 2015),

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more guilt for future than for past transgressions (Caruso, 2010), and more interest in future than in past celebrations (Weingarten & Berger, 2017).

These findings bear on comparison contexts. First, observers may be drawn to other people's salient excitement leading up to the event, clouding judgments of life overall and the fact that past experiencers enjoyed all of this anticipatory utility, too (Loewenstein, 1987). Second, functional theories of prospection posit the adaptive value of overweighting potential badness over what is already manifest, especially in social environments (Baumeister, Vohs, & Oettingen, 2016; Bulley, Henry, & Suddendorf, 2017). The hardest part about other people's sting-worthy achievements may come before they actually achieve them; somewhat paradoxically, observers may not feel so bad if a desired experience is already part of the person's life history.

We conducted four studies (N = 4,978) to test the hypothesis that comparative reactions may be less severe when other people's superior outcomes are already attained. We do so in the context of envy for two reasons. First, envy is pervasive (Smith & Kim, 2007). Understanding how people react to envy-related disparities is important, with social inequalities growing at a record pace (Saez, 2018) and opportunities for upward comparison growing with the rise of social media (Chou & Edge, 2012; Deri, Davidai, & Gilovich, 2017). It matters if small tweaks in tense influence observer reactions (e.g., seeing an enviable post about leaving, vs. heading to, the same event). The destructive "fear of missing out" tied to social media use (Przybylski, Murayama, DeHaan, & Gladwell, 2013) may really be a fear that one *will* miss out rather than a fear that one *has* missed out. Tense-specific thinking ("How will I feel looking back?") may make a novel regulation strategy.

Second, envy is not equally bad in all forms, affording valuable comparisons across valence but within the same construct. The experience of envy ranges from "hostile feelings toward the envied person and action tendencies intended to damage his or her position," dubbed *malicious envy*, to "more positive regard of the other person, desire for the superior fortune and the action tendency to improve one's own position by moving upward," dubbed *benign envy* (Crusius & Lange, 2014, p. 2). Although both states are frustrating, their relative differences are of interest: The same construct elicits distinct desires to tear the other person down (associated with negative outcomes such as stress and harmful self-views) and to raise oneself up (associated with more positive outcomes such as inspiration; van de Ven, Zeelenberg, & Pieters, 2009). This distinction allows us to test whether envy changes differently depending on how it is assessed, adding precision to the broad theoretical assertion that people experience stronger reactions of all kinds to anticipated events than to past events ("future = more").

Existing research on temporal asymmetries has been based on the assumption that past experiences are simply less motivationally relevant than equivalent future experiences (Caruso, 2010; Caruso et al., 2008; D'Argembeau & Van der Linden, 2004; Shani et al., 2015; Van Boven & Ashworth, 2007; Weingarten & Berger, 2017; for a review, see Caruso & Van Boven, 2018). By distinguishing two forms of the same construct and thus keeping all stimuli constant, we can shed more sophisticated light on how time shapes reactions to life events. For example, perhaps malicious envy dissipates over time but benign envy lives on; people may remain inspired (but not exactly threatened) by a past exemplar such as Einstein but feel threatened (and not exactly inspired) by an up-and-coming colleague down the hall. Research has indicated that future events will elicit more negative reactions (e.g., regret) and more positive reactions (e.g., excitement) than past events, but countless other differences between such constructs and study contexts may cloud the actual effect of valence. The dual nature of envy lends itself to revealing yet-obfuscated exceptions to the "future = more" assertion.

We began by testing whether the same envied event hurts less when people think about it happening in the past than when they think about it happening in the future (Study 1). We then replicated this effect by tracking reactions as an event approached and receded in real time (Studies 2a and 2b). Next, we compared malicious and benign reactions (Studies 3a, 3b, and 3c). Last, we tested whether reframing an upsetting experience as already part of the past relieved the pain of comparison in the present (Study 4). In all studies, sample size was predetermined at 100 or more participants per cell. We report all measures, manipulations, and exclusions. Studies 2b, 3a, 3b, and 3c were preregistered. Materials, data, and preregistration files can be found at https://osf.io/4ufvz.

Study 1: Less Envy for What Has Already Been Achieved

Method

Study 1 documented the basic effect. We hypothesized that people may perceive the same experience as less enviable after it occurs than in the equidistant time leading to its occurrence.

Participants. To thoroughly establish the basic effect, we launched the same study with three different populations: (a) 203 undergraduate and postgraduate students from our campus subject pool (47.78% female; age: M = 24.06 years, SD = 9.05) completed the study in individual laboratory sessions for $3.00 each; (b) 217 adults from our subject pool in downtown Chicago, open to the

community (34.56% female; age: $M = 37.93$ years, $SD = 14.06$), completed the study in individual laboratory sessions for $3.00 each; and (c) 200 participants from Amazon's Mechanical Turk (MTurk; 42.00% female; age: $M = 35.78$ years, $SD = 11.62$) completed the study online for $1.00 each.

Procedure. The study followed a 2 (tense: past or future; between-subjects) × 5 (life domain: vacation, date, job, house, or car; within-subjects) design. First, all participants were informed that their study tasks would involve feelings of envy and that they would be asked to imagine a close friend in various enviable circumstances. They typed the initials of a close friend into a text box, and we inserted these initials throughout all subsequent texts. We assessed actual friends rather than hypothetical targets to increase realism and elicit more envy (Schaubroeck & Lam, 2004).

Next, participants thought about their friend in five enviable circumstances, presented one at a time in random order: They imagined learning that their friend (a) gets to go on the participant's own dream vacation, (b) gets to go on the participant's own dream date, (c) gets promoted to the participant's own dream job, (d) gets to move into the participant's own dream house, and (e) gets to buy the participant's own dream car. Participants were instructed to treat the scenarios individually and to assume independence in their responses.

For each scenario, participants imagined either "the days and weeks before this event will occur" (student $n = 105$, community $n = 106$, MTurk $n = 100$) or "the days and weeks after this event occurs" (student $n = 98$, community $n = 111$, MTurk $n = 100$) and were then asked to "consider how the thought of [their friend] would make you feel at this particular point in time." Participants reported their general comparative reactions to each scenario via five items: (a) "How envious would you feel at this exact point?" (b) "How jealous would you feel at this exact point?" (c) "How much would you want to be your friend at this exact point?" (d) "How inferior to your friend would you feel at this exact point?" and (e) "How happy would you feel getting to be your friend at this exact point?" They responded to each item on a scale from 1 (*not at all*) to 7 (*extremely*).

