

## **Time Will Fly During Future Fun (But Drag Until Then)**

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## Abstract

Consumers' lives are filled with scheduled events – both positive and negative. The current research examines how the valence of future scheduled events colors consumers' temporal judgments in relation to such events: the time until their onset, the time during the events, and the time until their offset. We propose that the lay theory espousing “time flies when you're having fun” leads consumers to judge that positive (vs. negative) future events of equivalent objective distance and duration are *farther away* and *shorter*. Operating in tandem, these elements produce two novel phenomena: (1) the end of positive and negative events can feel similarly far from the present, and (2) the beginning and end of positive events can feel similarly far from the present, whereby, in some circumstances, the event's duration is effectively eliminated in the mind's eye. Four studies provide evidence for these predictions, informing future directions regarding prospective time perception.

*Keywords:* time, valence, duration, lay theory, prospection, time perception

After postponing her originally-planned honeymoon due to the novel coronavirus (COVID-19) pandemic, the first author rescheduled her trip upon the introduction of vaccination programs. She eagerly anticipated the honeymoon yet couldn't help but feel that it would be over in a flash. The start of her honeymoon felt distant, while the vacation itself felt fleeting, making it feel as though it would be over almost as soon as it began.

We propose that, like the first author, consumers tend to perceive positive (vs. negative) future events as particularly short and distant. Mentally integrating these two contrasting perceptions, when judging the distance to the end of an event, consumers can come to perceive that (1) the ends of both positive and negative events are similarly distant (despite differences in perceptions of time until and during these events), and (2) future positive events can seem to lack duration altogether (the beginning and end can feel similarly distant from the present). These novel effects inform theorization of prospective time perception as well as consumer decision making, where duration judgments impact a variety of behaviors, including temporal discounting (Read et al., 2005; Zauberan et al., 2009), willingness to expedite events (Goodman et al., 2019), activity engagement prior to events (Tonietto et al., 2019), and planning and time-budgeting decisions during events (Fernbach et al., 2015).

### **Valence and Temporal Judgments**

Consumers can appraise duration both directly (how long a future event feels) and indirectly (the difference between how far away the beginning and end of a future event feel from the present). In the present research, we examine how the valence of future events colors both of these types of duration judgments by jointly examining judgments of the time *during*,

until the *onset*, and until the *offset* of future events.

#### *Perceived Time During Future Events*

Consumers want positive events to last and engage in tactics to prolong enjoyment (Chun et al., 2017; Hurley & Kwon, 2012). Consistent with motivated reasoning, this preference could lead consumers to “see what they want to see” (Kunda, 1990), leading positive events to feel particularly long. However, consumers also hold the lay theory that “time flies when you’re having fun,” a notion that stems from the tendency to experience positive events as passing especially quickly (Droit-Volet et al., 2004, Gable & Poole, 2012; Kellaris & Kent, 1992; O’Brien et al., 2011). To the extent that memory informs lay theories (Novemsky & Ratner, 2003) and predictions of future utility (Kahneman & Snell, 1992; Wirtz et al., 2003), consumers may apply such beliefs to future events, essentially concluding that time *will* fly throughout future fun. As a result, positive (vs. negative) future events should feel prospectively shorter.

#### *Perceived Time Until Onset of Future Events*

While anticipating the start of positive events, consumers might be motivated to perceive these events as closer, just as they tend to see positive physical objects, locations, and memories as psychologically closer (Alter & Balci, 2011; Balci & Dunning, 2010; Ross & Wilson, 2002). In contrast, future positive events often feel farther, particularly when consumers have little control over time (Han & Gershoff, 2018), and at least in part due to loss aversion (Bilgin & LeBoeuf, 2010) and the emotionally evocative nature of negative events (Baumeister et al., 2001; Van Boven et al., 2010). Lay theories about time support the same conclusion. Lay theories can become a standard of comparison against which consumers form judgments, producing contrast effects among entities that deviate from this standard (Mukhopadhyay & Johar, 2005). Thus, consumers judging that time will fly during future positive events may contrastingly think time

will drag during the time beforehand (and vice versa for negative events), leading positive events to feel farther away.

#### *Perceived Time Until Offset of Future Events*

Because consumers judge time within the context of what will unfold (or has unfolded) between now and then (e.g., Maglio & Kwok, 2016; Raghurir et al., 2011; Zauberan et al., 2010), appraisals of the distance to the ends of events can be formed via a mental integration of the time until events will begin and the time over which events will elapse. According to our conceptualization, events of either valence will be perceived as having one protracted period of time (until positive events; during negative events) and one foreshortened period of time (until negative events; during positive events). These contrasting perceptions could cancel each other out depending on relative effect sizes. If so, the *ends* of positive and negative events could feel similarly distant. Thus, while awaiting and enjoying a positive event is perceived differently from awaiting and enduring a negative event, mentally reaching the ends of both events can be perceived equivalently.

