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DECOMPOSING TIME EFFECT ON VALUATION AND CHOICE

By

YAN MENG

A dissertation submitted to the Graduate Faculty in business in partial fulfillment of the requirements
for the degree of Doctor of Philosophy, The City University of New York

2017

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Yan Meng

This manuscript has been read and accepted for the Graduate Faculty in business in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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THE CITY UNIVERSITY OF NEW YORK

ABSTRACT

Decomposing Time Effect on Valuation and Choice

by

Yan Meng

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Intertemporal choice, defined as tradeoffs consumers make between the costs of waiting and the benefits of larger reward size, is an important and ubiquitous effect in marketing. Individuals' perception of time has been shown to impact intertemporal choice. Event markers are demarcations that cut time duration into intervals and make time discrete rather than continuous. Event markers impact individuals' decision making, such that a large number of event markers make individuals perceive the future to be far away. Therefore, when faced with an intertemporal choice, they take a Small-Sooner (SS) reward rather than waiting for a Large-Later (LL) reward. The current paper demonstrates that not only can the number of event markers impact intertemporal choice, but also the characteristics of event markers, namely salience, controllability, and changes in the connecting trend between event markers can influence intertemporal choice. These characteristics are especially relevant when individuals are making a judgement or a decision for their future. Seven studies conducted provide evidence of these antecedents of time perception and show that individuals in the following situations will prefer an immediate smaller reward over a larger reward in the future: 1) when they have past events salient in their mind, 2) when they feel low internal controllability, and believe in fatalism related to their futures, and 3) when they believe the passage of time from the past to the future follows a trend which may reverse at any time and thus is full of changes. The underlying

process and boundary conditions along with implications for consumers and marketers are discussed.

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I sincerely thank all the people in my life who give me dreams and support me in their special ways.

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1. INTRODUCTION

Time perception is extremely subjective yet important to the valuation of products and any choice that are connected with present/future tradeoffs. How soon a particular future time point seems to come is the crucial basis for consumers to make temporal decisions. For example, how soon Apple will release a new version of the iPhone is frequently discussed by both media and consumers alike. The more future time is perceived accurately, the more rational intertemporal choices individuals make. However, despite much research in psychology and marketing, such as valence of emotion (Bratfisch, Ekman, Lundberg, and Kruger 1971), construal level (Trope and Liberman 2003), and future self-connectedness (Bartels and Rip, 2010; Bartels and Oleg, 2011) has been conducted on the topic, what influences future time perception and therefore intertemporal choice and valuation is not completely understood.

Among the factors that influence time perception, the concept of “event marker” emerged in the literature. Event markers are defined as “subsequent events that are both accessible in memory and perceived to be related to the target event” (Zauberman, Levav, Diehl, and Bhargava 2010, p.134). For example, if a person wants to estimate how much time has passed since her college graduation, any events such as having graduation parties or trips serves as event markers that segment her time after graduation (the target event) into intervals.

The relevance of event markers in understanding time perception is connected to it understands time as an entity composed of discrete moments, rather than continuous as assumed by previous literature. In the literature, time is understood as a line (Zhang and Schwarz 2011) which is continuous and moves into the future. With some exceptions (Boroditsky and Gaby

2010), time should travel from a left point to the right. However, the continuous concept of time has been widened by the recent literature in cross-cultural psychology (Bylund and Athanasopoulos 2017). Rather than a line, time can have the capacity to include a variety of discrete points or events. Precisely, time in people's mind could be understood as a container, and what fills in the container is event markers. This concept is consistent with the quote from Marcus Aurelius in his *Meditations*, "Time is like a river made up of the events which happen" (167 A.D.) (Zauberman et al. 2010).

Event markers cut a time line into intervals. This is the reason why multiple events that happened in the same time may be perceived as having different temporal distant to the present. The example as given by Zauberman et al. (2010) explains this function of event markers. In the year of 1995, Yitzhak Rabin, the Israeli Prime Minister at that time, was assassinated. In the same year, Zauberman's children were born. The 1995 birth of his children felt very distant whereas the 1995 assassination of the Israeli Prime Minister felt very recent. Zauberman et al. (2010) revealed that there were many event markers after the birth of their children, such as seeing a doctor and playing in a park, but only a few event markers associated with the assassination. The more event markers there are, the long the time duration seems to be.

Event markers can also explain why individuals perceive future time differently (May 2017). Future event markers are imagined events that might happen in the future. As event markers can segment time in the past into intervals, imagined future event markers can also cut future time into intervals. The more future event markers, the more intervals in a future time period. If individuals predict many intervals in a future time period, they tend to judge that future time period to be long (Siddiqui, May, and Monga 2014; May 2017). However, we believe that it is not only the number of event markers matter what determines future time judgments, but other

relevant characteristics, such as the salience, certainty, and changes of those events. These characteristics matter in terms of future time perception and accordingly intertemporal choice and valuation. That is: past orientation (salience), fatalism (certainty), and trend reversal (changes).

When individuals look backward to their past, the salience of past personal, social, or political events will make the future seem farther than for the people who were not thinking about past events. We measured and manipulated individuals' time orientation and found that when past events were made salient in people's minds, they tend to choose a Small-Sooner (SS) reward rather than a Large-Later (LL) reward.

When individuals look forward, if they feel less in control of their future events, they will feel more certain about the future, the future will be less abstract, more concrete and closer to them (in time). As a consequence, individuals will choose a SS reward rather than waiting for a LL reward. We show that the uncontrollability of future events, measured and manipulated by fatalism, influences how individuals make an intertemporal choice.

Finally, when individuals focus on the progression of time from the past to the future, their prediction of events will have directional change, known as trend reversal. The anticipations of changes in the directionality (good or bad) of future events also influences future time perception. As James's (1890) indicated, "awareness of change is thus the condition on which our perception of time's flow depends" (p.620), psychological time perception is composed of physiological changes (Fraisse 1963). The contextual change hypothesis states that compared with a single task, multitasks make people perceive a remembered time duration to be longer (Block 1978), and compared with time spent in a routine activity, time spent in a non-routine activity is perceived to have longer recalled duration (Avini-Babad and Ritov 2003). Changes not

only impact how individuals recall a time duration in the past but also influence how close people perceive a future point to be (Siddiqui, May, and Monga 2014; Faro 2010). We measured and manipulated directional change by trend reversal and found that individuals who are primed by trend reversal value products whose valuation changes with time, such as antiques, more than individuals who are not primed by trend reversal.

Throughout our paper, we implemented two different testing contexts to reveal how event markers' characteristics impact perception of time and as a consequence judgement and decision making. One testing context is intertemporal choice. If event markers make individuals perceive the future to be far, individuals should prefer a SS rather than LL reward. We tested intertemporal choice in a pure choice scenario and also tested it in a marketing situation, such that participants were facing a choice of taking a smaller amount of an instant rebate versus a larger amount of a mail-in rebate in four to six weeks. Another testing context used in this paper is the valuation of products that are time dependent, such as antiques. The more time passes, the more they should be valued. If event markers make people perceive a future time point to be far, they should assign a high future value on an antique.

The current research contributes to the literature of time perception. We claim that time is construed based on the event markers connected to it as well as their characteristics. The salience, controllability, and changes in the progression of event markers impact individuals' intertemporal choice and valuation. Therefore, the paper also contributes to judgment and decision-making by introducing new variables that influence consumers' choices. We show that certain characteristics of event markers such as the salience of past events, controllability of future events, and changes of their progressing trend can be manipulated. As a consequence, it is practical for marketers to incorporate these factors into their marketing strategies when

appropriate. Since we suggest factors that induce consumers to take immediate choices, the strategies are especially relevant for marketers when they promote health food, exercising, saving, and prosocial behaviors.

It is noted that research in neuroscience has revealed that human's brain activity follows a similar pattern when individuals face any intertemporal choice with delays of reward up to one year. However, the brain activity shows a different pattern when the individual faces the choice of receiving a reward that delays longer than one year (Wittmann and Paulus 2009). To reduce this compounded effect, we tested intertemporal choice in our paper within a one year frame. That means that all LL rewards were to be received no more than one year after the date of the experiment.

2. THEORETICAL BACKGROUND

2.1 Time Perception Influences Intertemporal Choice

Intertemporal choice is a phenomenon in which people assign different values to the same payoffs in different points in time. Intertemporal choice was first understood in economics as a decrease of utility function over time. For example, Samuelson (1937)'s exponential model suggested that $V = Ae^{-kD}$, where V is the present value, A is future amount, e is the constant, D is the delay time, and K is the discount rate. The model in economics suggested how future value should be calculated.

However, economic models were based on assumptions such that the only purpose of individuals' choices was to maximize their utility, choosers were all rational, and they did not

differ in their preference structure. In reality, these assumptions do not always hold. Therefore, researchers in behavioral decision theory tried to explain intertemporal choice using hyperbolic discounting as a model (Ainslie 1975; Ainslie and Haslam 1992). Individuals tend to place less importance on future payoffs as time progresses. This is because people are relatively impatient about near payoffs but patient about far payoffs. One study has shown that instead of receiving \$15 now, participants are willing to wait for three months to get \$30 (discount rate 277%) but wait for one year to get \$60 (discount rate 139%) and wait for three years to get \$100 (discount rate 63%; Thaler 1981). The discount rate decreases over time.

Based on the hyperbolic discounting model, ample research has tried to explain intertemporal choice from different perspectives. One stream of research attributed intertemporal choice to impulsivity, such as lack of self-control and irrationality (Ainslie 1975; Loewenstein 1996). Other streams include construal level theory and time orientation. Construal level theory (Trope and Liberman 2003) states that when individuals think of the future, their construal level is high and thinking abstract, and when they think of the present, their construal level is low and thinking concrete. The discrepancy of temporal construal leads to intertemporal choice. Time orientation impacts intertemporal choice in a way that the same behavior could be viewed as positive or negative depending on how individuals orient their time. For example, if individuals anchor their time to the future, smoking is damaging to individuals' health, and therefore it is a wrong decision. However, if individuals orient their time to the present, smoking brings pleasure without immediate negative consequences, and thus becomes the preferred choice (Zimbardo and Boyd 1999).

The hyperbolic discounting model is based on how individuals perceive the value of payoffs as a function of the temporal delay. More recent research introduced the Subjective

Perception of Time model (Zauberman, Kim, Malkoc, and Bettman 2009). The model shows that the way individuals perceive the duration of the time until they receive those payoffs also matters in explaining intertemporal choice. Instead of assuming a decreasing discount rate over time in the hyperbolic discounting model, researchers assume a constant discount rate in the subjective perception of time model. What makes a difference is individuals' subjective perception of time intervals. This trend of research supports our current study in a crucial way. The model emphasizes individuals' psychology of time, takes into consideration individual differences in thinking about time and judging the duration of events.

