

**Chronic Overcommitment: The Role of Opportunity Cost Consideration in Time
Commitment Decisions**

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Abstract

The present paper examines how proposal bracketing and opportunity cost consideration impact people's willingness to accept future time commitments in attempt to understand systematic biases in decision making in the time domain. In two studies participants were asked to report their willingness to commit for either a defined or ambiguous time commitment with the presence or absence of an explicit opportunity cost prompt. Study 1 asked about a commitment in the near future (tomorrow), while Study 2 asked about a commitment farther in the future (a week from tomorrow) for which perceived time constraint would be lower and construal would be higher. Opportunity cost prompting led to greater reported opportunity cost consideration in both studies but only decreased willingness to commit in the near future and not in the far future. Additionally, defined bracketing led to greater opportunity cost consideration in the near future only but had no impact on willingness to commit in the near or far future. It is not clear if the null effects are due to manipulation and measurement weaknesses or the invalidity of the hypothesized mechanism, but looking at the pattern of significant simple effects within and between studies suggests that further research on the interaction of temporal distance, bracketing and opportunity cost consideration may be warranted. Limitations of the studies, implications of the findings, and future directions are discussed.

Introduction

Many of us are familiar with constantly feeling constrained for time, of feeling that we simply do not have enough hours in the day to accomplish all that we need to do. Despite constant constraint, we continue to make time commitments as if we will have more time in the future. So, why do not appear to realize that we will be no less busy in the future than we are today? Are there cognitive biases dictating our decisions about future time that lead to chronic overcommitment? Research has shown that people feel and behave as though they will have more spare time in the future than they do now. Thus, they avoid imposing time costs now, oftentimes in exchange for larger costs in the future, only to feel equally as time constrained at that later date (Zauberman and Lynch, 2005). However, there is lack of mechanistic explanation for this overestimation. This paper seeks to understand what drives the apparent misperception of future time constraint that causes chronic overcommitment.

A great deal of research has examined manipulations that impact how people make choices about spending their money. Central to this research are mental accounting and opportunity cost consideration, both of which prompt people to consider tradeoffs and help limit spending (Frederick et al., 2009; Spiller, 2011; Heath & Soll, 1996; Thaler, 1999; Prelec & Loewenstein, 1998). Previous studies have shown strong ties between mental accounting and opportunity cost consideration for money, but this connection has not been hashed out for time. Given that time is a valuable resource with distinct properties from money, extending this literature to the time domain is an interesting avenue for research. This paper examines factors that impact time commitments decisions. Namely, it tests how the bracketing and temporal distance of a time commitment impact opportunity cost consideration and, in turn, willingness to commit in the near and far future.

Literature Review

Slack Theory and Intertemporal Choice

There is a vast (and growing) body of research on how people make choices over time. These studies examine how people trade off their present and future preferences, and in general, find that people are present biased and prefer smaller rewards now to larger rewards in the future (Frederick, Loewenstein, & O'Donoghue, 2002, Soman et al., 2005). For a long time, this research focused on money and consumer goods, but it has generalized into other domains like health outcomes (Chapman, 1996), all of which confirm delayed discounting behaviors. It has also been shown that greater temporal distance leads to greater abstraction in the construal of events, making the conceptualization of events that are farther away less concrete (Trope & Liberman, 2003). Distorted perception of events farther in the future may make it difficult to make time consistent decisions.

In 2005, Zauberman and Lynch extended this research to examine people's intertemporal preference regarding time itself. They presented the concept of 'slack,' which they define as "the perceived surplus of a given resource available to complete a focal task without causing failure to achieve goals associated with competing uses of the same resource." They show that for both time and money, people prefer to incur larger costs in the future because they anticipate having greater slack. And most pertinent to the present research, they show that people predict greater growth in their time slack than in their money slack, meaning that people expect to have significantly more spare time in the future than they do now (Zauberman & Lynch, 2005).

In later work specifically examining financial slack, another group of researchers concluded that anticipated slack growth is driven by people focusing on their growing income, but neglecting their growing expenses (Berman et al., 2016). That paper focused entirely on

money, but it provides good insight for exploration in the time domain. Expense neglect seems particularly pertinent for time. Unlike money, time supply is fixed; we can never acquire more than 24 hours in a day, but we can acquire more money. Thus, our perception of spare time must be driven largely by our awareness and perception of future time expenses, rather than future time supply, because supply remains constant. Parsing out how the consideration of existing future commitments impacts willingness to accept another future commitment is at the crux of this paper.

Opportunity Cost Consideration

Likewise, there has been major growth in the study of opportunity cost consideration in choice. An opportunity cost is an alternative that is foregone when one option is chosen. Normative economic theory states that people spontaneously consider opportunity costs when they make decisions, which was endorsed as a behavioral assumption by many researchers for a long time (Becker et al., 1974; Okada & Hoch, 2004). However, research over the past decade suggests that spontaneous opportunity cost consideration may not be the case. Frederick et al. (2009) demonstrate in various studies that people do not necessarily spontaneously consider opportunity costs when making purchase decisions. They find that the willingness to spend money decreases or the selection of cheaper alternatives increases when participants are prompted to consider other possible uses of their money. If people already spontaneously considered opportunity costs, then prompting them to do so would not impact their choices, which that paper showed is not the case.

Other research has identified factors that affect whether or not opportunity costs are considered. First, cognitive accessibility of alternatives affects their likelihood of being considered. Awareness of an alternative is often not sufficient for it to be considered as an

opportunity cost, and a prompt may be necessary to retrieve the option from memory (Mitra & Lynch, 1995). The likelihood of retrieval of a particular alternative may be impacted by the frequency of that alternative's retrieval and the association it has with the category in consideration (Posavac et al., 1997). Category-specific consideration may be prompted through mental accounting or the use of resource-specific payments, like gift cards (Heath & Soll, 1996). Spiller (2011) proposes that the narrower the category of consideration, the more likely it is to prompt people to consider opportunity costs, which was evidenced by participants being more likely to consider opportunity costs when using Starbucks gift cards than when using Visa gift cards. Perceived resource constraint also impacts opportunity cost consideration. Spiller (2011) showed that when participants imagined they had less money available to them, they reported greater opportunity cost consideration in a purchasing decision. In line with this finding, Zauberman, Spiller and Lynch (2016) argue that when individuals do not feel constrained, they make decisions without feeling the need to consider the alternatives they are foregoing. Therefore, lack of perceived time constraint in the future may drive people to neglect the competing uses of their future time, and thus, increase their willingness to make commitments.

