The Special Fragility of Time: Time-Insensitivity and Valuation of Near and Far Future

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Consumers and managers often decide among options available at different future times. We propose that the temporal dimension is fragile, in that choices are insufficiently sensitive to the temporal dimension and such sensitivity as exists is exceptionally malleable, unlike for other dimensions such as money, which are attended by default. We develop a discount function that separates impatience from time-sensitivity, and in four studies we selectively manipulate time-sensitivity, where increased time-sensitivity results in less discounting in the near future and more discounting in the far future. In contrast, in two studies identical manipulations have little effect on the money dimension, irrespective of whether money or time is initially the most influential dimension.

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SYMPOSIA SUMMARY
Subjective Time and Decisions: The Role of Perception and Experience of Time in Consumer Decision Making

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SESSION OVERVIEW

Almost every decision that a consumer engages in has a temporal dimension. For instance, consumer decisions on which shipping option to choose and how long to wait for service, whether and when to save for future, decisions to keep on waiting on hold when calling customer service or renege from queue, all involve time decisions. While oftentimes the end behavioral variable studied varies, e.g., line chosen, time delivery option, renege or stay; most of them deal with first making a time estimate that is often biased that then leads them to display a downstream behavior. Prior research in different domains have often looked at this problem as either a pure time perception problem or alternatively as an intertemporal decision with the implicit or explicit assumption that time perceptions are unbiased and it is the outcomes valuation that changes at different points in time. Unlike previous research, the three papers in this symposia systematically study how consumers perceive and experience time, and point out the important consumer behavior implications in intertemporal as well as non-temporal settings. Specifically, these three papers explore

• Whether and to what extent consumers’ subjective time estimates map onto objective time (papers 1 and 3).
• Whether consumers pay adequate attention to time in their consumption decisions (papers 2 and 3).
• The implications of time insensitivity to intertemporal presences (papers 1 and 2) and to consumer decision making (paper 3).

Collectively, the three papers in this symposium provide new insights about consumer decision making, by focusing on the role of subjective time. Most of the prior research in this domain focused on the valuation of outcomes. Alternatively, these three papers show that consumers might be innately insensitive to time and have biased duration estimates, which affect a variety of consumer phenomena. The first paper illustrates that subjective time estimates are more compressed than objective time and that this difference is sufficient to account for hyperbolic discounting. Further supporting this idea, the results of the second paper indicate that insensitivity to objective time is unique to this dimension and does not present itself in others like money. Lastly, the third paper illustrates one very important consumer implication of malleable time perceptions, by showing that satisfaction with the service can be influenced by subjective estimates of pre-service and service time. Following the three papers, the discussant, Drazen Prelec, will comment on how the three papers inform and qualify the findings of previous research. He will also comment on some of the ways in which the three papers offer diverging perspectives on the common theme of the session. Discussant will then engage the audience by inviting questions, comments, and future research ideas.

EXTENDED ABSTRACTS

“Discounting Time and Time Discounting: Subjective Perception and Intertemporal Preferences”
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Research on intertemporal decisions has shown that people are biased towards current or near future events (e.g., O’Donoghue and Rabin 1999; Thaler 1981). In particular, one of the most important and robust findings in choice over time-hyperbolic discounting—demonstrates that the tendency to prefer a sooner-smaller outcome over a later-larger one (i.e., delay discounting) decreases as the time horizon gets longer.

Many models have been proposed to describe and explain preferences that show hyperbolic discounting (e.g., Ainslie 1975; Loewenstein & Prelec, 1992). Although varying in their specifications, all these models have two things in common: (1) incorporating objective time horizon in the model and (2) attributing present bias to changes in the valuation of outcomes at different points in time. That is, all models imply non-constant discounting of value in relation to objective (linear) time. Thus, these models overlook the possibility that how people perceive time (i.e., subjective time horizon) affects the valuation of outcomes over time.

Consistent with the Weber-Fechner Law, in this work we suggest that people are less sensitive to changes in objective time horizon and such insensitivity to time horizon leads to a declining rate of discounting with increased time intervals. Specifically, we predict that when examining individuals’ implicit discount rates using subjective assessments of duration (compared to objective, linear duration), they appear more consistent and the discount rates implied in their preferences over time show a reduced level of hyperbolic discounting.

