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Event Valence Matters: Investigating the Moderating Role of Event Valence on Event Markers' Systematic Effect*

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Previous research has revealed that people feel past target events are more distant when they recall more intervening events, event markers, that are both accessible in memory and perceived to be related to that target event (Zauberman, Levav, Diehl, and Bhargave 2010). This phenomenon was called the systematic effect of event markers (SEEM). In this research, we explore the moderating effect of the valence of the target event on SEEM and suggest the difficulty of recalling event markers as the possible mechanism. Study 1 shows that SEEM mainly occur when the valence of the target event is negative rather than positive. Study 2 showed that even though people have more difficulty recalling four event markers than one regardless of event valence, the difficulty of recalling event markers only mediates SEEM when the target event valence is negative. Furthermore, when the target event is positive, SEEM does not exist, confirming that the mediating role of the difficulty of recalling event markers on SEEM is moderated by the valence of the target event.

Key words: event marker, systematic effect, valence, difficulty of recalling, retrieval disfluency, subjective elapsed time

While experiencing the identical 24 hours, 1,440 minutes or 86, 400 seconds in a day, people perceive them differently and assign them different values. Since time is an invaluable resource, it is increasingly important to explore the factors that affect people's perception of time. While previous research on time perception has revealed various aspects of the characteristics of an event itself that affect people's perceived time, aspects of the time interval

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subsequent to the target event have not received much attention. Recently, Zauberman et al. (2010) proposed that event markers referring to subsequent events both accessible in memory and perceived as related to the target event have a systematic effect making the target event seem more distant. They labeled this the systematic effect of event markers (SEEM). Their research took a significant step towards understanding people's time perception, especially focusing on the time interval subsequent to the target event.

We posit that there may be a factor that moderates SEEM: the valence of the target event. Since people tend to separate themselves from negative events (Ross and Wilson 2000; Wilson and Ross 2001), we predict that this tendency strengthens SEEM for negative events. We also suggest that, people's tendency to put positive events closer to them attenuates SEEM for positive events. Thus, we expect weaker systematic effects when the target event is positive compared to when it is negative.

Also, we propose a metacognitive influence as the underlying mechanism for this effect. Recalling more aspects of a target event, since it requires more effort and deliberation, generates retrieval disfluency regardless of event valence. Thus, generated retrieval disfluency makes people perceive the past as further away because they simply assume that 'The event must have occurred a long time ago since I have difficulty in recalling the related events subsequent to that event'.

In addition, we suggest that this mediation is moderated by event valence. To be specific, if the target event is negative, retrieval disfluency mediates SEEM. In contrast, if the target event is positive, although people do feel more difficulty when recalling more event markers, people's motivation to maintain a positive self-regard makes positive target events closer to themselves, attenuating SEEM. Thus, retrieval disfluency will only mediate SEEM for negative events not for positive events.

To sum up, we explore the moderating role of the valence of the target event on SEEM and the mediating role of the difficulty of recalling more event markers moderated by target event valence on SEEM.

Ⅰ. Event Markers' Systematic Effect

One of the main research areas about time perception is the exploration of why people feel closer to or more distant from past events. Accordingly, much research has been conducted to investigate factors affecting subjective elapsed time, such as memory accessibility (Brown, Rips, and Shevell 1985), the valence of personal past experiences (Ross and Wilson 2002), perceived causality (Faro, Leclerc, and Hastie 2005), and the emotionality of the event (Bratfisch,

Ekman, Lundberg, and Kruger 1971).

More recent work has explored the influence of the time interval after the event on the subjective feelings of elapsed time. Zauberman et al. (2010) proposed that in order to understand subjective time perception, not only the nature of the event itself, but also subsequent events should be considered as well. They showed that recalling subsequent events makes the past event seem further away; they called this the systematic effect of event markers (SEEM). To be specific, they found that when people were asked to recall more accessible intervening events related to the target event, they reported longer subjective elapsed time.

