What Affects Prospection? – An Examination Of The Factors That Affect Future Time Perception, Sequence Preference For Future Experience, Or Future Temporal Orientation

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Abstract
The present research examines the factors that affect how people think about the future. Chapter 1 examines how choice affects future time perception. Two experiments manipulated the presence of choice regarding future experiences, and asked participants to indicate their subjective temporal distance to the future experiences. Results showed that the future experiences felt closer when people had a choice about them compared to when they did not have such a choice. Chapter 2 examines how valence and culture affect the sequence preference for future experiences. The results from two studies showed that people were more likely to prefer an ascending sequence for negative experiences than positive experiences, and that people were more likely to prefer a descending sequence for positive experiences than negative experiences. They also showed that Americans were more likely to prefer an ascending sequence than Indians and that Indians were more likely to prefer a descending sequence than Americans. Chapter 3 examines how culture affects temporal orientation. Building on prior research that has compared the cultural differences on past, present, and future orientation, I hypothesize that East Asians focus on the past and future more than North Americans, and North Americans focus on the present more than East Asians. It is suggested that in addition to a cultural difference in the focus on the three temporal domains, when moving from any past or future time point toward the present, North Americans’ focus on the temporal domain grows more than East Asians’ focus. I present evidence in three categories. Specially, I compare East Asians’ and North Americans’ focus on a temporal domain, their mental representation of a temporal domain and their subjective temporal distance to a temporal domain.

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WHAT AFFECTS PROSPECTION? – AN EXAMINATION OF THE FACTORS THAT AFFECT FUTURE TIME PERCEPTION, SEQUENCE PREFERENCE FOR FUTURE EXPERIENCE, OR FUTURE TEMPORAL ORIENTATION

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ABSTRACT

WHAT AFFECTS PROSPECTION? – AN EXAMINATION OF THE FACTORS THAT AFFECT FUTURE TIME PERCEPTION, SEQUENCE PREFERENCE FOR FUTURE EXPERIENCE, OR FUTURE TEMPORAL ORIENTATION

Xuan Gao

Paul Rozin, Gal Zauberman

The present research examines the factors that affect how people think about the future. Chapter 1 examines how choice affects future time perception. Two experiments manipulated the presence of choice regarding future experiences, and asked participants to indicate their subjective temporal distance to the future experiences. Results showed that the future experiences felt closer when people had a choice about them compared to when they did not have such a choice. Chapter 2 examines how valence and culture affect the sequence preference for future experiences. The results from two studies showed that people were more likely to prefer an ascending sequence for negative experiences than positive experiences, and that people were more likely to prefer a descending sequence for positive experiences than negative experiences. They also showed that Americans were more likely to prefer an ascending sequence than Indians and that Indians were more likely to prefer a descending sequence than Americans. Chapter 3 examines how culture affects temporal orientation. Building on prior research that has compared the cultural differences on past, present, and future orientation, I hypothesize that East Asians focus on the past and future more than North Americans, and North Americans focus on the present more than East Asians. It is suggested that in addition to a cultural difference in the focus on the three temporal domains, when moving from any past or future time
point toward the present, North Americans’ focus on the temporal domain grows more than East Asians’ focus. I present evidence in three categories. Specially, I compare East Asians’ and North Americans’ focus on a temporal domain, their mental representation of a temporal domain and their subjective temporal distance to a temporal domain.
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GENERAL INTRODUCTION

How people think about the future (i.e., prospection, Gilbert & Wilson, 2007) has important implications in perception, cognition, affect, memory, motivation, and action (Seligman, Railton, Baumeister & Sripada, 2013). Prior research has noted the adaptive functions of prospection, including making decisions (Bechara & Damasio, 2005; Seligman et al., 2013), solving problems, planning actions (Bar, 2007, 2009; Bar, Aminoff, Mason, & Fenske, 2007; Binder et al., 1999; Buckner & Vincent, 2007; Gollwitzer, 1999; Seligman et al., 2013; Singer, 1966; Smallwood & Schooler, 2006), developing creative solutions (for reviews, see Antrobus, Singer, Goldstein, & Fortgang, 1970; Gold & Cundiff, 1980; Klinger, 1999), and achieving goals (Taylor, Pham, Rivkin, & Armor, 1998; Oettingen & Gollwitzer, 2010; Zimbardo & Boyd, 1999).

The present research examines the factors that affect prospection. We examine prospection in three aspects: future time perception, preference for future experiences, and future temporal orientation, and identify factors that contribute to each of them.

Future time perception has been shown to affect intertemporal preferences (Kim & Zauberman, 2009; Zauberman, Kim, Malkoc & Bettman, 2009) and motivation (Bashir, Wilson, Lockwood, Chasteen & Alisat, 2014). Prior research on the factors that relate to the subjective temporal distance of future events has focused on the state of the person, the nature of the experience or the framing of time intervals. For example, a delayed monetary reward felt further away when people were sexually aroused (Kim & Zauberman, 2013). A future gain felt further away compared to a future loss (Bilgin & LeBoeuf, 2010). Future outcomes felt further away when the time interval was described
by amounts of time rather than by dates (LeBoeuf, 2006). Chapter 1 examines how an intervening event related to and preceding the future experience, more specifically, a choice, affects the subjective temporal distance of the future. Two between-subject studies manipulated the presence of choice and asked participants to indicate their subjective temporal distance to the fictional future scenarios. A pilot study found a trend that a future with a choice felt closer than a future without one with undergraduate students. Experiment 1 tested a wider range of scenarios and valences on Mturkers, and replicated the finding from the pilot study with significant results. Experiment 2 suggested that it was the presence or absence of choice rather than four other accounts that caused such a difference. The perceived duration of the future experience was not significantly different between the choice and the no choice conditions, and did not show a consistent trend across studies.

Preference for future experiences. An experience can be time-framed as anticipated, experienced, or remembered (Elster & Loewenstein, 1992; Kahneman, 1999). There may be a general human trend to emphasize one or the other of these perspectives, and there may as well be individual and cultural differences. Preferring a particular perspective may influence actual preferences or choices for future experiences (e.g., Rozin & Rozin, 2017). For example, if memory were privileged, there would be a tendency to seek novel experiences, because they are more likely to create new memories (e.g., Rozin & Rozin, 2017). If anticipation were privileged, one would put off positive events, but arrange to experience negative (or more negative) events sooner (Berns, et al., 2006; Loewenstein, 1987). The anticipation privilege theory states that a privilege of
anticipation may correspond to a preference for an ascending sequence for positive (best-last) as well as negative (worst-first) experiences, thus maximizing positive anticipation and minimizing negative anticipation (dread), respectively. Chapter 2 builds on a general finding that most Americans prefer sequences that get better over time (see Frederick & Lowenstein, 2008 for limitations). It differs from prior work in that 1) it employs more short term every day experiences; 2) it directly compares sequences of positive events and sequences of negative events in the same domain, and 3) it explores sequence preference, for the first time, in a non-Western culture (India), in comparison to Americans. The study examines how people prefer to order their everyday life experiences in 7 domains in the future and specifically examines the effects of valence and culture on the sequence preference. The results showed that people were more likely to prefer an ascending sequence for negative experiences than positive experiences, and that people were more likely to prefer a descending sequence for positive experiences than negative experiences. The results also showed that Americans were more likely to prefer an ascending sequence than Indians and that Indians were more likely to prefer a descending sequence than Americans. For judgments of a whole life, both groups prefer a pattern in which well being rises gradually, a preference that is more prominent for Americans than Indians. We discussed each motivation to prefer an ascending or a descending sequence noted in Frederick and Lowenstein (2008) in light of the valence and cultural effects.

Future time orientation has been shown to correlate with conscientiousness, consideration of future consequences, and predicts planning and achievement of future
goals (Zimbardo & Boyd, 1999). Chapter 3 examines how culture affects future temporal orientation and specifically reviews the cultural difference between East Asian and North American in terms of temporal orientation. Based on the cultural differences on holistic versus analytical cognitive processing style, and cyclical versus linear prediction trends, this review hypothesizes that East Asians focus on the past and future more than North Americans, whereas North Americans focus on the present more than East Asians. This review also proposes a speculation about how the cultural difference in temporal orientation changes along the continuous temporal dimension of the past, present and future.
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CHAPTER 1

Choice Brings the Future Closer to the Present
Abstract

How does the presence or absence of choice for a future experience affect the perceived temporal distance to the future experience? We predict that a future with a choice feels closer than a future without one based mainly on construal level theory (Trope & Liberman, 2010). Two experiments manipulated the presence of choice regarding fictional future scenarios, and asked participants to indicate their subjective temporal distance to the future scenarios. The results of experiment 1 supported the hypothesis. Experiment 2 showed that it was the presence or absence of choice rather than four other accounts that caused the difference in time perception. We also replicated prior findings that positive future experiences felt further away compared to negative ones (Bilgin & LeBoeuf, 2010), and found that the negative future experiences felt longer in duration compared to positive ones.

Keywords: time perception, prospection, choice
Choice Brings the Future Closer to the Present

Suppose your family is about to take a vacation. Have you agreed on a place to go or do you need to choose among multiple destinations? Suppose you’re about to move into a new apartment. Have you signed a lease already or do you need to choose among multiple apartments? The contrast between a future scenario with one option (referred to as a closed future) and a future scenario with a choice (referred to as an open future) is common in everyday life. How does the presence or absence of a choice affect how distant the future experience seems?

Future time perception has been shown to affect intertemporal preferences and goal achievement. Subjective time perception may affect the discount rate in intertemporal preferences (Zauberman, Kim, Malkoc, & Bettman, 2009). It is possible that when people make decisions about the future, they use the subjective temporal distance to guide their decisions. For example, if a future reward feels further away, people may show a higher discount rate. People are more motivated to pursue long-term goals when they perceive the goals as closer to the present (Bashir, Wilson, Lockwood, Chasteen, & Alisat, 2014). For example, students who perceived the upcoming test to be closer were more motivated to prepare for the test and practiced more for the test (Peetz, Wilson, & Strahan, 2009).

Prior research on the factors that relate to the subjective temporal distance of future events has focused on the state of the person, the nature of the experience or the framing of time intervals. For example, a delayed monetary reward felt further away when people were sexually aroused (Kim & Zauberman, 2013). A future gain felt further away compared to a future loss (Bilgin & LeBoeuf, 2010). Future outcomes felt further
away when the time interval was described by amounts of time rather than by dates (LeBoeuf, 2006). The current research examines how an intervening event related to and preceding the future experience, more specifically, a choice, affects the subjective temporal distance of the future.

Why study the effect of choice on the subjective temporal distance aside from the fact that the contrast of a future with a choice and a future without a choice is common in everyday life? First, perception of the future is a major aspect of understanding humans and their choices. Decision scientists (e.g., Peters, Kunreuther, Sagara, Slovic & Schley, 2012) have identified the general problem that people are disinclined to make future choices that have only long term future benefits (such as buying life insurance). Any reframing of these choices that makes them appear closer in time could promote more adaptive decisions. Second, it may be possible to manipulate the presence or absence of choice regarding future experiences with little extra cost or effort. If the relationship between choice and subjective temporal distance is well understood, this may be an efficient way to design future experiences to facilitate desirable outcomes. For example, teachers can create a writing assignment with a choice of paper topics, or no such a choice, alter the subjective temporal distance to the deadline, and ultimately affect how motivated students work on the assignment and how much effort they put into the assignment. A small change in designing the assignment can potentially improve academic outcome, with little extra effort from the teachers. The retirement plan may offer a choice of multiple saving plans or no such a choice, alter the subjective temporal distance to the retirement, and affect how much people save prior to retirement.
We predict that an open future feels closer than a closed future for three reasons. First, the construal level theory noted that people mentally simulate events at different level of concreteness and abstraction levels (Trope & Liberman, 2010). When they think about an event with greater details, the simulation is on a lower construal level. When they think about an event in a more abstract way, the simulation is on a higher construal level. The level of construal corresponds to, among other things, the subjective temporal distance to the event. Specifically, when the event is simulated at a lower construal level, the event feels closer. When people need to make a choice, they may think about the future scenario in greater details and at a lower construal level, which makes the open future seem closer (Trope & Liberman, 2010). Second, the need to make a choice may be arousing, which makes an open future feel more arousing than the closed future. Because more emotional scenarios seem closer (Bratfisch, Ekman, Lundberg, & Kruger, 1971; Zauberman, Levav, Diehl, & Bhargave, 2010), the open future may seem closer. Third, the need to make a choice for the open future may induce people to focus on the endpoint of the time interval (i.e., future experience), and decrease their attention to the interval duration between now and the future experience, which makes the open future seem closer (Zakay & Block, 1996, 1997). We further predict that the duration of the future experience (from the start to the end of the future experience) would not differ between the open and closed future, because the effect of choice proposed above doesn’t apply to the perceived duration of the future experience.

The competing hypothesis is that the closed future feels closer than the open future, which also has support from the literature. First, because the closed future only has one option and the open future has multiple options, the option in the closed future is
more probable (indeed, certain) than each of the options in the open future. According to construal level theory (Trope & Liberman, 2010), more probable events are processed at a lower level of construal than less probable events. Thus, the option in the closed future is processed at a lower level of construal than each of the options in the open future, which may make the closed future feel closer than the open future (Trope & Liberman, 2010). Second, because the open future has multiple options whereas the closed future has only one option, the open future may be harder to imagine and visualize, which may make the open future feel further away compared to the closed future. Third, prior research has shown that accessible intervening events related to the target event make the target event feel more distant in the past (Zauberman, Jonathan, Kristin & Rajesh, 2010). A choice is an intervening event related to the future experience, and the prior research on the past suggests that the choice may make the future experience feel further away. The visual judgment of distance also increases with intervening objects (Ross, & Plug, 2002).

Experiment 1 also tested the valence effect documented in the literature, that positive future experiences felt further away compared to negative ones (Bilgin & LeBoeuf, 2010). Prior literature examined how positive versus negative auditory stimuli modulated time perception, and found that negative sounds were judged to be longer than positive ones (Nouhiane, Mella, Samson, Ragot, & Pouthas, 2007; however, the perceived duration of pictures was affected by an interaction of valence and arousal, Angrilli, Cherubini, Pavese, & Manfredini, 1997; see Droit-Volet & Meck, 2007 for a review of how emotions affect time perception). We did not find a direct test of the valence effect on perceived duration on future experiences. Based on the results from
auditory stimuli, we predict that the duration of the negative future experiences feels longer compared to the positive experiences.

We conducted a pilot study and two experiments to test the hypothesis that an open future with a choice among multiple options feels closer than a closed future without a choice. The pilot study and Experiment 1 manipulated the presence of choice and asked participants to indicate their subjective temporal distance to fictional future scenarios. Experiment 2 examined each of five accounts that might explain the difference between the open and closed future in the prior two studies.

**Pilot**

**Method**

238 undergraduate students (67.2% female; age $M = 19.79, SD = 1.19$) from the University of Pennsylvania participated in a pilot study and passed all three check questions. Participants were randomly assigned to either a choice condition where they read four scenarios each with five options, or a no choice condition where they read four scenarios each with only one option. The descriptions for the choice condition indicated that the choices would be made sometime between now and the start of the experiences. For example, the choice condition for the trip scenario read, “suppose you win a lottery that rewards you with a free two-week trip. They offer five possible destinations, all of which you happen to like. Suppose you will go on this trip and choose one out of five destinations. The trip will start in a month. Please take some time to imagine yourself in the scenario stated above. The ‘next’ button will appear in 20 seconds, but feel free to take as much time as you need.” The no choice condition for the trip scenario was the same except it offered one possible destination instead of five. We included four
positive scenarios, which were taking a trip in 1 month, moving into a new apartment in 1 month, starting an internship in 3 months, and starting graduate school in 18 months (valence rated as \( M = 21.15 - 36.90 \) on a -50 extremely negative to +50 extremely positive scale). The descriptions of all scenarios in the pilot study, Experiment 1 and 2 are included in the Appendix.

Participants were asked to read and imagine four fictional scenarios one at a time, write down their mental simulations of the scenarios, and answer subjective temporal distance questions. The primary measurement was (1) how long it felt from now to the start of the future experience, on a very short to very long analog scale, with no numerical markers (Figure 1). We also asked (2) how long it felt from now to the end of the future experience, on a very short to very long scale, with no numerical markers; (3) how long the whole duration of the future experience felt to them, on a 0 (very short) to 11 (very long) scale; and (4) how they felt about the future experience, on an extremely negative to neutral to extremely positive scale, with no numerical markers. In addition, we asked participants (5) how long it felt from now to one year from now; and (6) how long it felt from now to two years ago, both on a very short to very long scale, with no numerical markers, before and after the manipulation. The latter two measures were to test whether manipulation had an effect on the decontextualized past or future. All measures except for the duration measure were on a 0-100 scale.

**Results**

To make the scores from different scenarios comparable, we transformed the raw scores to z scores for each scenario. Specifically, we took the mean across both conditions of a particular scenario, calculated the standard deviation of this combined distribution, and
computed a z score for each participant. We then averaged each participant’s z scores across scenarios. We ran independent sample t-tests between the choice and no choice groups on the mean z scores of the subjective temporal distance variables. Table 1 presents the descriptive and t-test results by scenario for the pilot study. Figure 2 summarizes the results on the primary measurement from Pilot, Experiment 1 and 2.