In study 1, we measured subjective mapping of prospective time horizons (3 months, 1 year, or 3 years) and discount rate for
deferring an outcome (i.e., $75 gift certificate) over these horizons. Subjective assessment of time horizon was measured by providing a 180mm continuous line. Results show that subjective time horizon is far more compressed and less sensitive to changes than objective time horizon (time horizon growth: $M_{3\text{mos}→1\text{year}}=24\%$, $M_{1\text{year}→3\text{years}}=32.33\%$). For discount rate, we replicated the standard pattern of hyperbolic discounting when objective time was used in the calculations ($M_{3\text{mos}}=159.73\%$, $M_{1\text{year}}=82.82\%$, $M_{3\text{years}}=35.67\%$). However, when subjective estimates of duration are used, discounting no longer follows a hyperbolic pattern, but is instead more constant with time horizon ($M_{3\text{mos}}=214.46\%$, $M_{1\text{year}}=276.04\%$, $M_{3\text{years}}=350.47\%$). In study 2, we replicated the findings with a within-subjects setting (i.e., 3 months and 12 months). As in study 1, subjective time horizon is less sensitive to changes than objective time horizon (time horizon growth: $M_{3\text{mos}→12\text{mos}}=37\%$). Furthermore, discounting based on subjective estimates of time is not hyperbolic, but rather it shows the opposite effect ($M_{3\text{mos}}=111.64\%$, $M_{12\text{mos}}=167.09\%$).

In study 3, we changed participants’ perception of time by manipulating sensitivity to time horizon. Prior to the estimation and discounting task (1 month & 3 months), half of the participants in the long time horizon condition considered and estimated the duration of activities that take many years to complete (e.g., completing education including all degrees/breaks). The other half (the short time horizon condition) considered activities that take shorter times (e.g., taking a shower). Results show that participants compressed time horizon more with long time horizon than with short time horizon (time horizon growth: $M_{\text{long}}; 1\text{mo}→3\text{mos}=50.28\%$, $M_{\text{short}; 1\text{mo}→3\text{mos}}=67.44\%$). Importantly, when discount rates were calculated with objective time, present bias was reduced in the long time horizon condition ($M_{\text{short}}=231.05\%→138.90\%$, and $M_{\text{long}}=176.57\%→143.22\%$). When subjective estimates of time horizon are used, discounting is constant with time for those who were primed with short time horizon and increasing with time for those who were primed with long time horizon. ($M_{\text{short}}=295.81\%→250.05\%$, and $M_{\text{long}}=232.99\%→327.44\%$).

In conclusion, we show that subjective estimation of time horizon is less sensitive to changes than objective time horizon. When discount rate is calculated using subjective estimates of duration, discounting is not hyperbolic but is either constant or increasing with time. These results imply that people show a hyperbolic pattern of discounting not because they discount outcomes hyperbolically over time, but because their perception of time is not sensitive to changes in objective time. In addition, when primed with long time horizon, hence compressing time horizon more, people show reduced present bias compared to when primed with short time horizon. But even more than the effect itself, these findings provide a different theoretical perspective than other current behavioral theories of intertemporal choice, which all focus on the psychology of perceived value of outcomes over different periods due to either affective or cognitive mechanisms. Our findings suggest that the psychology of time perception, and not simply outcome value, plays an important role in choice over time.

“The Special Fragility of Time: Time-Insensitivity and Valuation of Near and Far Future

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The temporal dimension is an unavoidable but problematic component of many decisions. Managers choose between long-term and short-term goals; investors choose how much to put aside for retirement or for the deposit on a house in five years; people exercise to lose weight for an upcoming vacation or to remain healthy in later years; governments decide whether to drill for oil and satisfy demand in the near term or not to drill and preserve the environment for future generations. The value people place on different points in the future matters in such decisions, and evidence suggests that the value people place on the future is not quite what it should be.

Normative concerns often expressed in writings and research are that people are commonly myopic, not valuing the future enough (e.g., as discussed in Ainslie (2001) and Loewenstein (1992) and they discount future utility according to a hyperbolic, rather than compound, function (Ainslie and Haslam 1992; Green et al. 1994; Rachlin et al. 1991), showing dynamically inconsistent choices (Ainslie and Haendel 1983; Green et al. 1994; Thaler 1981), where an individual does not choose according to plans that were optimal from an earlier vantage point.