In addition to this, we propose that there may be a key moderating factor that leads to stronger SEEM, and introduce the valence of the target event as this moderator.

Ⅱ. Event Valence and Temporal Distance

People are motivated to maintain and enhance their self-regard (Tesser 1988), leading them to focus on their strengths and ignore their weaknesses (Lewicki, 1984; Tesser and Campbell, 1983; Wilson and Ross 2000). In other words, people's motivation to maintain a positive self-esteem affects how they interpret their surroundings. This tendency also plays a critical role in people's perceptions of past events and their former selves. Ross and Wilson (2000) and Wilson and Ross (2001) proposed the temporal self-appraisal theory, which suggests that people revise their evaluations of past selves retrospectively according to their psychological needs. Consistent with this notion, their subsequent research showed that when perceiving temporal distance, people felt closer to their former favorable selves than unfavorable selves in order to maintain high self-esteem and that this generates a distancing bias (Ross and Wilson 2002). This direction of research has revealed how motivational interpretation distorts people's perceived temporal distances and suggests event valence as key to understanding subjective time perception.

Similarly, D'Argembeau, Comblain, and Linden (2003) found that people retrieve more sensorial and contextual detailed autobiographical memories about positive events than negative or neutral ones. This finding closely accorded with previous research showing that positive events are more likely to be elaborated, rehearsed, and accessed (Taylor and Brown 1988). Considering that people perceive the past as closer when memories are vivid and recall is easy, this research implies that valence has a significant role in people's subjective temporal distance.

In line with this, we posit that the event markers' effect of making the past seem further away is moderated by the valence of the target event. Specifically, when the target event

is negative, we predict that SEEM is much stronger than when it is positive and theorize that this is caused by people's motivation to maintain positive self-esteem. Thus, we expect that subjective elapsed time is affected by an interaction between the number of event markers and event valence: a stronger systematic effect for negative events and a weaker systematic effect for positive events. Since the previous research of Zauberman et al. (2010) did not directly compare the magnitude of systematic effect depending on the valence of target events, we expect that investigating the boundary condition and mechanism behind this effect will be meaningful.

Ⅲ. Retrieval Fluency

Ample studies have shown that retrieval fluency influences people's attitude toward a product (Wänke, Bless, and Biller 1996; Wänke, Bohner, and Jurkowitsch 1997). For example, if people feel a high level of difficulty when attempting retrieval of the reasons why they like BMW, they show less favorable attitudes toward that product (Wänke et al. 1996). The literature on information processing has suggested that people may use the perceived ease of generating favorable thoughts on an issue as an indicator of the amount of favorable information they have about that issue (Tversky and Kahneman 1973; Wänke et al. 1996). This is highly related to the availability heuristic (Tversky and Kahneman 1973), which showed that individuals base their estimation of the frequency and probability of an event based on how easily they can retrieve information about it.

Along with this logic, Brown et al. (1985) proposed the accessibility principle, which refers to people's bias in terms of estimating temporal distance. They suggested that people's subjective dates for events depend on the amount of information people have about them. Their main theory is simple: the more information people have, the more recent the event will seem. Contrarily, we can also infer that when people perceive that they have less information about an event, they consider the event as much further in the past.

According to this line of reasoning, we can make the prediction that the more subsequent events people recall, the higher difficulty they have experienced when recalling them, which causes them to perceive that they have less accessible information about the original event in memory. Put simply, the retrieval disfluency generated by recalling more subsequent events may lead to the creation of more subjective distance between the present and the past, and generate a distancing bias.

Combining the effect of valence and retrieval disfluency on subjective temporal distance, we can predict a more elaborate path for SEEM. Recalling more event markers may generate

retrieval disfluency regardless of the valence of the target event. However, only when the target event is negative does this metacognitive influence mediate SEEM. When the target event is positive, people's tendency to place positive target events closer to themselves may attenuate SEEM which makes the target event further away, even while people still feel more difficulty when recalling more event markers. Thus, we propose a moderating role of event valence on SEEM and suggest that this effect is mediated by the difficulty of recalling subsequent events. Moreover, we propose that this mediation is moderated by the valence of the target event.