Based on the measure of (1) the subjective temporal distance from now to the start of the future experience (abbreviated as “nts”), the choice condition \((M = -.07, SD = .68, n = 124)\) felt closer than the no choice condition \((M = .07, SD = .64, n = 114)\), \(t(236) = -1.61, p = .109, d = .21\). Based on the measure of (2) the subjective temporal distance between now and the end of the future experience (abbreviated as “nte”), the choice condition \((M = -.07, SD = .69, n = 123)\) felt closer than the no choice condition \((M = .10, SD = .67, n = 114)\), \(t(235) = -1.88, p = .062, d = .25\). However, neither difference reached a \(p = .05\) significance level in the pilot study. As expected, the choice \((M = .01, SD = .65, n = 124)\) and no choice \((M = -.03, SD = .65, n = 114)\) conditions did not show a significant difference in terms of (3) the perceived duration of the future experience, \(t(236) = .42, p = .678, d = -.06\). There was a trend that the durations in the no choice condition were perceived to be shorter compared to the durations in the choice condition.

For each of the two subjective temporal distance questions that were NOT specific to a scenario, how long it felt from now to one year from now, and how long it felt from now to two years ago, we computed a difference score (after manipulation – before manipulation) to represent the change of the subjective temporal distance between now and the decontextualized past or future due to the manipulation. Independent t-tests showed that the manipulation did not cause a significant change between the choice \((M =
6.82, $SD = 20.42, n = 117$) and no choice ($M = 5.31, SD = 25.11, n = 109$) conditions in the subjective temporal distance of (5) the decontextualized future, $t(224) = .50, p = .620, d = -.07$. There was no significant difference between the choice ($M = .15, SD = 24.57, n = 120$) and no choice ($M = -2.82, SD = 27.59, n = 110$) conditions for (6) the decontextualized past either, $t(228) = .86, p = .389, d = -.11$.

**Discussion**

We found a trend that people felt closer to open futures (with choices) than closed futures (without choices), though the mean differences were NOT significant. The two scenarios whose “nte” difference between the choice and the no choice conditions was nominally significant were the two scenarios with the longest time intervals (the apartment and graduate school scenarios, $p = .04$). We speculated that, if the objective temporal distance between now and the future experience increased, there would be more room for the two conditions to differ and the mean difference between the choice and no choice conditions would increase. In Experiment 1, we increased the objective temporal distance.

**Experiment 1**

**Method**

483 Mturk workers (54.5% female, age $M = 37.49, SD = 11.78$) completed the survey and passed all three check questions. All participants were located in the United States, older than 18 years old and native speakers of English. Participants were randomly assigned to a choice condition or a no choice condition. The descriptions for the choice condition indicated that the choices would be made sometime between now and the start of the experiences. We included eight scenarios: a job promotion in 18 months, attending
a court hearing with a high chance of winning the lawsuit in 48 months, taking a trip in 24 months, an anniversary meal in 12 months, a job demotion in 18 months, attending a
court hearing with a high chance of losing the lawsuit in 48 months, taking a medical
exam in 60 months, and moving into a cheaper apartment in 14 months. The scenarios
represented a wider range of feeling towards the future experiences compared to the pilot
study (valence rated as $M = -34.89$ to $+39.49$ on a $-50$ extremely negative - 50 extremely
positive scale).

We wanted to test the valence effect on the subjective temporal distance, and
therefore included the two job scenarios and the two lawsuit scenarios that were the same
except for valence. The display order of the positive and negative scenarios was
counterbalanced. Half of the participants responded to the positive version of the job and
lawsuit scenarios first (and responded to all scenarios in the following order: job
promotion, court hearing with a high chance of winning the lawsuit, trip, anniversary
meal, job demotion, court hearing with a high chance of losing the lawsuit, medical
exam, moving into a cheaper apartment), and the other half responded to the negative
version of the job and lawsuit scenarios first (and responded to all scenarios in the
following order: job demotion, court hearing with a high chance of losing the lawsuit, medical
exam, moving into a cheaper apartment, job promotion, court hearing with a high
chance of winning the lawsuit, trip, anniversary meal). Participants were asked to read the
eight fictional future experiences one at a time, imagine themselves in such scenarios,
and answer the subjective temporal distance questions: (1) how long it felt from now to
the start of the future experience; (2) how long it felt from now to the end of the future
experience; (3) how the whole duration of future experience felt to them; and (4) how
they felt about the future experience. We asked participants (1) how long it felt from now to one year from now, and (2) how long it felt from now to two years ago, before and after the manipulation.

**Results**

As in the pilot study, we transformed the raw scores to z scores for each scenario and used the mean z scores across scenarios as dependent variables. We conducted independent sample t-tests between the choice and no choice groups on the mean z scores of the subjective temporal distance variables. Table 2 presents the descriptive and t-test results by scenario for Experiment 1.

Based on the measure of (1) the subjective temporal distance between now to the start of the future experience (“nts”), the choice condition \( M = -.11, SD = .64, n = 243 \) felt closer than the no choice condition \( M = .11, SD = .59, n = 240 \), \( t(481) = -3.96, p < .001, d = .36 \). Based on the measure of (2) the subjective temporal distance between now to the end of the future experience (“nte”), the choice condition \( M = -.07, SD = .66, n = 243 \) felt closer than the no choice condition \( M = .07, SD = .60, n = 240 \), \( t(481) = -2.58, p = .01, d = .22 \). As predicted, the choice \( M = -.02, SD = .57, n = 243 \) and no choice \( M = .02, SD = .54, n = 240 \) conditions were not significantly different in terms of (3) the perceived duration of the future experience, \( t(481) = - .78, p = .436, d = .07 \). There was a trend that the durations in the choice condition were perceived to be shorter compared to the durations in the no choice condition.

As in the pilot study, we computed a difference score (after manipulation – before manipulation) to represent the change of the subjective temporal distance between now and the decontextualized past or future due to the manipulation. Independent sample t-
tests showed that the manipulation did not cause a significant change between the choice conditions in the subjective temporal distance of (5) the decontextualized future, \( t(480) = -1.27, p = .203, d = .12 \). There was no significant difference between the choice \((M = -2.74, SD = 20.72, n = 240)\) and no choice \((M = -4.75, SD = 22.92, n = 237)\) conditions for (6) the decontextualized past either, \( t(475) = 1.00, p = .317, d = -.09 \).

The positive and negative versions of the job and the lawsuit scenarios were the same except for valence. To test whether there was a valence effect on the subjective temporal distance, we conducted paired sample t-tests between the positive and negative versions of the job and lawsuit scenarios\(^2\). Based on the measure of (1) the subjective temporal distance between now to the start of the future experience (“nts”), the job demotion \((M = 58.60, SD = 28.89, n = 483)\) felt closer than the job promotion \((M = 65.24, SD = 24.93, n = 483)\), \( t(482) = 4.95, p < .001, d = -.23 \), and the court hearing with a high chance of losing \((M = 76.16, SD = 27.42, n = 482)\) felt closer than the court hearing with a high chance of winning \((M = 81.60, SD = 21.70, n = 482)\), \( t(481) = 4.02, p < .001, d = -.19 \). Based on the measure of (2) the subjective temporal distance between now to the end of the future experience (“nte”), the job demotion \((M = 66.95, SD = 28.87, n = 480)\) felt closer (but not significantly) than the job promotion \((M = 69.36, SD = 25.58, n = 480)\), \( t(479) = 1.75, p = .081, d = -.08 \), and the court hearing with a high chance of losing \((M = 76.59, SD = 26.45, n = 481)\) felt closer than for the court hearing with a high chance of winning \((M = 80.15, SD = 23.06, n = 481)\), \( t(480) = 2.73, p = .007, d = -.12 \). (3) The duration of the job demotion \((M = 7.72, SD = 2.77, n = 481)\) felt longer compared to the job promotion \((M = 7.11, SD = 2.65, n = 481)\), \( t(480) = -4.75, p < .001, d = -$
The duration of the court hearing with a high chance of losing felt longer ($M = 6.82$, $SD = 3.56$, $n = 482$) compared to the court hearing with a high chance of winning ($M = 5.34$, $SD = 3.56$, $n = 482$), $t(481) = -8.99, p < .001, d = .41$.

**Discussion**

Experiment 1 replicated and solidified the results from the pilot study, showing that an open future (with a choice) felt closer than a closed future (with no choice). In addition, the positive future experiences felt further away compared to the negative ones, but the negative future experiences felt longer in duration compared to the positive ones. The closed futures with no choice felt further away compared to the open futures with a choice, but the duration of the two future experiences did not show a significant difference. This suggests that the perception of “nts” and the duration of the future experience may not work in the same direction.

Objectively, the temporal distance between now and the end of the future experience consists of (1) the distance between now and the start of the experience and (2) the duration of the experience. Thus, “nts” may be a better measure than “nte”, because the “nts” is not related to the duration of the experience whereas “nte” is.

In fact, the measure of “nte” showed less consistent results compared to “nts”. For example, the only two results with a “wrong” direction were based on the “nte” measure (the two trip scenarios in the pilot study and Experiment 1 where the no choice condition was perceived to be closer than the choice condition). In Experiment 2, we used the results of “nts” as a measure of the subjective temporal distance between now and the future experience, and dropped the measure of “nte”.
**Experiment 2**

Experiment 1 showed that an open future with a choice felt closer compared to a closed future with no choice. We designed Experiment 2 to rule out alternative accounts of this basic effect (between the choice and the no choice conditions). The choice and no choice conditions in the pilot and Experiment 1 were different in five aspects.

1. The choice condition required a choice, whereas the no choice condition did not require a choice. (The difference we intentionally manipulated, and the focus of our analysis)

2. The choice condition had the future experience determined sometime between now and the start of the future experience, and the no choice condition had the future experience already determined, because there was only one option.

3. Because one can only know about the future experience (e.g., where to go for the trip) after it has been determined, the two conditions differed in terms of the time to know about the future experience.

The number of options was different between the two conditions. There was only one option in the no choice condition, which indicated both no uncertainty, and a lower level of uncertainty. Therefore the two conditions were different in terms of:

4. The presence or absence of uncertainty, and

5. A lower or higher non-zero level of uncertainty.

In total, the two conditions were different in these five aspects, and we did not know which was the cause of the difference in time perception. In Experiment 2, we isolated each one of these five factors and tested their effects. For each factor, we created two conditions that were the same except for the factor to be tested. An overview of the
five factors and a description of the six conditions in Experiment 2 are presented in Table 3.

In order to test the choice factor, we created two conditions that were the same except for the choice dimension (Condition 1 and 2). The future experience in Condition 1 was determined by a choice, and in Condition 2 it was determined by a random factor. In both conditions, the time to determine the future experience AND the time to know the future experience were around the start of the experience, and the number of options were five.

To test whether the time to determine the future experience explained the finding, we created two conditions in Experiment 2 that were the same except that the future experience would be determined around the start of the experience in Condition 2 and the future experience was already determined by now in Condition 3. In both conditions, the future experience was to be determined by a random factor, the time to know the future experience was around the start of the experience, and the number of options was five.

To test whether the time to know the future experience explained the finding, we created two conditions in Experiment 2 that were the same except that the future experience would become known around the start of the experience in Condition 3 and the future experience was already known by now in Condition 4. In both conditions, the future experience was to be determined by a random factor, the future experience was already determined, and the number of options was five.

To test whether the presence of uncertainty explained the finding, we created two conditions that were the same except that one had five options (Condition 4) and the other had one option (Condition 6). In both conditions, the future experience was to be
determined by a random factor, and the future experience was already determined and known.

If we only tested the presence of uncertainty with two conditions that contrasted five options versus one option, we would not be able to tell if the difference between the two conditions, if any, was due to the presence of uncertainty, or a lower or higher non-zero level of uncertainty. To test whether a lower or higher non-zero level of uncertainty explained the finding, we created two conditions in Experiment 2 that were the same except that one had five options (Condition 2) and the other had two options (Condition 5). These two conditions differed only in terms of a lower or higher non-zero level of uncertainty, but in both conditions where was a presence of uncertainty. In both conditions, the future experience was to be determined by a random factor, the future experience was to be determined and become known around the start of the experience.

Condition 1 largely corresponded to the choice condition in previous studies, with some of the factors described more specifically. For example, the time to determine the future experience was specified to be around the start of the experience in Experiment 2. Condition 6 largely corresponded to the no choice condition in previous studies. Condition 1 and 6 also worked as a replication for the basic effect.

For each factor, we tested if there was a significant difference between the two conditions designed to test this factor. If so, then this factor was a potential cause of the basic effect. If not, then this factor was unlikely to be the cause of the basic effect.
**Method**

1317 participants (53.7% female) from Mturk completed the survey and passed all five check questions. All participants were located in the United States, older than 18 years old and native speakers of English (age $M = 36.04$, $SD = 11.63$).

Experiment 2 followed a six condition between-subject design. To test each of the five factors, we created two conditions that were the same except for the factor to be tested. The first section in Table 3 indicates which two conditions were compared to test each factor, and the second section describes the factors in each condition. Experiment 2 included four fictional future scenarios: a job demotion in 18 months, being a defendant in a lawsuit in 14 months, moving into a cheaper apartment in 24 months, and starting a physical therapy program in 16 months. The scenarios represented a feeling towards the future experiences ranging from $M = -28.75$ to 11.58 on a -50 extremely negative to 50 extremely positive scale.

Participants were randomly assigned to one out of the six conditions. They were asked to read four fictional future experiences one at a time, imagine themselves in such scenarios, and answer the subjective temporal distance questions: (1) how long it felt from now to the start of the future experience; (2) how long the whole duration of future experience felt to them; and (3) how they felt about the future experience. As in the previous two studies, we asked participants to indicate (1) how long it felt from now to one year from now and (2) how long it felt from now to two years ago, before and after the manipulation.
Results and discussion

As in the previous two studies, for each measure of the subjective temporal distance, we transformed the raw scores to z scores for each scenario and averaged each participant’s z scores across scenarios. We ran one-way ANOVAs with condition as a factor, and the mean z scores as dependent variables, and when the ANOVA was significant, conducted Tukey HSD for post hoc comparisons. Table 4 presents the descriptive results by scenario for Experiment 2.

Based on the measure of (1) the subjective temporal distance between now and the start of the future experience (“nts”), the six conditions were significantly different, $F(5, 1316) = 6.17, p < .001, \eta^2 = 2.3\%$. The results replicated the findings from the previous two studies. The future experience with a choice (Condition 1; $M = -.23, SD = .75, n = 222$) felt closer than the future experience with no choice (Condition 6; $M = .04, SD = .74, n = 219$), $p = .001, d = .36$. The future experience determined by a choice (Condition 1; $M = -.23, SD = .75, n = 222$) felt closer than the future experience determined by a random factor (Condition 2; $M = .00, SD = .67, n = 220$), $p = .007, d = .32$.

The time to determine the future experience did not affect the subjective temporal distance. There was no significant difference between Condition 2 where the future experiences were determined around the start of the experience ($M = .00, SD = .67, n = 220$) and Condition 3 where the experiences were determined by now ($M = .10, SD = .66, n = 223$), $p = .690, d = .15$. The time to know the future experience did not affect the subjective temporal distance. There was no significant difference between Condition 3 where the time to know the experience was around the start of the experience ($M = .10,$
SD = .66, n = 223) and Condition 4 where the experience was already known (M = .03, 
SD = .68, n = 217), p = .893, d = -.10. The presence of uncertainty did not affect the 
subjective temporal distance. There was no significant difference between Condition 4 
with five options (M = .03, SD = .68, n = 217) and Condition 6 with one option (M = .04, 
SD = .74, n = 219), p = 1.000, d = .01. A lower or a higher non-zero level of uncertainty 
did not affect the subjective temporal distance. There was no significant difference 
between Condition 2 with five options (M = .00, SD = .67, n = 220) and Condition 5 with 
two options (M = .06, SD = .67, n = 216), p = .961, d = .09.

As expected, there was no significant difference between the six conditions in (2) 
the perceived duration of the experience, F(5, 1315) = .86, p = .506, η² = .33%. As in the 
previous two studies, we computed a difference score (after manipulation – before 
manipulation) to represent the change of subjective temporal distance between now to the 
decontextualized past or future due to the manipulation. One-way ANOVAs showed that 
the manipulation did not cause a significant change in the subjective temporal distance 
(4) in the decontextualized future, F(5, 1310) = .459, p = .807, η² = .18% or (5) the 
decontextualized past, F(5, 1308) = .525, p = .758, η² = .20%.