The particular combination of protracted time until and foreshortened time during positive events could lead to a yet more extreme possibility: The subjectively distant onset, combined with subjectively short duration, could lead the beginnings and ends of positive events to feel equally distant from the present. As a result, positive events could feel as though they lack duration altogether. This would particularly be the case when evaluating duration indirectly (considering the time to onset compared to offset), as consumers might be reticent to acknowledge zero explicit duration when estimating duration directly.

Four studies (along with two studies reported in the Methodological Details Appendix, or MDA) find that positive (vs. negative) events feel *shorter* and *farther away*, both when duration

is measured directly (Pilot Study, Study 3) and indirectly (i.e., comparing distance to the onset and offset; Studies 1 and 2). The indirect measurement studies document that the ends of positive and negative events can feel equally far from the present, as can the beginnings and ends of positive events. This occurs because consumers expect time to fly during, but drag before, positive events (and vice versa for negative events), and the observed effects are greater among those who more strongly hold this lay theory. Full materials for each study are available in the MDA.

### **Pilot Study**

As an initial test of the proposed effects in a naturalistic setting, on the Monday before Thanksgiving, 510 online participants ( $M_{\text{age}} = 29.32$ , 43.3% female) indicated their perceived duration of either the time until or during the Thanksgiving holiday on a slider scale (0 = very short, 100 = very long) and indicated how positive they expected Thanksgiving would be (1 = very negative, 5 = very positive).

A linear regression revealed a significant time frame by positivity interaction ( $B = 3.47$ ,  $SE = 1.13$ ,  $t(506) = 3.09$ ,  $p = .002$ ). The more positive participants expected Thanksgiving would be, the longer the time *until* Thanksgiving felt ( $B = 3.31$ ,  $SE = 1.59$ ,  $t(506) = 2.08$ ,  $p = .038$ ), but the shorter the time *during* Thanksgiving felt ( $B = -3.63$ ,  $SE = 1.59$ ,  $t(506) = -2.29$ ,  $p = .023$ ). This provides correlational evidence from a real event that positive (vs. negative) events feel farther and shorter.

### **Study 1**

Study 1 assessed duration judgments indirectly by comparing the subjective distance to the beginning and to the end of an event that was framed as either positive, negative, or neutral.

### *Method*

Four hundred fifty-one MTurkers ( $M_{\text{age}} = 36.78$ , 44.8% female) participated in this 3 (event valence: positive, negative, neutral; between-subjects) x 2 (time point: beginning, end; within-subjects) mixed design. Participants considered the upcoming weekend that was either expected to be fun (positive), terrible (negative), or just “ok” (neutral). Next, they indicated how far away the beginning and then the end of the weekend felt on slider scales (0 = very near, 100 = very far). Finally, participants completed a valence manipulation check (see MDA).

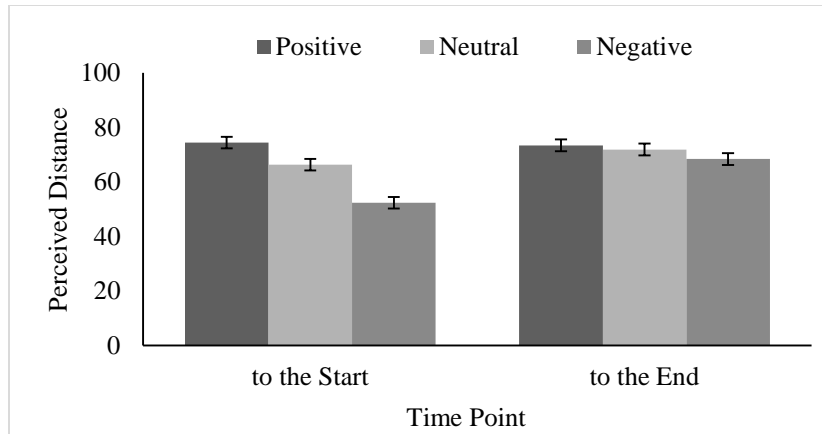
### *Results*

For the sake of brevity, in this and subsequent studies, we focus on the critical interaction and report main effects in the MDA.