Mental Accounting

Mental accounting is the practice of mentally budgeting and accounting for expenditures in different categories. Categorical budgeting is often used as a self-control mechanism to help weigh tradeoffs between categories (Thaler, 1999). The literature on mental accounting has focused on financial and consumption decisions, yielding a few important behavioral effects. First, and most importantly, labeling resources decreases their fungibility. This means that once a resource is budgeted for a specific purpose, people are less likely to reallocate that resource for a different purpose (Thaler, 1999; Heath & Soll, 1996). For example, if a person has spent the

majority of their transportation budget in a given month, and they unexpectedly need to pay to repair a flat tire, they might be more likely to take out a payday loan than they would be to pull from their entertainment budget to pay for expense. Further, mentally budgeting and mentally prepaying for future expenses decouples the cost from the consumption. This makes consumption more enjoyable because the cost had been accounted for in the past and the present payment does not contaminate the enjoyment of consumption (Prelec & Loewenstein, 1998). Thus, there may be both practical and hedonic motivation to mentally account for future time costs. Furthermore, one study found that when proposed with an ambiguous but desirable proposal, people interpret it advantageously to fit within their mental accounting constraints to justify accepting it (Cheema & Soman, 2006). Thus, the specificity or bracketing of a proposal may impact how it is considered within a mental accounting framework.

Research on the mental accounting of time has found that people do not demonstrate the sunk cost fallacy for time, meaning that how time was spent (or lost) in the past does not impact future decisions the way it does for money (Soman, 2001). Perhaps the lack of influence of past time spending on future time spending may contribute to people's tendency not to correct for their overcommitment. However, other research has shown that people may mentally budget their time into work and non-work accounts, and that the source of newly available time (i.e. a work vs. non-work activity gets cancelled) will impact how that time is reallocated (Rajagopal & Rha, 2009). This type of budgeting would require careful consideration of tradeoffs, which could make opportunity costs highly salient. However, it may be that even uncategorized accounting of time might similarly impact perceived constraint and opportunity cost consideration. If time is labeled for something, whether it is a hard commitment or a plan for things to accomplish during an hour, we might be less likely to reallocate it if a conflicting proposal arises. Thus, in

consideration of existing research, it seems that the mental accounting of time may impact the consideration of opportunity costs and how willing we are to make commitments.

Time as a Resource

Existing research has shown that consumers treat time differently than money. First, time, by nature, is less fungible than money. It cannot be stored for later use, cannot be recovered if it is lost and cannot be transferred from one transaction to another (Leclerc et al., 1995). This inflexibility of time may impact decisions, as we have limited ability to align supply and demand for the resource. Further, some researchers find that time has a more ambiguous value and is less deliberately exchanged, making precise opportunity cost consideration more difficult (Okada & Hoch, 2004). As mentioned above, people tend to be overly optimistic about the amount of spare time they will have in the future (Zauberman & Lynch, 2005). A 2007 study showed that when people considered larger time accounts, such as weeks instead of days, time costs appeared relatively less valuable (beyond the proportional difference in valuation that would be expected) (Morewedge et al., 2007), which may help explain why people discount future time so greatly. Further, Jhang and Lynch (2014) show that people may feel especially time constrained in the present moment due to in-progress pursuit of goals and sub-goals, causing an asymmetric perception of present busyness and discounting of the future. Finally, in developing a general propensity to plan scale, Lynch et al. (2009) find that individuals have domain-specific tendencies to plan how they will spend both time and money. They found that people demonstrate a greater propensity to plan to for time than money and are more likely to plan their time in the short run than in the long run. They suggest that people plan in response to perceived constraint, and that planning further enhances the feeling of constraint. Perception of greater time constraint in the short run may help explain the extreme discounting of future time (Lynch et al.

2009). Further, Frederick et al. (2009) suggest that tightwads (those who tend to avoid spending money) more spontaneously consider opportunity costs. To the extent that stringent time planning is analogous to careful money spending, it would make sense that those who are prone to planning may be more likely to consider opportunity costs for time.

The Present Paper

This paper contributes to the literature by examining the role of opportunity cost consideration in time commitment decisions, particularly investigating the impact of bracketing and opportunity cost prompting on willingness to accept a commitment. Because of intertemporal preference inconsistency and differential perception of events farther in the future (Soman et al., 2005, Trope & Liberman, 2003), one study examines this in the near future and one in the far future to see if the mechanisms hold at different temporal distances. The two studies test the following hypotheses.

H₁: Opportunity cost consideration decreases willingness to commit in the near and far term.

H₂: Defined bracketing will induce greater spontaneous opportunity cost consideration in the near and far term, and thus, opportunity cost prompting will decrease willingness to commit more for ambiguously bracketed commitments than for defined commitments.

Study 1- Bracketing, opportunity costs, and willingness to commit in the near future

The purpose of Study 1 is two-fold. First, it tests whether or not people spontaneously consider opportunity costs when making time commitments for the near future and how the bracketing of proposed commitments impacts opportunity cost consideration. Second, it evaluates if opportunity cost consideration impacts a person's willingness to commit.