Experiment 2 replicated the findings from Experiment 1, that an open future with 
a choice was perceived to be closer than a closed future without a choice. Experiment 2 
further suggested that the presence of a choice was likely to explain the basic effect; and 
that the four other accounts (the time to determine the experience, the time to know the 
experience, the presence of uncertainty, and a lower or a higher non-zero level of 
uncertainty) were unlikely to explain the basic effect.
General Discussion

A future with a choice was perceived to be closer than a future without one. Three between-subject studies manipulated the presence of choice and asked participants to indicate their subjective temporal distance to the fictional future scenarios. The pilot study found a trend that a future with a choice felt closer than a future without one with undergraduate students. The results suggested that this effect would be stronger in longer time frames. Experiment 1 tested a wider range of scenarios and valences on Mturkers, and replicated the finding from the pilot study with significant results. Experiment 2 suggested that it was the presence or absence of choice rather than four other accounts that caused such a difference in time perception. The perceived duration of the future experience was not significantly different between the choice and the no choice conditions, and did not show a consistent trend across studies.

Prior research showed that, when there was an intervening event related to the target event in the past, the target event felt more distant compared to no such intervening event (Zauberman et al., 2010). The prior research did not specifically test intervening events there were choices about the target events in the past. The current research showed that, when the intervening event was a behavior related to a future scenario (i.e., a choice), the future scenario felt closer compared to no such intervening event. When the intervening event was related to a future scenario but required no action (i.e., a random factor determines the future experience), the future scenario felt no different compared to no such intervening event (compare Condition 4 and 6 in Experiment 2).

All three of the findings reported in this study examine cases where (1) a target event occurs at time T; (2) there is an intervening event between now and the later time
point T, and (3) the intervening event is related to the target event. The findings share an independent variable, which is the presence or absence of the intervening event, and a dependent variable, which is the subjective temporal distance between now and the target event. However, the effects of the independent variable on the dependent variable are different, depending on the nature of the intervening event (e.g., choice or random outcome) or the temporal context in reference to the studies just cited (past or future).

There may be some generalities. For example, the findings may be consistent with a notion that the more attention the interval duration gets, the longer the time interval seems (Zakay & Block, 1996, 1997). It is possible that the choice induces people to pay more attention to the endpoint of the time interval (i.e., future experience) and thus less attention to the interval duration whereas the intervening event of the past induces people to pay attention to the interval duration. The effect of the random outcome on attention to interval duration is somewhere in between. The findings are also consistent with a speculation that the more control the person has over the target event, the closer the target event seems. The person has the most control in the choice condition, less control in the random outcome condition, and the least control over the target event that has already occurred in the past. In fact, people may pay more attention to the target event that they have more control over, and thus less attention to the interval duration of such events, which makes such events seem closer. Future research may be able to examine these issues and provide a more systematic and comprehensive view of the relationship between intervening events and the subjective temporal distance.

The present research only investigated the effect of a choice regarding the future experience on future time perception, e.g., a choice regarding where to go for a trip.
Future research could investigate how other types of choices affect future time perception, through which to clarify the nature of the choice that affects future time perception. Specifically, future research can test the effect of a choice that is relevant to the future experience but is NOT about the future experience itself; for example, a choice about which luggage to purchase for a trip. Such a choice is related to the trip, but not about the trip itself (e.g., where to go for a trip). Future research can also test the effect of a choice that is irrelevant to the future experience; for example, a choice about which college to go to before the start of a trip. If we interject such choices between now and the start of the future experience, how do they affect the subjective temporal distance between now and the start of the future experience?

The contrast between the positive and negative versions of the job or lawsuit scenario replicated prior findings that positive future experiences felt further away compared to negative ones (Bilgin & LeBoeuf, 2010). In addition, we found that the negative future experiences felt longer in duration compared to positive ones.

The valence manipulation had different effects on the measures including the present time point (“nts”/“nte”) and measures excluding the present time point (“duration”), so did the choice manipulation. While the “nts” or “nte” measures showed a significant difference between the choice and no choice conditions, the duration of the future experience did not. The results allude to a more general question, how does the special temporal point of the present affect the perception of time?

It has been noted that a negative experience was perceived to be more intense than a positive experience (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Rozin & Royzman, 2001). That is, the positive and negative experiences were different in term of
intensity levels as well as valence. Bilgin and LeBoeuf (2010) have noted that both the
valence effect and the intensity effect may be at work to contribute to the difference in
time perception between positive and negative events. The present research only tested
the valence effect and did not specifically test the effect of intensity. The job scenario’s
positive version ($M = 31.80$) was rated as more intense than the negative version ($M = -
16.96$), and the lawsuit scenario’s negative version ($M = -34.89$) was rated as more
intense than the positive version ($M = 10.90$). Both pairs of scenarios showed the same
effect that the positive future experiences felt further away than the negative ones, and
that the negative future experiences felt longer in duration than the positive ones. The
results suggest that the difference between the positive and negative in Experiment 1 was
due to a valence effect, rather than an intensity effect.

The finding that the presence of choice makes the contextualized future feel closer
has practical implications. First, we may alter the presence or absence of choice to affect
the subjective temporal distance to the future, and facilitate desirable outcomes. For
example, with a choice of retirement savings plans, people may feel closer to their
retirement, discount the future less, and save more. With a choice of paper topics,
students may feel closer to the deadline and work harder for the assignment. Such simple
alterations of the future experience (by offering a choice or no choice) can potentially
lead to important desirable outcomes. However, the presence of choice doesn’t make the
decontextualized future feel closer. A choice of retirement savings plans wouldn’t make
the next year feel closer to the present. This may suggest that the presence of choice only
changes temporal perception in the domain of the choice. For example, a choice of
retirement savings plans wouldn’t make people pay attention to their health condition.
Such questions warrant future research. We could examine (as suggested above) what defines the “domain” of the choice or decision.

Second, the presence of absence of perceived choice may be malleable, which provides an opportunity for intervention. The presence of choice is a matter of perception as much as it is a reality. Factors such as cognitive style, personality, sociocultural systems and mental status may affect the perceived presence of choice. For example, divergent thinking (Guilford, 1956) or openness to experiences (McCrae & John, 1992) may promote the perception of multiple options. Americans are more likely than Indians to construe actions as choices (Savani, Markus, Naidu, Kumar, & Berlia, 2010).

Rumination prompts dysphoric individuals to appraise their problems as unsolvable and fail to come up with effective solutions (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). This suggests that rumination may relate to a perception of fewer choices. It is very likely that the perceived presence of choice makes the contextualized future feel closer, just as the real presence of choice does. For example, the perceived presence of choice related to divergent thinking and openness to experiences may make the contextualized future feel closer, and the perceived absence of choice related to rumination may make a contextualized future feel more distant. A training program designed to enable the individual to detect and perceive more choices may make the future feel closer and lead to desirable outcomes. For example, teachers may routinely encourage students to actively think about different options and ultimately help students to develop the cognitive habit to do so in a given situation.

Third, the present research suggests a possible way for inborn advantage, choice, subjective temporal distance, motivation and effort, and acquired advantage to complete a
cycle of reinforcement. For example, people with an advantage of cognitive flexibility may perceive more choices, which make them feel closer to and work harder for the longer-term goals, and their longer-term achievements may reinforce their cognitive ability. People with a higher level of socioeconomic status (SES) may perceive or indeed have more choices, which make them feel closer to and work harder for the longer-term goals, which in turn place them even higher on the socioeconomic ladder. This cycle of reinforcement may enlarge the gap between people born with a lower or higher level of cognitive flexibility or SES. Such linkages warrant future research. If such linkages do exist, it may be possible to intervene by introducing more choices or training programs to increase the perceived number of choices in a given situation for people with lower SES, make people feel closer to their futures and become more motivated to work towards long term goals.
Footnotes
1. We aimed to prompt the participants to respond to the subjective temporal distance
questions based on gut feeling rather than calculation. We used a different scale for the
duration question than the other subjective temporal distance questions. This made it
harder for participants to “calculate” the duration of the experience by taking the
difference between the subjective temporal distance of the end (“nte”) AND the start of
the experience (“nts”).
2. We used raw scores for the paired sample t-tests because the tests couldn’t be based on
z scores. The raw scores couldn’t be averaged across scenarios because the job and
lawsuit scenarios had different objective temporal distances. Therefore we presented the
t-test results for the job and lawsuit scenarios separately.
3. The Cohen’s d of the valence differences was computed with the adjustment of the
correlation between the paired samples.
References


discounting to time-interval description. *Journal of Marketing Research, 43* (February), 59–72.


Appendix

Scenario descriptions for the pilot study, and Experiment 1 and 2

Pilot study

Choice condition

1. Suppose you win a lottery that rewards you with a free two-week trip. They offer five possible destinations, all of which you happen to like. Suppose you will go on this trip and choose one out of the five destinations. The trip will start in a month.

2. Suppose you are considering renting a new apartment for a yearlong lease. You have found five apartments that meet your criteria. Suppose you will choose one to lease and move into your new home in one month.

3. Suppose you are offered a 10-week internship position from five different companies. You like each of these positions. Suppose you will accept one of the five offers and start working as an intern in three months.

4. Suppose you’ve been accepted by five two-year graduate degree programs and you like all of them. Suppose you will accept one of the five offers and start the program in 1 year and a half.

No choice condition

1. Suppose you win a lottery that rewards you with a free two-week trip to a destination that you happen to like. Suppose you will go on this trip, which will start in a month.

2. Suppose you are considering renting a new apartment for a yearlong lease. You have found one apartment that meets your criteria. Suppose you will rent this apartment and move into your new home in one month.

3. Suppose you are offered a 10-week internship position in a company that you like.
Suppose you will accept the position and start working as an intern in three months.

4. Suppose you’ve been accepted by one two-year graduate program that you like. Suppose you will accept the offer and start the program in 1 year and a half.

Experiment 1

Choice condition

1. Suppose you are offered a job promotion, which involves a 3-year renewed job contract and the opportunity to transfer to one of five departments that you’ve been wanting to join. Suppose you will choose one department and start working in the new department in 18 months.

2. Suppose you’re involved in a small lawsuit that you are very likely to win. The lawyer offers five approaches to proceed with the case, and you need to choose one out of the five. You need to go to the court in 4 years. The court hearing will take 4 hours.

3. Suppose you’re planning your dream vacation. It will be a two-month trip. You’ve narrowed down to five destinations that you really like and will choose one of them. Because you have a busy schedule and some of the places on your itinerary have a long waitlist, the earliest date to go on this vacation is in 2 years.

4. Suppose you decide to make a reservation at a restaurant that requires a long wait to celebrate an anniversary next year (in 12 months). You narrowed down to five restaurants that you like and will choose one of them. The prix fixe meals usually consist of nine courses and last for four hours.

5. Suppose your department gets eliminated and you job position no longer exists. The company offers you a 3-year renewed job contract and the opportunity to transfer to one of five departments. This will be a step down for you, and you don’t find this new
arrangement particularly desirable. However, you decide to choose one department to join and start working in the new department in 18 months.

6. Suppose you’re involved in a small lawsuit that you are very likely to lose. The lawyer offers five approaches to proceed with the case, and you need to choose one out of the five. You need to go to the court in 4 years. The court hearing will take 4 hours.

7. Suppose you need to get a routine medical exam in 5 years. The exam will be painful but not harmful, and last for 2 hours. You can choose to get the exam from five different hospitals. Suppose you will choose one hospital and get the exam.

8. Suppose you lost your job recently and had to find a cheaper place to live. You’ve searched apartment listings and found five apartments within your budget. Suppose you will choose one apartment to lease and move into your new home in 14 months. The lease lasts for 2 years.

No choice condition

1. Suppose you are offered a job promotion, which involves a 3-year renewed job contract and the opportunity to transfer to a department that you’ve been wanting to join. Suppose you will start working in the new department in 18 months.

2. Suppose you’re involved in a small lawsuit that you are very likely to win. The lawyer offers one approach to proceed with the case. You need to go to the court in 4 years. The court hearing will take 4 hours.

3. Suppose you’re planning your dream vacation to a destination that you really like. It will be a two-month trip. Because you have a busy schedule and some of the places on your itinerary have a long waitlist, the earliest date to go on this vacation is in 2 years.

4. Suppose you decide to make a reservation at a restaurant that you like to celebrate an
anniversary next year (in 12 months) as it requires a long wait. The prix fixe meals usually consist of nine courses and last for four hours.

5. Suppose your department gets eliminated and you job position no longer exists. The company offers you a 3-year renewed job contract and the opportunity to transfer to another department. This will be a step down for you, and you don’t find this new arrangement particularly desirable. However, you decide to join the new department and start working in 18 months.

6. Suppose you’re involved in a small lawsuit that you are very likely to lose. The lawyer offers one approach to proceed with the case. You need to go to the court in 4 years. The court hearing will take 4 hours.

7. Suppose you need to get a routine medical exam in one hospital in 5 years. The exam will be painful but not harmful, and last for 2 hours.

8. Suppose you lost your job recently and had to find a cheaper place to live. You have found one apartment that meets your criteria. Suppose you will lease this apartment and move into your new home in 14 months. The lease lasts for 2 years.

Experiment 2
Condition 1

1. Suppose the company plans to eliminate your department in 18 months. It offers you a 5-year renewed job contract and to transfer you to another department at the end of the 18 months. Currently the company has a position at your level in five departments, all of which will be a step down for you. In 18 months, you have to decide which of the five departments to join and start working in the new department.

2. Suppose someone is suing you. The first hearing will be in 14 months. It will then take
a series of court hearings that span 3 years to reach a judgment. The lawyer has thought of five different strategies for your defense. It’s up to you to choose which one strategy to use. You need to decide one month before the first hearing in 14 months.

3. Suppose you lost your job recently. You plan to stay in your current apartment for another 16 months until the lease expires, and then rent a cheaper apartment. You have been searching apartment listings and have found five apartment buildings that offer affordable housing. You will decide which one of the five to rent one month before the move and move into your new home in 16 months. The lease lasts for 2 years.

4. Suppose you need to join a physical therapy program where a physical therapist helps you recover from an injury and promote mobility. The program lasts for 1 year. Your doctor recommends five physical therapy programs that you can join. In 2 years, you will decide which one to join and start the physical therapy.

Condition 2

1. Suppose the company plans to eliminate your department in 18 months. It offers you a 5-year renewed job contract and to transfer you to another department at the end of the 18 months. Currently the company has a position at your level in five departments, all of which will be a step down for you. The company will transfer you to the department that happens to have a vacancy in 18 months. The result is out of your control. You will know about which department to join and start working in the new department in 18 months.

2. Suppose someone is suing you. The first hearing will be in 14 months. It will then take a series of court hearings that span 3 years to reach a judgment. The lawyer has thought of five different strategies for your defense. The evidence that the lawyer ends up getting determines the best strategy to use. You will know which strategy to use one month
before the first hearing in 14 months.

3. Suppose you lost your job recently. You plan to stay in your current apartment for another 16 months until the lease expires, and then rent a cheaper apartment. You have been searching apartment listings and have found five apartment buildings that offer affordable housing. You’re on the waitlist for all five. You plan to move into the one that happens to have a vacancy in 16 months. You will know which apartment building has a vacancy one month before the move and move into your new home in 16 months. The lease lasts for 2 years.

4. Suppose you need to join a physical therapy program where a physical therapist helps you recover from an injury and promote mobility. The program lasts for 1 year. Your doctor recommends five physical therapy programs that you can join. You are on the waitlist for all five. You will join the one that happens to have a spot available in 2 years, at which time you will know which program to join and start the physical therapy.

Condition 3

1. Suppose the company plans to eliminate your department in 18 months. It offers you a 5-year renewed job contract and to transfer you to another department at the end of the 18 months. Currently the company has a position at your level in five departments, all of which will be a step down for you. The company will transfer you to the department that happens to have a vacancy in 18 months. The result is out of your control. The company already knows which employee will leave in 18 months at the end of the contract, and the department you will join, but it’s their policy to not inform you until 18 months later, at the time you will start working in the new department.

2. Suppose someone is suing you. The first hearing will be in 14 months. It will then take
a series of court hearings that span 3 years to reach a judgment. The lawyer has thought of five different strategies for your defense. The evidence that the lawyer ends up getting determines the best strategy to use. Which piece of evidence still exists and is available to the lawyer is a certainty at this point, but you won’t know until the lawyer conducts a thorough search for the evidence. You will know which strategy to use one month before the first hearing in 14 months.

3. Suppose you lost your job recently. You plan to stay in your current apartment for another 16 months until the lease expires, and then rent a cheaper apartment. You have been searching apartment listings and have found five apartment buildings that offer affordable housing. You’re on the waitlist for all five. You plan to move into the one that happens to have a vacancy in 16 months. The leasing office already knows which building will have a vacancy in 16 months, but it’s their policy to not inform people until one month before the move. You will move into the new home in 16 months. The lease lasts for 2 years.

4. Suppose you need to join a physical therapy program where a physical therapist helps you recover from an injury and promote mobility. The program lasts for 1 year. Your doctor recommends five physical therapy programs that you can join. You are on the waitlist for all five. The program coordinator already knows which program will have a spot available in 2 years, but it’s their policy to not inform you until 2 years later, when you start the physical therapy.

Condition 4

1. Suppose the company plans to eliminate your department in 18 months. It offers you a 5-year renewed job contract and to transfer you to another department at the end of the 18
months. Currently the company has a position at your level in five departments, all of which will be a step down for you. One of the departments happens to have a vacancy in 18 months. The company just decided and told you that you will be transferred to this department and start working in the new department in 18 months.