A mixed ANOVA revealed a significant valence by time frame interaction ( $F(2, 448) = 12.61, p < .001$ ; see figure 1). Unpacking this interaction, the beginning of the positive event felt farther ( $M = 74.37, SD = 22.02$ ) than the beginning of the negative event ( $M = 52.31, SD = 30.38, t(448) = 7.36, p < .001$ ). The neutral event fell in between ( $M = 66.32, SD = 24.80$ ) and significantly differed from both the positive ( $t(448) = 2.69, p = .007$ ) and negative events ( $t(448) = 4.68, p < .001$ ). There were no differences in perceived distance to the ends of events ( $M_{\text{positive}} = 73.34, SD_{\text{positive}} = 25.17; M_{\text{negative}} = 68.37, SD_{\text{negative}} = 29.13; M_{\text{neutral}} = 71.82, SD_{\text{neutral}} = 25.02$ , all  $|ts(448)| < 1.70$ , all  $ps > .11$ ).

### **Figure 1**

*Study 1: Perceived Distance by Time Point and Valence*



*Note.* Error bars represent +/- 1 standard error

To examine perceived duration, we compared the perceived distance to the beginning and to the end of the event. While the end of the negative event felt significantly farther than its beginning (Difference = 16.06;  $t(448) = 6.61, p < .001$ ), distances to the beginning and the end of the positive event did not differ (Difference = -1.03;  $t(448) = .42, p = .67$ ). Ensuring that the results were not driven by outliers, excluding participants with difference estimates outside +/- 2 standard deviations from the mean eliminated this directional difference – where the positive event was perceived to be over almost *before* it began – without altering the overall pattern of results. Given the within-subjects design, by participants' *own ratings*, the positive event seemed duration-less. Indeed, 46% of participants evaluated the positive event as having zero or negative duration (vs. 30% for the negative event; see MDA for percentages and histograms by condition across all studies). The end of the neutral event felt farther than its beginning (Difference = 5.50;  $t(448) = 2.27, p = .024$ ), but this difference was smaller compared to the negative event.

### *Discussion*

Study 1 documents that relative to a neutral event, positive events feel farther and shorter, while negative events feel closer and longer. In combination, these effects led to the perception



that the ends of differently-valenced events are similarly distant, and that positive events will be over almost as soon as they begin. We note that neither emotional intensity (Van Boven et al., 2010) nor loss aversion (Bilgin & LeBoeuf, 2010) can account for the full set of effects, as both would predict that neutral events would feel farther than events of positive or negative valence.

## Study 2

In Study 2, we tested the proposed mediating role of expected temporal progression in future time perception.

### *Method*

Two hundred sixty-seven undergraduate students ( $M_{\text{age}} = 21.15$ , 47.9% female) participated in this 2 (event valence: positive, negative; between-subjects) x 2 (time point: beginning, end; within-subjects) mixed design. Participants considered a scheduled weekend trip that was either expected to be fun (positive) or terrible (negative). This manipulation was confirmed by a pretest (see MDA). Participants next indicated how far away the beginning and the end of the trip felt (counterbalanced order; see MDA for order effects) on the same scale used in Study 1. Finally, participants indicated whether the time would drag on or fly by, both until and during the trip (1 = definitely drag on, 7 = definitely fly by).

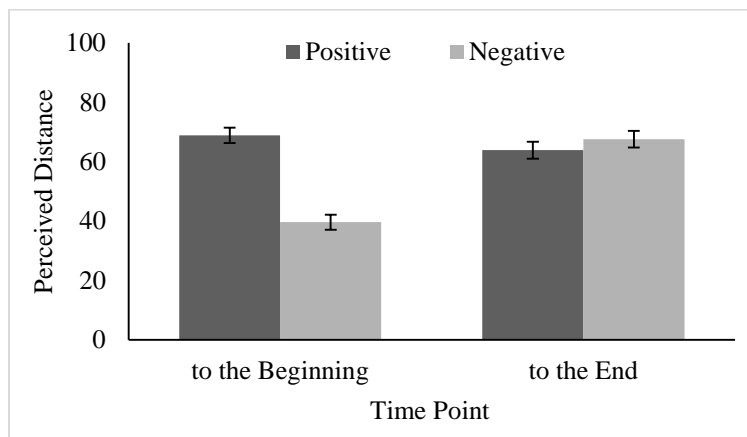
### *Results*

*Perceived distance.* A mixed ANOVA revealed a significant valence by time frame interaction ( $F(1, 263) = 46.81, p < .001$ ; see figure 2). Replicating Study 1, the beginning of the positive trip felt significantly farther away ( $M = 68.84, SD = 28.30$ ) than the beginning of the negative trip ( $M = 39.60, SD = 30.97; t(263) = 8.04, p < .001$ ), while the ends of the trips did not feel differentially distant ( $M_{\text{positive}} = 63.84, SD_{\text{positive}} = 32.76, M_{\text{negative}} = 67.58, SD_{\text{negative}} = 33.14$ ;

$|t(263)| < 1$ ). While the end of the negative event felt significantly farther than its beginning (Difference = 27.98;  $t(263) = 8.23, p < .001$ ), for the positive event, the distances to its beginning and its end did not differ (Difference = -5.00;  $t(263) = 2.14, p = .15$ ). As in Study 1, excluding outliers did not alter the pattern of results.