The following studies were conducted to test these hypotheses. Study 1 demonstrated the moderating role of a target event's valence on SEEM that makes the past more distant, and Study 2 explored the proposed underlying mechanism of this effect. More specifically, Study 2 showed that retrieval disfluency mediates SEEM, and that this mediation is moderated by the valence of the target event.

Ⅳ. Study 1: The Moderating Role of Event Valence on Event Markers' Systematic Effect

The purpose of Study 1 was to test the effect of the valence of the target event on SEEM. We predicted the magnitude of systematic effect would be different for the positive and negative events: stronger effects when the target event is negative and weaker effects when the target event is positive.

4.1 Method

Total 155 undergraduate students participated in this study. The study employed a 2 (valence of the target event: *Positive vs. Negative*) X 2 (number of event markers: *One vs. Four)* between-subjects design. The positive events presented were 'the entrance day to Korea University'(*personal*) and 'the 2002 World Cup which was jointly held by both the Republic of Korea and Japan'(*public*) and the negative ones were 'any failure including test failure'(*personal*) and 'the suicide of the renowned Korean actress, Jinsil Choi'(*public*). Participants were asked to make a series of judgments of both personal and public events during the experiments. This allowed us to conduct extra analysis for any possible distinction of the effect between public and personal events.

This experiment was conducted in a computer lab. Upon arrival, participants were randomly given one of the four conditions and asked to write down event markers (*One vs. Four*) related to the given target event. Then, they were told to make a series of judgments about the target event. The variables (Zauberman

et al. 2010) measured follow: subjective feeling of elapsed time since the event (1 = feels very recent, 15 = feels very distant); the difficulty of recalling the event itself (1 = not at all difficult, 7 = extremely difficult); and the actual year and month of the event. The latter variable was calculated to generate a new variable, actual time difference in months from the present to the target event, which should be controlled for individual differences. The difficulty of recalling the target event itself, which should also be controlled for individual differences, means the accessibility of the specific event in memory, which can be a significant factor when determining the closeness of the past event. For example, when people have high accessibility (vs. low accessibility) to a certain event in memory, they perceive the certain event occurred more recently (vs. more distantly). Finally, demographic information was measured.

4.2 Results

We collected 310 data from 115 participants. Of those data, we excluded nine data since the participants did not provide the exact year and month in which the target event occurred.