Since individuals' subjective time perception has been shown to be connected with intertemporal choice, the antecedents of time perception becomes important in order to understand time-related tradeoffs. In recent years, the concept of "event marker" emerged in marketing literature and has been shown to serve as cues to estimate time and influence intertemporal choice (Zauberman et al. 2010; Ahn et al. 2007). Event markers cut time duration into intervals and make time discrete rather than continuous as what we understood in the past. The number of intervals can be a more accurate predictor than time duration (Zauberman et al. 2010). The current research examines how characteristics of event markers influence time perception and therefore impact intertemporal choice.

2.2 Event Markers Influence Time Perception

When individuals evaluate how much time elapsed from a particular event, they usually use two cues to make the estimate: the characteristics of the event, for example, emotional events feel more recent (Bratfisch, Ekman, Lundberg, and Kruger 1971) and how many time intervals

followed the event marked by “event markers.” The concept of event markers is introduced by Zauberman et al. (2010) who draw from the construct of accessibility and diagnosticity in judgement (Feldman and Lynch 1988). They defined event markers as “subsequent events that are both accessible in memory and perceived to be related to the target event” (p.134). Basically, event markers are events that are both accessible and diagnostic (Feldman and Lynch, 1988): accessible in memory and perceived to be related to the target event. For example, if someone wants to estimate how long ago she had a bike accident when she was a college student, events, such as the ER visit, fixing the bike, and talking to professors to get an incomplete for her courses she was taking, all serve as markers that cut the time after the bike accident into intervals. The more event markers there are, the more individuals perceive the event to be distant from the present. This is because a long time is needed to accommodate a larger number of event markers. The reasoning is in line with Block (1974)’s findings: participants perceived a duration to be longer when the duration was filled with 60 words rather than 30 words.

In recent years, researchers have revealed that event markers can not only serve as a cue for people to feel how distant an event occurred in retrospect but also can be a factor to predict how long a task will take in the future. For example, complex tasks take more steps, and therefore the completion of these tasks is predicted to be more distant than the completion of simple tasks (Siddiqui, May, and Monga 2014). May (2017) further determined that larger numbers of event markers can make people feel the future is farther away from now and consequently, people prefer a SS reward rather than a LL reward when facing intertemporal choice. Although the framework of event markers is still used in the situation of how individuals perceive future time, there is not necessarily a specific target event involved as people think of

future. In an intertemporal choice paradigm, event markers refer to occurrences that might happen up until the time when the reward is received.

Event markers are happenings that are accessible to memory and relevant to a target event. The literature has shown that the number of event markers serve as cues of time duration. Event markers cut time duration into intervals and treat time as discrete rather than continuous. The discrete time intervals can be a more accurate predictor of time compared with continuous time duration (Zauberman et al. 2010).

It is also notable, however, event markers work in different ways when individuals think about the future instead of the past. When individuals imagine a time point in the future (e.g. July 14th 2018), there are no actual events that can be used as a reference. When make a time tradeoff related to the future, they have to imagine future events, rather than simply recalling what happened in the past as when they are thinking of past or estimating how much time has passed since a target event. This difference generates a perceptual process that has not been studied much in the literature.

In this research, we focus on time trade-offs in the future. When individuals think of the future or make a decision or choice for their future, the mere number of future event markers may not serve as a reliable cue for future time estimation and time judgment. What plays a role on future time judgment is needed to be explored further. We use the conceptualization of event markers as the basis of our theoretical framework since they allow for an analysis of discrete points forecasted in the future and provide a basis for understanding how the characteristics of these time points (or markers) moderate their effect on time perception and therefore influences intertemporal choices.

2.3 Characteristics of Event Markers Impact Intertemporal Choice and Evaluation

According to May (2017), the number of event markers may not only influence the judgment of time passage but also predict how future time duration is perceived by estimating how many future events will happen. Therefore, future event markers influence intertemporal choice. In this paper, we hypothesize and show that the characteristics of event markers can also influence consumers' intertemporal choice and evaluation of products that become more valuable with time, such as antiques. We focus on three important characteristics: salience of past markers, expected controllability of future markers, and stability in the pattern of progression of event markers. First, when past event markers made salience, the markers drive people's mind to the past and make the future less accessible and less relevant. As a result, when they face intertemporal choice, they will prefer SS over LL reward. Second, when they think of future events that might happen, individuals will show different levels of controllability over the events. The less control that an individual feels they have over events that might happen in their future, the more likely that individual will prefer a SS over a LL option. This is because if individuals feel they have no control, such as if they highly believe in fatalism, or only have a little control over their future, they will take what they can take now and not wait for a larger reward in an uncontrollable future. Third, their beliefs about the pattern of progression of time from the past to the future may also influence their perception of time. If individuals perceive that the direction of event markers may encounter frequent changes, called trend reversal (good things can change to be bad and bad things can change to be good), individuals perceive the future to be far away and therefore assign a higher value to a product that is relevant to time, such as antiques.

This paper is organized in the following manner. We present the theory which supports the first characteristic, the salience of event markers, and we provide empirical results to support the argument. Then, we present the second characteristic, controllability of event markers, and provide theoretical and empirical support. And the third characteristic, changes in connecting pattern between event markers, is followed in the same manner. The research's contributions, limitations, and future research will be discussed in the general discussion section.

3. SALIENCE OF PAST EVENT MARKERS

Temporal focus is defined as “the extent to which people devote their attention to the past, present and future” (Shipp, Edwards, and Lambert 2009, p. 2), and the past can be made salient by focusing on past event markers. Individuals can temporally allocate their attention to one or more temporal foci, and individuals' attention can also shift among the past-, present-, and future temporal focus depending on the context and task requirements. The degree in a temporal focus profile and the weight of temporal foci vary (McGrath and Rotchford 1983; Zimbardo and Boyd 1999; Shipp et al. 2009). Events which happened in the past influence how much individuals can focus on the future (Shipp et al. 2009). We believe that this is because the salience of the past events reduces the accessibility of the future. For example, recalling the September 11th terrorist attacks in 2001, U.S. participant reported weaker future focus (Holman and Silver 2005). When individuals focus on the past, their past is salient by recalling past event markers and overweighing their future focus. Their future is less accessible than their past since their attention is largely allocated to the past event markers. We expect that they will prefer a SS rather than a LL reward when deciding on intertemporal choice.

Compared with temporal focus, temporal orientation is a less fluid and flexible concept. Temporal orientation is defined as “cognitive involvement predominantly in the past, present, or future” (Shipp et al. 2009 p. 2), and it is usually understood as a personal trait. Future orientation has been shown to impact intertemporal choice. Compared to individuals who have weak future orientation, individuals who have strong future orientation tend to choose LL rather than SS options, such as being more likely to participate in retirement investment (Howlett, Kees, and Kemp 2008) and exercise more and eat healthier (Joireman, Shaffer, and Balliet 2012).

Temporal orientation can not only be a personal trait but also be a cultural trait. Culture also impacts temporal orientation. Research has shown that individuals from Western cultures tend to have a strong future orientation but a weak past orientation (Graham 1981; Kluckhohn and Strodtbeck 1961; Spears, Lin, and Mowen 2001), whereas individuals from Eastern cultures tend to have a strong past orientation but a weak future orientation (Brislin and Kim 2003; Doob 1971; Kluckhohn and Strodtbeck 1961; Ko and Gentry 1991; Pitta, Fung, and Isberg 1999; Spears et al. 2000; Yau 1988). Although the rationale behind this phenomenon has not been understood completely, some researchers believe that this is because of Westerner’s linear notion of time (Graham 1981; Spears et al. 2001) and Easterners’ cyclical notion of time (Kluckhohn and Strodtbeck 1961; Biao 2001). The culturally different time orientation influences time perception of individuals in different cultures. For example, Caruso (2007) showed that when U.S. participants were asked to compare one week from now to one week ago, U.S. participants reported that one week from now felt closer than a week ago. Ji, Guo, Zhang, and Messervey (2009) showed that Chinese students reported a past exam to be closer to the present while Canadian students felt the exam was further in the past.

Cultural groups can be treated as a unit of research, and cultural differences on temporal preference have been studied in anthropology, such as some cultural groups have longer collective memories than other groups and some cultural groups have longer future time horizons than others (Gell 1992; Nilsson 1920; Hardisty et al., 2012). Therefore, we believe that choice over time could be a collective preference. Compared with U.S. Caucasians, East Asians prefer a SS reward rather than a LL reward due to their past orientation.

To summarize, individuals' time orientation has been shown to be deeply rooted in culture, although temporal focus can also be primed by contextual cues. When individuals have a past (future) orientation or past (future) focus, past (future) event markers are silent in their mind, which makes the future (past) less accessible. In that case, intertemporal choice will be dependent on how they value their future, or value a future option as a consumer. If their focus is in the past, consumers will not be able to access the future as much and, thus, they are less likely to take a LL reward but prefer a SS reward. Therefore, we hypothesize that

H1: Participants who have a past instead of a future time orientation will be able to access past over future event markers and, thus, prefer a SS over a LL reward.

Three studies were conducted to investigate this hypothesis. In study 1, we recruited East Asian participants who tend to have strong past orientation and compared their intertemporal choice with Caucasian Americans who tend to have a future orientation. In study 2, we manipulated Asian consumers' past focus to rule out other factors that might be compounded in the result of study 1. In study 3, we manipulated the temporal focus of participants from all major cultural backgrounds and tested their intertemporal preference in a hypothetical marketing setting.

3.1 Study 1: Measured Temporal Orientation Impacts Intertemporal Choice

Since East Asians have strong past orientation whereas Caucasian Americans have strong future orientation, cultural identities are treated as a proxy of time orientation in this study.

Participants and Design. We recruited 209 participants from Qualtrics online panel for this study. One hundred and five Asian participants originally from East Asian cultures, such as China, Japan, and Korea, and 104 Caucasian participants from the U.S. participated in this study in exchange for \$5. Sixty percent of the participants were female and the age range was from 18 to 76 years old with an average age of 45.

Measures. In the questionnaire, participants were told that hypothetically they deserve a chance to receive \$200 in one year. If they did not want to wait for one year to get the \$200, they could choose to get some money ($< \$200$) today. They could choose to either wait for one year to receive the \$200 or take less than \$200 today, ranging from \$190 to \$10 in \$10 decrements. This was adapted from the common method of testing intertemporal choice (Thaler 1981; Sun and Li 2010; Van de Bergh, Dewitte, and Warlop 2008). See appendix 1.