At the end of the study, all participants rated how difficult it was to generate the mental images, how realistic they found the task, how confusing they found the instructions, how detailed their mental images were, and how close they are to the friend, each on a scale from 1 (*not at all*) to 7 (*extremely*).[1]

Results

The five envy items were collapsed into composite envy scales for each domain (each population; $\alpha s \geq .78$). The domains were highly correlated, so we also collapsed them into a global envy scale (each population; $\alpha s \geq .86$). We conducted independent-samples t tests.

Basic effect: less envy for what has already been achieved. Aside from slight incidental variation across domains and populations, we found clear evidence for the hypothesized asymmetry: Otherwise identical experiences were perceived as significantly less enviable after they happened than before they happened (see Table 1). This same asymmetry emerged among students, $t(201) = -3.09$, $p = .002$, $d = 0.43$, 95% confidence interval (CI) for the mean difference = [−0.90, −0.20]; community adults, $t(215) = -3.04$,

Table 1. Mean Rating of Envy for a Friend Who Either Will Get to Experience or Has Experienced an Enviable Event (Study 1)

	Student sample ($n = 203$)		Community sample ($n = 207$)		MTurk sample ($n = 200$)	
Event	Future	Past	Future	Past	Future	Past
Vacation	4.03_{a} (1.60)	3.07_{a} (1.39)	3.96_{d} (1.58)	3.54_{d} (1.40)	4.36_{h} (1.46)	3.53_{h} (1.45)
Date	4.47_{b} (1.76)	3.64_{b} (1.71)	3.86 (1.71)	3.53 (1.65)	4.62_{i} (1.55)	4.00_{i} (1.75)
New job	4.60 (1.64)	4.37 (1.52)	4.35_{e} (1.66)	3.68_{e} (1.36)	4.72 (1.43)	4.59 (1.40)
New house	4.18_{c} (1.58)	3.70_{c} (1.56)	4.20_{f} (1.57)	3.61_{f} (1.45)	4.75 (1.30)	4.51 (1.40)
New car	3.52 (1.36)	3.27 (1.46)	3.81_{g} (1.58)	3.17_{g} (1.42)	4.18_{j} (1.42)	3.75_{j} (1.35)
All domains	4.16_{x} (1.31)	3.61_{x} (1.22)	4.04_{y} (1.36)	3.51_{y} (1.21)	4.53_{z} (1.16)	4.08_{z} (1.16)

Note: Standard deviations are given in parentheses. Means with shared subscripts differ significantly ($p < .05$). MTurk = Amazon's Mechanical Turk.

$p = .003$, $d = 0.41$, 95% CI for the mean difference = [−0.87, −0.19]; and MTurk participants, $t(198) = -2.73$, $p = .007$, $d = 0.39$, 95% CI for the mean difference = [−0.77, −0.12] (for all individual pairwise results, see the Supplemental Material available online).

Discussion. Study 1 shows that the same life experience is perceived as less enviable if it is already part of another's past than if it is going to be part of another's future. Next, to test for this basic effect in a more real-world context, we tracked people's envy during the month of February, centering on Valentine's Day (Study 2). We assessed whether people feel increasing envy toward another person's desirable date as Valentine's Day approaches (i.e., as the holiday looms in the future) but care less come February 15 and beyond (i.e., as the holiday recedes into the past), despite both dates being equally close to the present. Studies 2a and 2b assessed real-time reactions, using both cross-sectional (Study 2a) and longitudinal (Study 2b) designs. We hypothesized that envy toward a desirable Valentine's Day date may asymmetrically drop after the event occurs.

Studies 2a and 2b: Envy in Real Time

Study 2a method

Participants. We requested 100 participants from MTurk for each of the 28 days of February 2017, yielding 2,824 unique participants (53.82% female; age: $M = 35.91$ years, $SD = 12.10$). They completed the study online for $0.75 each. We posted the study at 2:00 p.m. central standard time (CST) on February 1. The posting disappeared after the request was met. On February 2, we added 100 assignments; the posting reappeared but could be seen only by new participants. We repeated this each day, ensuring that unique participants responded to identical recruitment procedures. Each daily request was met within 2 hr.

Procedure. Participants thought about other people with enviable Valentine's Day plans and reported their reactions. We assessed changes in reactions as the holiday approached and receded on the calendar. Because we could not ensure that all participants would be single, we described an event that could apply to everyone regardless of relationship status or plans. All participants read the following:

> Valentine's Day (February 14) is an interesting holiday. As you may know in your own life, the holiday tends to elicit reactions in people, for better and worse. People vary in their experience of Valentine's Day. Some people have a truly great experience and make the best of the holiday: they've planned in advance, snagged impossible reservations, are generally thrilled to be with their date or group of friends for the evening, and so on. Other people have a less-than-great experience: they're not sure what to do, aren't particularly excited, generally feel down about the whole thing, and so on.

We then disabled all keyboard controls for 30 s, during which time participants were instructed to bring "those people in the first group" (i.e., enviable others) to life in their minds and consider how their Valentine's Day experiences make the participants feel. After this focusing task, participants read the following: "Today is February __. How do these people and their [future/past] plans make you feel today, now __ days [before/after] Valentine's Day?" (blanks were filled with corresponding numbers). Each day, they completed the same five-item envy scale from Study 1, adapted for the literal present (e.g., "How much envy do you feel . . .").

After all key measures, participants completed sociodemographic measures and answered numerous questions about their relationship status and Valentine's Day plans, their experience with MTurk, and what their current day was like. This battery of 21 individual-level items helped us assess potential selection effects (for the items, see the Supplemental Material).

Study 2a results

The five items were collapsed into a composite envy scale ($\alpha = .86$). To visualize the data, we first plotted mean envy by day. If envy normatively tracks with absolute distance, we should find an inverted-U, indicating that envy grows as absolute distance to Valentine's Day shrinks, irrespective of tense (e.g., the holiday should sting the same on February 13 and February 15). This was not the case (see Fig. 1). Some inevitable noise aside, three striking features can be seen in the figure: First, envy appears to track with a looming future (participants felt more envy from February 1 until February 14 as Valentine's Day approached); second, envy abruptly drops come February 15; and third, envy tracks less with a receding past (participants immediately felt less envy after Valentine's Day passed and stayed that way the rest of the month). The holiday seemed to lose its influence when it became part of the past.

To model these overall trends, we conducted linear regression analyses on the envy scale with tense (two levels: February 1–14, before Valentine's Day ends; February 15–28, after Valentine's Day ends), absolute distance (number of days away from Valentine's Day), and the Tense × Distance interaction term entered as predictors.