2. Suppose someone is suing you. The first hearing will be in 14 months. It will then take a series of court hearings that span 3 years to reach a judgment. The lawyer has thought of five different strategies for your defense. The evidence that the lawyer ends up getting determines the best strategy to use. Just now the lawyer has finished the search for evidence and thus determined which strategy to use.

3. Suppose you lost your job recently. You plan to stay in your current apartment for another 16 months until the lease expires, and then rent a cheaper apartment. You have been searching apartment listings and have found five apartment buildings that offer affordable housing. You’re on the waitlist for all five. Just now the real estate agent told you which one of the buildings would have a vacancy in 16 months. You plan to move into this apartment building in 16 months. The lease lasts for 2 years.

4. Suppose you need to join a physical therapy program where a physical therapist helps you recover from an injury and promote mobility. The program lasts for 1 year. Your doctor recommends five physical therapy programs that you can join. You are on the waitlist for all five. The program coordinator just told you which one program would have a spot available in 2 years and that would be the program for you to join. You will start the physical therapy in 2 years.

Condition 5

1. Suppose the company plans to eliminate your department in 18 months. It offers you a
5-year renewed job contract and to transfer you to another department at the end of the 18 months. Currently the company has a position at your level in two departments, both of which will be a step down for you. The company will transfer you to the department that happens to have a vacancy in 18 months. The result is out of your control. You will know about which department to join and start working in the new department in 18 months.

2. Suppose someone is suing you. The first hearing will be in 14 months. It will then take a series of court hearings that span 3 years to reach a judgment. The lawyer has thought of two different strategies for your defense. The evidence that the lawyer ends up getting determines the best strategy to use. You will know which strategy to use one month before the first hearing in 14 months.

3. Suppose you lost your job recently. You plan to stay in your current apartment for another 16 months until the lease expires, and then rent a cheaper apartment. You have been searching apartment listings and have found two apartment buildings that offer affordable housing. You’re on the waitlist for both. You plan to move into the one that happens to have a vacancy in 16 months. You will know about which apartment building has a vacancy one month before the move and move into your new home in 16 months. The lease lasts for 2 years.

4. Suppose you need to join a physical therapy program where a physical therapist helps you recover from an injury and promote mobility. The program lasts for 1 year. Your doctor recommends two physical therapy programs that you can join. You are on the waitlist for both. You will join the one that happens to have a spot available in 2 years, at which time you will know which program to join and start the physical therapy.

Condition 6
1. Suppose the company plans to eliminate your department in 18 months. It offers you a 5-year renewed job contract and to transfer you to another department at the end of the 18 months. Currently the company has a position at your level in one other department, which will be a step down for you. In 18 months, the company will transfer you to this department and you will start working in the new department.

2. Suppose someone is suing you. The first hearing will be in 14 months. It will then take a series of court hearings that span 3 years to reach a judgment. The lawyer has thought of a strategy for your defense. You will use this strategy to defend.

3. Suppose you lost your job recently. You plan to stay in your current apartment for another 16 months until the lease expires, and then rent a cheaper apartment. You have been searching apartment listings and have found one apartment building that offers affordable housing. Just now the real estate agent told you that the building would have a vacancy in 16 months. You plan to move into this apartment building in 16 months. The lease lasts for 2 years.

4. Suppose you need to join a physical therapy program where a physical therapist helps you recover from an injury and promote mobility. The program lasts for 1 year. Your doctor recommends a physical therapy program that you can join. The program coordinator just told you that the program would have a spot available in 2 years, at which time you will start the physical therapy.
Table 1. Subjective temporal distance between now and the start of future experience ("nts"), now and the end of future experience ("nte"), duration of future experiences, by scenario, Pilot

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|-----------------------------|----|-------|-----|------|--------|-----|-----|------------|-------- \
| Chance of losing            |    |       |     |      |        |     |     |            |        \
| Routine medical exam        | 60 | -24.16| 28.92 | 28.54 | -2.12 | 481 | 0.035 | 0.19       |        \
| Apartment                   | 14 | 4.19  | 27.57 | 27.46 | -3.75 | 478 | 0.035 | 0.19       |        \
| Job promotion               | 54 | 31.8  | 25.58 | 25.47 | -1.77 | 478 | 0.077 | 0.16       |        \
| Court hearing with a high chance of winning | 48.0055 | 10.9 | 24.46 | 21.32 | -2.04 | 474 | 0.041 | 0.19       |        \
| (2) nte                     |    |       |     |      |        |     |     |            |        \
| Trip                        | 26 | 39.49 | 26.29 | 26.24 | 0.28  | 480 | 0.783 | -0.03      |        \
| Anniversary meal            | 12.0055 | 28.82 | 25.77 | 24.89 | -1.37 | 477 | 0.172 | 0.13       |        \
| Job demotion                | 54 | -16.96| 29.48 | 28.08 | -1.84 | 481 | 0.066 | 0.17       |        \
| Court hearing with a high chance of winning | 48 | 34.89 | 27.49 | 25.28 | -1.56 | 479 | 0.12  | 0.14       |        \


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<td>Apartment</td>
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<td>241</td>
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<td>25.85</td>
<td>240</td>
<td>0.005</td>
<td>0.26</td>
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<tr>
<td>Job promotion</td>
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<td>31.8</td>
<td>242</td>
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<td>239</td>
<td>0.207</td>
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<tr>
<td>Court hearing with a high chance of winning</td>
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<td>10.9</td>
<td>243</td>
<td>5.46</td>
<td>3.54</td>
<td>240</td>
<td>0.444</td>
<td>-0.07</td>
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<tr>
<td>(3) Trip</td>
<td>2</td>
<td>39.49</td>
<td>242</td>
<td>5.38</td>
<td>3.08</td>
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<td>Anniversary meal</td>
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<td>239</td>
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<td>Job demotion</td>
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<td>240</td>
<td>0.193</td>
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<td>M</td>
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<td>3.48</td>
<td>480</td>
<td>0.922</td>
<td>0.01</td>
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<tr>
<td>chance of losing routine medical exam</td>
<td>0.0028</td>
<td>-24.16</td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>M</td>
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<td>6.99</td>
<td></td>
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<tr>
<td>SD</td>
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<td></td>
</tr>
<tr>
<td>M</td>
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<td></td>
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<tr>
<td>SD</td>
<td>2.9</td>
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<td>478</td>
<td>0.279</td>
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### Table 3. Condition Summary for Experiment 2

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<th>Factor</th>
<th>Condition</th>
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<tr>
<td></td>
<td>1</td>
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<tr>
<td>The two conditions compared to test each factor</td>
<td></td>
</tr>
<tr>
<td>Future experience determined by a choice or a random factor</td>
<td></td>
</tr>
<tr>
<td>Time to determine the future experience</td>
<td></td>
</tr>
<tr>
<td>Time to know the future experience</td>
<td></td>
</tr>
<tr>
<td>Presence of uncertainty</td>
<td></td>
</tr>
<tr>
<td>A lower or higher non-zero level of uncertainty: number of options, given that there are more than 1 option</td>
<td></td>
</tr>
<tr>
<td>A description of the factors for each condition</td>
<td>choice</td>
</tr>
<tr>
<td>Time to determine the future experience</td>
<td>around the start of the experience</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Time to know the future experience</td>
<td>around the start of the experience</td>
</tr>
<tr>
<td>Number of options</td>
<td>5</td>
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</table>
Table 4. Subjective temporal distance between now and the start of future experience ("nts") by scenario, Experiment 2

<table>
<thead>
<tr>
<th>DV</th>
<th>Scenario</th>
<th>Objective duration (in &quot;months&quot;)</th>
<th>Valence (-50 = extremely negative; 50 = extremely positive)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Cohen's d between Condition 1 and 6</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>M</td>
<td>SD</td>
<td>N</td>
<td>M</td>
<td>SD</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>job</td>
<td>demotion</td>
<td>18</td>
<td></td>
<td>-8.72</td>
<td>47.24</td>
<td>51.22</td>
<td>53.79</td>
<td>50.29</td>
<td>47.77</td>
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<td>defendant</td>
<td>of a lawsuit</td>
<td>14</td>
<td></td>
<td>-28.75</td>
<td>50.83</td>
<td>61.11</td>
<td>62.3</td>
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<td>63.05</td>
<td>56.91</td>
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<td>24</td>
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<td>60.44</td>
<td>59.01</td>
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<td>59.77</td>
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<td>physical</td>
<td>therapy</td>
<td>16</td>
<td></td>
<td>5.31</td>
<td>67.4</td>
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</tbody>
</table>
Figure 1. The primary measure, i.e., the subjective temporal distance between now and the start of the future experience, displayed on the Qualtrics survey for the trip scenario.
Figure 2. Mean z-scored subjective temporal distance from now to the start of the future experience (“nts”) by condition (Pilot, Experiment 1 and 2). Error bars indicate standard errors of the mean.
CHAPTER 2

Valence and Culture Affect Sequence Preference
Abstract

The present research examines the effects of valence and culture on sequence preference for everyday life experiences. It differs from prior work in that 1) it compares sequence preferences of symmetrical positive and negative events in the same domain, and 2) it explores sequence preference, for the first time, in a non-Western culture (Asian India), in comparison to Americans. The results from two studies showed that, when given a choice of ascending, descending and other sequences, people were more likely to prefer an ascending sequence for negative experiences than positive experiences, and that people were more likely to prefer a descending sequence for positive experiences than negative experiences. They also showed that Americans were more likely to prefer an ascending sequence than Indians and that Indians were more likely to prefer a descending sequence than Americans. Despite the cultural difference, the majority of Americans and Indians showed a preference for an ascending sequence for life experience as a whole. People have shown a medium to large level of individual consistency in their sequence preference. We discussed each motivation to prefer an ascending or a descending sequence noted in Frederick and Lowenstein (2008) in light of the valence and cultural effects.

*Keywords: sequence preference, experience, valence, culture*
Valence and Culture Affect Sequence Preference

Prior research based on western samples has found that people generally prefer an ascending sequence when given a choice between an ascending sequence and a descending sequence for positive as well as negative events (e.g., Loewenstein & Sicherman, 1991; see Frederick & Loewenstein, 2008 for a discussion on the limitations of the finding). Prior research has not systematically examined the sequence preference for everyday life experiences. Everyday life experiences constitute a large part of people's daily experiences. Everyday life experiences can become more appealing when arranged in a preferred sequence. For example, a restaurant that presents dishes with a preferred sequence on a tasting menu may attract more customers and/or provide a more pleasant dining experience. The presentation sequence of negative experiences may influence preferences. It is possible to alter the sequences of experiences to facilitate desirable outcomes. For example, doctors may design a treatment plan with a better medical outcome in a preferred sequence to increase the chance that patients opt in for the treatment plan. Teachers may design the reading assignments in a preferred sequence to increase the chance that the students work on the assignments.

1. In the present research, we examine the valence effect of sequence preference. Is there a difference in sequence preference for positive versus negative situations? The asymmetry between the positive and the negative has been noted in the prior literature (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Rozin & Royzman, 2001). For example, negative potency indicates that negative entities are stronger than the equivalent positive entities. As noted by Frederick and Loewenstein (2008), people may prefer an
ascending sequence to increase the positive anticipation and decrease the dread (Berns, et al., 2006; Loewenstein, 1987). Dread may be stronger than the positive anticipation due to negative potency, which may drive people to show a stronger preference for an ascending sequence for negative than for positive situations.

In fact, prior research has suggested that people may show a stronger preference for an ascending sequence for negative than positive situations. For example, Frederick and Loewenstein (2008) asked participants to specify their preferred allocation of 30 events, such as 30 headaches, over an 8 year interval. More people chose an ascending sequence for negative experiences such as headaches than positive experiences such as massages or sushi dinners, and more people chose a descending sequence for such positive experiences than for such negative experiences (see Table 3 in Frederick & Loewenstein, 2008, Study 1a and 1b). Frederick and Loewenstein (2008) noted that people showed a greater disposition to accelerate bads than to postpone goods because aversive dread was more potent than pleasurable anticipation. In the present research, we created symmetrical positive and negative experiences, and examined the effect of valence on sequence preference.

It is possible that the preferred sequence of events may be at least partly a function of culture. Prior research on sequence preference has used western samples. Most studies used American samples (e.g., Loewenstein & Prelec, 1991, 1993; Loewenstein & Sicherman, 1991). Some studies included Canadian (e.g., Redelmeier & Kahneman, 1996) and UK samples (e.g., Read & Powell, 2002). No study to our knowledge has compared the sequence preference between U.S. Americans and any non-Western group; the present research examines this by comparing Americans and Indians.
Prior research has identified differences between Asian Indian cultures or more generally, South and East Asian countries and North Americans. For example, when asked to indicate which of “anger, happiness, shame” did not belong with the other two, Americans tended to pick “happiness” because it was the only positive item, whereas Indians were much more likely to pick “anger” because it was an emotion that was socially disruptive, whereas the other two, “happiness” and “shame”, were socially constructive emotions (Menon & Shweder, 1997; Rozin, 2003). More generally, the more communal South and East Asian countries seem to privilege communal values over individualistic values (Markus & Kitayama, 1991). Communal frameworks tend to focus less on the pleasure dimension.

One of the reasons for people to choose an ascending sequence, as noted in Frederick and Loewenstein (2008), was that people extended the presented sequences according to the trends. For example, people may have projected an ascending sequence such as (5, 6, 7) to (5, 6, 7, 8) and a descending sequence such as (7, 6, 5) to (7, 6, 5, 4). Because the ascending sequence has a projected sequence with a higher total value, people prefer an ascending sequence. It has been shown that when predicting a trend, North Americans tended to predict a linear trend (e.g., what has been going up will continue to go up), whereas East Asians tended to predict a cyclical trend (e.g., what has been going up will go down) (Ji, 2005). Although not directly tested on Indians, the results suggest that there may be South/East Asian versus American differences in terms of how people predict trend, which according to Frederick and Loewenstein (2008), may affect people’s preference for an ascending sequence.

2. In the present research, we compared the sequence preference between U.S.
Americans and Asian Indians to examine whether the preference for an ascending sequence was generalizable beyond the western sample, and to explore possible cultural differences between Americans and Indians in sequence preference.

3. To what extent does sequence preference show individual consistency? Does favoring ascending (or descending) sequences in one domain correlate with favoring the same in other domains? Most studies examined the relationships of sequence preference in domains such as money, health, environment, career, etc. (e.g. Chapman, 1996a; Chapman, 1996b; Chapman, & Elstein, 1995; Hardisty & Weber, 2009; Schoenfelder & Hantula, 2003). There were mixed findings regarding whether people showed consistency across such domains. Whereas some studies found little consistency of preference across such domains (Chapman, 1996a; Chapman, 1996b; Duffy & Smith, 2013; Schoenfelder & Hantula, 2003); other studies found consistency of preference across some domains (Chapman & Weber, 2006; Hardisty & Weber, 2009). We extended these studies by exploring a set of 14 everyday experiences. For example, do people prefer to eat dishes in a meal in the same sequence that they prefer to make phone calls?

4. What is the sequence preference for life experience as a whole? We asked participants to indicate their sequence preference for a whole life experience, and compared the results with their sequence preference for everyday life experiences. We examined whether everyday life experiences differed from the whole life experience in terms of preferred sequence.

In two studies, we asked participants to indicate their sequence preferences in various everyday life experiences, balanced across negative and positive sequences, or
life experience as a whole, and explored their responses with an emphasis of the four questions noted above.

**Study 1**

**Method**

Two hundred and thirty eight Mturk Americans and 455 Mturk Indians participated in the study. 512 Mturk workers completed the online survey and 408 passed all five catch questions and were included in the analysis. An example of a catch question was “please add 3 to 54 and put the answer in the box.” The analysis included 190 Mturk Americans (64.7% female; mean age = 36.3) and 218 Mturk Indians (35.8% female; mean age = 31.3).

Participants were asked to select the sequence in which they prefer to proceed in fourteen scenarios. For example, participants were asked, “if you have a plan to eat three dishes on the same platter in a meal right now (e.g., meat, potatoes and a vegetable), and you like all of the dishes, in which order do you prefer to proceed? ” In this scenario, the participants were asked to indicate their preferences to order three positive items of the same sort. For each positive scenario, we created a corresponding negative scenario, which for the meal scenario was, “if you have a plan to eat three dishes on the same platter in a meal right now (e.g., meat, potatoes and a vegetable), and you dislike all of the dishes (you are hungry and there are no alternative foods), in which order do you prefer to proceed? ”

For each scenario, participants were presented with four options: a descending
sequence (e.g., “I prefer to eat my most favorite dish first and eat my least favorite dish last”), an ascending sequence (e.g., “I prefer to eat my least favorite dish first and eat my most favorite dish last”), any other sequence (e.g., “I prefer to approach the foods in a different order than any described above. What I prefer to do is___”) and no particular sequence (e.g., “I prefer to not do the ordering of the foods in any particular way”).