Individuals' tendency of time orientation were tested by "Sometimes I think I live in the past (future)," in 7-point Likert scale, where 1 represented strongly disagree and 7 represented strongly agree. Money importance and urgency were tested by questions, such as "Compared to people you know, how important is money to you?", in Likert scale 1 to 5, where 1 represented unimportant and 5 represented very important, and "How urgently do you need money at this

very moment?" in Likert scale 1 to 9, where 1 represented not urgent at all and 9 represented very much urgent. All demographic questions were asked at the end of this study.

Cultural Differences on Intertemporal Choice. We identified that the distribution of the dependent variable was moderately negative skewed ($Sk = -9.54$), as seen in figure 1. We applied square root transformation to correct towards normality. Specifically, we transformed the data by taking square root of $(K-X)$ where X our dependent variable: the lowest dollar amount that individuals' willingness to accept the monetary reward today, and K was a constant from which each score was subtracted so that the smallest score was 1. In this case $K=201$ since the largest amount of depend variable was \$200. The result of ANOVA showed a significant difference between East Asian and U.S. Caucasian participants on their intertemporal choice. Instead of waiting for one year to get \$200, the average minimum payment that East Asian participants agreed to receive today ($M_{\text{East Asian}} = \143.14 , $SD = 55.41$) was significantly lower than U.S. Caucasian participants' amount ($M_{\text{US}} = \$158.37$, $SD = 45.31$, $F(1,207) = 4.538$, $p = .034$, $\eta^2_p = .021$).

Mediating Effect of Time Orientation. When answering how agreeable the participants were to the question "Sometimes I think I live in the past", East Asian participants showed significantly higher agreeableness ($M_{\text{East Asian}} = 4.12$, $SD = 2.16$) than U.S. participants ($M_{\text{US}} = 3.45$, $SD = 2.17$, $F(1,207) = 5.04$, $p < .05$, $\eta^2_p = .02$). This sense of living in the past mediates the cultural effect on intertemporal choice. The result of a mediation bootstrap procedure (Model 4 in the macro suggested by Hayes, 2008) supported this hypothesis. Upon specifying a confidence interval of 95% with 10,000 bootstrap resamples, the analysis confirmed a significant indirect

effect with a confidence interval excluding zero (.0119 to .1807). In other words, East Asians' unwillingness to wait for getting a larger monetary amount at a future time was due to the way they project their time to the past. The sense of living in the past made East Asians to discount their futures.

Discussion. In this study, results show that cultural differences in intertemporal choice were due to different time orientations of individuals from different cultures. We believe that time orientation could be manipulated, and the different time orientation should influence intertemporal choice. We conducted study 2 in a controlled classroom setting instead of an online panel and confirmed what we hypothesized. This can also rule out other explanations of the different preference of intertemporal choice that we found in different cultures.

3.2 Study 2: Manipulated Temporal Orientation Impacts Intertemporal Choice

Although time orientation could be a trait rooted in culture, we believe that it could also become a state, which can be manipulated in a controlled behavioral lab setting or in the market place. In this study, we recruited only Asian students since their collective time orientation should be the same and manipulated their mental accessibility to the past. The result supported the finding in study 1 that time orientation played a role when individuals are deciding on an intertemporal choice. This procedure and result also ruled out the alternative explanation that the cultural differences on intertemporal choice might be due to other cultural factors rather than time orientation.

3.2.1 Pretest

Participants. Thirty one foreign-born Asian college students (43% female and average age = 22) were recruited from the subject pool of a university in North America. This test was paper based.

Design. We administered a suppression paradigm (Wegner et al. 1987) to make the thoughts about their pasts accessible to participants' mind. Specifically, participants in the experimental condition read an article suggesting that in order to stay happy, they should forget the past. The article was adopted from Baumeister et al. (2013)' article regarding happiness. See appendix 2 for the full article used in this manipulation. Participants in the control condition read an article about how clouds are associated with weather. Participants were randomly assigned one of the conditions.

Measures. We measured past accessibility by asking the same question that was implemented in study 1. Participants rated their agreeability in a 7-point Likert scale to the statement: "Sometimes I think I live in the past" (1 = *strongly disagree* and 7 = *strongly agree*). Anchor of mind was measured by the question: "Where is your mind right now?" Participants were asked to mark on a 160mm line with the middle point labeled "now", the left extreme end of the line was labeled far past, and the right extreme end of the line was labeled far future (Zauberman et al. 2009). If a participant marked the point of "Now", we coded the value as 0. If a participant marked a future point, we coded that mark as a positive value, and if a participant

marked a past point, we coded it as a negative value. The values were decided by the distance from the “Now” point. It ranged from -10 to 10.

Results. Participants in the past accessible condition showed marginally significantly stronger agreeability to the statement of “Sometimes I think I live in the past” ($M_{\text{past}} = 4.15$, $SD = 2.25$) than participants in the control condition ($M_{\text{control}} = 2.55$, $SD = 1.97$, $F(1,29) = 3.92$, $p = .057$). However, anchor of time did not differ significantly between the two conditions ($M_{\text{past}} = 1.6$ vs. $M_{\text{control}} = 1.75$, $F(1,29) = .05$, $p = .824$). We believe that although the anchor of time for participants in the past accessible condition might be further in the past than the mind location of participants in the control condition, participants might have reported that their mind was in the future because the manipulation article suggested that in order to become happy, people should look forward to the future.

3.2.2 Main Study

Participants. Ninety foreign-born Asian college students (44% female and average age = 23) were recruited from the subject pool of a university in North America.

Design and Measures. The design of the experiment was the same as what we tested in the pretest. Dependent variable was measured by the same method that we used in study 1. The only change we made was to change the waiting time to get a reward from one year to six months. This is because we used student data, and some students in our subject pool might graduate in one year.

Results. Because the distribution of the dependent variable was also moderately negative skewed ($Sk = -5.45$), we conducted the same transformation as we did in study 1. See figure 2. Instead of waiting six months to get \$200, the average minimum payment that participants in the accessible past condition agreed to receive today ($M_{\text{past}} = \$158.2$, $SD = 37.83$) was lower than the amount of participants in the control condition ($M_{\text{control}} = \$171.2$, $SD = 24.09$) However, the effect was only directional but not statistically significant ($F(1,87) = 1.328$, $p = .270$).

Discussion. In this study, we showed that time orientation could be manipulated to become a state (instead of a trait). Participants in the past condition might preferred a SS over LL reward. Although the result of ANOVA only supported our hypothesis directionally, we believe that the effect will be significant after we recruit more participants and run this study again.

However, it is still not clear whether thinking of past increased the number of event markers or increased the salience of the past. In the next study, we asked participants to recall the same number of event markers but manipulated the point in time in which the event marker is anchored: in the past vs. in the present.

3.3 Study3: Manipulated Temporal Orientation Impacts Intertemporal Choice: Replication in Marketing Context

In this study, we recruited participants from all cultural backgrounds rather than only Asian participants in study 2. We also used an instant rebate vs. mail-in rebate scenario to test the effect we found in study 1 and 2 in a more realistic marketing setting.

Participants. Eight-seven college students (average age = 22, 64% female and 27% East Asians) were recruited from a subject pool in a university on the East Coast of the U.S. The subject pool consisted of participants from all major cultural backgrounds.

Design and Procedure. Participants were randomly assigned to the “access to the past” condition and “access to the current” condition. This experiment was computer-based and conducted in our behavioral lab. In the “access to the past” condition, we adapted the (May 2017) method to ask participants to recall the day they received the admission letter from the university they were attending. See appendix 3. They were required to use at least 30 seconds to think of four events that related to the admission letter. The events could be their personal experiences or news events that they could remember happened after they got the admission letter. On the next screen page, they had to write down those events in details by using at least 50 words. In the “access to the current” condition, the task changed to think of a standard day at school and list four things that they engaged in on a regular basis.

Measures. As a manipulation check, we asked two questions: “How much did the writing task at the beginning of the study brings your mind back to your past?” and “How much did you think of your past during the writing task at the beginning of the study?” in 7-point Likert scale (1 = *not at all* and 7 = *very much*).

As a dependent measure, instead of directly asking students’ preference for an immediate small reward over a larger reward in the future, we adapted the scenario implemented by Pyone and Isen (2011) about an intertemporal choice between getting a smaller amount of instant rebate and a larger amount of mail-in rebate. Specifically, in the scenario, participants were told to

imagine that they were buying a printer online and comparing between two online stores: one offering a \$25 instant rebate and another one offering \$30 mail-in rebate to be received in four to six weeks. They were asked to make a choice between the two stores. On the next page, participants were asked, “Suppose the amount of instant rebate stays the same (\$25), but the mail-in rebate is set to be \$35, \$40, \$45, \$50, \$55 or \$60. Please complete the six choice sets”. They had to make a choice between the \$25 instant rebate and each amount of the mail-in rebate in four to six weeks. The highest willing to accept the mail-in rebate of each participant was recorded. The lower the willingness to wait for a reward, the higher the amount of the mail-in rebate needed to be. If they did not want to wait, they would expect a higher amount of monetary reward (higher mail-in rebate amount) to compensate for the waiting time. See appendix 4 for details of the dependent measure. We also conducted an attention check by the question: “This is an attention check. Please just choose the answer two.” Demographic questions were asked at the end.

Manipulation Check. Fifteen participants did not pass the attention check. They chose a number rather than two and therefore their answer were eliminated from data analysis. Participants in the past condition reported that the writing task brought their mind farther way back ($M_{\text{past}} = 4.34, SD = 1.85$) than participants in the current condition ($M_{\text{current}} = 3.32, SD = 1.73, F(1,70) = 5.83, p = .018, \eta^2_p = .077$). Participants in the past condition also thought much more their past ($M_{\text{past}} = 4.14, SD = 1.90$) than participants in the current condition ($M_{\text{current}} = 3.27, SD = 1.77, F(1,70) = 4.07, p = .048, \eta^2_p = .055$). The Cronbach’s Alpha of the two questions “How much did the writing task at the beginning of the study brings your mind back to your

past?” and “How much did you think of your past during the writing task at the beginning of the study?” was .834.

Results. The dependent variables did not deviate significantly from normality and therefore we did not transform data. See figure 3. An ANOVA result revealed that participants indicated a marginally significantly higher willingness to accept a mail-in rebate amount ($M_{\text{past}} = \$42.66$, $SE = 11.98$) in the access to the past condition than in the current condition ($M_{\text{current}} = \$38.38$, $SE = 7.55$; $F(1,67) = 3.24$, $p = .077$, $\eta^2_p = .046$).

We further conducted a mediation analysis by implementing PROCESS Model 4 (Hayes 2012). We tested whether the temporal focus effect on intertemporal choice was due to how much participants dwelled their mind in the past. The questions of “How much did the writing task at the beginning of the study brings your mind back to your past?” and “How much did you think of your past during the writing task at the beginning of the study?” also served as measures of mediation. Upon specifying a confidence interval of 95% with 10000 bootstrap resamples, the mediation analysis confirmed a significant indirect effect with a confidence interval excluding zero (.0560 to 6.1144). The reason that participants in the past condition were more likely to choose SS (instant rebate) rather than LL (mail-in rebate) than participants in the current condition was because participants’ minds in the past condition were brought farther back than participants’ mind in the current condition.