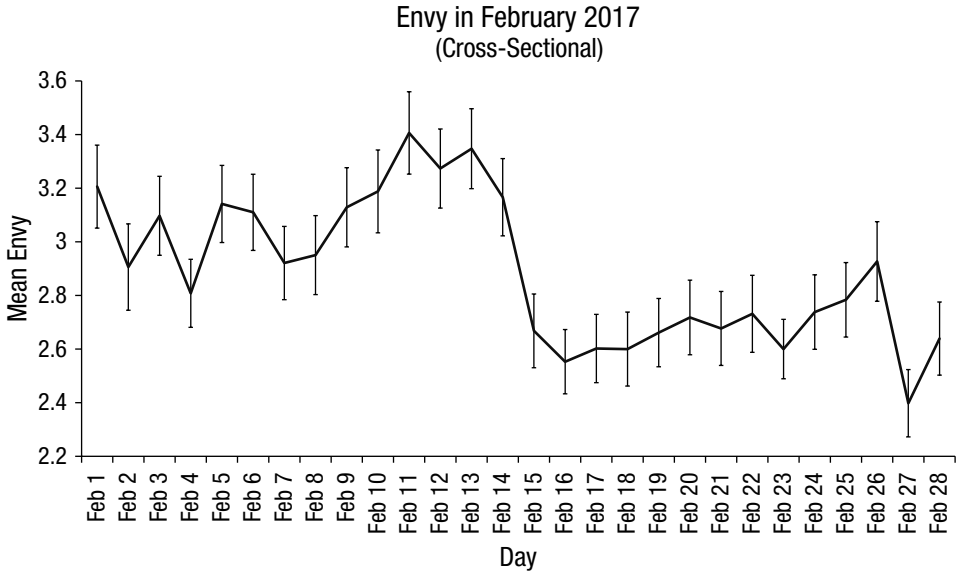

Fig. 1. Mean rating of envy toward other people with desirable Valentine's Day plans, assessed across different participants each day during the month of February 2017 (Study 2a). Error bars show ±1 *SE*.

We observed a significant main effect of tense: Participants felt less envy after Valentine's Day than before Valentine's Day, $\beta = -0.23$, $p < .001$. There was also a significant main effect of absolute distance: Participants felt more envy the closer Valentine's Day fell to the present, $\beta = -0.14$, $p = .015$. Critically, these effects were qualified by a significant interaction, $\beta = 0.14$, $p = .035$. Teasing apart this interaction, we found that Valentine's Day indeed elicited more envy as it grew closer from the future to the present (as time moved from February 1 to 14), $\beta = -0.06$, $p = .019$, but after Valentine's Day passed (as time moved from February 15 to 28), it elicited similarly little envy regardless of distance, $\beta = 0.02$, $p = .576$.

In addition, conceptually replicating Study 1, our results showed that Valentine's Day elicited significantly less envy after it passed ($M = 2.66$, $SD = 1.34$) than it did before arriving ($M = 3.12$, $SD = 1.48$), $t(2822) = 8.54$, $p < .001$, $d = 0.33$, 95% CI for the mean difference = [0.35, 0.56]. Planned contrasts from an analysis comparing three specific dates of interest (February 13, February 14, and February 15) showed that envy did not significantly differ between the day before Valentine's Day ($M = 3.35$, $SD = 1.51$) and the day itself ($M = 3.17$, $SD = 1.45$), $t(300) = 0.89$, $p = .374$, $d = 0.12$, 95% CI for the mean difference = [−0.22, 0.58]; yet at the same point on the other side of time (February 15), envy was significantly lower than it was on the day itself ($M = 2.67$, $SD = 1.38$), $t(300) = 2.45$, $p = .015$, $d = 0.35$, 95% CI for the mean difference = [0.10, 0.90].

Finally, the kinds of participants who signed up from day to day did not systematically differ (see the Supplemental Material). These individual-level items compose a large data set that invites many other interesting analyses, and we encourage curious readers to consult the data to explore further. The key point for the current purposes is that this homogeneity in our participant sample from day to day suggests no obvious selection effects. All envy effects remained significant when analyses controlled for these variables (βs ≥ 0.23, ps $\leq .004$).

Study 2b method

In Study 2b, we sought to replicate the effects from Study 2a using a longitudinal design. In a preregistered study for Valentine's Day 2018, we tested whether the same specific date comparisons might emerge—that envy might be equally high on February 13 and February 14 but drop lower than both of these dates come February 15.

Participants. We requested and obtained 200 unique participants from MTurk (54.00% female; age: $M = 38.55$ years, $SD = 11.30$). They signed up for a 3-day study for a $6.00 final payment if they completed all days, in addition to receiving $0.20 immediately after each successful day. We doubled our typical sample size because we did not know what to expect for attrition.

We first posted the study at 5:00 p.m. CST on February 13. In this posting, we explained all plans and procedures in detail, and then participants completed the Day 1 study. Thus, all 200 participants completed Day 1. On February 14, a second new study link was sent to these participants at 5:00 p.m. CST (expiring at 5:00 a.m. the next morning), containing the Day 2 study.

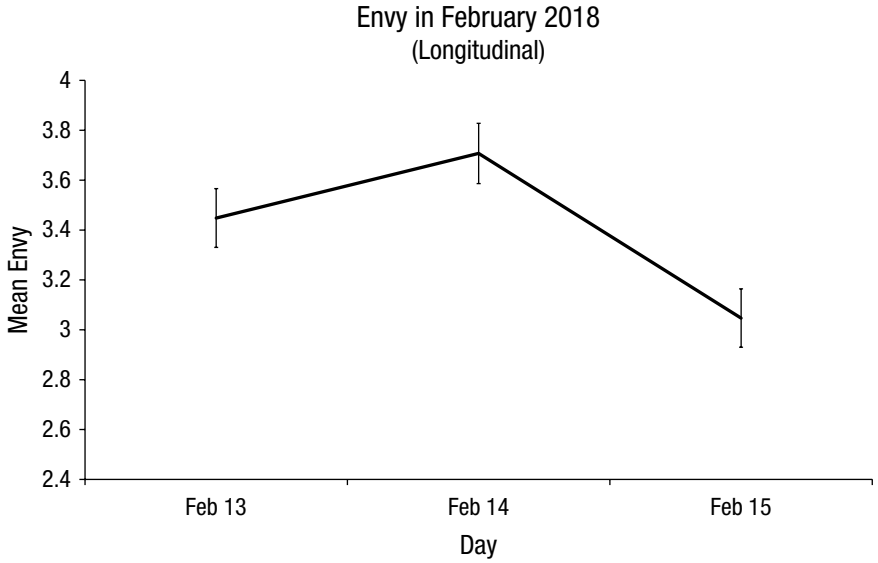

Fig. 2. Mean rating of envy toward other people with desirable Valentine's Day plans, within the same participants over the course of 3 days in February 2018 (Study 2b). Error bars show ±1 *SE*.