As mentioned above, the mental accounting and opportunity cost literature have shown that narrow bracketing makes it easier to recruit alternative options (Heath & Soll, 1996), and

ambiguous proposals can lead to a weaker adherence to mental accounting practices and higher willingness to accept (Cheema & Soman, 2006). The opportunity cost literature has also shown that the recruitment of alternatives causes people to choose more inexpensive options (Frederick et al., 2009). This study proposes that because people implicitly understand that time is not fungible and therefore naturally tend to avoid scheduling conflicts, when they are presented with a defined time commitment, they spontaneously consider opportunity costs for that window. However, when the time window is more ambiguous, it will prompt less opportunity cost recruitment and, thus, they will be more likely to agree. It is important to note that a greater willingness to accept an ambiguous proposal is expected for some purely practical reasons (in addition to cognitive reasons), as it makes sense that people would have conflicts for a defined time window but may be available during the broader time window that encompasses it. We are more interested in analyzing the interaction effect of between the opportunity cost prompt and the bracketing of the commitment.

We predict that there will be a negative main effect for opportunity cost consideration, as those prompted to consider opportunity costs will be less likely accept the commitment. Further, we predict a negative main effect of proposal bracketing on willingness-to-commit for the defined commitment, as the defined time window prompts more recruitment of conflicting alternatives. Finally, we predict an interaction effect whereby the opportunity cost prompt decreases the willingness to commit for the ambiguous commitment more than for the defined commitment. While the main effects are important, we are particularly interested in the interaction effect. If the opportunity cost prompt differentially impacts willingness to accept for ambiguous and defined time commitments, this would suggest that bracketing induces different levels of spontaneous opportunity cost consideration.

Methods

Participants and Design

Participants were recruited from Amazon's Mechanical Turk (M-Turk) online survey platform (n=310, Female=134); 11 participants were removed for failing an attention check. They completed an online survey for compensation. This study employed a 2 (bracketing: 'defined' vs. 'ambiguous') x 2 (opportunity cost prompt: 'opportunity cost' vs. 'not') between-subjects design in which subjects were randomly sorted into one of four conditions.

Procedure

All participants were asked how willing they would be to accept a potential time commitment. Those in the 'defined' conditions were asked about their willingness to commit to something 3pm-5pm tomorrow afternoon, while those in the 'ambiguous' conditions were asked about a 2-hour commitment tomorrow afternoon. Those in the 'opportunity cost' conditions saw a sentence prompting them to consider other potential commitments they may have, while those in the 'not' conditions did not see that sentence. Below is the prompt for the defined/opportunity cost condition. The opportunity cost manipulation was inspired by Frederick et al., 2009.

Your friend is having a minor medical procedure tomorrow and needs someone to accompany her to and from the doctor's office. She would need your help from 3pm to 5pm tomorrow afternoon. Consider other commitments you may have and tasks you may need to accomplish at that time. How willing are you to commit to helping?

Prompts for all four conditions are included in the Appendix. Participants were then asked to indicate how willing they would be to commit to helping (11-point Likert scale 1-*Very unwilling* to 11-*Very willing*). Past opportunity cost consideration studies have used the choice distribution amongst a range of cheap to expensive options or willingness to pay measures to assess the impact of opportunity cost consideration (Frederick et al., 2009; Spiller, 2011), as

greater opportunity cost consideration decreases your willingness to spend money. This study employs a similar strategy, using a ‘willingness to commit’ measure. This time commitment was chosen because it was widely relatable to different age groups, demographics and occupations. Also, we felt that people would report their willingness to commit largely based on their ability to commit, rather than individual preferences about time spending. There is pressure to help your friends and to not back out of commitments, which would help yield honest responses on willingness to commit. This was followed by two manipulation checks intended to see if those in the ‘opportunity cost’ and ‘defined’ conditions would self-report considering opportunity costs more than those in the ‘not’ and ‘ambiguous’ conditions. They responded to each of the following on a 6-point Likert scale (1-*Strongly Disagree* to 6-*Strongly Agree*).

- 1) To what extent do you agree with the following statement? I considered my other time commitments and available spare time tomorrow when deciding how willing I would be to commit.
- 2) To what extent do you agree with the following statement? Helping my friend tomorrow would limit my ability to complete other things that I need to do.

Additionally, they were asked to complete Lynch et al.’s (2009) short run propensity to plan for time scale to test for correlations between planning behavior and willingness to commit (included in the Appendix). The scale includes rated measures such as “I set goals for the next few days for what I want to achieve with my time.” With planning being akin to mental accounting, those who are more likely to plan their time may be more aware of their upcoming commitments and thus naturally consider opportunity costs, which may make them less susceptible to the manipulations. Finally, they were asked to report how often they feel rushed or pressed for time (1-*Never* to 5-*Always*) to test for correlations between self-reported busyness and willingness to commit.

Results

(All data are summarized in tabular form in the Appendix)

Willingness to Commit

A two-way ANOVA test with bracketing and opportunity cost as between-subject factors revealed that there was no significant interaction between these factors and willingness to commit $F(1, 306)=0.321, p=0.571$. There was no significant main effect for bracketing on the willingness to commit between the ‘ambiguous’ ($M=9.17, SD=2.40$) and ‘defined’ ($M=8.88, SD=2.58$) groups, $F(1, 306) = 1.09, p=0.30$. However, as expected, there was a significant main effect for the opportunity cost prompt such that those who did not see the prompt on average were more willing to commit ($M=9.49, SD=1.97$) than those who did see the prompt ($M=8.53, SD=2.87$), $F(1, 306) = 11.75, p<0.00$. These results are summarized in Figure 2.