Discussion. In this study, we manipulated time focus (past/present) related to a controlled number of event markers. We replicated the pattern of results that the saliency of the past impacts intertemporal choice, such that participants who focus on the past tend to choose SS over

LL rewards. A mediation analysis confirmed that the path of the temporal focus effect on intertemporal choice is through the saliency of the past event markers.

Combining these findings with the findings of study 1 and study 2, results consistently support that both temporal orientation as a trait or temporal focus as a state can impact intertemporal choice. Past literature has only shown that future orientation can influence choice over time. We contribute to the literature by showing that manipulated past focus can also influence intertemporal choice. This is because the past was made salient by accessing past event markers. To summarize, changes in time orientation or time focus may affect consumers' intertemporal choice, that is, SS choice rather than LL reward. When consumers face an intertemporal choice in a marketing context, they may choose an instant rebate rather than a bigger amount of mail-in rebate when they focused on their past as we showed in this study. The results of studies 1 to 3 were summarized in table 1.

4. CONTROLLABILITY OF FUTURE EVENT MARKERS

We have shown that focusing on past event markers can increase the saliency of the past but decrease the accessibility of the future. However, focusing on future event markers may or may not increase the saliency of the future because the future has not arrived yet. Future event markers are under each individual's perception and imagination. There are many factors that can impact the saliency of the future and therefore intertemporal choice. Controllability is one of the factors. Do people believe their future is within their control or just determined by fate? Different answers to this question exist regarding belief in fate, known as fatalism (Dake 1992; Young and Morris 2004; Yen 2013). We believe that if individuals perceive a high degree of internal control

over their future, the accessibility of their future would become high, and thus the future will play an important role in consumers' judgements. Thus, when faced with an intertemporal choice, consumers will prefer a LL rather than SS reward. This is consistent with findings that strong future-focused individuals are more likely to save for a 401K (Howlett et al. 2008) and eat healthier and exercise more (Joireman et al. 2012), compared with individuals who have weak future focus.

On the other hand, when individuals perceive that they have low internal control, they often strongly believe in fatalism. According to Webster's Dictionary and Thesaurus (2002), fate is defined as "the force or power held to predetermine events," and fatalism is defined as "1) a doctrine that events are fixed in advance so that human beings are powerless to change them; 2) a belief in or attitude determined by this doctrine." Fatalism has been studied in several dimensions in social psychology and socio-cultural psychology (Díaz et al. 2015).

Fatalism is understood in three dimensions. First, which is also the core dimensions of fatalism is predetermination, that is, things are meant to happen regardless of what action we take beforehand (Sirigatti et al. 2013). Life events occur due to external forces led by destiny (Flórez et al. 2009), luck (Franklin, Schlundt, and Wallston 2008), nature (Shen, Condit, and Wright 2009) or God (Powe 1997; Morgan, Tyler, and Fogel 2008). Beliefs in predetermination have been shown to be connected to a sense of lack of internal control (Díaz et al. 2015), meaning that people are not able to master the environment they live in or interact effectively with their environment (Neff and Hoppe 1993).

The second dimension of fatalism is personal controllability over the future. Low internal controllability is a major part of fatalism, which is measured by the Fatalism Scale (Dake 1992) in literature. Controllability is correlated to time perception and intertemporal choice (Keren and

Roelofsma 1995; Wakslak, Trope, Liberman and Alony 2006). In this section, we examine how individuals make intertemporal choices when they perceive that they have low internal control and strongly endorse beliefs in fatalism.

It is also notable that because of predetermination and lack of internal control, individuals who show high tendency for fatalism tend to focus on their present event markers. This is labelled “Presentism”, explained by Martín-Baró (1973): “there is no need to regret the past or plan the future; the only thing that can be done is to think in the present, for better or for worse.” Therefore, presentism, defined as “the only realistic alternative when each path is already predetermined and nothing can be changed” (Martín-Baró 1989, p.158; Díaz et al. 2015) is another important dimension of fatalism.

The three dimensions of fatalism jointly impact the way individuals think of their future, and as a downstream effect, fatalism influences how people make an intertemporal choice. Since fatalistic individuals believe in a predetermined future governed by other forces, rather than their own controllability, they cannot do so much to change their future. They will feel the accessibility to the future is low and have to focus on their current status, and as a result, an immediate gain will be desirable for them. They will get whatever they can get at the current stage. This will be especially true for those who feel their future is uncertain. Similar to the notion behind the famous quote by Ernestine Ulmer “Life is uncertain. Eat dessert first,” when individuals feel low control over their future and perceive the future as full of uncertainty, they will go for an immediate reward, even though the amount of reward is small, rather than waiting for a larger amount of reward in an uncertain future.

To conclude, belief in fatalism and activating fatalism can lower individuals’ accessibility to the future and make them focus on the present. Since the future is uncontrollable and

inaccessible, a reward in the future is less desirable for individuals who highly believe in fatalism and it is not worth it for them to wait for a larger reward. Therefore, we hypothesize that:

H2: Participants who hold a strong belief in fatalism will showcase a less accessible future focus and, thus, will prefer a SS over a LL reward.

Two different studies were conducted to test the hypothesis. We measured the concept of fatalism in study 4 and manipulated fatalism in study 5. The intertemporal choice also tested in the pure monetary reward setting and in the hypothetical marketing setting as we used in the previous three studies.

4.1 Study 4: Measured Fatalism Impacts Intertemporal Choice

In this study, we measured participants' predisposition of fatalism and intertemporal choice to find the initial support to our hypothesis.

Participants. Sixty-six college students (average age = 23, 59% female) were recruited from a subject pool in a university on the East Coast of the U.S. The subject pool consisted of participants from all major cultural backgrounds.

Measures. Fatalism was measured by the well-established present fatalistic scale (Zimbardo 1999) consisting of nine items such that "My life path is controlled by forces I cannot influence." and "fate determines much in my life." Participants were asked to indicate their agreeability in a

7-point Likert scale (1 = *strongly disagree* and 7 = *strongly agree*). In addition, the event markers question was asked by “Between today and the same day 1 year later, how many different things do you think could happen?” (1 = *very few* and 7 = *a lot*).

We used the same method as we used in study 3 to measure participants’ preference of intertemporal choice.

Results. The dependent variables did not deviate significantly from normality and therefore we did not transform data. See figure 4. Regression analysis was used to test whether fatalism significantly predicted individuals’ intertemporal choice. The result of the regression indicated that fatalism explained 4.5% of the variance ($R^2 = .045$, $F(1,64)=3.01$, $p = .087$). It was found that fatalism marginally significantly predicted intertemporal choice ($\beta = 2.968$, $p = .087$). The more participants believed in fatalism, the more likely they chose to take the money now.

We further conducted a mediation analysis to test the mediational effect of event markers. Upon specifying a confidence interval of 95% with 10,000 bootstrap resamples, the analysis confirmed a significant indirect effect with a confidence interval excluding zero (– 4.2064 to – .3524). The impact of fatalism on intertemporal choice is through how many event markers were predicted. Fatalism led participants to anticipate less event markers and therefore chose SS rather than LL rewards.

Discussion. This study found initial support that fatalism can influence intertemporal choice. And participants in the fatalism condition anticipated less event markers that could happen in the future than the control condition, and the number of anticipated event markers played a mediating role when the participants’ choice is intertemporal. In order to support that

beliefs in fatalism are both a trait as well as a state that can be manipulated, study 5 manipulates beliefs in fatalism and replicates the result of study 4 to test the interval validity.

4.2 Study 5: Manipulated Fatalism Impacts Intertemporal Choice

4.2.1 Pretest

Participants. Sixty college students who were recruited from the subject pool of a university in North America participated in this study for exchange of partial course credits. The average age of the participants was 22 and 40% of them were female. Participants consisted of students of various cultural backgrounds with 25% East Asians and 22% U.S. Americans. The pretest was computer-based and conducted in our consumer behavioral lab.

Design. In order to manipulate individuals' fatalistic beliefs, we revised the scenario used by Au et al. (2011). Specifically, in the fatalism condition, participants were asked to read a short article about how fate plays a role in determining personal outcomes, such that individuals lack of control over their life. Sometimes people even make tremendous efforts, but they still cannot get what they want. Therefore, they should resign themselves to their fate and be guided by their destiny. In the control condition, participants were asked to read an article about research on sleep. Both articles were similar in length. After participants read the articles, they were required to write an essay in a minimum of 50 words to support the main idea of the article that they read. Participants were told that they were randomly assigned to be either "for" or "against" the issue stated in the article. They should try to write a convincing essay even if they did not agree with

the side they were assigned to since the purpose of the task was to assess students' writing skills. See appendix 5 for the articles and detailed instructions. In reality, all participants were instructed to write an essay to support the issue they read.

Measures. After writing the essay, agreeability to the article was assessed, followed by four scales, namely: fatalism (Dake 1992), present fatalistic (Zimbardo and Boyd 1999), external locus of control (Rotter 1954), and entity theory (Dweck and Leggett 1988) scales. All responses were measured by a 7-point Likert scale where 1 represents strongly disagree and 7 represents strongly agree. Higher value in the fatalism scale and the fatalistic scale represents that individuals tend to be fatalistic, and higher value in the locus of control scale represents that individuals have higher external locus of control. Anchor of mind ("Where is your mind right now?"), accessibility of past and future ("Sometimes I feel I live in the past" and "Sometimes I feel I live in the future") and time duration ("How long does a year seem to you?") were also measured by 7-point Likert scales.

Results. Participants showed high agreeability over the article they read, and no difference between the fatalism and control conditions ($M_{\text{fatalism}} = 4.52$, $SE = 1.64$, $M_{\text{control}} = 3.81$, $SE = 1.70$; $F(1,58) = 2.71$, $p > .10$). However, participants in the fatalism condition showed significantly higher fatalistic disposition than participants in the control group. This was measured by fatalism scale ($M_{\text{fatalism}} = 3.86$, $SE = 1.1.22$, $M_{\text{control}} = 3.16$, $SE = 1.11$; $F(1,58) = 5.46$, $p = .023$), present fatalistic ($M_{\text{fatalism}} = 3.19$, $SE = .94$, $M_{\text{control}} = 2.73$, $SE = .92$; $F(1,58) = 3.70$, $p = .059$), and external locus of control ($M_{\text{fatalism}} = 3.55$, $SE = 1.01$, $M_{\text{control}} = 3.04$, $SE =$

1.02; $F(1,58) = 3.69, p = .060$). The result consistent across all scales, and therefore the method was valid to be used in the main study of study 3.