On February 15, a third new study link was sent to all original 200 participants at 5:00 p.m. CST (expiring at 5:00 a.m. the next morning).

Procedure. Procedures were identical to those in Study 2a. For all days, participants completed the same measures. In the Day 1 survey, participants also reported their similarity to the target, their own plans, and their relationship status (see the Supplemental Material). These items helped further assess attrition.

Study 2b results

Eighty-five percent of participants (170 of 200) completed all days. Logistic regressions predicting attrition found no systematic relationships with any of the variables (bs ≤ 0.75, ps ≥ .163; for full attrition analyses, see the Supplemental Material). For our main analyses, we included all participants who completed all days, resulting in a total sample of 170 (54.71% female; age: M = 38.49 years, SD = 11.53). The five items were collapsed into composite envy scales for each day (αs ≥ .88). We conducted repeated measures analyses using general linear models (GLMs) with day as the within-subjects factor.

We observed a significant effect of day, $F(2, 168) = 21.72$, $p < .001$, $\eta^2 = .21$ (see Fig. 2). Pairwise comparisons revealed that envy significantly rose from February 13 (M = 3.45, SD = 1.53) to February 14 (M = 3.71, SD = 1.57), Bonferroni-adjusted $p = .016$, $d = 0.22$, 95% CI for the mean difference = [0.04, 0.48]. Incidentally, this differs from Study 2a, in which we found similarly high envy on February 13 and February 14. More importantly, envy then significantly dropped from February 14 to February 15 (M = 3.05, SD = 1.52), Bonferroni-adjusted $p < .001$, $d = 0.51$, 95% CI for the mean difference = [−0.42, −0.90]. (In turn, February 15 also elicited significantly less envy than February 13, Bonferroni-adjusted $p = .001$, $d = 0.29$, 95% CI for the mean difference = [−0.61, −0.19].)

Most importantly, the drop was significantly bigger than the rise: A separate paired-samples t test specifically comparing the absolute difference between February 13 and February 14 (M = 0.26, SD = 1.19) with the absolute difference between February 14 and February 15 (M = 0.66, SD = 1.31) revealed a significant difference, $t(169) = 3.75$, $p < .001$, $d = 0.29$, 95% CI for the mean difference = [0.19, 0.61]. This asymmetry is consistent with our hypothesis. Envy was weaker the day before Valentine's Day than it was on Valentine's Day itself, suggesting that an absolute distance of 1 day is less intense than experiencing the day itself. However, not all distance is created equal: Even less emotion (compared with the day itself) was experienced 1 day after than 1 day before Valentine's Day.

Studies 2a and 2b discussion

Studies 2a and 2b extended the basic effect to a more naturalistic context. As Valentine's Day loomed in the future, people were sensitive to distance and experienced increasing envy toward other people with desirable plans. But after those same individuals had that

same desirable experience, people's envy dropped and plateaued the moment it became part of the past.

Next, we tested how this effect might vary across a range of valences. As reviewed, envy lends itself well to this question because this same construct, although generally unpleasant, is experienced on a distinct spectrum: Envy motivates people to tear others down (malicious envy) and to raise themselves up (benign envy, a relatively more positive form). Our items thus far assumed the prototypical malicious form (note that even our positive items, such as how happy one imagines getting to be the target, are malicious because they suggest a zero-sum removal of the target from high status). Explicitly teasing apart these dimensions rules out incidental demand by retaining the same past and future framing in all conditions, and it affords a novel test of "future = more" explanations (if so, a past framing should elicit lower ratings on both measures).

With this goal in mind, we used Studies 3a, 3b, and 3c to test whether the asymmetry emerged more or less strongly for malicious comparisons than for benign comparisons. We conducted the study three times (all preregistered): first, an exploratory test (Study 3a), followed by two confirmatory replications (Studies 3b and 3c).

Studies 3a, 3b, and 3c: Tearing Down Versus Pulling Up, Over Time

Method

Studies 3a, 3b, and 3c were conducted on MTurk with unique participants, who were paid $0.80 each. All key procedures and measures were identical across each study. For ease of reading, we report only the first study in full. In the Results section, we also report our two confirmatory attempts and then the summary analyses of all three studies together. For Study 3a, we requested 300 participants and obtained 302 (41.72% female; age: M = 34.95 years, SD = 10.61).

All participants were informed that their study tasks involved feelings of envy and that we were interested in documenting the kind of envy that people feel. They were instructed to bring to mind a real person in their own life who makes them feel envious when thinking about them. They read, "Identify this person now. For example, it could be a colleague who just got a raise or a friend who owns a particular possession or is having a particular experience (e.g., currently on a vacation or in a relationship)." This design used stimulus sampling in terms of real personal experiences.

Participants were asked to bring to mind either "the days and weeks leading up to an enviable experience this person gets to have (e.g., if you're envious of a vacation, think about the days and weeks before the vacation occurs)" (n = 151) or "the days and weeks following an enviable experience this person got to have (e.g., if you're envious of a vacation, think about the days and weeks after the vacation occurs)" (n = 151).

All participants then reported their reactions via the same dependent measures: five items that captured malicious envy and five items that captured benign envy (presented within the same single block in randomized order). Items were adapted directly from existing conceptualizations of what primarily distinguishes these forms (Crusius & Lange, 2014; Lange & Crusius, 2015; van de Ven et al., 2009). All items were prefaced with the phrase "The kind of envy I feel at this particular point in time . . ." The items that captured malicious envy continued (a) "feels frustrating," (b) "makes me want to scream," (c) "makes me want to replace the person with myself," (d) "is fueled by dislike/negative feelings," and (e) "makes me feel ill-will for the person." The items that captured benign envy continued (a) "feels inspiring," (b) "feels pleasant," (c) "motivates me to try harder to achieve my own goals," (d) "is fueled by liking/positive feelings," and (e) "makes me want to compliment the person." Items were rated on a scale from 1 (*not at all*) to 7 (*very much so*).

Results

Study 3a. First, when we submitted all 10 items to a principal component analysis, results confirmed only two distinct components (for this study and Studies 3b and 3c, see the Supplemental Material). Therefore, we collapsed items into their intended scales for malicious envy (α = .84) and for benign envy (α = .81) and conducted mixed measures GLM analyses.