We asked for the sequence preference for the life experience as a whole, given that the total amount of goodness in life was constant across options, to contrast with the sequence preference for everyday life experiences. “Suppose the curves below represent everything you care about in your life: happiness, meaning, health, etc. The y-axis represents how good your life is taken as a whole; the x-axis represents your age.” We provided seven options including a descending sequence, an ascending sequence, a flat sequence, a sequence with a peak in the middle, a sequence with a low point in the middle, any other sequence, or indifferent to any sequence, with the first five options each represented by a curve.

We asked participants to rank the importance of anticipation, experience, and memory for positive and negative experiences respectively. Specifically, for positive experiences we asked, “think of a positive experience, like going to a favorite sports event or concert. We can talk about three aspects of this experience. First is the anticipation of the experience: You have the ticket and enjoy thinking about going. Second is the actual experience of the event: You are attending it. Third is the memories of the event: You remember the different things that happened during it. This could be immediately after the event, or days, months or years later. Generally, how important do
you think anticipation, experience, and memories of POSITIVE experiences are for you, in your life? Please rank the three.” For negative experiences, we asked, “think of a negative experience, like going to see your dentist or disputing a bill. We can talk about three aspects of this experience. First is the anticipation of the experience: You are scheduled to see your dentist and dread going. Second is the actual experience of the event: You are attending it. Third is the memories of the event: You remember the different things that happened during it. This could be immediately after the event, or days, months or years later. Generally, how important do you think anticipation, experience, and memories of NEGATIVE experiences are for you in your life? Please rank the three.”

Results

The basic results on sequence preference are presented in Table 1. We collapsed the two non ascending/descending choices (other and no particular sequence) into one “other” category. The table presents the frequency of ascending, descending, and other choices for Americans, Indians, and for the total sample. Results for a given domain in the positive version are followed by results for the same domain in the negative version, with this pattern repeated for each domain.

The ascending sequence was the predominant choice for Americans in all seven negative scenarios and five (out of seven; except for the positive meal and positive project scenario) positive scenarios. The ascending sequence was not the predominant choice for Indians in any scenarios. The descending sequence was the predominant choice for Indians in all fourteen scenarios. The descending sequence was the
predominant choice for Americans in one (positive project) out of the fourteen scenarios. We created binary variables for each scenario to indicate an ascending (or a descending) sequence was chosen or not, and averaged the binary variables for an ascending (or a descending) sequence across fourteen scenarios. The correlation between the mean ascending and mean descending for the total sample was, \( r(381) = -0.67, p < 0.001 \).

1. Is there a difference in sequence preference for positive versus negative situations? Based on a paired sample t-test, the mean ascending preference for negative scenarios \((M = .41, SD = .33)\) was stronger than the mean ascending preference for positive scenarios \((M = .35, SD = .32)\), \( t(382) = -3.46, p < .001 \).

   The importance ranking of positive anticipation didn’t correlate with the preference for an ascending sequence for positive experiences, \( r(347) = -0.03, p = .573 \), and the importance ranking of dread didn’t correlate with the preference for an ascending sequence for negative experiences, \( r(322) = -0.05, p = .372 \). The results were in the right direction that a higher ranking of positive anticipation or dread corresponded to a stronger preference for an ascending sequence. Based on a paired sample t-test, the mean descending preference for positive scenarios \((M = .47, SD = .35)\) was stronger than the mean descending preference for negative scenarios \((M = .36, SD = .34)\), \( t(382) = 6.34, p < .001 \).

   Is there a difference in the value placed on anticipation by valence? Negative anticipation was ranked as more important than the positive anticipation by a paired-sample t test that compared the rankings of the positive \((M = 2.42, SD = .76)\) and negative anticipation \((M = 2.06, SD = .79)\), \( t(313) = 5.93, p < .001 \). This finding is
consistent with the position that anticipation importance may play a role in the predominance of ascending in the negative situation.

2. Is there a difference in sequence preference between Americans and Indians? Based on an independent sample t-test, the mean ascending preference for Americans ($M = .48$, $SD = .30$) was stronger than the mean ascending preference for Indians ($M = .29$, $SD = .24$), $t(345) = 6.54$, $p < .001$. Is there a difference in the value placed on anticipation by culture? For positive experiences, Indians ($M = 2.38$, $SD = .75$) rated anticipation higher than Americans ($M = 2.52$, $SD = .72$), $t(355) = 1.77$, $p = .078$, but not significantly. For negative experiences, Americans ($M = 2.04$, $SD = .78$) rated anticipation higher than Indians ($M = 2.09$, $SD = .82$), $t(338) = -.50$, $p = .618$, again not a significant difference. Therefore, we cannot use anticipation importance to explain the cultural difference in their preference for an ascending sequence. Based on an independent sample t-test, the mean ascending preference for Indians ($M = .55$, $SD = .28$) was stronger than the mean ascending preference for Americans ($M = .26$, $SD = .25$), $t(381) = -10.52$, $p < .001$.

3. To what extent does sequence preference show individual consistency? The correlations between the binary variables for an ascending sequence among the fourteen scenarios were all positive, ranging from $r(404) = .09$, $p = .075$ to $r(403) = .56$, $p < .001$, with an average correlation of $r = .29$, which approached a medium level of consistency. The correlations between the descending sequence binary variables among the fourteen scenarios were all positive, ranging from $r(404) = .15$, $p < .01$ to $r(401) = .59$, $p < .001$, with an average correlation of $r = .33$, which suggested a medium level of consistency.
4. What is the sequence preference for life experience as a whole? Despite their differences in sequence preference regarding everyday life experiences, more than half of Americans as well as Indians preferred an ascending sequence for the life experience taken as a whole (Table 2). The distribution of sequence preference was contingent on the culture, $\chi^2(6) = 18.68, p = .005$. To test the cultural difference in the preference for an ascending (or descending) sequence, we created a binary variable to represent an ascending (or descending) sequence was chosen or not. Independent sample t-tests showed that Indians ($M = .05, SD = .22$) were more likely to prefer a descending sequence compared to Americans ($M = .02, SD = .12$), $t(697.88) = -2.75, p = .006$. There was a trend that Americans ($M = .55, SD = .50$) were more likely to prefer an ascending sequence compared to Indians ($M = .51, SD = .50$), though the difference was not significant, $t(821) = 1.03, p = .306$.

**Study 2**

In Study 1, for each experience, the positive scenario was presented first, followed by the corresponding negative scenario. All participants responded to the questions in the same order. To rule out the possibility that the display order of valence accounted for the valence difference observed in Study 1, Study 2 counterbalanced the display order of valence.
Method

Four hundred and ninety two Mturk Americans participated in the study. 469 (44.6% female; mean age = 37.29) participants passed all five catch questions and were included in the analysis.

Participants were randomly assigned to respond to either seven positive scenarios first (n = 233), or seven negative scenarios first (n = 236). For the seven scenarios of the same valence, we randomized the order in which they were presented for each participant. Participants were asked to select the sequence in which they prefer to proceed in the same fourteen scenarios as in Study 1 except that each scenario only consisted of two exemplars instead of three (e.g., two dishes in a meal rather than three). For each scenario, we presented three options: a descending sequence (e.g., “I prefer to eat the dish that I like better first”), an ascending sequence (e.g., “I prefer to eat the dish that I like better second”) and “neither of above.”

We also asked participants to respond to the importance ranking questions, which were the same as in Study 1, with the display order of valence counterbalanced. Participants who responded to the seven positive (or negative) scenarios first also responded to the positive (or negative) importance ranking question first.

Results

The basic results on sequence preference are presented in Table 3. In fourteen out of the fourteen scenarios, ascending was the predominant choice. The percent of participants who preferred an ascending sequence ranged from 46.7% to 68.4% (out of
three choices). Based on this American sample, the preference for an ascending sequence was generalized to everyday life experiences across situations. We created binary variables for each scenario to indicate an ascending (or a descending) sequence was chosen or not, and averaged the binary variables for an ascending (or a descending) sequence across fourteen scenarios. The mean ascending correlated with mean descending at \( r(467) = -0.93, p < .001 \).

1. Is there a difference in sequence preference for positive versus negative situations? Based on a paired sample t-test, the mean ascending preference for negative scenarios (\( M = .60, SD = .34 \)) was stronger than the mean ascending preference for positive scenarios (\( M = .57, SD = .36 \)), \( t(468) = -1.95, p = .051 \), though the results did not quite reach a significant level.

   The importance ranking of positive anticipation didn’t correlate with the preference for an ascending sequence for positive experiences, \( r(440) = -0.03, p = .516 \). The correlation between the importance ranking of dread and the preference for an ascending sequence for negative experiences approached significance, \( r(424) = -0.09, p = .054 \), indicating a trend that people who found dread to be more important would prefer an ascending sequence for negative experiences.

   Is there a difference in the value placed on anticipation by valence? The negative anticipation was ranked as more important than the positive anticipation by a paired-sample t test that compared the rankings of the positive (\( M = 2.53, SD = .70 \)) and negative anticipation (\( M = 1.99, SD = .81 \)), \( t(403) = 10.97, p < .001 \).
Based on a paired sample t-test, the mean descending preference for positive scenarios ($M = .40, SD = .36$) was stronger than the mean descending preference for negative scenarios ($M = .34, SD = .32$), $t(468) = 5.43, p < .001$.

3. To what extent does sequence preference show individual consistency? The correlations between the binary variables for an ascending sequence among the fourteen scenarios were all positive, ranging from $r(422) = .21, p < .001$ to $r(422) = .64, p < .001$, with an average correlation of $r = .40$, which indicated a medium to large level of consistency. The correlations between the descending sequence binary variables among the fourteen scenarios were all positive, ranging from $r(420) = .21, p < .001$ to $r(420) = .64, p < .001$, with an average correlation of $r = .40$, which indicated a medium to large level of consistency.

**Discussion**

The valence effect appeared to be robust in Study 2, where the display order of valence was counterbalanced, the display order of the seven scenarios for each valence was randomized for each participant, two instead of three exemplars were used for each scenario, and three options (i.e., ascending sequence, descending sequence, neither) were presented.

For the preference for an ascending sequence, the valence effect approached significance, $t(468) = -1.95, p = .051$, while in Study 1 it was significant, $t(382) = 6.34, p < .001$. It may be because that in Study 1, the negative scenario was presented right after the corresponding positive scenario for the same experience, while in Study 2, we presented seven positive (or negative) scenarios first, and then the corresponding seven
negative (or positive) scenarios. The contrast of valence for each experience may be more salient in Study 1 compared to Study 2.

**General Discussion**

In two studies, we examined sequence preference in everyday life experiences and life experience as a whole. We have found a valence effect and a cultural difference (between Americans and Indians) on sequence preference. Despite the cultural difference, the majority of Americans and Indians showed a preference for an ascending sequence for life experience as a whole. People have shown a medium to large level of individual consistency in their sequence preference.

1. Is there a difference in sequence preference for positive versus negative situations? Prior research suggested that more people chose an ascending sequence for negative experiences such as headaches than positive experiences such as massages or sushi dinners, and more people chose a descending sequence for such positive experiences than for such negative experiences (see Table 3 in Frederick & Loewenstein, 2008, Study 1a and 1b). However, such studies didn't aim to test for the valence effect and therefore didn’t isolate the valence factor. In the present research, we created symmetrical positive and negative scenarios that were different only in valence and isolated the valence factor. We found that people were more likely to prefer an ascending sequence for negative experiences than positive experiences, and that people were more likely to prefer a descending sequence for positive experiences than negative experiences. A sizable percentage of people (e.g., 41% in Study 1) preferred an ascending sequence for negative experiences despite of the fact that such a sequence presented them with the
most negative experience first. The evolutionary standpoint suggests that the delay of the most negative experience, which may indicate the greatest danger, maximizes the chance of survival. The results suggest that the preference for an ascending sequence is stronger than the evolutionary instinct to delay the most negative experience.

2. Is there a difference in sequence preference between Americans and Indians? We believe this was the first time that sequence preference was examined with a sample outside of the western culture. We recruited participants and contrasted their sequence preference with that of the Americans. We found significant cultural differences. Americans were more likely to prefer an ascending sequence than Indians and that Indians were more likely to prefer a descending sequence than Americans, even for the life experience taken as a whole, when the majority of Americans as well as Indians preferred an ascending sequence.

The cultural difference suggests that being sensitive to each culture’s unique sequence preference may help to tailor experiences or products to appeal to the particular culture. For example, 63.8% Indians preferred a descending sequence for a positive trip, whereas 55.3% Americans preferred an ascending sequence for a positive trip. In order to attract more Indian customers to a positive trip, e.g., design an experience on a cruise trip, it may be more appealing to use a descending sequence to arrange the activities on the cruise. If the potential customers were Americans, it may be more appealing to use an ascending sequence to arrange the activities on the cruise.

Prior research showed that the real-time evaluation of the end of an experience was significantly correlated with the retrospective global evaluation of the pleasant
experience with American samples (Frederickson & Kahneman, 1993), which suggested that, given the same pleasant experiences, an ascending sequence would be evaluated as a better experience than a descending sequence according to Americans. This discrepancy may be due to a difference of culture or a prospective versus retrospective evaluation of an experience.

3. To what extent does sequence preference show individual consistency? For the total sample, there are 91 possible pairings of two scenarios from the set of 14. The correlations were all positive. The individual’s sequence preference was consistent across domains. The consistency level across scenarios for an ascending sequence was $r = .29$ in Study 1 and $r = .40$ in Study 2; for a descending sequence was $r = .33$, in Study 1 and $r = .40$ in Study 2, indicating a medium to large level of consistency for sequence preference across scenarios.

4. What is the sequence preference for life experience as a whole? We found a strong preference for the ascending life course in both Americans (54.7% ascending) and Indians (51% ascending).

Frederick and Loewenstein (2008) have shown that different elicitation procedures may produce different responses in sequence preference. For example, they showed that the preference for an ascending sequence documented with a choice task disappeared when using allocation or pricing tasks. Our studies used a choice task, the standard elicitation procedure for sequence preference, and thus caution should be exercised when generalizing the results to other elicitation procedures. There are a number of other limitations of the present research, including using only Mturk samples
and self-report data without any real choices.

Building on prior research, Frederick and Loewenstein (2008) noted three factors that favored an ascending sequence. 1) By saving the better outcomes for later, people increased the positive anticipation and decreased the dread (Berns, et al., 2006; Loewenstein, 1987). 2) People experienced a series of gains relative to the last outcome (Helson, 1964). 3) The respondents extended the presented sequences according to the trends. For example, the sequence (5, 6, 7) might have been projected as (5, 6, 7, 8...) and thus was preferred to (7, 6, 5), which might have been projected as (7, 6, 5, 4...), because they offered different totals. They also noted three factors that favored a descending sequence, including 1) the uncertainty about whether the later outcome would occur; 2) the opportunity cost of delaying the better outcomes; and 3) pure time preference (i.e., people cared less about outcomes that were more temporally remote).

We discuss each of the motivations to prefer an ascending or a descending sequence noted in Frederick and Loewenstein (2008) in light of the valence and cultural effects. Frederick and Lowenstein (2008) have noted three motivations to prefer an ascending sequence. The first motivation is to increase positive anticipation and decrease dread. Is the valence effect or/and the cultural effect related to anticipation? We tested the relationship between the importance ranking of anticipation (out of anticipation, experience and memory) and the preference for an ascending sequence. On the individual level, the correlations between the anticipation preference and the ascending sequence preference were not significant, but in the predicted direction, that a person who values anticipation more would show a stronger preference for an ascending sequence. On a
group level, negative anticipation (dread) was rated as more important than positive anticipation. This finding is consistent with the position that anticipation importance may play a role in the predominance of ascending in the negative situation. There was no significant difference in the value placed on anticipation by culture. Hence this could not be used to account for Indian-American differences in ascending sequence preference.

The second motivation to prefer an ascending sequence is to experience gains relative to the last outcome. This motivation applies for both positive and negative experiences. It is possible that people would perceive such gains (i.e., the difference between two consecutive elements in a sequence) to be larger for negative experiences compared to for positive experience due to negative potency (Baumeister et al., 2001; Rozin & Royzman, 2001); the larger perceived gains relative to the last outcome in a negative experience (compared to a positive experience) leads people to show a stronger preference for an ascending for the negative experience (compared to positive experience). There is no obvious reason why Americans and Asian Indians would be different in this aspect.

The third motivation to prefer an ascending sequence is that people extend the trends according to the existing sequence, and the extended trends based on an ascending sequence yields a higher total value (compared to the extended trends based on a descending sequence). The positive and negative experience can both be extended. For positive experiences, suppose the ascending sequence is (5, 6, 7), which will be extended to (5, 6, 7, 8); the descending sequence is (7, 6, 5), which will be extended to (7, 6, 5, 4). In this case, the total value of the extended ascending sequence is 26, and the total value of the extended descending sequence is 22. For negative experiences, suppose the
ascending sequence is (-7, -6, -5), which will be extended to (-7, -6, -5, -4); the
descending sequence is (-5, -6, -7), which will be extended to (-5, -6, -7, -8). In this case,
the total value for the extended ascending sequence is -22, and the total value of the
extended descending sequence is -26. It seems that in both cases, the extended ascending
sequence is up by 4 in total value compared to the descending sequence. However, this is
based on the assumption, for any specific sequence, the numerical value equals the
perceived value. If people perceive the negative to be more intense compared to the
positive (Baumeister et al., 2001; Rozin & Royzman, 2001), then the extended elements
of -4 (ascending) and -8 (descending) for the negative experiences would be perceived to
be more intense compared to 4 (descending) and 8 (ascending) for the positive
experiences. For example, at a 1.5 inflation rate, -4 and -8 will be perceived as -6 and -12.
Then the difference between -4 and -8 would be perceived as larger compared to the
difference between 8 and 4. If so, the difference in total value will be larger between the
ascending and the descending for the negative experiences compared to positive
experiences. Therefore, people should show a stronger preference for an ascending
preference for negative experiences compared to for positive experiences.