It was also notable that this manipulation only elicited predetermination and locus of control, as measured by the scales of fatalism, fatalistic present, and locus of control. There appeared to be no differences between the two conditions in terms of entity theory and perceived uncertainty in the future (p 's > .10). Moreover, as the presentism dimension of the concept of fatalism indicates, the anchor of time ($M_{\text{fatalism}} = 1.97$ vs. $M_{\text{control}} = 1.94$), the accessibility to the past ($M_{\text{fatalism}} = 2.86$ vs. $M_{\text{control}} = 3.29$), the accessibility to the future ($M_{\text{fatalism}} = 3.90$ vs. $M_{\text{control}} = 3.71$), and time duration ($M_{\text{fatalism}} = 3.38$ vs. $M_{\text{control}} = 3.21$) did not differ between the fatalism condition and the control condition (all p 's > .10). The statistics indicated that participants in both conditions equally anchored their mind to the current, and the accessibility to the past and to the future were equally low (means were around or below the mean score 3.5 of 7-point Likert scale).

4.2.2 Main Study

Participants and Design. One hundred college students (average age = 23; 66% female) were recruited from the same subject pool as we used in the pretest. One response to dependent variables was not completely recorded due to a technical error and therefore was treated as a missing value. We also used the same manipulation procedure as we pretested. The main study was also conducted through computers at workstations in our consumer behavioral lab.

Measures. After the manipulation, we measured intertemporal choice as a dependent variable. We measured the intertemporal choice as the same manner in study 3. Besides the dependent measure, we also measured mind location (“where is your mind right now?”), money importance (“How important is money to you?”), and money urgency (“How urgently do you need money right now?”) in the 7-point Likert scales where 1 represented far in the past, unimportant, and not at all urgent for money, and 7 represents far in the future, very important and very urgent for money, and income level (1 = household annual income less than \$50,000 and 5 = above \$10,000) to rule out other factors that might explain the fatalism effect on intertemporal choice.

Results. Because the distribution of the dependent variables was moderately positively skewed ($Sk = 11.35$), and therefore transformed the data by taking square root to correct towards normality (Tabachnick and Fidell 2007, Howell 2007). See figure 5. An ANOVA result revealed that participants indicated a significantly higher willingness to accept the mail-in rebate amount ($M_{fatalism} = \$48.78, SE = 22.54$) in the fatalism condition than in the control condition ($M_{control} = \$41.10, SE = 12.55; F(1,97) = 4.39, p = .039, \eta^2_p = .043$).

In order to understand the process of the effect, we conducted a moderation analysis by implementing PROCESS Model 1 (Hayes 2012). Upon specifying a confidence interval of 95% with 10000 bootstrap resamples, the moderation analysis confirmed a conditional effect of fatalism beliefs on intertemporal choice at values of perceived future uncertainty. Specifically, fatalistic beliefs only influenced participants’ intertemporal choice for those who believed their future would be full of uncertainty in a high degree ($M = 5.47$) or a medium degree ($M = 3.81; p$'s $< .05$) but not for those who did not believe their future would be full of change ($M = 2.16; p$

> .10). We further conducted a Johnson-Neyman technique to detect the boundary condition. Precisely, for participants who scored 3.71 and above on the future uncertainty, their WTA the mail-in rebate amount in the fatalism condition was significantly higher than those in the control condition. The participants who scored 3.71 and above on the future uncertainty accounted for 54.55% of our sample.

Notably, the process of fatalism impacting on intertemporal choice was not through time orientation. Participants in both conditions anchored their time to the current ($M_{\text{fatalism}} = 1.22$, $SE = 1.85$, $M_{\text{control}} = .84$, $SE = 1.91$; $F(1,98) = 1.02$, $p > .10$). We showed this result in our pretest and replicated it in the main study. Other factors, such as money importance ($M_{\text{fatalism}} = 3.90$ vs. $M_{\text{control}} = 3.71$), money urgency ($M_{\text{fatalism}} = 3.90$ vs. $M_{\text{control}} = 3.71$), and income level ($M_{\text{fatalism}} = 1.94$ vs. $M_{\text{control}} = 1.96$) did not play a role in the fatalistic effect on intertemporal choice (both p 's > .10).

Discussion. The result showed that when participants were primed by fatalism beliefs, a sense of low controllability over their future was activated; since they feel that they have little control over their own future, they did not want to wait a longer time (four to six weeks in this case) to get a larger monetary reward (mail-in rebate) but preferred to take an immediate and smaller reward (instant rebate). This tendency was projected by the higher WTA a mail-in rebate in the fatalism condition than in the control condition. In order for participants in the fatalism condition to agree with accepting a mail-in rebate, they expected a higher monetary reward to compensate for the uncertainty of the wait time. This was especially true for participants who feel a strong uncertainty about the future. Evidence from the moderation analysis supported this argument.

In study 4, fatalism was measured and in study 5, fatalism was manipulated. The two studies generated consistent results, and the results were summarized in table 2. When participants believe in fatalism, they feel they have a low internal locus of control over their futures and tend to believe that events are fixed in advance so they are powerless to change them. Their future is not accessible to them and, therefore, they take current rewards, although the rewards are smaller and less desirable. Fatalism is a major concept in both cross-cultural psychology and clinical psychology. We are arguably the first to introduce the concept to explain intertemporal choice. We have shown a clear and consistent effect that fatalism impacts intertemporal choice. This finding deepens our understanding of fatalism and intertemporal choice by adding one more factor that influences the effect.

5. CHANGE IN THE CONNECTING PATTERN BETWEEN EVENT MARKERS

So far, we have discussed two sets of characteristics of event markers, which influence individual preference on intertemporal choice: how individuals access past event markers and how their perception of future event markers impacts their perception of time. In this third section, we demonstrate that the trend of connecting pattern between event markers, that is the pattern of progression from the past to the future, also matters when individuals are assigning a valuation to products that are time dependent, such as antiques.

Event markers could be similar to each other or different from each other. When event markers are similar to each other with little or no change, time is perceived to progress quickly. This is consistent with what has been called the contextual change hypothesis (Block 1978), which is based on Fraisse (1963)'s idea that "estimated [time] duration is proportional to the

[amount of] perceived changes” (Fraisse 1984 p.28). Researchers did a six-month longitudinal study on a subject living in a 70-meter deep cave and showed that the participant perceived shorter time duration on several temporal experiments than the clocked duration. For example, on average for 64 days, the participant estimated the duration between waking up and lunch was 4 hours and 40 minutes, but the clocked duration was 10 hours and 26 minutes. This time discrepancy is attributable to the fact that few changes took place in the life of the participant who lived in a perceptual deprivation situation with very few actual changes (Fraisse and Rasmussen 1973).

In recent years, changes have been defined and studied from different perspectives, and researchers consistently find that various changes influence the perceived passage of time. For example, change of sensory stimulation can bias duration judgement (Ahrens and Sahani 2011), and time passage is perceived to be faster when doing routine work (less changes of event markers) than doing non-routine work (more changes of event markers) (Anvi-Babad and Ritov 2003). If two events have a strong causal relationship, the estimated time duration between the occurrence of the two events is shorter than two events without causal relationship (Buehner and Humphreys 2009; Eagleman and Holcombe 2002; Faro et al. 2005). A causal relationship can also be used as a predictor to estimate how quickly a future event will occur (Faro 2010). When the cause is closely connected to the effect, a quicker occurrence of the effect is expected. In our trend reversal paradigm, either there is no causal relationship between event markers or the effect appears in the opposite direction of the cause. Therefore, the path from the past to the future is perceived to be long if trend reversed events populated the time period. In this situation, event markers are not conceptually connected, rather, one event marker changes the direction from the previous event marker’s development.

One event marker occurs and the next event marker follows, and a continuous occurrence of event markers creates a time flow. These patterns of event markers can be conceptually perceived to follow the same trend (positive or negative) or not. Therefore events determine different patterns of time progression depending on how the event markers related to each other. People differ in how they perceive the pattern of time progression. The difference in perception depends on whether they hold a lay theory of stability or change of personal attributes (Ross 1989) and events (Ji, Nisbett and Su 2001). If individuals hold a linear lay theory of change, they tend to believe stability is the norm (Ji 2005), but individuals who hold a non-linear lay theory of change tend to predict reversals in trends (Guo and Spina 2014).

The idea that change is constantly linear could be traced back to Heraclitus (ca. 540–480 B.C.), who asserted that people cannot “step into the same river twice” (Heraclitus 1962 version, pp. 14,17). Individuals who have this view of stability believe that the world changes in the same path from one state to another (Ji et al. 2001). However, the idea that change is non-linear stems from the theory of *yin* and *yang*: everything has two extremes, and the energy between the two extremes can make everything constantly move and can make the two extremes transform into each other. The good can change to the bad and the bad can change to the good. This theory was documented in *Tao Te Jing* (Lao Tsu 2000 version) in about 500 B.C.

Individuals who believe in trend reversal perceive more directional changes of event markers in their future than those who hold a lay theory of stability; perceived changes impact individuals’ time perception. Since individuals who believe in trend reversal perceive the future as full of changing event markers, they perceive the future to be distant. They will assign a higher future value to products that increase in value over time than participants who do not

believe in trend reversal. Although trend reversal could be a belief which is a state of mind, we also believe and demonstrate that the degree of trend reversal can be manipulated.

In sum, the expectation that there will be a reversal in the trend of progression between two markers influences time perception, and therefore, impacts how individuals value objects when value is time dependent. Because conceptually two events that are connected by the same trend can make the future more accessible (can make time seem to pass faster), two unexpected events, or events that have directional changes from the previous ones, can make the future become less accessible (or can make time between two events seem shorter). As a result, participants who mentally experienced trend reversal (or believe in trend reversal) will assign a higher value to objects when their value changes as time passes. This is the case for both the situation of judging a present value and estimating a future value.

H3: Participants who strongly believe in trend reversal (vs. those that do not hold that belief), will access the future with more difficulty and, thus, will prefer a SS over a LL reward.

We ran two studies to examine this hypothesis. In both study 6 and 7, we manipulated trend reversal and tested how it influences participants' valuation of products that increase as time progresses. Study 6 tested a product (a ring)'s present value by the evidence of its value in the past. Study 7 tested a product (a bond)'s future value by the evidence of its value in the past.

5.1 Study 6: Manipulated Trend Reversal Impacts Valuation of Time Related Product: From Past to the Current

Participants. Ninety four college students (60% females and average age = 23) from the subject pool of a university in North America participated in this study for exchange of partial course credits. This computer-based experiment was conducted in the university's marketing behavioral lab.