There was a main effect of tense, $F(1, 300) = 11.49$, $p = .001$, $\eta^2 = .04$, and a main effect of envy form, $F(1, 300) = 15.85$, $p < .001$, $\eta^2 = .05$. These effects were qualified by a significant interaction, $F(1, 300) = 8.54$, $p = .004$, $\eta^2 = .03$. Pairwise comparisons revealed a replication of the basic effect but only for malicious envy. Participants reported that they would feel significantly lower malicious envy (less patently upset) after an envied event occurred (M = 2.86, SD = 1.39) than during the equidistant time leading up to it (M = 3.57, SD = 1.44), $F(1, 300) = 18.84$, $p < .001$, $\eta^2 = .06$, d = 0.50, 95% CI for the mean difference = [0.39, 1.03]. In contrast, they would not feel less benign envy (no less inspired) after the occurrence of the event (M = 3.75, SD = 1.43) than before the occurrence of the event (M = 3.71, SD = 1.36), $F(1, 300) = 0.08$, $p = .773$, $\eta^2 < .001$, d = 0.03, 95% CI for the mean difference = [−0.36, 0.27].

Study 3b. Next, we sought to replicate these patterns in a confirmatory replication, with 307 new participants. There was no main effect of tense, $F(1, 305) = 0.04$, p =

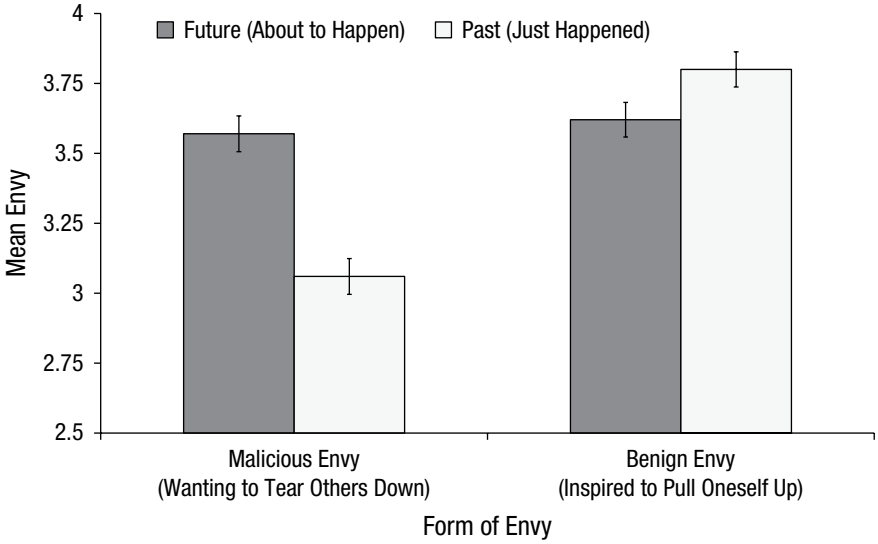

Fig. 3. Mean rating of envy as a function of form of envy and tense, combined across three replication attempts (Studies 3a–3c). Error bars show ±1 *SE*.

.845, $\eta^2 < .001$; a main effect of envy form, $F(1, 305) = 4.39$, $p = .037$, $\eta^2 = .01$; and an interaction, $F(1, 305) = 9.76$, $p = .002$, $\eta^2 = .03$. Again, malicious envy was significantly lower in the past condition ($M = 3.12$, $SD = 1.39$) than in the future condition ($M = 3.52$, $SD = 1.39$), $F(1, 305) = 6.41$, $p = .012$, $\eta^2 = .02$, $d = 0.29$, 95% CI for the mean difference = [0.09, 0.71]. Unexpectedly, the effect reversed for benign envy: Benign envy was significantly higher in the past condition ($M = 3.76$, $SD = 1.33$) than in the future condition ($M = 3.39$, $SD = 1.38$), $F(1, 305) = 5.48$, $p = .020$, $\eta^2 = .02$, $d = 0.27$, 95% CI for the mean difference = [0.06, 0.67].

Study 3c. We conducted a third confirmatory replication, with 403 new participants and preregistering this significant reversal from Study 3b. There was no main effect of tense, $F(1, 401) = 2.76$, $p = .098$, $\eta^2 = .007$, but there was a main effect of envy form, $F(1, 401) = 11.53$, $p = .001$, $\eta^2 = .03$, and an interaction, $F(1, 401) = 6.22$, $p = .013$, $\eta^2 = .02$. Yet again, malicious envy was lower in the past condition ($M = 3.18$, $SD = 1.37$) than in the future condition ($M = 3.61$, $SD = 1.59$), $F(1, 401) = 8.67$, $p = .003$, $\eta^2 = .02$, $d = 0.29$, 95% CI for the mean difference = [0.15, 0.73]. However, the reversal from Study 2b was no longer statistically significant: As in Study 3a, benign envy remained similarly high across the past condition ($M = 3.86$, $SD = 1.48$) and the future condition ($M = 3.72$, $SD = 1.40$), $F(1, 401) = 0.99$, $p = .320$, $\eta^2 = .002$, $d = 0.10$, 95% CI for the mean difference = [−0.43, 0.14].

Summary analyses (full sample). To clarify these patterns, we reran our analyses, collapsing data across studies ($N = 1{,}012$). There was a main effect of tense, $F(1, 1010) = 8.91$, $p = .003$, $\eta^2 = .009$; a main effect of envy form, $F(1, 1010) = 30.18$, $p < .001$, $\eta^2 = .03$; and an interaction, $F(1, 1010) = 23.71$, $p < .001$, $\eta^2 = .02$ (see Fig. 3). Pairwise comparisons confirmed that malicious envy was significantly lower in the past condition ($M = 3.57$, $SD = 1.49$) than in the future condition ($M = 3.06$, $SD = 1.39$), $F(1, 1010) = 31.48$, $p < .001$, $\eta^2 = .03$, $d = 0.35$, 95% CI for the mean difference = [0.33, 0.68]. We observed consistent evidence for this effect, whereby the passing of time may be especially linked with assuaging the negative. Moreover, benign envy was significantly higher in the past condition ($M = 3.80$, $SD = 1.42$) than in the future condition ($M = 3.62$, $SD = 1.39$), $F(1, 1010) = 4.19$, $p = .041$, $\eta^2 = .004$, $d = 0.13$, 95% CI for the mean difference = [0.008, 0.35]. However, this reversal was smaller and did not emerge consistently across our three replication attempts.