## Figure 2

Study 2: Perceived Distance by Time Point and Valence



Note. Error bars represent +/- 1 standard error

*Temporal progression.* Participants thought the time until the positive event would pass more slowly ( $M = 2.82, SD = 2.00$ ) than the time until the negative event ( $M = 4.16, SD = 2.28, t(265) = -5.09, p < .001$ ). Conversely, they thought the time during the positive event would pass more quickly ( $M = 6.51, SD = .85$ ) than the time during the negative event ( $M = 3.58, SD = 2.36, t(265) = 13.48, p < .001$ ). Supporting the proposed contrasting effect on expected temporal progression, there was a negative correlation between expected temporal progression during and before the event ( $r = -.47, p < .001$ ) such that participants expected time to drag before, but fly during positive events (and vice versa for negative events).

Next, two separate models tested whether expected temporal progression mediated the

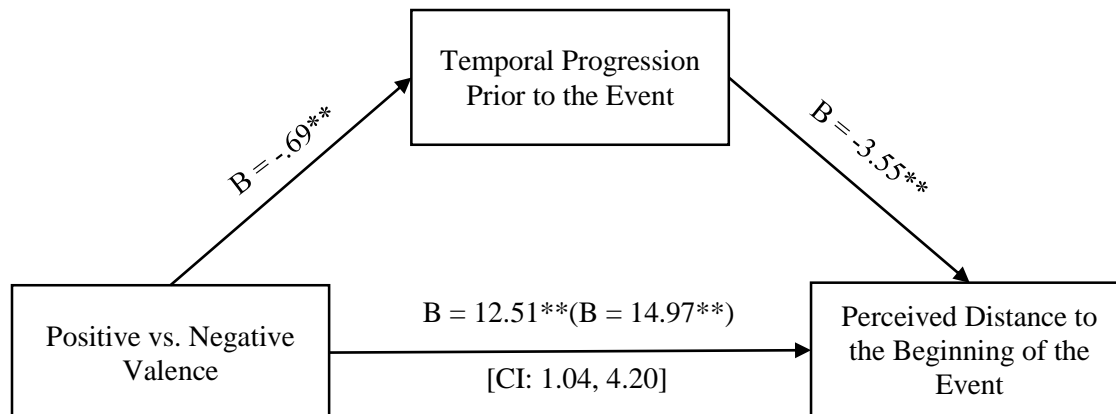
effect of event valence on distance perceptions before and during the event (see figure 3).

Expectations about how time would pass *until* the event significantly mediated the effect of valence on perceived distance to the event's beginning (controlling for distance to the end and order; 95% CI: [1.04, 4.20]). When analyzing the perceived distance to the end of the event, *both* expectations about how time would pass *during* the event (95% CI: [-5.97, -.24]; controlling for distance to the beginning and order) and *until* the event (95% CI: [.11, 2.48]) played mediating roles. As expected, each operated in opposing directions, accounting for the observed null effect of valence on perceived distance to the end of the events.