Design. The participants were randomly assigned to one of the two conditions. We manipulated the trend reversal by asking participants to read an article suggesting the idea of trend reversal and write down their thoughts and examples to support the idea in minimum 50 words. The trend reversal article was adapted from a story recorded in *Huai Nan Zi* (139BC) about how an apparently good thing can change to a bad thing, and an apparently a bad thing can change to a good thing. The idea stems from East Asian culture but in order to make it cultural neutral to the majority of our participants, we changed the background of the story to Native Americans. Participants in the control condition were asked to read an article about study on sleep and write down their thoughts and examples to support the idea in at least 50 words. Both articles were in a similar length. See Appendix 6 for the complete story that used in manipulation. Participants were told that they were randomly selected to be either “for” or “against” this issue, and they needed to write a convincing essay even if you do not agree with the side they were assigned to. The mark of a successful writer was that they could write about any topic convincingly, and this task was to assess how well people can do that. In reality, all participants were asked to write an article to support the idea they read in either the trend reversal condition and in the control condition.

Measures. Participants' dispositions of trend reversal were gauged by questions developed by Ji et al. (2001). Specifically, participants rated how likely the two situations could happen in the future: "Lucia and Jeff are both seniors at the same university. They have been dating each other for 2 years. How likely is it that they will break up after graduation?" This is an example of a good thing that changed to be bad and "Two kids are fighting at kindergarten. How likely is it that they will become lovers some day?" This is an example of a bad thing that changed to be good. We used 7-point Likert scales to measure the degree of the change (1 = *very unlikely to happen* and 7 = *very likely to happen*). The dependent variable was measured by valuating a gold ring (Levinson and Peng, 2007). Precisely, participants were asked to estimate the present value a gold ring in this scenario: "Suppose you were walking along the beach recently when you found a gold ring in the sand. Unbeknownst to you, the ring had been purchased in 1985. According to *World Jeweler*, an international jewelry appraisal publication, the ring was worth 100 Dollars at the time it was purchased. How much would the ring be worth today?" In this study, we use the value of a ring as an indicator of time perception. Since a gold ring's value increases as time passes, the longer time from 1985 to current that participants perceive, the higher value participants assign to the gold ring.

Manipulation Check. Participants' disposition of trend reversal was measured by the two questions involving perdition of directional future change. We averaged the degree to which the likelihood of the events' occurrence as participants indicated and confirmed that participants in the trend reversal priming condition gave marginally significantly higher likelihood judgment ($M_{\text{trend reversal}} = 3.73, SE = 1.10$) than participants in the control condition ($M_{\text{control}} = 3.34, SE = 1.04; F(1,92) = 3.15, p = .079$).

Results. We observed that some participants gave an extreme dollar amount, such as 10 million dollars, in estimating the gold ring's present value. We conducted an outlier analysis (Tukey 1977; Hoaglin et al. 1986; and Hoaglin and Iglewicz 1987) and identified mathematically the outliers to be more than \$15,340 and less than -\$10,040. We treated the 13 outliers that were more than \$15,340 as missing values.

We identified that the distribution of the dependent variable was also positively skewed ($Sk = 13.03$), we transformed the dependent variable as we did in study 5 to ensure normality. See figure 6. We further conducted an ANOVA and its result revealed that participants in the trend reversal condition valued the gold ring as significantly more expensive ($M_{\text{trend reversal}} = \$2,749.88$, $SE = 3526.77$) than those in the control condition ($M_{\text{control}} = \$1,354.75$, $SE = 2,130.92$; $F(1,79) = 4.766$, $p = .032$, $\eta^2_p = .057$), suggesting trend reversal prolongs individual's perception of time from a past temporal point to current.

In the next study, we replicate what we found in this study by using participants from a different source and examine trend reveal can influence perception of future time.

5.2 Study 7: Manipulated Trend Reversal Impacts Valuation of Time Related Product: From Past to the Future

In this study, we recruited participants from Qualtrics online panel and replicated the results of study 6. We also replaced the manipulation scenario to test participants' future time perception. We further identified a mediator for the effect of trend reversal on time valuation.

Participants and Design. We recruited 113 Caucasian Americans (20% female, average age = 47.47 ranging from 19 to 85) from online pane and paid \$5 for each participant. The design was the same as we used in study 6.

Dependent Measure. The dependent variable was measured by valuating a bond's future value (Levinson and Peng, 2007). Precisely, participants were asked to estimate the present value of a gold ring in this scenario: "Suppose your family purchased a municipal bond for 100 dollars in 1985. The bond has not yet matured. If it is cashed in the year 2045, how much would your family get then?" In this study, we use the value of a bond as an indicator of how far the future time of 2045 seems to be. The farther participants perceive the year of 2045 to be, the higher value participants assign to the bond. See appendix 7.

Change was measured by the question "How probable do you think it is that your life will be full of changes?" in a 7-point Likert scale where 1 represented very improbable and 7 represented very probable. We also conducted an attention check, but participants who did not pass the test were filtered out by the panel data collection. Demographic variables were also measured.

Results. Fourteen participants who did not properly fulfill the manipulation check were excluded from further data analysis. We observed that some participants gave an extreme dollar amount, such as one million dollars in estimating the bond's future value. Therefore we conducted the same outlier analysis as we used in study 6 and identified the outliers to be any value more than \$15,451. We excluded six such outliers.

We identified that the distribution of the dependent variable was also positively skewed ($Sk = 7.25$), we transformed the dependent variable as we did in study 5 to ensure normality. See figure 7. An ANOVA revealed that participants in the trend reversal condition valued the bond as significantly more expensive ($M_{\text{trend reversal}} = \$2,239$, $SE = 3,348$) in 2045 than those in the control condition ($M_{\text{control}} = \$863.6$, $SE = 1,523$; $F(1,92) = 4.127$, $p = .045$, $\eta^2_p = .043$), suggesting that trend reversal made future to be perceived distant.

Mediation Analysis. When answering the question regarding change, “How probable do you think it is that your life will be full of changes?”, participants in trend reversal condition believed that it would be very probable that their future would be full of changes ($M_{\text{trend reversal}} = 5.97$, $SE = 1.51$), this is significantly higher than participants in the control condition ($M_{\text{control}} = 5.08$, $SE = 1.52$; $F(1,84) = 4.62$, $p = .009$, $\eta^2_p = .079$). We further conducted a mediation analysis. Upon specifying a confidence interval of 95% with 10,000 bootstrap resamples, the analysis confirmed a significant indirect effect with a confidence interval excluding zero (-7.3689 to $-.5492$). The impact of trend reversal on time-related product (bond) valuation is because participants in the trend reversal condition believed that life would be a lot of change. This belief should make future seem to be far and therefore participants assigned a higher value on the bond than those in the control group.

Discussion. Trend reversal is about anticipating future change. It is about the belief that one event marker has the directional change to the event that happened before it. Dramatic changes make the future to be perceived as being farther away than in the situation in which not much change occurs. In study 6, we tested a product (a ring)’s present value and in study 7, we tested a

product (a bond)'s future value in 2045. We found a consistent result. Trend reversal lead participants to add more value to the product that increases its value as time progresses. The effect of trend reversal is that it is no longer perceived as existing from the past to the present or the present to the future, but becomes overarching from the past to the future. The results of study 6 to 7 were summarized in table 3.

The change in the trend that connects event markers has never been studied in psychology and marketing in order to understand how consumers value time-related objects. Our research suggests that change, as a characteristic of event markers, impacts individuals' perception of time and therefore their valuation of objects such that they increase their value as time progresses.

6. GENERAL DISCUSSION

Across seven studies, we show that the characteristics of event markers can impact intertemporal choice and valuation of objects that involve time. Event markers are defined as “subsequent events that are both accessible in memory and perceived to be related to the target event” (Zauberman et al. 2010, p.134), and we reveal that the characteristics of the event marker, namely time orientation and focus, fatalism, and trend reversal influence time perception and therefore intertemporal choice and product valuation. Through study 1 to 3, we examine how people perceive the past can influence their future decision. In study 1, we found that compared with Caucasian Americans, East Asian participants tended to choose a SS rather than LL reward when faced with an intertemporal choice. This was because East Asians' past orientation rooted in cultural experiences made their past more salient than their future. In study 2 and 3, we found

that time orientation can also be manipulated. When primed to focus in the past, participants showed that they preferred a SS over a LL reward and preferred an instant online rebate over a mail-in rebate. This effect was consistent in participants from all major cultures. Study 4 and 5 examined how belief in fatalism impacts intertemporal choice. We measured (study 4) and manipulated (study 5) fatalism and found that when participants strongly believed in fatalism, they perceived low controllability over their future event markers and therefore low accessibility to their future. As a result, they preferred a SS rather than a LL reward and an instant online rebate over a mail-in rebate. Study 6 and 7 examined how trend reversal impacted valuation of products that increase their values as time progresses. We manipulated trend reversal and revealed that participants who believed time is full of events that have directional changes tended to judge a piece of antique with higher present value (study 6) and bonds with higher future value (study 7).

In sum, three characteristics of event markers are shown to impact intertemporal choice and product valuation.

6.1 Theoretical Contribution

Past research has shown that time perception impacts intertemporal choice (Zauberman et al. 2009). This paper builds on this stream of research by showing that time orientation and focus, fatalism, and trend reversal can influence intertemporal choice or evaluation of products that involve time. All these three variables are new to the intertemporal choice literature and add to the literature by explaining intertemporal choice in terms of characteristics of event markers. The number of event markers has been shown to influence time perception (May 2017). The present

research shows that the characteristics of the event markers also shape individuals' time perception. When individuals think of the past, the salience of the past event markers bring people's mind to the past and therefore the future is perceived to be far. When they think of the future, the controllability of future events determines how accessible the future events are. If individuals are primed by fatalism, which is low controllability over the future, they tend to think that the future is less accessible and therefore prefer a smaller but current reward rather than waiting for a larger reward in an uncontrollable future. When individuals think about the progress of time moving from the past to the future, they think about the pattern of one event connecting to the next influences time perception. A pattern that includes many directional changes causes individuals to perceive the future to be distant. Therefore, the current research contributes to the concept of time perception in psychology.

It is notable that event markers can also act as distractors and make time seem to go fast, such that multitasking makes people feel time goes faster than a single task (Chinchanachokchai, Duff, and Sar 2014). This is because when individuals are multitasking, they have many stimuli to which they pay attention and therefore lack attentional resources to process temporal cues. They will feel time goes quicker than individuals performing a single task. This reasoning is through a path of prospective time judgment. A prospective mode denotes that individuals are not aware of the passage of time but estimate the duration of the interval at the end. However, time can also be perceived in a retrospective mode: individuals estimate a time duration depending on memories stored in their mind (Zakay 1989, 1993). In the retrospective mode, when people retrieve the duration with a large number of event markers after a significant time delay, they recall the duration to be long (Ahn, Liu, and Soman 2009). The findings of the current research were consistent with the retrospective mode: three characteristics of event

markers reduce the accessibility of the future. This is because we focus on future time perception, which does not involve a specific temporal signal when individuals make a choice at a future time point or determine an antique's future value. Event markers should act as cues, rather than distractors, when making a decision involving future time.