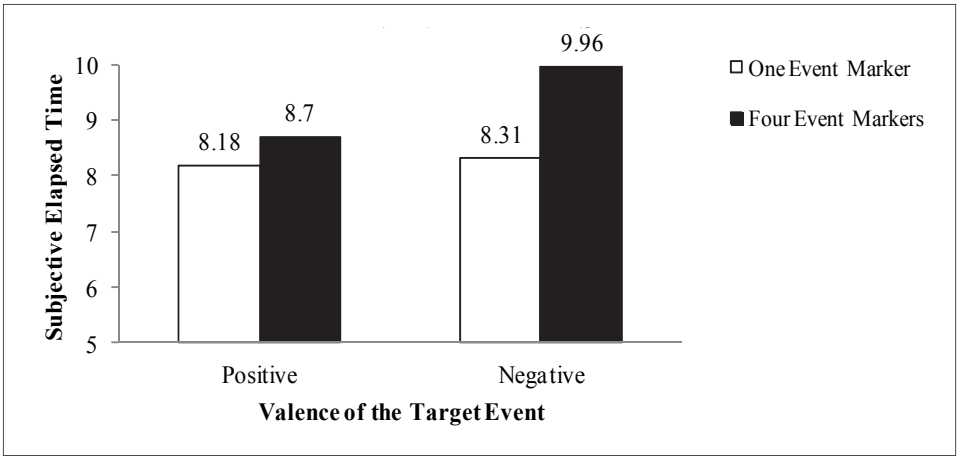
4.2.1 Subjective Elapsed Time

An analysis of covariance (ANCOVA) controlling actual time differences in months from the present to the target event and the difficulty of recalling the target event was conducted to see the main effect and the interaction effect. The result showed a significant main effect for event valence ($F(1, 295) = 15.59$, $p = .00$), but no main effect for the number of event markers ($F(1, 295) = 1.67$, *ns*). Supporting our prediction, an ANCOVA of subjective elapsed time yielded a marginally significant interaction between valence of the target event and number of event markers ($F(1, 295) = 2.94$, $p = .09$). To be specific, when the target event is negative, participants perceived a much longer elapsed time since that event when they had recalled multiple subsequent event markers ($M_4 = 9.96$, $SD = 4.16$) than when they recalled just one ($M_1 = 8.31$, $SD = 4.11$; $F(1, 144) = 4.16$, $p = .04$). However, when the target event was positive, there was no significant difference between the four event markers condition ($M_4 = 8.70$, $SD = 4.04$) and the one event marker condition ($M_1 = 8.18$, $SD = 3.97$; $F(1, 149) = .05$, *ns*, see Figure 1).

4.2.2 Additional Analyses

To confirm if there is an event effect depending on whether the event is personal or public, we conducted an additional analysis. An ANCOVA controlling actual time differences in months from the present to the target event and the difficulty of recalling the target event

〈Figure 1〉 Study 1: Subjective Elapsed Time as Function of Valence of the Target Event and Number of Event Markers



revealed no three-way interaction between the valence of the target event, number of event markers, and characteristic of the target event ($F(1, 291) = .21$, *ns*), suggesting that there was no difference in subjective elapsed time between personal and public events.

4.3 Discussion

The major goal of Study 1 is to provide initial support for our hypothesis that valence of target events moderates SEEM. We expected to see a stronger systematic effect for the negative events. Supporting our prediction, only when the target event was negative did participants asked to recall four subsequent events feel more distant from the past than those asked to recall just one. Noticeably, no systematic effect was found for positive target events, suggesting that they did not share the negative target events' robust event marker effects. However, we did find a marginally significant interaction between valence and number of event markers on their effects on subjective elapsed time in Study 1. We suppose that the weak effect shown may be due to participants' lack of understanding of the notion of event marker. In order to rule out this problem, in Study 2 we explain further the concept of event marker and then check the participants' level of understanding before they answer questions about their time perception.

Moreover, in the next study we seek to examine the underlying mechanism behind this effect. We predict that recalling more event markers will reduce retrieval fluency and produce a feeling of further distance from the past which will only manifest strongly when the target event is negative. People have tendency to bring positive (vs. negative) things close (vs. distant)

to themselves. Thus, even though people remembering positive events also experience reduced retrieval fluency, they do not distance themselves from them, so SEEM is diminished. In Study 2, we examine the mediating role of the difficulty of recalling more subsequent events moderated by the target event's valence.

V. Study 2: The Mediating Role of the Difficulty of Recalling the Subsequent Event on Event Markers' Systematic Effect

The main goal of Study 2 was to see if the difficulty of recalling subsequent events mediates the effect of number of event markers on subjective elapsed time and if this mediation is moderated by event valence. Particularly, in order to improve participants' understanding on the concept of event marker, we added sufficient explanation about event marker with two examples. Moreover, we included only personal event since we confirmed that there was no difference between personal events and public events. Finally, we measured the difficulty of recalling subsequent events in order to find out the mechanism behind this effect.