There may be a cultural difference in how people extend the trends. The literature
has only noted the cultural difference between the East Asians and North Americans in
terms of how they predict future trends. East Asians were more likely to predict cyclical
trends (e.g., what has been going up will go down) compared to North Americans, and
North Americans were more likely to predict linear trends (e.g., what has been going up
will continue to go up) compared to East Asians (Ji, 2005). That is, based on a sequence
of (5, 6, 7), East Asians may predict the reversal such as (5, 6, 7, 6, 5) rather than a
continuance of the sequence (5, 6, 7, 8, 9). The motivation to prefer an ascending sequence based on extended trends assumes that people predict linear trends, which may or may not be the case for Indians. There is no study on how Indians predict trends in comparison to Americans; it is possible that the two cultures predict trends differently, which relates to their cultural difference in sequence preference. If Indians, being a South Asian culture, resemble East Asians in this regard rather than North Americans, and thus predict reversals, this is consistent with the results that Indians show a weaker preference for an ascending sequence.

Frederick and Lowenstein (2008) have noted three motivations to prefer a descending sequence. The first motivation is based on an uncertainty about whether the later outcome would occur, which applies to both the positive and the negative situations. In both positive and negative experiences, the later outcome may not occur. A preference for a descending sequence for a positive (or negative) experience indicates that the least positive (or most negative) element, which comes later, may not occur. A preference for an ascending sequence for a positive (or negative) experience indicates that the most positive (or least negative) element, which comes later, may not occur. Therefore, the motivation based on uncertainty favors a descending sequence for positive (or negative) experience.

In terms of the valence difference, if anything, losing the most negative element (in the case of a descending sequence) and losing the least negative element (in the case of an ascending sequence) for a negative experience due to uncertainty may make a larger difference compared to losing the least positive element (in the case of a descending sequence) and losing the most positive element (in the case of an ascending sequence) for
a positive experience, due to negative potency (Baumeister et al., 2001; Rozin & Royzman, 2001). Therefore, in consideration of the uncertainty factor, the difference between the ascending and the descending is larger in negative than in positive situations. Thus people should show a stronger preference for a descending sequence for a negative experience. It is possible that the two cultures differ in terms of perceived level of uncertainty. A culture that perceives a higher level of uncertainty should show a stronger preference for a descending sequence. If Indians perceive a higher level of uncertainty compared to Americans, this is consistent with Indians’ stronger preference for a descending sequence.

The second motivation to prefer a descending sequence is based on the opportunity cost of delaying the better outcomes. This motivation is mostly related to sequences of monetary gains, because monetary gains can be invested and accumulate returns. The present research used everyday life experiences as domains to test the sequence preferences, and such everyday life experiences cannot be invested with monetary returns.

The third motivation to prefer a descending sequence is temporal discounting. According to this motivation, the later outcome will be discounted; if the later outcome is of a higher value, it will be discounted more. For example, at the same discount rate of 30%, $10 will be discounted by $3, and $1 will only be discounted by $.3. Therefore, with temporal discounting, it is preferable to have a later outcome of a lower value, i.e., a descending sequence, compared to a later outcome of a higher value, i.e., an ascending sequence. The higher the discount rate is, the more the later outcome will be discounted. For example, $10 will be discounted by $3 based on a 30% discount rate, and will be
discounted by $6 based on a 60% discount rate. At a higher discount rate, it is even more preferable to arrange the element of a lower value to be the later outcome, i.e., a descending sequence. Therefore, there should be a stronger preference for a descending sequence at a higher discount rate.

There is evidence that gains are discounted more than losses (e.g., Appelt, Hardisty & Weber, 2011). Based on the temporal discounting factor, people should show a stronger preference for a descending sequence for gains compared to losses. This is consistent with the valence effect that people show a stronger preference for a descending sequence for positive experiences compared to negative experiences, and could potentially explain the valence effect.

Prior research shows that some Indians may show a longer term future orientation, which is consistent with a lower discount rate of future outcomes, compared to Americans (Sundberg, Poole & Tyler, 1983). Based on the logic stated above, the culture with a lower discount rate of future outcomes, i.e., Indians, should show a weaker preference for a descending sequence. This is inconsistent with the cultural difference that the Indians show a stronger preference for a descending sequence compared to North Americans.

We discussed each motivation for an ascending or a descending sequence in light of the valence and cultural effects, and noted some possible mechanisms for the valence and cultural effects. Future research may investigate the potential mechanisms for the valence effect. For example, future studies could test if the discount rate mediates the relationship between valence and a preference for a descending sequence; that is, whether
the direct effect of valence on a descending sequence preference is reduced or becomes zero when the discount rate is controlled for.

Future research may investigate the mechanisms of the cultural difference in sequence preference. For example, future studies may compare how Indians and Americans predict future trends, whether Indians predict cyclical trends more than Americans, and whether the way they predict trends mediates the relationship between culture and an ascending sequence preference. Future studies may also investigate how the two cultures compare in their perceived uncertainty of whether the later outcomes would occur, and if this factor mediates the relationship between culture and a descending sequence preference.
Footnotes

1. We conducted another study to replicate the findings from Study 1 and examine if they can be generalized to behavioral tendency (Loewenstein & Prelec, 1993). 201 Mturk Americans (62.2% female) and 215 Mturk Indians (33.5% female) indicated the sequence in which they usually chose to organize their experiences.

   The ascending sequence was the predominant choice for Americans in seven out of fourteen scenarios. The descending sequence was the predominant choice for Indians in all fourteen scenarios. For ascending sequence, we found that (1) people were more likely to choose an ascending sequence for negative experiences ($M = .30, SD = .29$) than for positive experiences ($M = .26, SD = .27$), $t(400) = -4.51, p < .001$. (2) Americans ($M = .29, SD = .25$) were more likely to choose an ascending sequence than Indians ($M = .27, SD = .27$), but the cultural difference was not significant, $t(399) = .50, p = .62$. (3) The importance ranking of positive anticipation didn’t correlate with the tendency to choose an ascending sequence for positive experiences, $r(359) = -.06, p = .298$, and the importance ranking of dread didn’t correlate with the tendency to choose an ascending sequence for negative experiences, $r(344) = .03, p = .571$.

   For descending sequence, we found that (1) people were more likely to choose a descending sequence for positive experiences ($M = .46, SD = .35$) than for negative experiences ($M = .32, SD = .31$), $t(400) = 10.64, p < .001$, and (2) Indians ($M = .50, SD = .29$) were more likely to choose a descending sequence than Americans ($M = .28, SD = .27$), $t(399) = -7.77, p < .001$. The cultural difference for an ascending sequence only showed a right trend, and no significant results; but overall, the study replicated the results from Study 1 and suggested that the valence and cultural differences based on sequence preference were generalizable to behavioral tendency.

2. The Indian samples in our studies might be less representative than the American samples because the former were limited to Indians who spoke English.

3. We asked participants from Study 1 and its replication study to respond to the same sequence preference question for life experience as described in the method section of Study 1. Table 2 presents the aggregated results from the two studies. There is no counterpart behavioral tendency question for life experience.
References


Frederickson, B. L., & Kahneman, D. (1993). Duration neglect in retrospective


Table 1. Sequence preference by valence and culture, N (%)
(The category showing the largest number for each row is in bold face)

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<th>Scenario</th>
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Chi square: India vs American

- Positive meal: $\chi^2(2) = 103.49, p < .001$
- Negative meal: $\chi^2(2) = 11.62, p = .003$
- Positive phone call: $\chi^2(2) = 36.11, p < .001$
- Negative phone call: $\chi^2(2) = 23.62, p < .001$
- Positive project: $\chi^2(2) = 23.82, p < .001$
- Negative project: $\chi^2(2) = 17.13, p < .001$
- Positive trip: $\chi^2(3) = 76.43, p < .001$
- Negative trip: $\chi^2(2) = 42.42, p < .001$
- Positive visit people: $\chi^2(2) = 50.84, p < .001$
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>156 (38.2)</td>
<td>146 (35.8)</td>
<td>103 (25.2)</td>
<td>405 (99.3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ascending</td>
<td>Descending</td>
<td>Flat</td>
<td>Peak in mid life</td>
<td>Low in mid life</td>
<td>Other</td>
<td>Indifferent</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>-----------</td>
<td>------------</td>
<td>----------</td>
<td>------------------</td>
<td>-----------------</td>
<td>--------</td>
<td>-------------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>Americans</td>
<td>214 (54.7)</td>
<td>6 (1.5)</td>
<td>102 (26.1)</td>
<td>28 (7.2)</td>
<td>15 (3.8)</td>
<td>14 (3.6)</td>
<td>12 (3.1)</td>
<td>391 (100)</td>
<td></td>
</tr>
<tr>
<td>Indians</td>
<td>221 (51.0)</td>
<td>21 (4.8)</td>
<td>109 (25.2)</td>
<td>44 (10.2)</td>
<td>22 (5.1)</td>
<td>3 (.7)</td>
<td>12 (2.8)</td>
<td>432 (99.8)</td>
<td></td>
</tr>
</tbody>
</table>
Table 3. Sequence preference by valence from Study 2, N (%)  
(The category showing the largest number for each row is in bold face)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Valence</th>
<th>Ascending</th>
<th>Descending</th>
<th>Neither</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meal</td>
<td>Positive</td>
<td>249 (53.1)</td>
<td>173 (36.9)</td>
<td>47 (10.0)</td>
<td>469 (100)</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>251 (53.5)</td>
<td>185 (39.4)</td>
<td>33 (7.0)</td>
<td>469 (100)</td>
</tr>
<tr>
<td>Phone call</td>
<td>Positive</td>
<td>269 (57.4)</td>
<td>160 (34.1)</td>
<td>38 (8.1)</td>
<td>99.6 (100)</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>280 (59.7)</td>
<td>163 (34.8)</td>
<td>26 (5.5)</td>
<td>469 (100)</td>
</tr>
<tr>
<td>Project</td>
<td>Positive</td>
<td>238 (50.7)</td>
<td>207 (44.1)</td>
<td>24 (5.1)</td>
<td>469 (100)</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>282 (60.1)</td>
<td>157 (33.5)</td>
<td>30 (6.4)</td>
<td>469 (100)</td>
</tr>
<tr>
<td>Trip</td>
<td>Positive</td>
<td>301 (64.2)</td>
<td>144 (30.7)</td>
<td>23 (4.9)</td>
<td>468 (99.8)</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>321 (68.4)</td>
<td>119 (25.4)</td>
<td>29 (6.2)</td>
<td>469 (100)</td>
</tr>
<tr>
<td>Visit</td>
<td>Positive</td>
<td>297 (63.3)</td>
<td>130 (27.7)</td>
<td>40 (8.5)</td>
<td>467 (99.6)</td>
</tr>
<tr>
<td>people</td>
<td>Negative</td>
<td>308 (65.7)</td>
<td>120 (25.6)</td>
<td>40 (8.5)</td>
<td>468 (99.8)</td>
</tr>
<tr>
<td>Video clip</td>
<td>Positive</td>
<td>228 (48.6)</td>
<td>208 (44.3)</td>
<td>32 (6.8)</td>
<td>468 (99.8)</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>259 (55.2)</td>
<td>170 (36.2)</td>
<td>39 (8.3)</td>
<td>468 (99.8)</td>
</tr>
<tr>
<td>Read</td>
<td>Positive</td>
<td>219 (46.7)</td>
<td>208 (44.3)</td>
<td>42 (9.0)</td>
<td>469 (100)</td>
</tr>
<tr>
<td>article</td>
<td>Negative</td>
<td>243 (51.8)</td>
<td>185 (39.4)</td>
<td>40 (8.5)</td>
<td>468 (99.8)</td>
</tr>
</tbody>
</table>
Figure 1. The first five options each accompanied by a curve in the sequence preference question for the life experience as a whole. The remaining two options were: any other sequence, or indifferent to any sequence.
CHAPTER 3

Cultural Differences Between East Asian and North American in Temporal Orientation

Abstract

Based on East Asian and North American differences in holistic versus analytical cognitive processing style and the tendency to predict cyclical versus linear trends, this review proposes cultural differences in their temporal orientation. Building on prior research that has compared the cultural differences on past, present, and future orientation, this review hypothesizes that East Asians focus on the past and future more than North Americans, and North Americans focus on the present more than East Asians. It is suggested that in addition to a cultural difference in the focus on the 3 temporal domains, when moving from any past or future time point toward the present, North Americans’ focus on the temporal domain grows more than East Asians’ focus. I present evidence in three categories based on how temporal orientation is defined. Specially, I compare East Asians’ and North Americans’ focus on a temporal domain, their mental representation of a temporal domain and their subjective temporal distance to a temporal domain.

**Keywords:** cultural difference, East Asian, temporal orientation, time orientation, time perspective
Cultural Differences Between East Asian and North American in Temporal Orientation

How do East Asians and North Americans differ in their temporal orientations? Guo, Ji, Spina, and Zhang (2012) have noted that temporal orientation describes the cognitive involvement in (e.g., Holman & Silver, 1998; Zimbardo & Boyd, 1999) and the tendency to experience emotional and behavioral reactions to the past, present, or future (Jones, Banicky, Lasane, & Pomare, 1996; Strathman & Joireman, 2005). Time perspective describes how the individual perceives the past and future at a given time (Frank, 1939; Lewin, 1942). In this review, I compare East Asians’ and North Americans’ tendency to perceive, represent, and focus on the past, present, and future. I use the terms temporal orientation or temporal focus to refer to the extent to which a culture attends to a specific temporal domain. This review (a) proposes theoretical bases and a hypothesis for East Asians’ and North Americans’ cultural differences in temporal orientations, and (b) analyzes and evaluates evidence in light of the hypothesis.

Theoretical Bases and Hypothesis

East Asian and North American cultures tend to have two distinct cognitive processing styles, the holistic and analytical, respectively (Nisbett, 1998; Nisbett, Peng, Choi, & Norenzayan, 2001; Peng & Nisbett, 1999). East Asians, with a holistic cognitive style, pay attention to the context and the relationship between the object and its context, and prefer to explain and predict events based on this relationship. North Americans, with an analytical cognitive style, pay attention to the primary object, assign a category to a focal object, and prefer to explain and predict events based on the rules that apply to the
categories. These cognitive processes require East Asians to pay attention to the past and future to provide a context for the present, or the longer term past and future to provide a context for the shorter term past and future. North Americans, conversely, may pay primary attention to the present, or the shorter term past and future. The way that the Chinese and Americans denote dates is consistent with this view. The common practice in America is to specify a date in order of month, day, and year. In contrast, the practice in China is to specify a date in order of year, month, and day, in which the year and month provide a context for the day. This may suggest that in denoting time, the Chinese consider the broader context more important compared with Americans.

When asked to predict the future based on existing trends, East Asians tend to predict more changes and cyclical trends, that is, the future will be the reverse of the present and past (e.g., what goes up will go down), whereas North Americans tend to predict more stability and linear trends, that is, the future will be stable and will keep going in the same direction (e.g., what goes up will keep going up; Ji, 2005; Ji, Nisbett, & Su, 2001). The way people predict changes may relate to their temporal orientation (Ji, Guo, Zhang, & Messervey, 2009). East Asians may predict cyclical trends because they take into account longer term time horizons, which prime them with more changes. North Americans may predict linear trends because they focus on shorter term time horizons, which prime them with more stability (Ji et al., 2009). In fact, when induced to take a shorter term temporal perspective, both European Canadians and Chinese predicted more stable patterns and fewer reversals (Guo & Ji, 2008).

These theoretical views suggest that, compared with North Americans, East
Asians have a stronger temporal focus on the longer term time horizon, and compared with East Asians, North Americans have a stronger temporal focus on the shorter term time horizon. This review therefore hypothesizes that East Asians focus on the past and future more than North Americans, and North Americans focus on the present more than East Asians.