### Figure 3

#### Study 2: Mediation

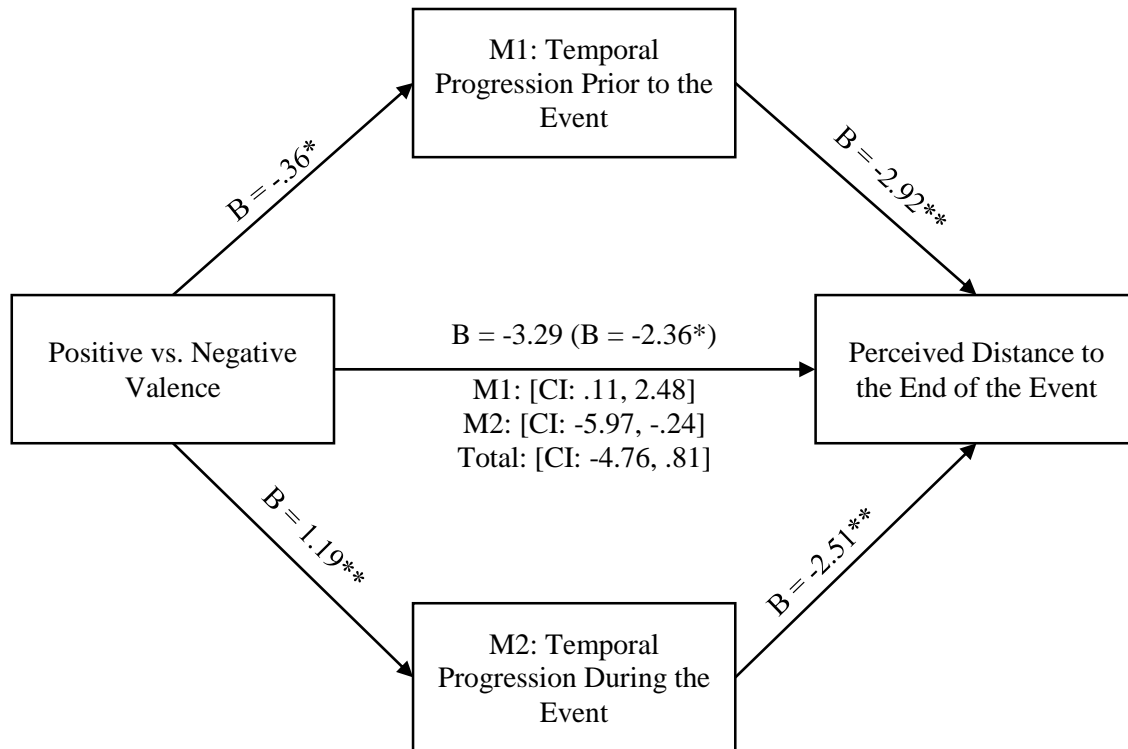
##### Panel A – Mediation of Perceived Distance to the Beginning



\*  $p < .05$ ; \*\*  $p < .01$

Coefficients are reported controlling for perceived distance to the end and question order

##### Panel B – Mediation of Perceived Distance to the End



\*  $p < .05$ ; \*\*  $p < .01$

*Coefficients are reported controlling for perceived distance to the beginning and question order*

### Discussion

Study 2 provides support for the role of the “time flies when you’re having fun” lay theory of time progression: Participants prospectively applied this lay theory, expecting time to drag before and fly during a positive event (and vice versa for negative events). Moreover, the opposing expectations regarding the time prior to and during events accounted for both the null effect of valence on perceived distance to the end of events and the mental elimination of the duration of positive events, whereby the beginning and end felt equally distant.

### Study 3

The studies thus far have inferred duration from the perceived distance to the beginning

and end. Study 3 tested our process by directly measuring perceived duration of the event and using a moderation approach (e.g., Raghurir & Valenzuela, 2006; Raghunathan et al., 2006), whereby our observed effects should be exaggerated for participants who chronically endorse the “time flies when you’re having fun” lay theory. Further, Study 3 utilized a more externally-valid design in which participants evaluated future events that they were about to actually experience.

### *Method*

The methods and analyses for this study were preregistered (<http://aspredicted.org/blind.php?x=pr8ue6>). Three hundred ninety-nine MTurkers ( $M_{\text{age}} = 39.47$ , 51.6% female) participated in this 2 (event valence: positive, negative; between-subjects) x 2 (timeframe: until, during; within-subjects) x chronic belief in the lay theory (measured) mixed design. To assess judgments about real future events, all participants read that they would watch two five-minute-long videos back-to-back. The second video was described as either humorous and fun (positive) or as boring and dull (negative) to serve as the valenced event, while the first video served as the preceding interval. Participants indicated how long both the first (until timeframe) and second (during timeframe) videos felt like they would last (0 = very short, 100 = very long). Next, participants completed valence manipulation checks (see MDA).

Participants then watched both videos and completed a memory test and filler questionnaire to separate the manipulation from the lay theory measure, assessed via agreement with four statements (e.g., “time flies when you’re having fun,” “if an event went by slowly, then it must have been negative;” 1 = strongly disagree, 7 = strongly agree;  $\alpha = .73$ ).