5.1 Method

Total 94 undergraduate students participated in Study 2. The study used a 2 (valence of the target event: *Positive vs. Negative*) X 2 (number of event markers: *One vs. Four)* between-subjects design. At the beginning of the experiment, each participant was given sufficient explanation of the concept of event marker with two examples. Subsequently, participants indicated their understanding level on a 7-point scale (1 = I don't understand the concept of event marker at all, 7 = I fully understand the concept of event marker).

The following procedures were similar to Study 1. Participants were randomly given one of the four conditions and asked to write down event marker(s) (*One vs. Four*) related to the given target event. The positive event presented was 'the entrance day at Korea University' and the negative event presented was 'any failure including test failure'. Participants were asked to make a series of judgments about the target event. In order to see if the difficulty of recalling event markers mediates event markers' systematic effect, we measured this variable (1 = not difficult to recall event marker(s) at all, 7 = very difficult to recall event marker(s)) along with variables we measured in Study 1: the difficulty of recalling the target event itself and the actual year and month that the target event occurred. Consistent with Study 1, we controlled actual time differences and the difficulty of recalling target event itself in analyzing the data in Study 2. Finally, we measured the emotionality of the target event by asking

how much people feel emotional about the target event on 7-point scale (1 = not strong, 7 = very strong).

5.2 Results

In order to minimize the exceptional effects of extraordinarily distant events, of the 94 data collected we excluded three relating to events which had occurred over 80 months previously.

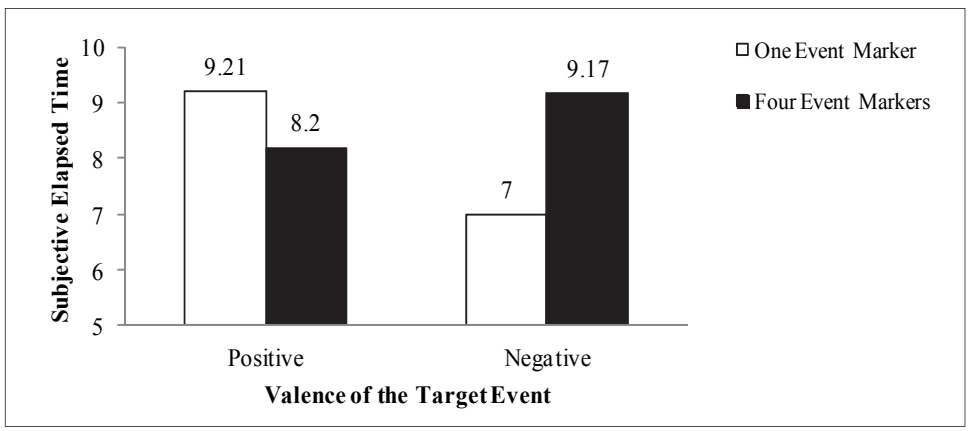
5.2.1 Level of Understanding

In order to identify participants' understanding of the concept of event marker, we analyzed it which indicated that all participants showed more than a modest level of understanding (M = 6.5, SD = .69).

5.2.2 Subjective Elapsed Time

An ANCOVA controlling actual time in months from the present to the target event and the difficulty of recalling the target event itself was conducted to see the main and interaction effects. The result revealed no main effect for either the valence of the target event ($F(1, 85)$ = .24, *ns*), or the number of event markers ($F(1, 85)$ = .44, *ns*). As expected, an ANCOVA of subjective elapsed time yielded a significant interaction between the valence of the target event and the number of event markers ($F(1, 85)$ = 4.70, p = .03). As illustrated in Figure 2, participants in the negative event condition perceived elapsed time as much longer when they recalled four event markers (M_4 = 9.17, SD = 3.97) than when they recalled only one (M_1 = 7.00, SD = 2.94; $F(1, 38)$ = 3.91, p = .06). In contrast,

〈Figure 2〉 Study 2: Subjective Elapsed Time as Function of Valence of the Target Event and Number of Event Markers



when the target event was positive, there was no significant difference between the four event markers condition (M_4 = 8.20, SD = 3.96) and the one event marker condition (M_1 = 9.21, SD = 3.06; $F(1, 45)$ = .90, *ns*).