Studies 3a, 3b, and 3c discussion

Studies 3a, 3b, and 3c provided more nuanced insights. We robustly replicated the basic effect for malicious envy, suggesting that the passing of time may especially assuage the destructive pain of comparison (as opposed to its more motivating, inspiring feelings, which may remain high or even grow more intense after other people achieve a superior outcome).

Finally, Study 4 assessed downstream consequences of this potential feature of the effect. We tested whether tense can be exploited to combat the prototypically negative effects of envy. We hypothesized that taking a past perspective—focusing on how one will feel after a real envied experience occurs—may help people feel better in the present.

Study 4: Exploiting Tense for Regulating Negative Emotion

Method

We recruited 322 participants across our university subject pool to complete a study about imagination for $3.00 each (45.65% female; age: $M = 28.61$ years, $SD = 12.38$). Each participant was randomly assigned to a 3 (condition: control, past, or distant future; between-subjects) × 2 (time: Time 1 or Time 2; within-subjects) design. First, all participants brought to mind a person from their own life who has an upcoming envy-inducing event (sampling real events as in Studies 3a, 3b, and 3c). However, here we crafted more detailed instructions to better match the goal of our intended manipulation. Participants read the following:

> Please think of a real person in your own life (e.g., a friend, classmate, or family member) who has a real upcoming event that makes you feel envious. There is one rule: This upcoming event needs to have a "start point" and an "end point." For example, it can't just be that a friend has a desirable life in general and that's that. Rather, it could be that a friend is taking a specific vacation or going on some kind of trip; starting an internship or some other academic opportunity; winning an award or getting some recognition; going on a date; going to a party, concert, or game; getting to have some special or unique experience; and so on.

When participants had an answer in mind, they were prompted via open-ended text boxes to type how they knew the person, a few details about the event, when the event will start, and how long the event will last. All participants then completed a similar focusing task as in Studies 2a and 2b, during which time they were instructed to "focus on this event and bring it to mind in detail" and to consider how this upcoming event makes them feel. After, they indicated how they felt "here and now" along four dimensions: envy, stress, self-esteem, and life satisfaction. Beyond having other important effects, these latter dimensions are also direct consequences of malicious envy (Smith & Kim, 2007).

First, participants completed the five-item envy scale from Studies 1, 2a, and 2b. Second, participants completed the six-item short form of the Spielberger State-Trait Anxiety Inventory (Marteau & Bekker, 1992), which predicts a host of health outcomes from elevated blood pressure to impaired attention. Each item (e.g., "I feel tense") was rated on a scale from 1 (*not at all*) to 4 (*very much*). Third, participants completed the seven-item social subscale of the well-tested State Self-Esteem Scale (Heatherton & Polivy, 1991), which assesses concerns about how one is viewed by other people and predicts self-destructive behavior (e.g., binge eating and self-control failures). Each item (e.g., "I am worried about what other people think of me") was rated from 1 (*not at all*) to 5 (*extremely*). Fourth, participants rated how satisfied and how happy they felt with their lives as a whole at the moment, each from 1 (*not at all*) to 7 (*extremely*). These two items are often used together in studies and policy surveys (O'Brien & Kardas, 2016) and are recommended in Organisation for Economic Co-operation and Development (2017) guidelines as representative assessments of momentary well-being.

Participants then moved on to the second task. Control participants ($n = 102$) were instructed to complete the same focusing task again and reported how they felt at the moment via the same four dimensions. This condition served as a neutral control comparison. Perhaps simply having more time or reflection is sufficient for changing how people feel from Time 1 to Time 2; likewise, perhaps being asked to make repeated ratings elicits general demand to change one's answers.

Past participants ($n = 110$) were instructed, "Now mentally fast forward in time, about 1 year from now. That is, consider how this event will feel when it is in your past. Focus on how the event will make you feel from this perspective." They reported how they felt at the moment via the same four dimensions, prefaced with the clarifying phrase, "Ok, back to the present. How does thinking about the event now make you feel, here and now?" This condition served as the key condition of interest.

Distant-future participants ($n = 110$) were instructed, "Now mentally rewind in time, about 1 year ago. That is, consider how this event felt when it was in your far-off future, maybe not even here yet. Focus on how the event made you feel from this perspective." They reported how they felt at the moment via the same four dimensions, in the same way as past participants. This condition served as an additional control. If all distance is created equal, then gaining any temporal distance from the event should reduce its impact. However, our findings so far suggested that not all distance is created equal: Taking this future perspective might also help relative to thinking about the event up close in real time, but it may not help as much as taking an equidistant past perspective.

Finally, along with the same condition checks as in previous studies, all participants also rated how objectively far away their experience was from the day they completed the study. As in all previous studies, there were no meaningful differences between

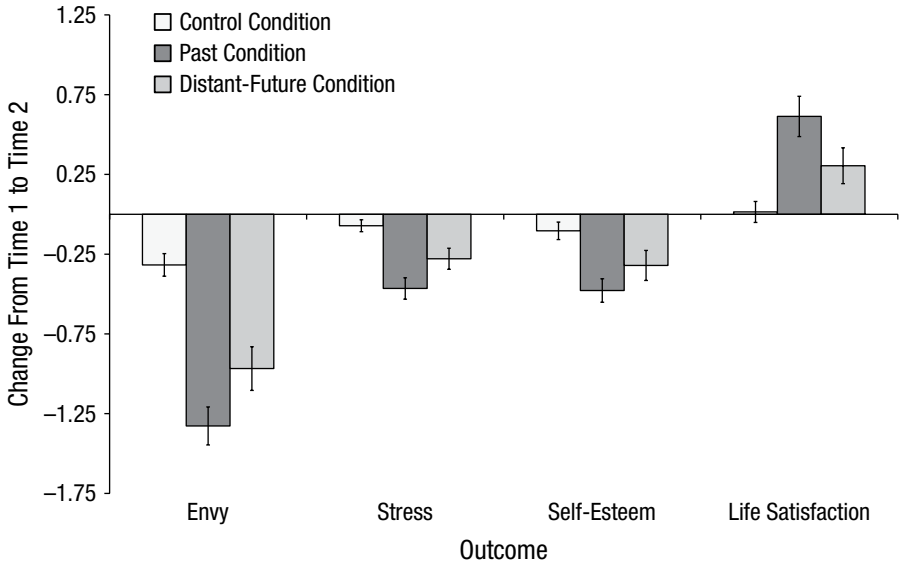

Fig. 4. Mean change in present reactions, from focusing on the event normally at Time 1 to refocusing on the event in one of three ways at Time 2 (Study 4). Results are shown separately for each condition and each type of reaction. Error bars show ±1 *SE*.

conditions on any of these variables (see the Supplemental Material).