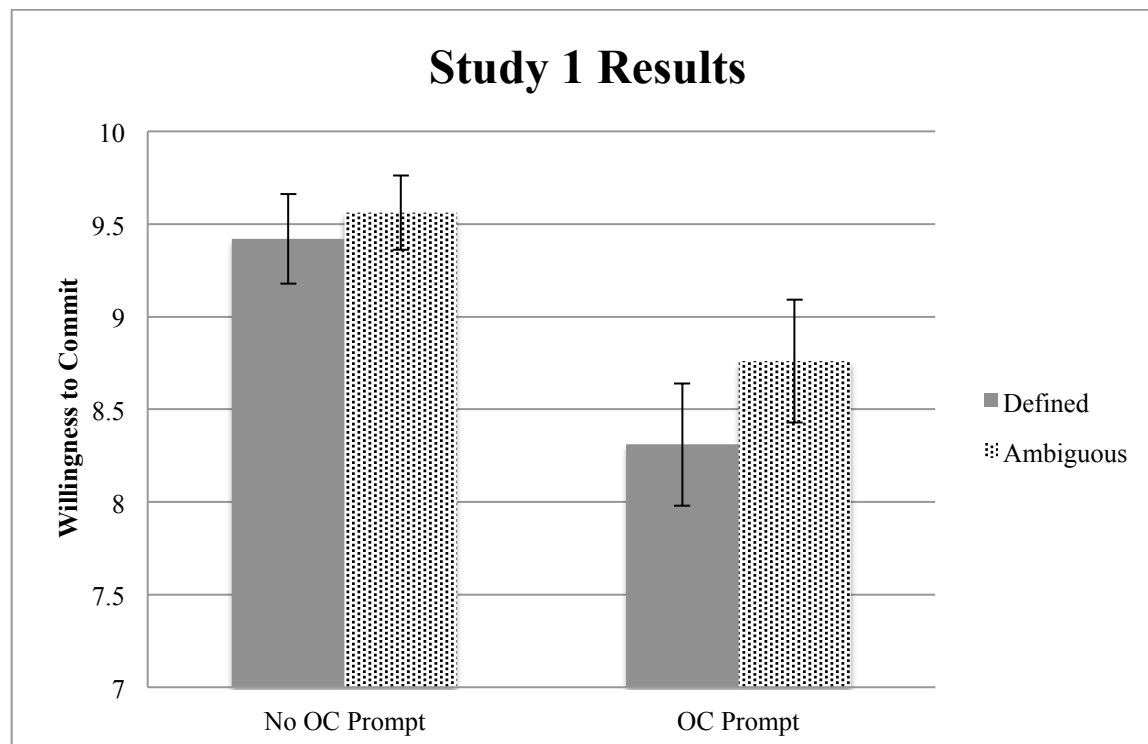


Figure 2: There was a negative main effect for the opportunity cost prompted, no main effect for bracketing and no interaction effect.

Manipulation Checks

We then checked for differences in our manipulation checks and covariates between conditions. A two-way ANOVA with bracketing and opportunity cost prompt as between subject factors revealed that there was no significant interaction between these factors and the first manipulation check measuring self-reported opportunity cost consideration $F(1, 306)=0.694$, $p=0.405$. As expected, those in the ‘opportunity cost’ conditions reported considering alternative uses of their time ($M=5.01$, $SD=1.01$) significantly more than those who did not receive the prompt ($M=4.47$, $SD=1.35$), $F(1, 306)=15.75$, $p=0.00$, and interestingly, those in the ‘defined’ conditions also reported considering alternatives ($M=4.88$, $SD=1.12$) significantly more than those in the ‘ambiguous’ condition ($M=4.58$, $SD=1.30$), $F(1, 306)=4.58$, $p=0.03$. A two-way ANOVA revealed no interaction between bracketing and opportunity cost prompting on believing that committing to help would limit their ability to complete other things they needed to do, $F(1, 306)=.64$, $p=0.43$. Those in the ‘opportunity cost’ conditions reported that helping their friend would limit their ability to complete other tasks more ($M=4.32$, $SD=1.29$) than those in the ‘not’ conditions ($M=3.86$, $SD=1.34$), $F(1, 306)=9.67$, $p=0.002$, but there was no significant main effect for bracketing, $F(1, 306)=1.40$, $p=0.24$.

Covariates

The propensity to plan measures were averaged and collapsed into a single propensity to plan score (as was done in Lynch et al., 2009), in which a higher score indicates a greater propensity to plan. A multiple linear regression was run using proposal definition, opportunity cost prompt, propensity to plan score, and self-reported busyness as explanatory variables to predict willingness to commit. We found that only opportunity cost prompt and busyness significantly negatively impacted willingness to commit ($\beta=-0.96$, $p=0.001$ and $\beta=-0.36$, $p=0.03$,

respectively), while propensity to plan and bracketing had no significant effect ($p=0.47$ and $p=0.30$, respectively). See Table 1 for regression details. However, this model only explained 5% of the variance in willingness to commit ($R^2= 0.05$, $F(4, 305) = 4.38$, $p= 0.002$), indicating that a large amount of the variability comes from factors outside of these. It is noteworthy that even when controlling for busyness and planning, the opportunity cost prompt remains a significant predictor, evidence of the robust effect of the opportunity cost manipulation.

Multiple Linear Regression predicting willingness to commit		
Indicator	Coefficient (SD)	P-values
Intercept	10.37 (.68)**	0.00
Busyness	-0.36 (.17)*	0.03
Planning	0.1 (.14)	0.47
Opportunity Cost (OC)	-0.96 (.28)**	0.00
Bracketing (Defined)	-0.29 (.28)	0.30

Table 1: This multiple linear regression from Study 1 demonstrates the significant negative effect of busyness and opportunity cost prompt on willingness to commit.

These results support the hypothesis that when prompted to consider opportunity costs, willingness to accept a time commitment in the near future decreases. There is some support for the hypothesis that defined bracketing induces greater spontaneous opportunity cost consideration, however, with no interaction between proposal bracketing and opportunity cost prompt and no main effect for bracketing, these results do not support the hypothesis that this in turn decreases willingness to commit. While this provides evidence for some of our hypotheses, it is important to examine if these effects hold or if new effects emerge for commitments farther in the future.

Study 2- Bracketing, opportunity costs and willingness to commit in the far future

Despite Study 1 showing some evidence that defined bracketing may prompt greater opportunity cost consideration, there is no evidence that this significantly decreases willing to

commit. This could be for a few reasons. It is possible that in the near term, people are so time constrained and aware of upcoming commitments that the subtle bracketing manipulation used in Study 1 (2 hours tomorrow afternoon vs. 3pm-5pm tomorrow afternoon) did not cause significant processing differences between the two. This study extends Study 1 to a commitment farther in the future to test how the bracketing manipulation and opportunity cost prompts impact willingness to commit when there is greater temporal distance, and thus decreased perceived time constraint (Zauberman & Lynch, 2005) and greater construal (Trope & Liberman, 2003).