Taking a step further, this review proposes a speculation about how the cultural difference in temporal orientation changes with respect to the present time point. The notion that East Asians have a stronger temporal focus on the longer term time horizon compared with North Americans, and North Americans have a stronger temporal focus on the shorter term time horizon compared with East Asians suggests the following (see Figure 1): First, when applied to the three extreme time points, the present, and the furthest past and future conceivable, (a) North Americans, compared with East Asians, show a stronger temporal focus on the present; and (b) East Asians, compared with North Americans, show a stronger temporal focus on the furthest past and future. Second, suppose the extent of temporal focus can be represented by a linear relationship. The dividing points are the two points of intersection, one in the past and the other in the future temporal domain. In the areas beyond the two dividing points, East Asians show a stronger temporal focus than North Americans; the difference between the two cultures’ temporal foci increases as the temporal orientation moves toward the further past or future. Within the area between the two dividing points, North Americans show a stronger temporal focus than East Asians; the difference between the two cultures’ temporal foci increases as the temporal orientation moves toward the present.
This review therefore speculates that, for the time points to the left of the past dividing point, East Asians show a stronger temporal focus than North Americans, and the cultural difference is largest for the furthest past, and decreases with movement toward the past dividing point, until there is no cultural difference at the past dividing point. Starting from the past dividing point and moving toward the present, North Americans show a stronger temporal focus compared with East Asians, and the cultural difference increases and becomes the largest at the present point. In other words, when moving from any past time point toward the present, North Americans’ focus grows more than East Asians’ focus. The pattern for the future resembles that of the past.

To test this speculation, studies would ideally sample multiple time points in past or/future domains as well as the present. Such studies are very limited in number. Most studies only include one representation for the past or future. These representations are likely to be time points that fall outside of the two dividing points for two reasons. First, the area between could be quite small compared with the area outside of the two dividing points. Second, the time points outside of the two dividing points are more representative of the past or future. Therefore, such studies are likely to find that East Asians show a stronger focus on the past or future compared with North Americans.

**Analysis of Evidence**

I present studies in three categories based on how temporal orientation or time perspective is defined and operationalized and compare cultural differences on each:

1. To what extent do East Asians and North Americans focus on each temporal
domain?

2. How good is their mental representation of a particular temporal domain?

3. How “far away” does this temporal domain feel to them?

I present evidence on the past and future temporal domains in two separate sections. I present evidence on the present temporal domain along with either the past or future section because the present orientation is often compared with the past or future orientation in the same studies.

Cultural Differences in Past Orientation

Prior research has pointed out that East Asian countries have a stronger past orientation compared with North Americans (Block, Buggie, & Matsui, 1996; Doob, 1971; Guo et al., 2012; Kluckhohn & Strodtbeck, 1961; Ko & Gentry, 1991; Pitta, Fung, & Isberg, 1999; Rojas-Méndez, Davies, Omer, Chetthamrongchai, & Madran, 2002; Spadone, 1992; Yau, 1988). I present evidence in three categories.

To what extent do East Asians and North Americans focus on the past? The proposed cultural differences are reflected in how people explain events. Based in the United States, a Chinese-language newspaper tended to explain assassination based on the history of the assailant, whereas the U.S.-based English-language newspaper tended to explain assassination based on the personal attributes of the assailant (Morris & Peng, 1994). This suggests that the Chinese explain events with information from the past, whereas Americans explain events with information from the present. The Chinese and
European Canadians were asked to indicate how relevant each piece of information was to solving a theft crime (Ji et al., 2009). The information pieces differed in their temporal focus, representing longer term past (e.g., 3 years ago), shorter term past (e.g., 2 weeks ago), and present (e.g., currently). The Chinese considered information with a past temporal focus as more relevant to the case than Canadians did. The cultural difference on present temporal focus did not reach significance. The general trend suggests that, as moving from longer term past toward the present, Canadians’ focus on the temporal domain increased more than that of the Chinese.

Compared with North Americans, East Asians tend to use the past to direct behaviors. Asian Americans showed a stronger past focus than Anglo-Americans, whereas Anglo-Americans showed a stronger present focus than did Asian Americans when considering whether to buy an ice cream cone (Briley & Aaker, 2007). The Chinese wrote down more reflections based upon memories than European Americans did, such as “I learned that practice makes perfection” (Q. Wang & Conway, 2004). Chinese teachers were more likely to discuss students’ past mistakes in order to improve their future performances than American teachers did (Stevenson & Stigler, 1992). In addition, it has been proposed that marketing should connect products with past events (Brodowsky, Granitz, & Anderson, 2008) or its history (Spears, Lin, & Mowen, 2000) for Asian cultures. Compared with Americans, the Chinese were less likely to switch to a new brand if they were satisfied with the product in the past (Brislin & Kim, 2003; Yau, 1988), or to try new products in general (Legohérel, Daucé, Hsu, & Ranchhold, 2009). This is considered less conclusive evidence because connection with the past is not the
only possible explanation for whether people switch brands; other factors, including variety seeking (e.g., Berlyne, 1970), are alternative explanations.

The past is more integrated with the self for East Asians than for North Americans. For Asian Americans, higher levels of well-being were associated with, and resulted from more positive present and past self-ratings. For European Americans, higher levels of well-being were only associated with, and resulted from more positive present self-ratings, but not more positive past self-ratings (Kim et al., 2012).

There is evidence that East Asians consider the past to be more important in their lives compared with North Americans, whereas North Americans consider the present to be more important in their lives compared with East Asians. Levinson and Peng (2007) asked the Chinese and Americans to estimate the present value of antique objects, for example, an antique chair, given their past value. The Chinese placed a higher value on antique objects. This study presents an exception in which Asian Americans’ responses resemble Americans rather than the Chinese. In an unpublished study, Gao and Rozin (2014) recruited Americans and Chinese of comparable age, gender distribution, and years of education, and asked them to rank, in a positive and a negative hedonic context respectively, how important anticipation, experience, and memory were in their lives. The Chinese gave memory a higher ranking than Americans, whereas Americans gave experience a higher ranking than the Chinese.

East Asians may like to think about the past more, whereas North Americans may like to think about the present more. Gao and Rozin (2014) asked Chinese and Americans
which they liked to think about more—the past, present, or future. Most Chinese ranked the past as the second, whereas most Americans ranked the past as the third, though the average ranking for the Chinese and Americans was not significantly different. Note that this does not suggest that the Chinese actually do think about the past more than Americans. The Chinese and Americans estimated the percentages of past, present, and future thoughts they had. The Chinese (24.2%) and Americans (26.5%) attributed similar percentages to the past. Americans reported liking to think about the present more than the Chinese, but the Chinese (44.8%) and Americans (42.5%) reported similar percentages of present thoughts.

In sum, East Asians focus more on the past compared with North Americans. Specifically, East Asians consider the past as more relevant for explaining events (Ji et al., 2009), directing behaviors (Briley & Aaker, 2007; Stevenson & Stigler, 1992; Q. Wang & Conway, 2004), and self-evaluation (Kim et al., 2012). Evidence also suggests that East Asians consider the past or memory as more important and like to think about the past more compared with North Americans, though the evidence comes mainly from one unpublished study (Gao & Rozin, 2014). For the hypothesis that North Americans focus more on the present compared with East Asians, the evidence is less conclusive (Ji et al., 2009), though not nonexistent (Briley & Aaker, 2007; Gao & Rozin, 2014). Most evidence comes from studies that had only one representation for the past domain and supported the hypothesis. One study sampled multiple time points in the past temporal domain and showed that, moving from the longer term past toward the present, Canadians’ focus on the temporal domain increased more than that of the Chinese, which
supported the speculation (Ji et al., 2009). Most evidence comes from a comparison between Chinese and Americans. Additional research is needed to sample multiple time points in the past domain and cover more populations from East Asia and North America.

**How good is East Asians’ and North Americans’ mental representation of the past?** Briley (2009) has proposed that East Asians’ mental representations of the past and future tend to be low-level construals that are more concrete and contextual, and North Americans’ mental representations of the past and future tend to be high-level construals that are more schematic and decontextualized (Liberman & Trope, 1998; Nussbaum, Trope, & Liberman, 2003; Trope & Liberman, 2003).

This may relate to the fact that East Asian cultures tend to be interdependent and North American cultures tend to be independent (Markus & Kitayama, 1991). Interdependent cultures tend to have a prevention focus that emphasizes security needs, whereas independent cultures tend to have a promotion focus that emphasizes growth needs. The prevention focus fosters local, low-level construals because careful processing of details is needed to fulfill security needs. The promotion focus fosters global, high-level construals because going beyond the local information is needed in order to achieve growth (F Förster & Higgins, 2005; A. Y. Lee, Keller, & Sternthal, 2010). In addition, in social contexts, interdependent culture needs to pay close attention to the relationship between the self and others, which requires people to construct the self and others in a concrete and specific way rather than abstract and general (Kanagawa, Cross, & Markus, 2001; Morris & Peng, 1994).
Some empirical evidence suggests that East Asians’ memories tend to be more accurate and complete than North Americans. The theft crime study by Ji et al. (2009) asked Chinese and European Canadians to freely recall the list of information provided to them. The Chinese were more accurate in reporting the information about the past than the Canadians were (Guo et al., 2012). In Ji et al. (2009), the Chinese and European Canadian students recalled their first day of class at the end of the same day and 2 weeks later. Canadians reported slightly more information after the first day of class (though the result did not reach significance); the Chinese reported more information than did Canadians 2 weeks later. This indicates that Chinese remember the past better than Canadians do, which supported the hypothesis. This may further suggest that the Chinese remember the longer term past better than Canadians do, and Canadians remember the shorter term past better than the Chinese do, which supported the speculation (Ji et al., 2009).

On the other hand, there is evidence that North Americans tend to report more details for episodic and autobiographical memories compared with East Asians. European Americans reported more episodic details when describing past and future events than East Asians, but both cultures reported a similar amount of nonepisodic details (Wang, Hou, Tang, & Wiprovnick, 2011). North American adults have an earlier age of first autobiographical memory and more detailed autobiographical memories of childhood than East Asian adults do (Leichtman, Wang, & Pillemer, 2003). These may be related to the fact that European American mothers usually engage in high-elaborative conversation and scaffold children in reconstructing detailed narratives of the past (Wang et al., 2011),
and that North American cultures emphasize the role of the self and encourage children to construct stories about themselves (McAdams, 2008).

In sum, with the exception of episodic and autobiographical memory details, East Asians seem to have more accurate and complete representations of the past. Further, there is a trend that East Asians remember the longer term past better than North Americans, and North Americans remember the shorter term past better than East Asians, which supported the speculation. Samples included in the comparison consist only of European Canadians and the Chinese. Further research is needed to cover more subgroups within East Asian and North American cultures.

How “far away” does the past feel to East Asians and North Americans?

Construal level theory posits that a low-level construal that is concrete and specific is associated with a proximal temporal distance, whereas a high-level construal that is abstract and general is associated with a distal temporal distance (Liberman & Trope, 1998; Trope & Liberman, 2003). If East Asians’ mental representations of the past and future are more concrete and specific than North Americans’, then East Asians may feel temporally closer to the past and future.

Empirical evidence supports this proposition. A specific time point (e.g., this month last year) or an event (e.g., one final exam) in the past felt closer to the Chinese than to the European Canadians (Ji et al., 2009). Past proud or embarrassing events felt closer to the Japanese than Canadians (Ross, Heine, Wilson, & Sugimori, 2005). I did not find studies that sampled multiple time points in the past, which could be a direction for
Cultural Differences in Future Orientation

Prior research has shown that East Asians have a stronger temporal focus on the long-term future than North Americans (e.g., Briley, 2009; Brislin & Kim, 2003; Hofstede, 2001; Ji et al., 2009; Li, 1999; Trompenaars & Hampden-Turner, 1998). As with the analysis of the past, I present the evidence in three categories.

To what extent do East Asians and North Americans focus on the future?

East Asians in the United States (including Chinese, Korean, and Japanese) imagined the response to a future event to last longer than European Americans did (S. Lee, Lee, & Kern, 2011), which suggests that East Asians perceive the consequences to be greater for given future events and are more connected with future outcomes compared with North Americans. Japanese and Americans listed as many consequences as they could think of for converting an area to a national park and wildlife preserve. The responses were coded into direct consequences that “immediately follow the critical event in time and/or location,” and indirect consequences that were “relatively far away from the critical event in time and/or location.” Americans listed more direct consequences than the Japanese, whereas the Japanese listed more indirect consequences than Americans (Maddux & Yuki, 2006). This suggests that East Asians may focus on the longer term future consequences more than North Americans, and North Americans may focus on the shorter term future consequences more than East Asians, which supports the speculation.

Asian Americans (50% East Asian) and European Americans were asked to indicate,
with respect to a game of pool, how much a shot would affect the person who takes the 
next shot, the third and the sixth shot after the focal shot, respectively, and how much it 
would affect the overall outcome. Both cultures indicated that the critical shot had a 
bigger effect on the closer shots (shorter term) compared with those that were further 
away (longer term). European Americans indicated that the critical shot affected the next 
shot (shorter term future) more so than Asian Americans, whereas Asian Americans 
indicated that the critical shot affected the sixth shot (longer term future) more so than 
European Americans. European Americans’ estimation of future consequences, moving 
from shorter term to longer term future, decreased more than that of Asian Americans, 
which supports the speculation (Maddux & Yuki, 2006). Hofstede’s (2001) Long-term 
Orientation Scale puts future long-term, past, and present temporal orientation on one 
single dimension (it uses “long term” to refer to future long-term orientation, and “short 
term” to refer to past and present orientation), and does not measure temporal domains 
directly (persistence, ordering relationships by status and observing this order, thrift, and 
having a sense of shame are positively related to the long-term orientation, and personal 
steadiness and stability, protecting “face,” respect for tradition, and reciprocation of 
greetings, favors, and gifts are negatively related to long-term orientation), which may 
make the results difficult to interpret. However, results from this scale showed that East 
Asians countries had high scores on the Long-term Orientation Scale, whereas North 
American countries had low scores.

Out of anticipation, experience, and memory, the Chinese and Americans did not 
rank the importance of anticipation significantly differently. However, there was a trend
that the Chinese ranked positive future (anticipation) as more important than Americans, and Americans ranked negative future (dread) as more important than the Chinese (Gao & Rozin, 2014). This suggests an interesting possibility that temporal focus may depend on the valence of the context. Chinese reported liking to think about the future the most out of past, present, and future (71.43% future), whereas only 43.33% Americans reported liking to think about the future the most. The two cultures reported similar percentages of actual future thoughts (31.0%; Gao & Rozin, 2014).

In sum, three studies support the hypothesis that East Asians focus more on future consequences compared with North Americans (S. Lee et al., 2011; Maddux & Yuki, 2006). Further, two studies sampled multiple time points in the future temporal domain and supported the speculation (Maddux & Yuki, 2006). There is also evidence that East Asians consider anticipation as more important and would like to think about the future more than North Americans. However, this evidence comes from one single unpublished study, with participants exclusively from China and United States (Gao & Rozin, 2014). Additional studies are needed to provide more conclusive evidence and cover more population in the two cultural groups.

How good is East Asians’ and North Americans’ mental representation of the future? I discussed the proposition that East Asians have a low-level construal of the future, whereas North Americans have a high-level construal of the future and provided a theoretical basis for this in the section on past orientation (Briley, 2009). I did not find empirical evidence for this proposition. However, there is evidence suggesting that East Asians feel temporally closer to the future compared with North Americans (see next
section “How ‘far away’ does the future feel to East Asians and North Americans?”), which is consistent with the view that East Asians have a more concrete and contextual mental representation of the future compared with North Americans, according to construal level theory (Liberman & Trope, 1998; Trope & Liberman, 2003).

How “far away” does the future feel to East Asians and North Americans?

East Asians in the United States (including Chinese, Koreans, and Japanese) imagined a given future event taking place sooner than European Americans (S. Lee et al., 2011), which suggests that East Asians felt temporally closer to the future. In an unpublished study, Gao and Rozin (2014) asked the Chinese and Americans to indicate the subjective temporal distance from the present to 3 months and from the present to 20 months into the future. Americans perceived the shorter term future (i.e., 3 months) as closer compared with the Chinese, whereas the Chinese perceived the longer term future (i.e., 20 months) as closer compared with Americans. This suggests that East Asians perceive a longer term future as closer compared with North Americans, and North Americans perceive a shorter term future as closer compared with East Asians, which supports the speculation.

People who feel closer to the future would discount future outcomes less (Zauberman, Kim, Malkoc, & Bettman, 2009). Do East Asians discount future outcomes less than North Americans? Some empirical evidence suggests that the answer is “yes.” For example, Asians Americans tend to have higher educational attainments compared with White Americans (Sue & Okazaki, 2009). Compared with Americans and Canadians, the Chinese and the Japanese discount the future less in financial planning.
(e.g., save more, retire with more wealth) and health maintenance (e.g., practice safer sex, smoke less, less obese; M. K. Chen, 2013). However, studies on intertemporal choices yield mixed results. Some studies suggest that Asians discount delayed outcomes less so than Westerners. Asian Americans, when primed with their Asian identity, made more patient choices (Benjamin, Choi, & Strickland, 2010). Bicultural Singaporeans, when primed with Western (vs. Singaporean) icons, showed less patience (H. Chen, Ng, & Rao, 2005). Americans discounted the delayed outcomes more steeply than the Japanese for both monetary gains and losses (Du, Green, & Myerson, 2002; Takahashi et al., 2009). However, other studies suggest that East Asians and North Americans discount delayed outcomes to similar degrees. Americans and Chinese discounted delayed rewards to a similar extent (Du et al., 2002). Tan and Johnson (1996) reported no differences in the temporal discounting rate between Canadian and Chinese undergraduates. A study that sampled 45 countries found that a comparable proportion of undergraduates of Anglo and East Asian descent—around 66% to 70%—chose to wait for a delayed reward (M. Wang, Rieger, & Hens, 2016). Studies on intertemporal choices may yield mixed results because shorter and longer term future times were not considered separately.