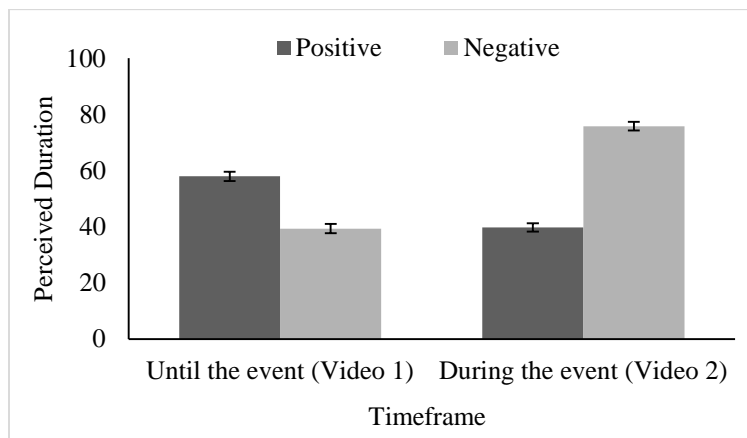
### *Results*

A mixed ANOVA revealed the expected event valence by timeframe interaction ( $F(1, 395) = 481.00, p < .001$ ; see figure 4). In line with prior studies, participants expected the first

video to feel significantly longer when it constituted the time until the beginning of a positive event ( $M = 58.27$ ,  $SD = 23.38$ ) compared to a negative event ( $M = 39.45$ ,  $SD = 22.45$ ;  $t(395) = 8.17$ ,  $p < .001$ ). Conversely, the time *during* the second video was expected to feel significantly shorter when that event was positive ( $M = 39.78$ ,  $SD = 22.83$ ) versus negative ( $M = 75.50$ ,  $SD = 20.47$ ;  $t(395) = 16.74$ ,  $p < .001$ ).

#### Figure 4

##### Study 3: Perceived Duration by Timeframe and Valence

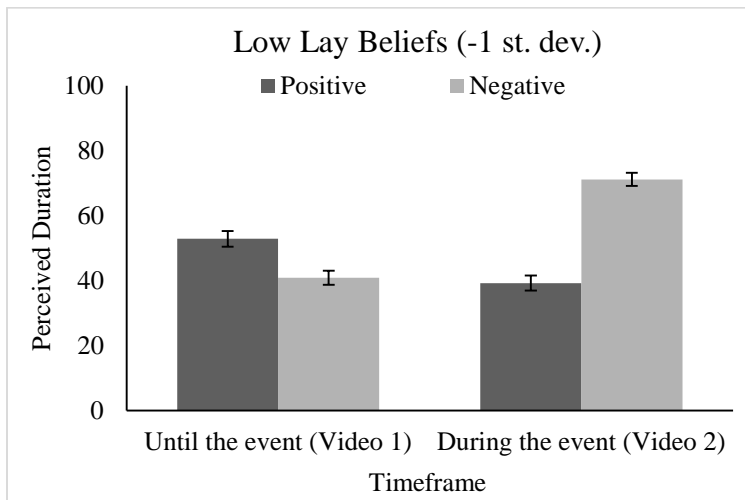
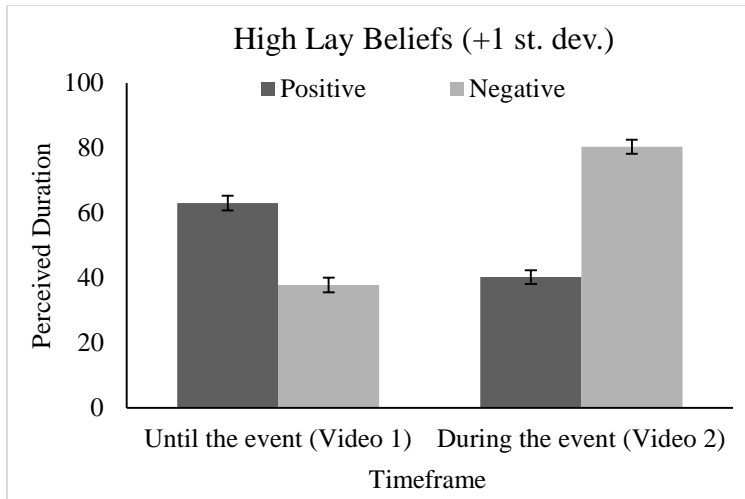


Note. Error bars represent +/- 1 standard error

We also observed a significant three-way interaction ( $F(1, 395) = 18.22$ ,  $p < .001$ ). As preregistered, we conducted two sets of analyses to probe this interaction. First, we examined the critical valence by timeframe interaction at high (+1 standard deviation) and low (-1 standard deviation) levels of belief in the lay theory (see figure 5). This analysis revealed that the effects associated with the critical interaction were larger among those high on the lay theory ( $F(1, 395) = 343.98$ ,  $p < .001$ ) compared to those low on the lay theory ( $F(1, 395) = 153.20$ ,  $p < .001$ ).