It has been shown that in the money domain, perceived constraint can drive people to consider trade offs between alternatives (Spiller, 2011). It has also been shown that people perceive significantly less time constraint for the future than they do in the present (Zauberman & Lynch, 2005). Thus, we will use temporal distance to operationalize perceived time constraint for this study. Research on construal level theory and on delayed preferences suggest that time beyond a few days in the future is conceptualized very differently than time today or tomorrow (Soman, 1998; Trope & Liberman, 2003). Therefore, this study will mirror Study 1, but ask participants about a commitment a week from tomorrow, as that should be sufficient cognitively different from a proposed commitment for tomorrow. With less perceived constraint and higher construal of time farther in the future, competing time use may naturally be less salient and less concrete, thus our bracketing manipulation and opportunity prompt may induced significant differences in the processing of the decision. Again, we predict that there will be an interaction effect whereby the opportunity cost prompt will decrease willingness to accept more in the ambiguous conditions than in the defined conditions. Further, the opportunity cost prompt will have a negative main effect on willingness to commit, as lack of perceived constraint will induce very little spontaneous opportunity cost consideration, and thus, the participants will be impacted

by the prompt. Additionally, defined bracketing will have a negative main effect on willingness to commit, as temporal distance makes anything but previously scheduled commitments difficult to access from memory, and thus defined bracketing will bring to mind more competing uses of time than ambiguous bracketing.

Method

Participants and Design

This study employed a 2 (bracketing: ‘defined’ vs. ‘ambiguous’) x 2 (opportunity cost prompt: ‘opportunity cost’ vs. ‘not’) between subjects design. Again, participants were recruited from M-Turk (n=270, Female=135) and completed an online survey for compensation; all successfully answered the attention check question. Participants were randomly assigned to one of the four conditions.

Procedure

Participants read and responded to prompts nearly identical to those used Study 1, but the proposed commitment was for a week from tomorrow. Below is the prompt for the defined/opportunity cost condition.

Your friend is having a minor medical procedure a week from tomorrow and needs someone to accompany her to and from the doctor's office. She would need your help from 3pm to 5pm a week from tomorrow. Consider other commitments you may have and tasks you may need to accomplish at that time. How willing are you to commit to helping?

Prompts for all four conditions are included in the Appendix. As in Study 1, participants were then asked to indicate how willing they would be to commit to helping (11-point Likert scale 1-*Very unwilling* to 11-*Very willing*). This was again followed by the same two opportunity cost consideration manipulation checks as Study 1. Participants also responded to the same self-reported busyness measure and to an altered version of the short run propensity to plan for time

scale (Lynch et al., 2009) asking for measures of planning behaviors ‘over the next week’ rather than the ‘next couple of days.’ To check that people on average perceived more time constraint for tomorrow than for next week, participants completed Zauberman and Lynch’s (2005) slack measure.

“Think about your activities tomorrow and your available spare time. Now consider your likely activities and available spare time for the same day of the week next week. On which day do you expect to have more spare time?”

They responded on a 10-point Likert scale (1-*much more time available today* to 10-*much more time available next week*). An average score significantly above the scale’s mid-point of 5.5 would indicate that participants generally anticipate having more free time next week than tomorrow.

Results

(All data are summarized in tabular form in the Appendix)

Willingness to Commit

A two-way ANOVA test with bracketing and opportunity cost as between-subject factors revealed that there was no significant interaction between these factors and willingness to commit, $F(1, 266)=0.021, p=0.886$. There was also no significant main effect for proposal bracketing on willingness to commit between the ‘ambiguous’ ($M=8.85, SD=2.49$) and ‘defined’ ($M=9.11, SD=2.26$) groups, $F(1, 266) = 0.779, p=0.38$. Unlike Study 1, there was no significant main effect of opportunity cost prompt between those who did not see the prompt ($M=9.14, SD=2.26$) and those who did see the prompt ($M=8.83, SD=2.48$), $F(1, 266) = 1.16, p=0.28$. These results are summarized in Figure 2.