This paper also contributes to the literature of cross-cultural psychology. In study 1, we recruited participants with East Asian identity and compared their intertemporal preference with their counterpart in the U.S. The result shows that because of East Asians' past orientation, they tend to choose a SS rather than a LL reward. This result seems to be contradictive to what Kacen and Lee (2002) found that Asian consumers shop less impulsively than Caucasian American consumers. Compared with East Asians, Western consumers tend to be impulsive buyers. However, intertemporal choice involves more dimensions than purchase impulsiveness. We believe that Kacen and Lee's paradigm applies only in a product choice setting where variety seeking plays a role, and what we tested in our studies is seen in a setting that involves pure monetary rewards.

6.2 Practical Implications

This research suggested clear practical implications in the field of marketing. First, consumers usually have a choice of purchasing a product now with full price or later with a discounted price. Marketers tend to make an effort to foster consumers to buy now rather than later with a price discount. The current research provides strategies to influence consumers' preference. Social media can easily manipulate individuals' minds to anchor in the past. Social media apps store information not only public information as we can see in news but also large

amount of information that users uploaded by themselves. For example, Facebook are able to show your friends' posts that were published in the past, such as a post with photos that were labeled as "two years ago". Reviewing events happened in the past brings social media users' mind to the past. Markers should take advantage of this past focus and promote their products or service that involves SS reward right after these review posts. This strategy is also valid for boosting individuals' prosocial behaviors. For example, consumers can donate now rather than waiting until the end of a year, and sign up a fitness club now rather than waiting for months to start your New Year resolution.

Second, insurance companies, such as life, auto, and home insurance, tend to emphasize low controllability of individuals over their futures, such as "*Fire, Water, Earth, and Insurance*". However, our research shows that fatalism can decrease the accessibility of the future, and therefore potential customers of the insurance industry might want to focus on the presence and eventually opt out of purchase insurances or only purchase small amount of coverage. Increasing future accessibility and control is a preferred practice for marketing communication in the insurance industry. *The Power to Help You Succeed.* by Pacific Life and *Insuring Your Future... Today.* by Nicholas Insurance Group are good examples of activating the accessibility of the future. However, fatalism can help vacation and entertainment industries to gain customers. They can use fatalist elements in their promotion message and lead consumers to believe, at least temporally, that life is short and uncontrollable. They should enjoy their life along the way. This is consistent with the mantra "Life is uncertain and eat the dessert first".

There are many categories of products that take time to see results, such as beauty products, medications, health products, fitness and diet products, language and skill learning programs. The promotion of these industries faces a common challenge in that consumers do not see the

expected results quickly enough. Our research suggests that marketers can increase the saliency of past event markers, the controllability of the future event markers, and variability of the connections between the event markers, to make consumers perceive that they have not spent that much time since they used the product or started a project. In other words, the achievement in the future is near and accessible.

6.3 Limitations and Future Studies

All our seven studies involve a gain. However, ample evidence has shown that discount rates for gains are larger than those for losses over the same time period (Kahneman and Tversky 1979), implying that individuals are more sensitive to losses, which means less discounting. However, individuals discount their future time in different rates depending on the future event involves a loss or a gain (Bilgin and LeBOEUF 2010). In addition, individuals from independent cultures (such as U.S.) tend to weigh gain-framed information more importantly than loss-framed information, and individuals from interdependent cultures (such as China) tend to show the opposite pattern (Lee, Aaker, and Gardner 2000). We suspect that culture will influence intertemporal choice differently when framing choice as avoiding a loss than when it is framed as a gain.

Time is not the same as money. Research (Zauberman and Lynch 2005) has shown that individuals exhibit steeper delay discounting when required investments are framed in terms of minutes of effort rather than numerically equivalent dollars. Our research only involves money. Would participants from different cultures behave the same way when intertemporal choice

involves time, and how would East Asians' past time orientation influence intertemporal choice on time? These questions might be interesting to investigate in our future studies.

Intertemporal choice is not limited within one year. Research in neuroscience has shown that there are two routes for humans to process temporal information within one year and more than one year (Wittmann and Paulus 2010). In the current studies regarding intertemporal choice, we only used the time frame within one year. But it will be interesting to test the paradigm in time frame work longer than one year. Especially a lot of important intertemporal choices, such as buying a property or saving for retirement, involve the time frame much longer than one year.

Age has been show to influence intertemporal choice. Among three groups of children, young adults, and older adults, the discounting rate was highest for children and lowest for older adults. This is because older adults have the highest level of self-control whereas children have the lowest self-control (Green, Fry, and Myerson 1994). However, there is numerous explanation of the cause of intertemporal choice, and self-control is only one of them. In terms of the three paradigms suggested in this paper, we did not find that intertemporal choice differs across age groups. This may due to the fact that we recruited college students who were in a similar age to participate in our four out of six studies. However, as lay theory shows that older people tend to have a past orientation whereas younger people tend to have a future orientation, the age effect on intertemporal choice through the paths of time orientation and focus, fatalism, and trend reversal should be studied deeper in the future.

Intertemporal choice is an important topic and this dissertation is a first step at a deeper understanding of its determinants. We hope this is a starting point of many papers to come.

TABLES

Table 1: Test Results of Past Orientation Influencing Intertemporal Choice										
Study	Participants	N	Method	DV	Conditions	Mean	SD	Test	p-value	Mediation / Moderation
1	Qualtrics	209	Measured	Monetary Reward	East Asians	\$142.14	55.41	F(1, 207) = 4.538	p < .05	Mediator: Sense of Living in the Past
					Caucasians	\$158.37	45.31			
2	Behavioral Lab	90	Manipulated	Monetary Reward	Past	\$158.20	37.83	F(1, 87) = 1.328	p = .270	
					Control	\$171.20	24.09			
3	Behavioral Lab	87	Manipulated	Rebate	Past	\$42.66	11.98	F(1, 67) = 3.24	p = .077	Mediator: Mind in the Past
					Present	\$38.38	7.55			

Table 2: Test Results of Fatalism Influencing Intertemporal Choice										
Study	Participants	N	Method	DV	Conditions	Mean	SD	Test	p-value	Mediation / Moderation
4	Behavioral Lab	66	Measured	Rebate				$\beta = 2.968$	p = .087	Mediator: Number of Event Markers
5	Behavioral Lab	100	Manipulated	Rebate	Fatalism	\$48.78	22.54	F(1, 97) = 4.41	p < .05	Moderator: Future Uncertainty
					Control	\$41.10	12.55			

Table 3: Test Results of Trend Reversal Influencing Valuation of Time-Depended Products										
Study	Participants	N	Method	DV	Conditions	Mean	SD	Test	p-value	Mediation / Moderation
6	Behavioral Lab	94	Manipulated	Valuation (Ring)	Trend Reversal	\$2,749	3526	F(1, 79) = 4.766	p < .05	
					Control	\$1,354	2130			
7	Qualtrics	113	Manipulated	Valuation (Bond)	Trend Reversal	\$2,239	3348	F(1, 92) = 4.127	p < .05	Mediator: Life is Full of Changes
					Control	\$863	1523			