Results

We collapsed each set of items into scales for Time 1 (envy: $\alpha = .76$, stress: $\alpha = .85$, self-esteem: $\alpha = .92$, life satisfaction: $\alpha = .89$) and Time 2 (envy: $\alpha = .86$, stress: $\alpha = .86$, self-esteem: $\alpha = .93$, life satisfaction: $\alpha = .94$), reverse-coding where necessary. We conducted repeated measures GLM analyses. For simplicity, we report results for each measure individually (see Fig. 4).

Reduced envy in the present after considering a past perspective. For envy, there was a main effect of condition, $F(2, 319) = 3.30$, $p = .038$, $\eta^2 = .02$; a main effect of time, $F(1, 319) = 174.03$, $p < .001$, $\eta^2 = .35$; and the critical interaction, $F(2, 319) = 19.66$, $p < .001$, $\eta^2 = .11$ (for descriptive statistics for envy and for all subsequent measures, see Table 2; for the full reporting of all individual pairwise comparisons, see the Supplemental Material).

Participants who reconstrued an envied event as having already occurred in the past reported significantly less envy than they felt originally. Less expectedly, this drop was also observed among all conditions: Participants who reconstrued the event as occurring in the distant future, and even control participants, reported significantly less envy than they felt originally. This suggests that other aspects of the task (e.g., having more time to reflect) may have contributed to the effect. Most critical, the interaction indicates that one or more of these drops are especially large. Planned contrasts of the difference scores between Time 2 and Time 1 revealed that the drop in envy among past participants ($M = -1.33$, $SD = 1.25$) was significantly larger than among distant-future participants ($M = -0.97$, $SD = 1.44$), $t(319) = 2.26$, $p = .025$, $d = 0.27$, and than among control participants ($M = -0.32$, $SD = 0.71$), $t(319) = 6.21$, $p < .001$, $d = 0.99$. These findings support our hypothesis: Distance of any kind helps, but taking a past perspective reduces envy the most.

Reduced stress in the present after considering a past perspective. For stress, there was no effect of condition, $F(2, 319) = 0.99$, $p = .375$, $\eta^2 = .006$; a main effect of time, $F(1, 319) = 63.09$, $p < .001$, $\eta^2 = .17$; and again the hypothesized interaction, $F(2, 319) = 10.86$, $p < .001$, $\eta^2 = .06$: Control participants did not feel significantly less stressed on reflecting a second time compared with how they felt originally, whereas participants who took a past perspective felt significantly less stressed than they felt originally. Like for envy, distant-future participants also felt significantly less stressed than they felt originally. Again, however, the past helped the most: The drop in stress among past participants ($M = -0.47$, $SD = 0.70$) was significantly larger than the drop among distant-future participants ($M = -0.28$, $SD = 0.69$), $t(319) = 2.25$, $p = .025$, $d = 0.27$, and than among control participants ($M = -0.07$, $SD = 0.38$), $t(319) = 4.66$, $p < .001$, $d = 0.71$.

Table 2. Present Reactions Across Time and Condition (Study 4)

Reaction and time	Control condition	Past condition	Distant-future condition
Envy			
Time 1	4.05 (1.48)	4.13 (1.18)	4.26 (1.23)
Time 2	3.73 (1.52)	2.80 (1.43)	3.29 (1.46)
Difference	$p = .007$, $d = 0.45$	$p < .001$, $d = 1.07$	$p < .001$, $d = 0.68$
Stress			
Time 1	2.20 (0.80)	2.32 (0.76)	2.35 (0.69)
Time 2	2.13 (0.77)	1.85 (0.67)	2.07 (0.75)
Difference	$p = .238$, $d = 0.19$	$p < .001$, $d = 0.67$	$p < .001$, $d = 0.40$
Self-esteem			
Time 1	3.45 (1.17)	3.42 (1.04)	3.17 (1.15)
Time 2	3.55 (1.17)	3.90 (0.99)	3.49 (1.11)
Difference	$p = .190$, $d = 0.18$	$p < .001$, $d = 0.62$	$p < .001$, $d = 0.33$
Life satisfaction			
Time 1	4.34 (1.59)	3.96 (1.58)	3.77 (1.60)
Time 2	4.35 (1.63)	4.58 (1.72)	4.07 (1.71)
Difference	$p = .893$, $d = 0.02$	$p < .001$, $d = 0.47$	$p = .004$, $d = 0.26$

Note: Means are given for each time and condition; standard deviations are given in parentheses. Time 1 versus Time 2 test statistics are given for each reaction and condition.

Mixed evidence for self-esteem. For self-esteem, there was no main effect of condition, $F(2, 319) = 2.83$, $p = .060$, $\eta^2 = .02$; a main effect of time, $F(1, 319) = 45.88$, $p < .001$, $\eta^2 = .13$; and an interaction, $F(2, 319) = 5.88$, $p = .003$, $\eta^2 = .04$: Control participants felt no better about themselves after reflecting a second time compared with how they felt originally, whereas past participants did feel significantly better about themselves compared with how they felt originally. Here, however, this boost was not unique: Distant-future participants also felt significantly better about themselves compared with how they felt originally, and difference-score analyses revealed that although a past perspective ($M = 0.48$, $SD = 0.77$) helps more than control ($M = 0.10$, $SD = 0.56$), $t(319) = 3.42$, $p = .001$, $d = 0.56$, a past perspective was not significantly more helpful than a distant-future perspective ($M = 0.32$, $SD = 0.99$), $t(319) = 1.46$, $p = .144$, $d = 0.18$.

Improved life satisfaction in the present after considering a past perspective. For life satisfaction, the unique boost reemerged. There was no main effect of condition, $F(2, 319) = 2.33$, $p = .099$, $\eta^2 = .01$; a main effect of time, $F(1, 319) = 25.59$, $p < .001$, $\eta^2 = .07$; and the critical interaction, $F(2, 319) = 7.83$, $p < .001$, $\eta^2 = .05$: Control participants felt no more satisfied on reflecting a second time compared with how they felt originally, whereas past participants did feel significantly more satisfied than they felt originally. Distant-future participants also felt significantly more satisfied than they felt originally, but the past helped the most: The boost among past participants ($M = 0.61$, $SD = 1.33$) was significantly larger than the boost among distant-future participants ($M = 0.30$, $SD = 1.18$), $t(319) = 2.08$, $p = .038$, $d = 0.25$, and than among control participants ($M = 0.01$, $SD = 0.67$), $t(319) = 3.95$, $p < .001$, $d = 0.57$.