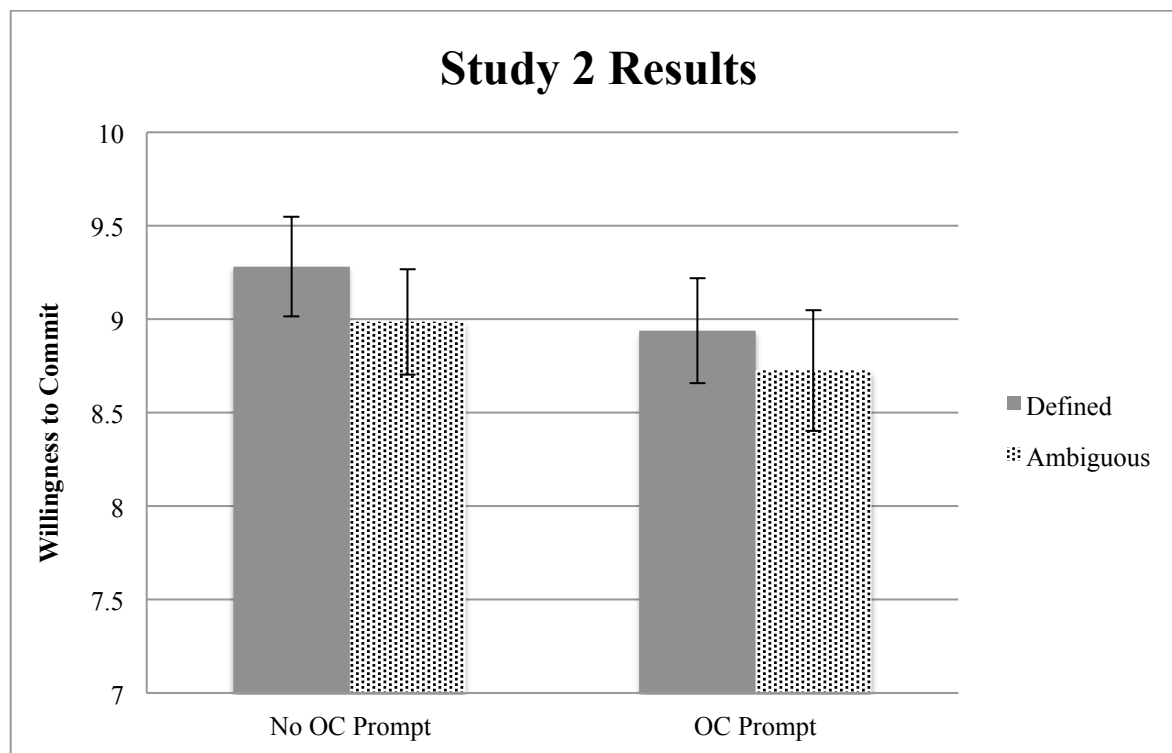


Figure 3: There was no main effect for opportunity cost prompt or bracketing, and there was no interaction effect.

Manipulation checks

Two-way ANOVA analyses were run on the opportunity cost manipulation checks with opportunity cost prompt and bracketing as between subject factors. For the first measure, there was no significant interaction between the factors and the extent to which participants reported considering alternatives in their decisions, $F(1, 266) = 1.16, p=0.283$. As in Study 1, those in the ‘opportunity cost’ conditions reported considering alternative uses of their time ($M=4.94, SD=1.10$) more than those who did not see the prompt ($M=4.60, SD=1.14$), $F(1, 266) = 6.48, p=0.01$. However, unlike Study 1, those in the ‘defined’ bracketing conditions did not report considering alternatives significantly more ($M=4.86, SD=1.10$) than those in the ‘ambiguous’ conditions ($M=4.67, SD=1.15$), $F(1, 266) = 2.22, p=0.138$. When examining the second opportunity cost manipulation check in which participants reported how strongly they believed

that committing to help their friend would limit their ability to complete other tasks, we again find no significant interaction between bracketing and the opportunity cost prompt, $F(1, 266) = 0.335, p=0.56$. Unlike Study 1, those in the ‘opportunity cost’ conditions did not agree with this statement significantly more ($M=3.72, SD=1.39$) than those who did not see the prompt ($M=3.82, SD=1.44$), $F(1, 266) = 0.335, p=0.56$. However, interestingly, those in the ‘ambiguous’ conditions reported believing that the commitment would limit their ability more ($M=3.93, SD=1.35$) than those in ‘defined’ conditions ($M=3.62, SD=1.47$) at a marginally significant level, $F(1, 266) = 3.43, p=0.07$. The difference in the result patterns for these two measures and between the two studies suggests that they may not both be measuring opportunity cost consideration. This will be discussed at greater length in the limitations section.

Slack Measure

Additionally, the slack measure indicated that participants expected to have more spare time a week from tomorrow than tomorrow, yielding an overall average slack rating of $M=6.41$, which was significantly above the midpoint of 5.5 on the scale $t(269)=6.14, p<0.00$. This is consistent with Zauberman and Lynch (2005) findings, and gives us reason to believe that participants considered the time commitment in this study differently than participants did in Study 1. We did, however, find some interesting differences between conditions. A two-way ANOVA with opportunity cost and bracketing as between subjects factors revealed no significant interaction between these factors on the slack measure, $F(1, 266) = 0.314, p=0.58$. There was no significant main effect for bracketing (defined- ($M=6.54, SD=2.54$), ambiguous- ($M=6.28, SD=2.36$), $F(1, 266) = 0.57, p=0.45$). However, those in the ‘opportunity cost’ conditions reported anticipating having significantly less free time next week ($M=5.97, SD=2.50$) than those in the ‘not’ conditions ($M=6.85, SD=2.30$), $F(1, 266) = 8.93, p=0.003$.

While not originally hypothesized, it is interesting that consideration of future opportunity costs may affect the perception of available spare time in the future.

Covariates

As in Study 1 and following Lynch et al., 2009, planning measures were averaged to generate a single propensity to plan score. A multiple linear regression similar to that of Study 1 was run in which busyness, planning, opportunity cost prompt and bracketing were used to predict willingness to commit. We find that self-reported busyness had a significant negative impact on willingness to commit ($\beta=-0.52$, $p=0.005$) while opportunity cost prompt, bracketing and propensity to plan did not have significant effects ($p=0.27$, $p=0.47$ and $p=0.96$, respectively). See Table 2 for regression details. However, as in Study 1, these factors explain a very small fraction of the variance in willingness to commit ($R^2= 0.04$, $F(4, 265) = 2.61$, $p= 0.04$). Therefore, it again seems that people's willingness to commit is largely impacted by factors not captured by this model.

Multiple Linear Regression predicting willingness to commit		
Indicator	Coefficient (SD)	P-values
Intercept	10.73 (.80)**	0.00
Busyness	-0.52 (.18)**	0.00
Planning	-0007 (.14)	0.96
Opportunity Cost (OC)	-0.32 (.28)	0.27
Bracketing (Defined)	0.21 (.28)	0.47

Table 2: Study 2 multiple linear regression model showing that only busyness significantly predicts willingness to commit.

These results do not support our hypothesis that for a time commitment farther in the future, greater opportunity cost consideration would lead to lower willingness to commit, despite evidence that there were differences in the extent of opportunity cost consideration between some conditions. There is also no evidence that defined bracketing induced great spontaneous

opportunity consideration, which we had found some evidence for in Study 1. While these results do not support our original hypotheses, looking at the different result patterns between our other secondary measures and between studies provides some helpful insights.