5.2.3 Difficulty of Recalling Event Markers

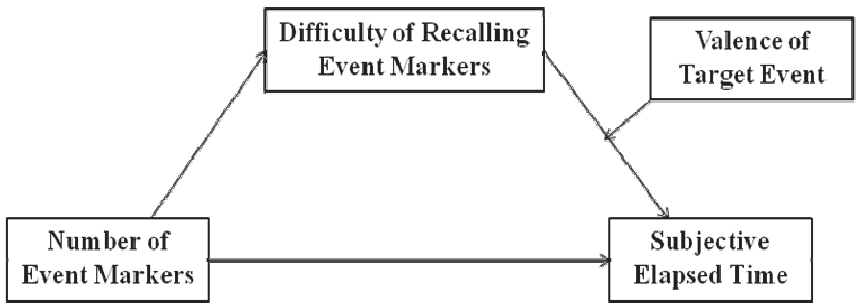
We conducted an ANCOVA controlling actual time difference in months from the present to the target event and the difficulty of recalling the target event in order to see the main effect of the number of event markers on the perceived difficulty of recalling subsequent events. Supporting our prediction, the analysis showed that the number of event markers had a significant main effect on the perceived difficulty of recalling ($F(1, 85)$ = 11.47, p = .00). Specifically, people perceived increased difficulty when they recalled four event markers (M_4 = 4.00, SD = 1.50) compared to when they recalled just one (M_1 = 2.88, SD = 1.87). As we expected, no two-way interaction between the valence of the target event and the number of event markers ($F(1, 85)$ = 1.25, *ns*) or main effect of event valence ($F(1, 85)$ = .521, *ns*) emerged.

5.2.4 Moderated Mediation Analysis

The main purpose of this study was to examine if the difficulty of recalling event markers mediates SEEM and whether this mediation is moderated by the valence of the target event as depicted in Figure 3. More specifically, we propose that the mediating role of the difficulty of recalling event markers emerges only when the target event is negative and that increased perceived difficulty in fact no longer leads to further subjective perceptions of time when the target event is positive.

We employed a bootstrapping procedure that generated a sample size of 5,000 with 95% bias-corrected confidence estimates (Preacher and Hayes 2004) to confirm the conditional indirect effect suggested. The results indicated

〈Figure 3〉 Study 2: Moderated Mediation: Difficulty of Recalling Event Markers Mediates Relationship Between Number of Event Markers and Subjective Elapsed Time When The Target Event Is Negative



significant mediation for the negative but not positive event (B = .24, CI = .04 to .60; B = .02, CI = -.21 to .26). Furthermore, the direct effect of the number of event markers on subjective elapsed time was not significant, indicating indirect-only mediation (Zhao, Lynch Jr., and Chen 2010).

5.2.5 Supplementary findings

To rule out an alternative explanation for our results, we examined whether emotionality can induce the difference in time perception depending on the valence, so we analyzed the data with emotionality as mediator but the result was not significant for either positive (B = -.02, CI = -.25 to .60) or negative event conditions (B = .06, CI = -.03 to .32). Also, we ran a separate analysis adding emotionality as another control variable and the result was consistent with what we already have (F(1, 84) = 4.32, p = .04). Thus, we rule out the possibility that emotionality might be responsible for inducing different time perception.

5.3 Discussion

Study 2 confirmed that the mediating role of the difficulty of recalling event markers is moderated by target events' valence. Consistent with our prediction, while it was more difficult to recall more event markers regardless of the valence of the target event, only for the negative target events does the increased difficulty of recalling related subsequent events mediate SEEM. In fact, as in Study 1, SEEM did not emerge for the positive event.