#### Figure 5

##### Study 3: Perceived Duration by Timeframe and Valence at High and Low Lay Beliefs



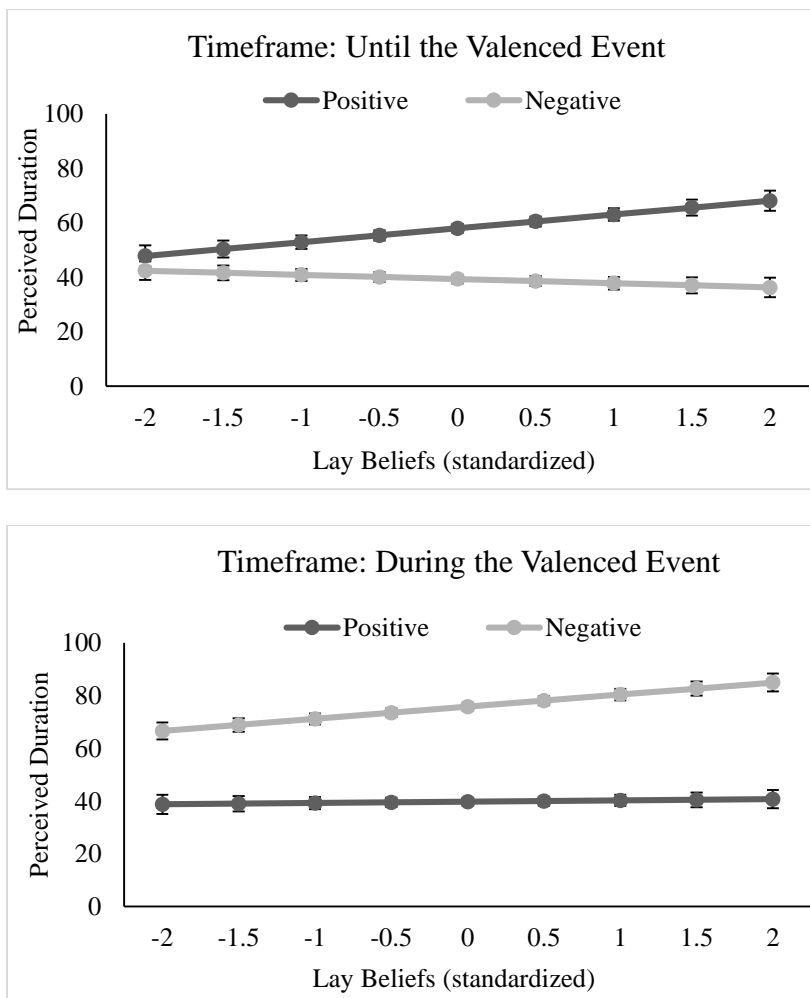
*Note.* Error bars represent +/- 1 standard error

Next, we performed Johnson-Neyman analyses separately on each of the timeframe duration measures (see figure 6). Looking first at the time *until* the valenced event, we observed a significant valence by lay theory interaction ( $B = 3.30$ ,  $SE = 1.15$ ,  $t(395) = 2.88$ ,  $p = .004$ ), with a single Johnson-Neyman point. For participants 1.55 standard deviations below the mean (raw score = 2.94) or greater in their endorsement of the lay theory (94.49% of the sample), the difference between the positive and negative conditions was significant. Looking next at the time *during* the valenced event, we observed a marginally significant interaction ( $B = -2.05$ ,  $SE =$

1.08,  $t(395) = -1.89, p = .059$ ). There were no Johnson-Neyman points. Instead, the difference between conditions was statistically significant across the full range of belief in the lay theory, but this difference increased the more that participants endorsed the lay theory. Thus, for both timeframes, greater chronic endorsement of the lay theory exacerbated the observed effects of valence on perceived duration.

**Figure 6**

*Study 3: Perceived Duration Until and During Event by Valence and Lay Beliefs*



*Note.* Error bars represent +/- 1 standard error



### *Discussion*

Supporting the proposed role of the “time flies when you’re having fun” lay theory, the more that participants in Study 3 endorsed the lay theory, the more valence impacted judgments of the time until and during future events. Study 3 demonstrated these effects under more realistic conditions in which participants evaluated future events that they actually then experienced. This study also utilized a direct measure of perceived event duration, revealing that when consumers directly estimate duration, positive events are perceived to span a (non-zero) amount of time. We corroborated this result in Supplemental Study A (see MDA) utilizing the same stimuli as Study 2. Moreover, as the results of Studies 1 and 2 indicate, mentally integrating perceived time before and during an event (while judging distance to the end of an event) can produce the perception that positive events lack duration. Thus, when explicitly judging duration, positive events feel fleeting, but when considering the time until the onset and offset, positive events can even feel duration-less.