General Discussion

This paper sought to explore the decision-making mechanisms that impact people's willingness to accept future time commitments. Prior research about perceptions of present and future time constraint showed that people tend to believe they will have more spare time in the future, and thus, prefer to incur time costs later, despite often feeling overwhelmed when those commitments come to fruition (Zauberman & Lynch 2005). These studies aimed to parse out what might be causing this inconsistent behavior. Literature about consumption and finances has shown that people neglect opportunity costs when making decisions, but that explicit prompting, narrow choice bracketing and sense of constraint all reduce neglect (Frederick et al, 2009; Spiller 2011). This paper applied these concepts to the time domain to see if opportunity cost consideration (and the factors that impact it) influences our willingness to make future time commitments. It was hypothesized that considering opportunity costs would decrease willingness to make a future time commitment, and that defined bracketing would lead to greater spontaneous opportunity cost consideration.

In Study 1, we found that when prompted to consider the opportunity costs, participants were significantly less willing to commit than when they were when not prompted to do so. However, contrary to our hypotheses, there was no significant difference between participants' willingness to commit to defined and ambiguously bracketed time commitments in the near term, and there was no interaction effect with bracketing and the opportunity cost prompt. The lack of interaction effect and lack of main effect between the 'ambiguous' and 'defined' conditions

provides no evidence that bracketing affects overall willingness to commit due to increased opportunity cost consideration in the near future.

While it is difficult to interpret null results, it is possible that for time commitments in the near future, defined bracketing simply does not impact the degree of spontaneous opportunity cost consideration. As past research has shown, people are far more likely to plan their time in the short-run, which increases awareness of upcoming time commitments and increases perceived time constraint (Lynch et al, 2009). Therefore, it is possible that “3pm-5pm tomorrow” and “two hours tomorrow afternoon” conjured very similar considerations of competing uses of time, and thus, similar opportunity cost consideration. However, Study 1 provided some evidence that defined bracketing may have prompted greater opportunity cost consideration as demonstrated by higher ratings on the self-reported opportunity cost consideration measure for the ‘defined’ conditions. So, while the bracketing manipulation appeared to impact the cognitive processing of the decision, it simply may not have been strong enough to create a difference in willingness to commit. While it was originally hypothesized that ambiguous bracketing would increase willingness to commit, upon further consideration, it is not clear that this would necessarily be the case. People may actually be averse to committing to something for an undefined period of time because they cannot be sufficiently sure that they do not have a conflict. Thus, the impact of bracketing may not cleanly map onto our proposed opportunity cost consideration mechanism. Other factors are likely at play. Further investigation would be necessary to understand the interplay between bracketing, opportunity cost consideration and willingness to commit in the short run.

In Study 2, we found that some of the significant effects between conditions found in Study 1 did not hold. In Study 1, we saw a significant negative main effect of the opportunity

cost prompt on willingness to commit, but no main effect for bracketing and no interaction between the two factors. In Study 2, there were no main effects for either of these factors and again no interaction effect. The null results between conditions in Study 2 is not due to ceiling effect, as may have been expected given robust past findings of increased willingness to commit farther in the future (Zauberman & Lynch, 2005). The data in Study 2 show no evidence of a ceiling effect, and instead just smaller differences between conditions.

While we again are hesitant to draw inferences from the null results in Study 2, we can consider some preliminary hypotheses. First, despite those in the ‘opportunity cost’ conditions reporting greater opportunity cost consideration in our first manipulation check, they did not correspondingly report a lower willingness to commit. These null results could be partially attributed to our willingness to commit measure not capturing the effect of opportunity cost consideration for commitments farther in the future. Alternatively, it is possible that increased opportunity cost consideration may not impact willingness to commit farther in the future, and thus the null results may be valid. If time is perceived to be more fungible farther in the future, opportunity cost consideration may be less influential, as we believe that we have a greater ability to reallocate time in the future. To this point, the significant main effect of the opportunity cost prompt on willingness to commit in Study 1 was not replicated in Study 2, despite those who saw the opportunity cost prompt self-reporting greater opportunity cost consideration than those who did not see the prompt. It is not clear if the null result is due to weak manipulations or to legitimate mechanistic differences. Our data cannot inform us on this matter, but leaves open questions for future research. Given the robust impact of opportunity cost consideration in other contexts, its role for commitments in the distant future deserves further investigation.

Though not a primary goal of this paper, Study 2 yielded an interesting insight about

slack perception. After being asked about a commitment a week from tomorrow, those in the ‘opportunity cost’ conditions reported significantly lower slack measures, meaning that they did not perceive having as much free time the following week as those not in the ‘opportunity cost’ conditions. While this intuitively makes sense, it had not yet been shown that considering future opportunity costs can alter perception of future spare time. This suggests that the saliency of opportunity costs may not only impact local decisions, but also more global perceptions, an interesting contribution to both the opportunity cost and slack literature.

Limitations and Future Directions

While this paper aimed to evaluate how bracketing impacts opportunity cost consideration and how opportunity cost consideration impacts willingness to accept a time commitment in the near and far future, the findings and the methodology of the studies are limited in a few ways. First, participants in these studies were asked to make judgments about hypothetical time commitments. In turn, participants’ reported willingness to commit may have reflected their preferences to demonstrate dedication to their friend, rather than their actual ability to commit to the task. This may have made them less susceptible to manipulations, thus condensing the effects between conditions. Further, because of the hypothetical nature of the study, participants may not have considered their real world commitments when they imagined the proposed situation. However, those in the ‘opportunity cost’ conditions received the additional prompt to consider their existing activities, which may have signaled that the question should be answered as if it were a real world proposal, while those who did not see the prompt may not have considered it as seriously. Thus, it is unclear if opportunity cost consideration was actually driving the decreased willingness to commit in Study 1, or if those participants were in a less hypothetical mindset which made them provide more realistic answers. Our results cannot

inform us on this issue, but future studies using hypothetical time commitments should alter the opportunity cost manipulation to address this concern.