Ⅵ. General Discussion

6.1 Implications for Consumer Research

Previous research found that event markers have a systematic effect which makes the past distant (Zauberman et al. 2010). People felt more distant from past events when they were asked to recall more subsequent events. However, we posit that there may be a moderating factor on SEEM: the valence of the target event. Since people have a tendency to mentally distance themselves from negative things and associate more closely with positive things, we expect much stronger systematic effects for negative events and diminished ones for positive events. This prediction aligns with previous research on temporal self-appraisal (Ross and Wilson 2002), which suggested that people perceive past events and selves differently according to event valence. We also propose a metacognitive influence as the possible mechanism. Specifically, recalling more event markers may generate retrieval disfluency regardless of the valence of the target event. However, only when the target event is negative does this meta-

cognitive influence mediate SEEM. When the target event is positive, even though people still feel more difficulty due to recalling more event markers, SEEM may be attenuated by people's tendency to bring positive events closer to them. Thus, we propose that the underlying mechanism of this effect is the difficulty of recalling event markers and that it is moderated by event valence.

In order to test our hypothesis, we conducted two studies. Study 1 demonstrated that SEEM is moderated by the valence of the target event, showing that this effect mainly emerges for the negative event. Study 2 showed that people have more difficulty recalling four event markers than one, regardless of event valence. More importantly, only when the target event is negative does the difficulty of recalling event markers mediate their systematic effect, and when the target event is positive, this mediation effect disappears. In other words, this confirms that the mediating role of the difficulty of recalling event markers is moderated by the valence of the target event.

6.2 Implications for Marketers

The findings from this research can be applied to real world business as well, especially when a firm encounters a negative reputation. If a company confronts an issue, such as producing a defective product or providing improper services to consumers, the company surely wants to establish distance from these negative events to ensure continued customer satisfaction. As such, it is important that these events are shifted further away from the present. In order to make this happen, the company can provide chances to recall a series of event markers to consumers. The more subsequent events consumers try to recall, the more distance they tend to perceive from those events to the present. This tactic will result in the lessening of the negative events' effects on the present choices. Thus, the findings from this research can be useful to the management of a company's crisis. Note that, just simply providing the event markers related to the negative events to consumers may bring the backfire effect. Because when consumers are given the event markers by the others (e.g. the company or other agent), they are unlikely to experience the difficulty of recalling event markers. This may lead consumers to feel closer to the negative event which is the exactly the opposite of what the company wants. Thus, the company should give consumers the opportunity to recall the event markers by themselves, making hard to generate them.

6.3 Limitations and Future Research

In this research, we showed that event valence moderates subjective elapsed time. As expected, we found much stronger systematic effects with negative target events. Moreover,

no systematic effect even emerged when the target events were positive. However, there are occasions when positive events still generate SEEM, such as in Study 2 of Zauberman et al. (2010). We assume that the contradictory result with Zauberman et al. (2010) may be because the significance of positive events used in our study (i.e., entrance day into the university) are different from the events used in their study (i.e., day received admission letter). Entrance day to college itself might have less impact than the day received the admission letter, and consequently did not induce SEEM. Still, however, it's not clearly shown what exactly leads to this different result. Accordingly, future research should explore the boundary condition of systematic effects for the positive condition. There may be another moderator which determines the SEEM for positive events.

Also, it is possible that the positive event (entrance day into the university) itself is more significant than the negative event (any failure including test failure) we used in the studies. It would have been better if we had maintained the magnitude of significance across the valence, but by nature, it is impossible to do so unless we use the exactly same event. However, previous literature suggests that the impact of the negative events outweighs that of the positive events, thus we predict that the differential impact of the events would be mitigated.

Additionally, it would be valuable to investigate the effect of the future version of event markers: announcements of future events. Using the SEEM theory, we can infer the function of periodic announcements of an upcoming event on the anticipation of future time. We posit that the more future event announcements there are, the more distance people feel from the present to the future. To test this hypothesis would be another interesting study in the research of time perception.

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