Here we provide a new theoretical diagnosis, supported by fresh experimental evidence, about the root cause of the problems with time. Consistent with other research that suggests that people are insensitive to or neglect some aspects of time (Frederickson and Kahneman 1993; Redelmeier and Kahneman 1996; Block and Zakay 1997), we propose that in the valuation of future events the temporal dimension is fragile in a dual sense. First, choices are insufficiently sensitive to the temporal dimension. Second, such sensitivity as exists is exceptionally malleable: certain manipulations can easily compromise it while others can easily enhance it. In this respect, we suggest that time behaves differently from other attributes, such as money or outcome quality. Unlike a money amount, which is difficult to ignore, the temporal dimension has an ‘optional status’—it can be pushed into the background or become a key concern, depending on incidental aspects of the choice situation.

We conceptualize sensitivity as the impact of time variation on value variation, developing a discount function that allows the separation of impatience from time-sensitivity. In four studies, we show that time-sensitivity is susceptible to manipulations that draw attention to or facilitate processing of the time dimension, while impatience remains unchanged. As a result discounting changes in a characteristic way: with greater time-sensitivity people show less discounting in the near future and more discounting in the far future. In three of these studies, we also find that the time dimension seems especially vulnerable and susceptible to manipulation, relative to other dimensions.

In study 1, we show that time-sensitivity, rather than discounting per se, is enhanced in a within-subject design. Consequently, discount rates measured within-subject rather than between-subject are smaller for the near future, but larger for the far future. In study 2, time-sensitivity is compromised by requiring subjects to make a decision under time pressure. This selective vulnerability of the time dimension obtains even though in the baseline “unlimited time” condition the time dimension shows up as the most important (of three) dimensions in relative weight terms. Hence, time pressure does not simply cause subjects to focus attention on the most important attribute, as one might have supposed. Rather, with pressure, the time dimension becomes neglected in favor of an alternative dimension, one that was less influential with unlimited time.

In studies 3 and 4 we examine further this special vulnerability of the time dimension. Time-sensitivity is enhanced if subjects are asked to attend to the time dimension (Study 3), or are provided with an analogue visual cue (Study 4). However, when these same manipulations are directed toward the money dimension, we do not observe any increase in the influence of money. Hence, the money dimension is attended without specific instruction, or without
visual bolstering of magnitude. This is the case whether time or money is initially the more influential dimension, suggesting that time is naturally neglected in contrast to money, which is naturally carefully attended.

“How Long You Received Service Determines How Long You Thought You Were in Line: Role of Fairness and Prior Expectations”

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Customers can wait before, during or after a transaction; that is pre process, in-process and post-process (Dube-Rioux, Schmitt, and Leclerc 1988). For example, in a retail checkout scenario, a pre-process wait would occur as one waits in line at a checkout queue; an in-process wait would occur as one has their items being scanned; and a post-process wait would occur after the items are scanned and one is waiting to leave the store. In most service contexts, pre-process waits are considered queue time where the customer is waiting to be served (e.g. call to CVS waiting to be answered), while in-process waits are termed service time (e.g. call time with the pharmacist).

While there exists prior research on the differential effect of delays on these stages of the waits on satisfaction; there exists no prior work on how consumers perceive their wait in queue (pre-process wait) based on how long they have been serviced (in-process wait). For example, imagine the following scenario: A customer calls IRS and waits on a telephone queue for 30 minutes (pre-process wait). Subsequently, she speaks to the IRS representative for either 2 minutes or 20 minutes (in-process wait). Would perceived duration of the time in queue (i.e. 30 minutes), vary due to the length of the service (i.e. 2 or 30 minutes)? Is so, why? In our research we hypothesize that duration of service time is likely to affect perception of queue waits. We base this on the notion that consumers hold norms that relate the length of wait for length of service. Violation of these norms we hypothesize leads to perceived unfairness that subsequently affects perceived duration (Katz, Larson, and Larson 1991).

A 2*2 pretest that tested for queue length (short/long) and service time (less/more) revealed support for the fact that shorter service times exacerbate perceptions of queue waits. A field study was then conducted at a leading supermarket chain. Using stopwatches, actual time spent waiting in line and at a teller was recorded. Customers exiting the line were then asked to provide process feedback on what thoughts passed through their mind as they were waiting in line and as they were being serviced. Analysis revealed that when individuals had prior knowledge of the service time (i.e. duration of the study) they form norms of reasonable waits; and if individuals have no prior knowledge of the service time (i.e. duration of the study) they actively engage in comparing service time to queue time.

REFERENCES