In sum, evidence indicates that East Asians perceive the future as closer compared with North Americans (S. Lee et al., 2011). It is also suggested that North Americans perceive a shorter term future as closer and East Asians perceive a longer term future as closer (Gao & Rozin, 2014), which supports the speculation. Although the studies on intertemporal choices contain mixed results, studies within real-life contexts, such as education, finance, health, consistently suggest that East Asians discount future outcomes
less so than North Americans, which indicates that East Asians feel temporally closer to
the future.

**Discussion**

Based on the cultural differences on holistic versus analytical cognitive
processing style, and cyclical versus linear prediction trends, this review hypothesizes
that East Asians focus on the past and future more than North Americans, whereas North
Americans focus on the present more than East Asians, and analyzes evidence in three
categories based on the operationalization of temporal orientation. Overall, available
evidence supports the hypothesis. This review also proposes a speculation about how the
cultural difference in temporal orientation changes with respect to the present time point,
which is that when moving from any past or future time point toward the present, North
Americans’ focus on the temporal domain grows more than East Asians’ focus (see
Figure 1). Only studies that sample more than one time point in the past or future
temporal domain can test this speculation. Though very limited in number, the available
evidence consistently supports the speculation.

**Connections With Prior Literature**

Some articles point out that East Asians may have a stronger past and future
orientation compared with North Americans (e.g., Briley, 2009; Ji et al., 2009; there is a
significant amount of literature suggesting that East Asians have a stronger past
orientation, e.g., Block et al., 1996; Brislin & Kim, 2003; Burkhardt, 1955; Doob, 1971;
Guo et al., 2012; Ji et al., 2009; Kluckhohn & Strodtbeck, 1961; Ko & Gentry, 1991;
Núñez, Cooperrider, Doan, & Wassmann, 2012; Pitta et al., 1999; Rojas-Méndez et al., 2002; Spadone, 1992; Spears et al., 2000; Yau, 1988; Zuo, 2001). Literature also suggests that North Americans have a stronger present orientation compared with East Asians (e.g., Brislin & Kim, 2003; Cho, Kwon, Gentry, Jun, & Kropp, 1999; Ji et al., 2009; Sundberg, Poole, & Tyler, 1983; Trompenaars & Hampden-Turner, 1998).

Some literature distinguishes short- and long-term past and future, and suggests that East Asians have a stronger long-term orientation (though they mostly refer to long-term future orientation; e.g., Briley, 2009; Brislin & Kim, 2003; Hofstede, 2001; Li, 1999; Trompenaars & Hampden-Turner, 1998) and North Americans have a stronger short-term orientation (e.g., Brislin & Kim, 2003; Hofstede, 2001). Such studies take one step further and break the past or future into two domains: short term and long term. This review proposes a hypothesis regarding the cultural differences on three temporal domains, and further proposes a speculation based on the theoretical views by treating the past, present, and future as a continuous temporal dimension, and differentiates predictions based on temporal distance with respect to the present.

Some research argues that East Asians have a past orientation and North Americans have a future orientation (Brislin & Kim, 2003; Cho et al., 1999; Graham, 1981; Guo et al., 2012; Hall, 1976; Kluckhohn & Strodtbeck, 1961; Spears et al., 2000; Yau, 1988). This may come from the literature on temporal asymmetry, which suggests that North Americans value the future more than the past, whereas East Asians value the past more than the future (Guo et al., 2012). These statements hold true when comparing the past and future temporal orientation within the same culture, but should not be taken
as a comparison for the same temporal orientation between the two cultures. For example, although there is evidence that North Americans have a stronger focus on the future than the past, evidence does not suggest that North Americans have a stronger focus on the future compared with East Asians.

**Cultural Groups**

This review compares temporal orientations between East Asians and North Americans. East Asian samples were Chinese in China, Japanese in Japan, and Korean nationals, as well as East Asians (Chinese, Koreans, and Japanese) in the United States or Asian Americans in the United States. North American samples were European Americans or Americans in the United States, European Canadians or Canadians in Canada, or Anglo-Americans.

East Asians or Asian Americans in the United States resemble East Asians living in East Asian countries in their cultural difference with North Americans (except for the Levinson & Peng, 2007 study, in which Caucasian and Asian Americans from United States did not show a significant difference). This suggests that cultural heritage has a stronger influence on the tendency for temporal orientation than the country of residence. In addition, even though both Asian Americans and Caucasiains are likely to have English as their native language, there are cultural differences between these two groups (e.g., Kim et al., 2012). When East Asians or Asian Americans in the United States used English to complete the studies, the cultural difference remains (e.g., Kim et al., 2012; S. Lee et al., 2011). These suggest that language is unlikely to explain the cultural
difference (this contradicts the view in M. K. Chen, 2013).

It is possible that the cultural differences between East Asians and North Americans, with most evidence coming from China, United States and Canada, is because of the fact that China has a much longer history. Are the differences in temporal orientation a cultural difference or a difference because of the length of history? Greece, a Western culture with a much longer history, resembles the patterns found in North America rather than China. Though I do not have direct empirical evidence on Greek participants’ temporal orientation, Greeks tend to predict linear changes (Fisher, 1964), which, theoretically, is consistent with a present orientation. In addition, M. K. Chen (2013) suggests that Greece saves less than East Asian countries, which resembles the tendency of North Americans.

The majority of evidence for East Asia, especially for past orientation, comes from the Chinese, which raises the question of whether the conclusions apply to East Asians in general. Though limited in numbers, the studies that sampled other East Asian cultures, including the Japanese (Ross et al., 2005) and East Asian Americans (Briley & Aaker, 2007; Kim et al., 2012) for past orientation, and Korean and the Japanese (S. Lee et al., 2011; Maddux & Yuki, 2006) for future orientation, consistently show similar findings as the Chinese.

The observed temporal orientation of North Americans may be generalizable to Westerners. First, research has shown similar psychological tendencies among cultures with a Confucian influence, which include China, Japan, Korea, and so forth, compared
with cultures with an Aristotelian/Judeo-Christian heritage, which include the United States, Canada, Australia, and Western Europe (Fiske, Kitayama, Markus, & Nisbett, 1998; Maddux & Yuki, 2006; Markus & Kitayama, 1991; Nisbett et al., 2001). Second, the theoretical basis for the proposed cultural differences between East Asians and North Americans on temporal orientation, including an analytical cognitive processing style (Nisbett, 1998; Nisbet et al., 2001; Peng & Nisbett, 1999) and a linear way of predicting change (Ji, 2005; Ji et al., 2001), apply to Westerners in general. Third, empirical studies show that Westerners in general resemble North Americans in temporal orientation. Trompennaars and Hampden-Turner (1998) found that Confucian cultures tended to score higher on longer term planning and Western cultures tended to score higher on shorter term planning. Anglo-Australians resemble European Americans in that they discount long-term rewards more than the Chinese. For example, Chinese students tended to believe that effort would contribute to their academic success (Stevenson & Stigler, 1992) and would put more effort into their academic work compared with Anglo-Australian and Euro-American students did (Rosenthal & Feldman, 1991).

Within-Cultural Differences

For most significant East–West differences, more of the variation is within as opposed to between cultures (Rozin, 2003). Talhelm et al. (2014) showed that even within China, there are regional differences between north and south. Specifically, northern Chinese are more independent and analytical in thinking than southern Chinese. This suggests that northern Chinese may resemble North Americans in temporal orientation.
It has been suggested that wealth and education lead to patience (Becker & Mulligan, 1997; M. Wang et al., 2016; however, research on the relationship between wealth and discount rates in intertemporal choices yields mixed results, see Anderson, Dietz, Gordon, & Klawitter, 2004; Harrison, Lau, & Williams, 2002; Hausman, 1979; Kirby et al., 2002; Lawrance, 1991; Mink, 1993; M. Wang et al., 2016). The modernization hypothesis suggests that people become more individualistic and engage in more analytic thinking as they become wealthier (Greenfield, 2009; Talhelm et al., 2014). This suggests that the wealthier regions within East Asia or North America may show temporal orientation more characteristic of North Americans compared with regions that are less wealthy.

Nowadays young people from Eastern cultures have more access to Western culture as a result of globalization and may show features that traditionally represent Western cultures. For example, in China and Japan, the power of collectivism declined among young people (Naito & Gielen, 2005; Stevenson & Zusho, 2002). Even within North America, younger Americans appear to be more individualistic than older Americans (Heine, 2012). Thus, compared with older adults, young people’s temporal orientation in both cultures may be more similar to North Americans, whereas the elderly may be more characteristic of East Asians. Socioemotional selectivity theory (Carstensen, Isaacowitz, & Charles, 1999) provides a competing prediction. The theory argues that as people perceive their future to be more limited, which is often associated with aging, people have a shorter term orientation in emotional regulation and prioritize emotional goals that bring shorter term satisfaction. The theory suggests that as people age, they
may resemble North American in temporal orientation, at least in the domain of emotional regulation. The results on how aging relates to discount rate in intertemporal choice are mixed. Some studies show that, as age increases, people discount delayed rewards less steeply (Du et al., 2002; Green, Fry, & Myerson, 1994). Others show that middle-aged people discount less than both younger and older people (Read & Read, 2004). It is possible that the relationship between age and temporal orientation depends on other factors.

**Limitations**

This review does not discuss cultural differences surrounding other topics related to time, such as polychronicity (i.e., preference for doing multiple things at a time) and monochronicity (i.e., preference for doing one thing at a time), event time (i.e., go with natural flow of events) and clock time (i.e., adhere to schedules), pace of life (i.e., speed of doing everyday activities), time use (i.e., how much time people spend on various activities), and so forth, because these topics will warrant separate reviews (see Fulmer, Crosby, & Gelfand, 2014, for a review).

On the topic of temporal orientation, this review focuses on comparing the two cultural groups in terms of the same temporal domain, and does not compare the temporal orientation for the past, present, and future within the same culture. First, the temporal orientation for the past and future may not be symmetrical for the same culture. The literature of temporal asymmetry shows that East Asians focus more on the past than the future (Guo et al., 2012), whereas North Americans focus more on the future than the
past (Graham, 1981; Kluckhohn & Strodtbeck, 1961; Spears et al., 2000; Specter & Ferrari, 2000). Second, both cultures may focus more on the present than the past or future (e.g., Briley & Aaker, 2007; Ji et al., 2009, Study 1; Maddux & Yuki, 2006, Study 1), but this may not be the case for all studies (e.g., Ji et al., 2009, Study 2). Figure 1 should be used with these considerations in mind.

**Future Directions**

This review brings out new directions to study temporal orientation. One possibility is to examine temporal focus in the context of positive, neutral, and negative valenced events. Most research on temporal orientation so far has downplayed the factor of valence. Gao and Rozin (2014) have results indicating that positive and negative contexts seem to prompt different importance rankings for the future. It may be interesting to study psychological temporal domains. The time points that people naturally think of may reflect the psychological past, present, and future rather than the physically defined domains. Technically, any time point in the past, even one second ago, is the past, but people may not perceive it to be the past. Psychologically, people may naturally group time points together, which forms three temporal domains. The two dividing points, which delineate the boundary of when the two cultures differ in temporal orientation, may represent, psychologically, how people divide time.
Footnotes

1 For the purpose of this review, I use “North American” to describe American and Canadian cultures. Mexican cultures may warrant separate consideration.

2 Sircova et al. (2015) administered the Zimbardo Time Perspective Inventory with five temporal orientations—past positive, past negative, present hedonistic, present fatalistic, and future—to 24 countries, which included China, Japan, and the United States. However, the psychometrics for East Asian samples were not sufficiently sound for the purpose of making cross-cultural comparisons.


Unpublished raw data.
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Figure 1. Temporal orientation by culture
GENERAL DISCUSSION

The present research examined the factors that affected prospection, in the domains of future time perception, sequence preference for future experience and future temporal orientation.

Valence affected prospection across the three domains. In Chapter 1, valence affected future time perception. A positive future experience felt further away compared to a negative future experience. The duration of a negative future experience felt longer compared to the duration of a positive future experience. In Chapter 2, there was a stronger preference in both American and Asian Indian cultures for an ascending sequence for negative future experiences compared to for positive future experiences. In Chapters 2 and 3, the importance ranking of anticipation, experience and memory was different by valence. In chapter 2, both Indians and Americans rated anticipation as more important for negative events. In chapter 3, there was a trend that the Chinese ranked positive future (anticipation) as more important than Americans, and Americans ranked negative future (dread) as more important than the Chinese (Gao & Rozin, 2014). These findings suggest that valence may be a factor that affects prospection across domains and framings of events.

The mechanism through which valence affects prospection may differ depending on the specific aspect of prospection (e.g., future time perception, sequence preference for future experience, future temporal orientation) or it may be consistent across the various aspects of prospection. One major difference between the positive and the negative is that the negative is more intense than the positive (Baumeister, Bratslavsky,
Finkenauer, & Vohs, 2001; Rozin & Royzman, 2001). Of course, with this in mind, it is possible to equate the intensity of any pair of negative and positive events. Does intensity explain the valence effect in the present research?

Bilgin and LeBoeuf (2010) have noted that both the valence effect and the intensity effect may be at work to contribute to the difference in time perception between positive and negative events (Chapter 1). Chapter 1 only tested the valence effect and didn’t test the effect of intensity, but the results suggest that, the valence effect is stronger than the intensity effect. Job scenario’s positive version ($M = 31.80$) was rated as more intense than the negative version ($M = -16.96$), and the lawsuit scenario’s negative version ($M = -34.89$) was rated as more intense than the positive version ($M = 10.90$). However, both the job and the lawsuit scenarios showed the same effect, that the positive future experiences felt further away than the negative ones, and that the negative future experiences felt longer in duration than the positive ones. This suggests that the difference between the positive and negative in Experiment 1 was due to a valence effect, rather than an intensity effect. However, this issue can only be settled clearly by future research.

The intensity account of the valence effect may be consistent with the stronger preference for an ascending sequence in negative situations compared to positive situations in Chapter 2, with the assumption that people have a stronger preference for an ascending sequence for more intense situations. Future research may explore and examine the explanations of why valence affects prospection. For example, does the negative context prompt different responses from the positive context because people pay
more attention to the negative context? Is it possible that people process the positive and negative situations in different ways because they serve different purposes? People may be more likely to choose positive experiences because of their hedonic value, but they are less likely to choose negative experiences for this reason. They are more likely to choose negative experiences for a practical purpose and endure the negative sensation associated with the experience (compared to positive experiences). The difference in the motivation to choose positive versus negative experiences may prompt people to place different values on the different components of positive or negative experiences. For example, people may value the ending of a negative experience, which signifies the outcome of an experience, more than the ending of a positive experience. This may lead to different responses in negative contexts of prospection than positive ones.

Culture has been shown to affect prospection. Chapter 2 has shown a significant cultural difference between the Americans and Asian Indians in sequence preference. Americans showed a stronger preference for an ascending sequence compared to Indians, whereas Indians showed a stronger preference for a descending sequence compared to Americans. Chapter 3 noted the cultural difference between East Asians and North Americans in their temporal orientation. East Asians showed a stronger focus on the longer term horizons compared to North Americans, whereas North Americans showed a stronger focus on the shorter term horizons compared to East Asians. Chapter 1 did not explicitly test the effect of choice on future time perception with different cultural groups. The prior literature has noted cultural differences in the perception of choices. For example, Americans were more likely than Indians to construe actions as choices.
(Savani, Markus, Naidu, Kumar, & Berlia, 2010). Such cultural differences in the perception of choices are likely to lead to cultural differences in future time perception.

The cultural differences on prospection may reflect each cultural group’s adaptation to their own environment. For example, the finding that East Asians show a stronger focus on the longer term compared to North Americans in Chapter 3 may be related to East Asians’ history and practice of growing rice. Talhelm et al. (2014) have shown that the rice growing may have caused people in South China to show more collectivism compared to people in the North China who plant wheat, because growing rice requires more large-scale collaboration than growing wheat. This shows that the specific requirement for growing rice or wheat may have caused cultural differences. Another feature of growing rice plantation is that it requires planting a few times per year. Because of the multiple planting cycles, people have to plant and harvest very promptly according to a schedule. People who plant rice may have to plan ahead far more into the future and show a longer term future orientation. The domestication of rice occurred in East Asia and even today China produces the largest quantity of rice in the world. It is notable that Southern China, Korea and Japan, the major sources of East Asian data, have rice as their major staple grain. This may relate to East Asians’ longer term future orientation compared to North Americans.

Future research may 1) more precisely describe the cultural differences in prospection, across different situations and framings, with different methods of eliciting preferences or choice (See Frederick & Loewenstein, 2008); and 2) examine the mechanisms of such cultural differences. Why different cultures show a difference in
prospection? How do such cultural differences in prospection illuminate each culture’s story of adaptation to their own environment?
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