FIGURES

Figure 1: Study 1

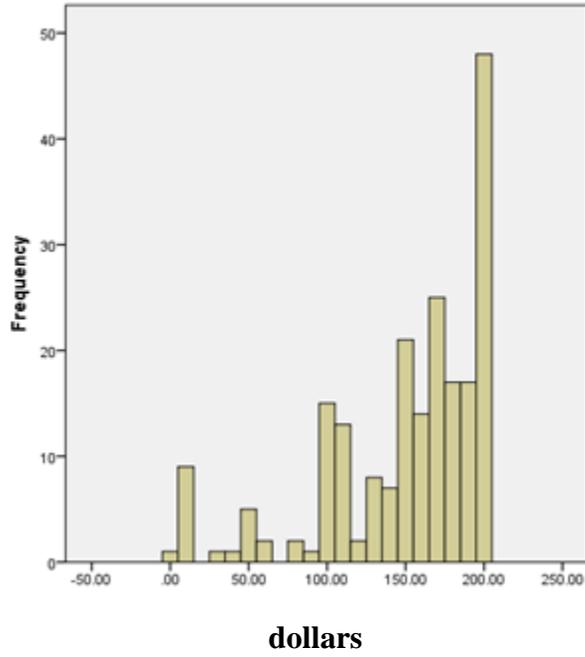


Figure 2: Study 2

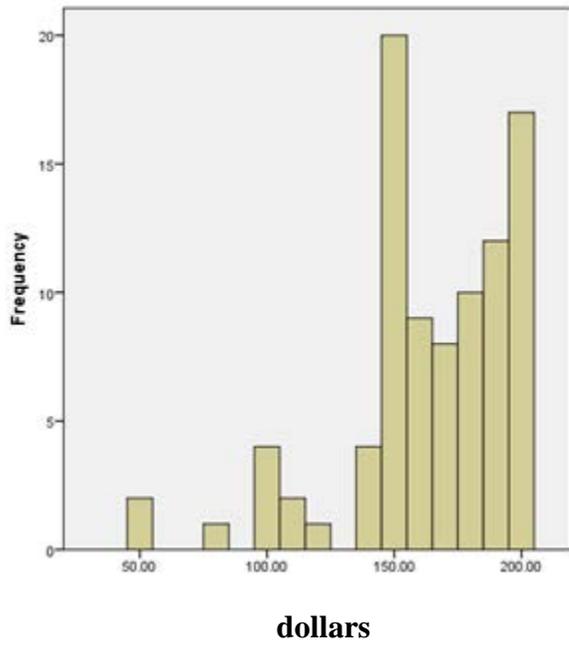


Figure 3: Study 3

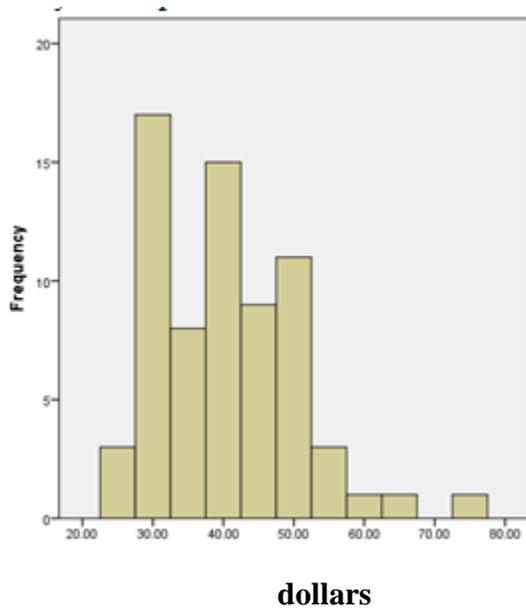


Figure 4: Study 4

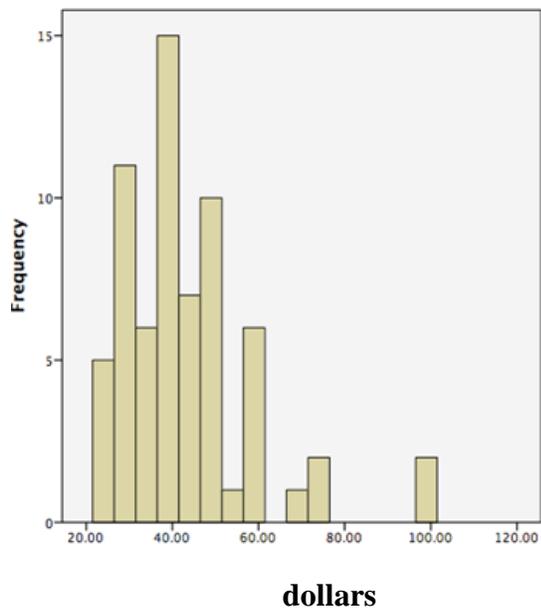


Figure 5: Study 5

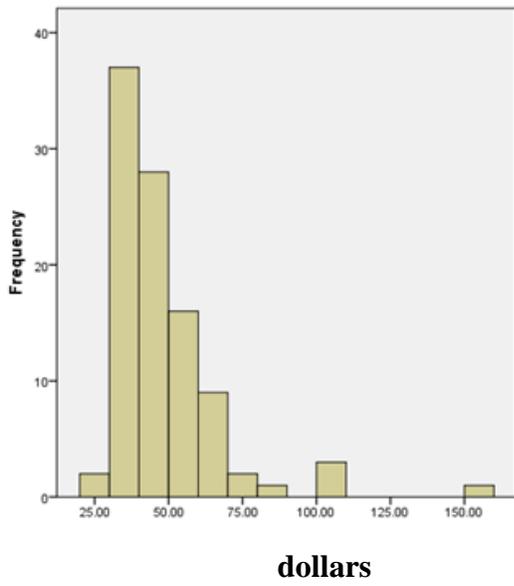


Figure 6: Study 6

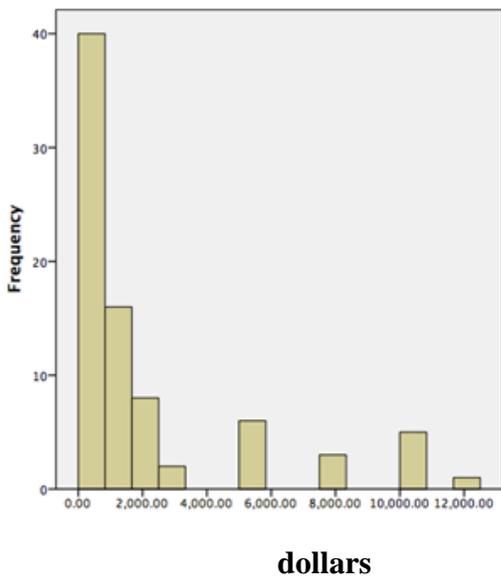
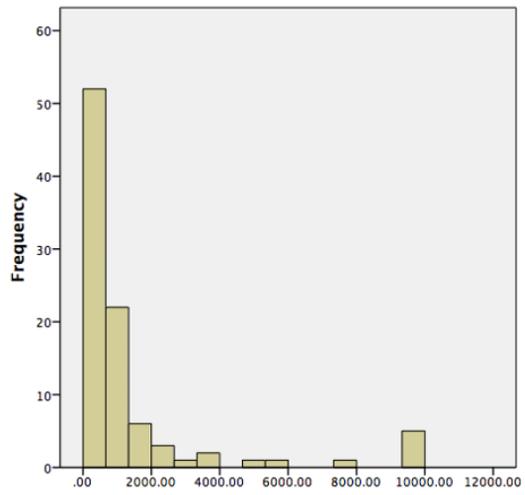


Figure 7: Study 7



APPENDIX

Appendix 1

Suppose you were promised to receive \$200 on **August 26th, 2016** (first day of fall semester). But if you do not want to wait, you could receive a smaller amount of money **now**.

For each of the possible monetary amounts below, indicate whether you wish to:

- Receive this amount of money now

OR

- Receive \$200 on August 26th, 2016

For each of amount of money listed below, please indicate whether you would prefer to receive the amount of money now or receive \$200 on August 26th, 2016 by circling your preference. *Please presume that this is an actual opportunity from a trustworthy source.*

Please select **one** of the two options on each line:

<u>Receiving \$200 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>
<u>Receiving \$190 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>
<u>Receiving \$180 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>
<u>Receiving \$170 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>
<u>Receiving \$160 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>
<u>Receiving \$150 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>
<u>Receiving \$140 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>

<u>Receiving \$130 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>
<u>Receiving \$120 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>
<u>Receiving \$110 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>
<u>Receiving \$100 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>
<u>Receiving \$90 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>
<u>Receiving \$80 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>
<u>Receiving \$70 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>
<u>Receiving \$60 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>
<u>Receiving \$50 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>
<u>Receiving \$40 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>
<u>Receiving \$30 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>
<u>Receiving \$20 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>
<u>Receiving \$10 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>
<u>Receiving \$0 now</u>	or	<u>Receiving \$200 on August 26th, 2016</u>

Appendix 2

If you want to have a happy life, forget the past!

Happiness is generally defined as subjective well-being, which is to say, an experiential state that contains a globally positive affective tone. It may be narrowly or broadly focused: A person may claim to be happy to have found a lost shoe, happy that the war is over, or happy to be having a good life. Researchers have conceptualized and measured happiness in at least two quite different ways. One is affect balance, indicating having more pleasant than unpleasant emotional states, and is thus essentially an aggregate of how one feels at different moments. The other, life satisfaction, goes beyond momentary feelings to invoke an integrative, evaluative assessment of one's life as a whole.

We assume the simpler form of happiness (i.e., affect balance rather than life satisfaction), at least, is rooted in nature. As we are told to "let go of the past" and "not to live in the past", a research shows that what we are thinking about makes how happy we feel. A national sample of 397 adults (68% female; ages 18-78; average age 35.5 years old; 48.1% were parents) participated in an online study. The survey asked people if they were thinking about the past, the

present, or the future. The participants who were thinking about the past reported being significantly less happy at that moment than participants who were not thinking about the past.

More ways to forget the past: [Check out these tips.](#)

Appendix 3

Please think about the day you received your letter of admission to Baruch College and recall 4 specific events in your life triggered by that letter or news events that had occurred since you received the letter.

<You have to spend at least 30 seconds on this page. After 30 seconds, you will see the button to move forward to the next page.>

Now, take a moment and try to recall in your mind of the moment. What did the letter of admission look like? What was it like when you received the letter? You may want to remember the time you received the admission. What did your teachers, family and friends say about it? What did you think before you accepted it? How did you feel when you get the letter? After the visualization, write down 4 events triggered by the letter of admission that happened in your life at that time.(Min 100 words)

Appendix 4

Please read the scenario below and answer the questions as you would if you were actually in the situation.

Suppose you would like to buy an All-In-One Printer online. The printer is now available for the same price at two online stores but with different promotions.

One online store provides a \$25 instant rebate, which means you can get \$25 off **right away when you check out online.**

The other online store provides a \$30 mail-in rebate, which means you will get \$30 check in mail **in four to six weeks** after you check out online.

Suppose the amount of instant rebate stays the same (\$25), but the mail-in rebate is set to be \$35, \$40, \$45, \$50, \$55 or \$60. Please complete the six choice sets.

For each of the rebate amount below, indicate you wish to buy from the online store that provides:

- \$25 instant rebate right away

OR

- mail-in rebate in four to six weeks

You must select one of the two options on each line.

Appendix 5

Please read the paragraph below.

You are RANDOMLY selected to be either “for” or “against” this issue. Please try to write a convincing essay EVEN IF YOU DO NOT AGREE with the side you were assigned to. (The mark of a successful writer is that they can write about any topic convincingly, and we would like to see how well students can do that.)

There are times in life when it’s undeniable that fate plays a role in determining personal outcomes; and sometimes, there are inexplicable turns in events that leave you frustrated. Life is full of uncertainty, and almost everybody has experienced some situations in which they have made tremendous effort but still cannot get what they want. As the famous saying goes, “resign yourself to your fate and be guided by your destiny.”

Please write an essay to support this idea. You can give some examples to make your essay convincing. (Min 50 words).

Appendix 6

You are RANDOMLY selected to be either “for” or “against” this issue. Please try to write a convincing essay EVEN IF YOU DO NOT AGREE with the side you were assigned to. *(The mark of a successful writer is that they can write about any topic convincingly, and we would like to see how well people can do that.)*

Indigenous people of the Americas have a legend about a man and his horse. One day he led his tribe members to hunt a bison but came back empty-handed. This was very bad for the indigenous people since they had to stay hungry until hunting again next day or even later. However, on their way back, the man accidentally found a wounded wild horse in a small valley. Horses are precious resources for American Indians, and everybody was happy for him since he was getting a horse without any effort. However, the man said, "How can you know it isn't a bad thing?" Soon, the man healed the wounded horse and tried to ride on it and fell off, breaking his leg. Again, people in his tribe came to comfort the man, but he said, "How can you know it isn't a good thing?" Some months later, a war broke out, and all the men in the tribe were recruited for the war. The man did not have to go to the war because of his broken leg.

Please write an essay in support this idea. You can give some examples to make your essay convincing. (*Min 50 words*).

Please read the scenarios below and provide your estimation. Take your best guess and do not look it up on the Internet. Write down the dollar amount under each question. Please give a realistic amount.

Suppose you were walking along the beach recently when you found a gold ring in the sand. Unbeknownst to you, the ring had been purchased in 1985. According to World Jeweler, an international jewelry appraisal publication, the ring was worth 100 Dollars at the time it was purchased. How much would the ring be worth **today**?

Your estimation: \$ _____

Appendix 7

Please read the scenarios below and provide your estimation. Take your best guess and do not look it up on the Internet. Write down the dollar amount under each question. Please give a realistic amount.

Suppose your family purchased a municipal bond for 100 dollars in 1985. The bond has not yet matured. If it is cashed in the year 2045, how much would your family get **then**?

Your estimation: \$ _____

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