Study 4 highlights consequences. Considering how one will feel after an envied experience is already part of another person's life history may help observers feel better about the event and about themselves in the present.

General Discussion

> We envy those who are near us in time . . . We do not compete with men who lived a hundred centuries ago.
>
> —Aristotle, *Rhetoric* (fourth century B.C./2004, p. 82)

A life that sums to the same desirable outcomes presumably should count the same regardless of where those achievements are crossed on the timeline. Yet in our reactions to other people who enjoy such lives, location apparently matters. Participants experienced more envy when imagining other people about to attain desired outcomes than when imagining other people who had already attained them (Study 1). This asymmetry was replicated in real time, with envy rising as a peer's desirable date approached but abruptly dropping after the date occurred (Studies 2a and 2b). This asymmetry applied mostly to malicious envy; participants felt less hostile (but no less inspired) toward other people's past superior outcomes (Studies 3a, 3b,

and 3c). Accordingly, taking a past perspective alleviated the pain of comparison in the present (Study 4).

Our findings advance research on the psychology of time and tense in at least three ways. First, we extended temporal asymmetries into the domain of social comparison, whereas most past research has focused on nonsocial, noncomparative outcomes such as regret (Shani et al., 2015). Our findings qualify traditional models of social comparison, which assume that reactions such as envy should be a simple function of how much one desires the outcome itself (Festinger, 1954; Tesser, 1991). Tense may be an overlooked dimension on which comparisons remain affected. The same Maui vacation, taken by the same coworker, at the same distance away, may wield less power merely after it occurs. These findings highlight a myopic nature to envy: Observers may bring to mind how other people are right now (which may be unrepresentative but easy to imagine) rather than other people's outcomes additively (which may be more relevant but hard to imagine; Klein & O'Brien, 2018; O'Brien, Kristal, Ellsworth, & Schwarz, 2017). This myopia may also explain why allocators of resources are more sensitive to fairness before making allocations than after making allocations, despite leaving recipients with the same unfair outcome (Cooney, Gilbert, & Wilson, 2016).

Second, to date, temporal asymmetries have been understood as asymmetries in event relevance (see Caruso & Van Boven, 2018): Known events are assumed to be less relevant for online attention than looming uncertainties, fostering a general overweighting of the future. Our studies robustly support this idea while revealing a critical exception: Studies 3a, 3b, and 3c suggest that tense may interact with valence in yet-obfuscated ways, all else being equal. This nuance highlights the need for better understanding when and why the future will be no more prioritized than the past (see also O'Brien, 2015a, 2015b). For general mechanisms, to the extent that prospection prioritizes the negative over the positive (Baumeister et al., 2016; Bulley et al., 2017), emotions such as malicious envy may be especially linked to future threats. For specific mechanisms, one promising candidate is perceived *deservingness*. Malicious envy dominates reactions to other people who seem undeserving of their lot, whereas benign envy dominates for other people who seem to have earned it (van de Ven, Zeelenberg, & Pieters, 2012). Accordingly, outcomes may seem more undeniably deserved in the past, hinted at by phenomena such as belief in a just world (Lerner, 1980); after all, the person now has them. This suggests predictable paths toward a more sophisticated understanding of when "past = more" beyond valence (e.g., people may feel prouder of past than of future accomplishments but also less empathy for past than for future struggle).

Finally, our findings have novel practical implications. Study 4 is the first study to exploit tense as an emotion-regulation tool, showing downstream effects on well-being. Notably, we tested the full range of past, present, and future perspectives (also in Studies 2a and 2b), revealing that not all distance is created equal. Popular models of emotion regulation (Gross, 2013; Kross & Ayduk, 2011) and psychological distance (Trope & Liberman, 2010) predict the general pattern that imagining events feels less intense than experiencing events in real time (as in Studies 2b and 4), but they would have failed to predict our relative boost of the past over the future, holding distance constant.

This relative boost may prove critical for regulating destructive emotions. More than 500 million people interact daily on social media such as Facebook, where they disproportionately encounter other people's best moments, promoting a fear of missing out and undermining viewers' well-being. Most relevant, it is envy that "mediates [this] relationship between passive consumption of information on [social networking sites] and life satisfaction" (Krasnova, Wenninger, Widjaja, & Buxmann, 2013, p. 1489). There may be subtle power in the timing of information sharing. A status update of "All packed for Maui!" may have more influence than "Back home from Maui!" Because people are more likely to share news about future than about past events (Weingarten & Berger, 2017), our findings suggest a causal clue into the positive correlation between Facebook use and depression (Kross et al., 2013). To minimize envy, companies could hide future-framed information, and more research should assess our effect as a regulation tool. To maximize envy, companies could highlight future-framed information (e.g., creating advertisements with future-oriented customer quotes). Beyond social media, a boss might be wise to announce that a competitive promotion "has gone to Ayelet" than that the promotion "will go to Ayelet" in anticipating the hazards of envy in the workplace (Exline & Lobel, 1999).

Psychologists have long been interested in social and temporal comparisons. Our findings highlight the importance of when comparisons are made—changing one's experience of identical events in ways that may be underemphasized in the literature. There is something of a paradox in our reactions to people who get to have what we want: It stings less if they already have it.

Action Editor

Jamin Halberstadt served as action editor for this article.

Author Contributions

E. O'Brien generated the idea (inspired by E. M. Caruso's past research), designed the studies, and drafted the manuscript. A. C. Kristal and E. M. Caruso provided critical feedback and revisions. All the authors approved the final manuscript for submission.

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Declaration of Conflicting Interests

The author(s) declared that there were no conflicts of interest with respect to the authorship or the publication of this article.

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Supplemental Material

Additional supporting information can be found at http://journals.sagepub.com/doi/suppl/10.1177/0956797619839689

Open Practices

All data and materials have been made publicly available via the Open Science Framework and can be accessed at osf.io/4ufvz. Studies 2b, 3a, 3b, and 3c were preregistered, and copies of the preregistrations can be found at osf.io/4ufvz. The complete Open Practices Disclosure for this article can be found at http://journals.sagepub.com/doi/suppl/10.1177/0956797619839689. This article has received the badges for Open Data, Open Materials, and Preregistration. More information about the Open Practices badges can be found at http://www.psychologicalscience.org/publications/badges.

Note

1. In Study 1 (and all subsequent studies), we found no meaningful differences in these condition checks or in basic attention checks (more than 90.00% pass rate; see the Supplemental Material available online).

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