### **General Discussion**

Consumers commonly consider how long the time during, until the beginning, and until the end of future events feel. Investigating the role of event valence, we find that the beginning of positive events feels farther away, while the end of positive and negative events can feel similarly distant. Additionally, positive events feel prospectively shorter—so much so that their beginnings and ends can feel similarly distant from the present. We provide support for lay theories of temporal progression as one driver of the observed effects: Consumers expect future positive events to fly, and they generate a contrasting expectation regarding the time preceding

the event, expecting time to drag beforehand.

This contrast effect in expectations of temporal progression might imply a change in the relative valence of the preceding time, such that time feels more negative prior to a positive versus a negative event. This possibility appears to contradict prior research examining savoring/dread, whereby consumers gain utility (disutility) from anticipating a positive (negative) future event (Loewenstein, 1987; Morewedge, 2015). However, prior research also finds that anticipating positive events creates ambivalence: Consumers enjoy thinking about, but dislike waiting for, positive future events (Hardisty & Weber, 2020). In Supplemental Study B (see MDA), participants simultaneously evaluated time before positive events to be more positive than time before negative events *even while* thinking that time before positive events would drag more than time before negative events. This suggests that savoring and dread influence expected utility during waiting times but do not necessarily drive subjective time perception, which instead derives from lay theories.

Like the adage “time flies when you’re having fun,” other potential adages might impact perceived time, including that good things come “to those who wait” and “in small packages.” Such common sayings indicate potential lay associations between positivity and distance and between positivity and size, respectively, that might feed into perceptions of positive events as particularly far away and short. Future research might uncover additional lay theories that operate in tandem or even oppose the belief that time flies when you’re having fun.

Our results do not align with a motivational account, whereby consumers would evaluate positive (vs. negative) events as particularly long and near to the present. Whereas motivation has been found to draw positive *past* events psychologically closer (Ross & Wilson, 2002), we find that the opposite occurs for *future* events. This is consistent with established differences

between appraisals of the past and the future (Caruso et al., 2008; Caruso et al., 2013). It is possible that results more aligned with motivated reasoning would manifest if consumers considered the ways in which their behavior, such as the type and number of activities they perform (e.g., Ahn et al., 2009; Csikszentmihalyi, 1997), can impact how fast or slow time feels, thus altering perceived distance and duration.

Our investigation presupposes that consumers think of events as transpiring over time. However, one interesting possibility for future work is that not all events are thought of as such. Consumers might represent positive events as discrete instances corresponding to the event's onset (e.g., anticipating a weekend means anticipating 5pm on Friday) but think of negative events as having meaningful durations. Marketers of experiences (e.g., vacations, massages) might highlight sub-elements of the experience in order to combat subjective brevity (Kruger & Evans, 2004). Our investigation also invites future research to consider the consequences of event-derived prospective time for decisions made in the present (e.g., Siddiqui et al., 2018). For example, if consumers anticipate an inordinate degree of suffering while waiting for a seemingly short vacation, they may feel licensed to splurge over their planned budget (Khan & Dhar, 2006; May & Irmak, 2014).

Throughout our studies, we examined situations in which the target future event was unambiguously valenced, while the preceding time was relatively neutral (or lacked valence information). However, future research could explore how information about the valence of intervening events might change perceptions. If the time prior to future valenced events is itself explicitly positive or negative, hedonic contrast effects could arise (Novemsky & Ratner, 2003), potentially moderating our observed results. In addition, we focused on experiences happening relatively soon (in minutes or days), and future research might examine the influence of

increasing objective distance to events. Because consumers tend to demonstrate diminishing sensitivity to increases in objective time (Zauberman et al., 2009), consumers may distinguish less between valenced events when scheduled to occur in the distant future.

Apart from the control condition in Study 1, our studies focused on positive versus negative events. Future research could parse beyond binary valence, as our results suggest that the most enjoyable experiences may prove most susceptible to our findings. The extraordinary positivity tied to high-quality brands may cause consumers to perceive especially long wait times until the product can be enjoyed (e.g., delivery time from a 5-star versus 3-star restaurant), highlighting specific applications in which consumer time expectations are of utmost importance. Marketers might leverage the tendency for future positive events to feel particularly far by providing consumers the opportunity to purchase away the waiting period (e.g., offering early access at a premium price) or by providing enjoyable activities in advance to help the preceding time pass more quickly.

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