Second, we must address the validity of our two manipulation checks. In one measure, participants reported the extent to which they considered alternative uses of their time in their decision, and in the other, the extent to which committing would limit their ability to accomplish other tasks. While both items were intended to measure opportunity cost consideration, the data do not suggest that they were measuring the same thing. In Study 1, opportunity cost prompting increased ratings on both measures, while defined bracketing only increased reported alternative consideration. In Study 2, opportunity cost prompting increased reported alternative consideration only and defined bracketing decreased the belief that the commitment would interfere with other tasks. Manipulation checks that assess the same factor should be highly correlated or at very least produce similar patterns of results, which these did not. The first measure very clearly and cleanly asked the extent to which opportunity costs were considered, while the second measure tested whether or not they thought their commitment would compete with other time uses. The second measure may not have measured *if* opportunity costs were considered, but instead *how* they were considered. Thus, we cannot accurately call both manipulation checks for opportunity cost consideration.

Because we did not counterbalance the order of presentation, we cannot accurately infer reasons for the pattern of results between the two measures. However, the measure of consideration of alternatives was always shown first, so we feel that it can give us somewhat reliable insight into participants' responses to the willingness commit measure from earlier in the survey, from which we were able to draw the inferences detailed in previous sections. Differences between conditions for this measure shows that we successfully manipulated the

degree of opportunity cost consideration, though this did not necessarily change willingness to commit. We are not able to make strong inferences from the second measure, but it is clear that differentiating between ‘if’ and ‘how’ opportunity costs are considered could be an important factor to account for in future research.

Finally, Study 2 aimed to see if bracketing would impact opportunity cost consideration for decisions farther in the future because temporal distance may have allowed for greater susceptibility to manipulations. While these two studies effectively provided all eight cells of a 2 (bracketing: ‘defined’ vs. ‘ambiguous’) x 2 (opportunity cost prompt: ‘opportunity cost’ vs. ‘not’) x 2 (temporal distance: ‘tomorrow’ vs. ‘next week’) design, because they were run as two separate studies, the data could not be analyzed together. Although the results of these analyses would likely also be null with the present data, a design with more effective manipulations and including all of the factors would allowed for a greater understanding of their interactions and their impact on willingness to commit. While not clear from this study, it is possible that people have different levels of aversion to ambiguous commitments depending on their temporal distance. We can image that it could be taxing to commit to something ambiguous far in advance without being able to sufficiently check for conflicts or plan around it, making people less willing to commit to ambiguous commitment farther in the future. However, as demonstrated in the present studies, defined bracketing may increase opportunity cost consideration, so the effect of bracketing over time is not entirely clear. Thus, examining the interplay between opportunity cost consideration, temporal distance and bracketing is a natural avenue for future research.

Finally, these findings can naturally be extended to the study of planning behavior and can be extended to different populations. The Lynch et al. (2009) propensity to plan scale studies planning behavior in very general terms. However, anecdotally, we know that people vary

greatly in their planning practices, which may impact how they make decisions about future time. Comparing how making a to-do list versus explicitly scheduling time throughout the day impacts willingness to commit may help us parse out the difference between being aware of future time costs and actually mentally accounting for them. This topic could substantially contribute to the study of mental accounting, while also having relatable real world implications. Also, it would be interesting to study time commitment behavior specifically within a student population. For full-time students, more so than employed people, time is intrinsically valuable rather than financially valuable. Time commitment decisions for students would more heavily consider time opportunity costs rather than monetary opportunity costs, while this may not be the case for those in the labor force. While our pool of primarily labor force participants does not invalidate our results, examining a population for whom time is a more salient resource could provide particularly interesting insight into time usage decisions. The time high constraint and regularity of students' schedules may play heavily into the findings.

Conclusion

For many, chronic overcommitment is all too familiar. We can acknowledge our habits of taking on too many commitments, but despite negative results, we fail to change our behavior. This paper begins to examine the mechanism driving systematic biases in how we make decisions about future time commitments. If we can acknowledge our tendency to neglect future time costs, we can put in place decision-making practices to avoid this. This paper provides preliminary evidence of instances of opportunity cost neglect for time, and opens the door for future research about how other factors interact with this mechanism to create a more holistic picture of time commitment decisions. A clearer picture of the factors at play could help people devise better decision-making strategies for future time commitments.

Appendix

Prompts for Study 1:

Opportunity Cost/Defined:

Your friend is having a minor medical procedure tomorrow and needs someone to accompany her to and from the hospital. She would need your help from 3pm to 5pm tomorrow afternoon. Consider other commitments you may have and tasks you may need to accomplish at that time. How willing are you to commit to helping?

Opportunity Cost/Ambiguous:

Your friend is having a minor medical procedure tomorrow and needs someone to accompany her to and from the hospital. She would need your help for about 2 hours tomorrow afternoon. Consider other commitments you may have and tasks you may need to accomplish at that time. How willing are you to commit to helping?

No Opportunity Cost/Defined:

Your friend is having a minor medical procedure tomorrow and needs someone to accompany her to and from the hospital. She would need your help from 3pm to 5pm tomorrow afternoon. How willing are you to commit to helping?

No Opportunity Cost/Ambiguous:

Your friend is having a minor medical procedure tomorrow and needs someone to accompany her to and from the hospital. She would need your help for about 2 hours tomorrow afternoon. How willing are you to commit to helping?

Prompts for Study 2:

Opportunity Cost/Defined:

Your friend is having a minor medical procedure a week from tomorrow and needs someone to accompany her to and from the doctor's office. She would need your help from 3pm to 5pm a week from tomorrow. Consider other commitments you may have and tasks you may need to accomplish at that time. How willing are you to commit to helping?

Opportunity Cost/Ambiguous:

Your friend is having a minor medical procedure a week from tomorrow and needs someone to accompany her to and from the hospital. She would need your help for about 2 hours in the afternoon a week from tomorrow. Consider other commitments you may have and tasks you may need to accomplish at that time. How willing are you to commit to helping?

No opportunity Cost/Defined:

Your friend is having a minor medical procedure a week from tomorrow and needs someone to accompany her to and from the doctor's office. She would need your help from 3pm to 5pm a week from tomorrow. How willing are you to commit to helping?

No Opportunity Cost/Ambiguous:

Your friend is having a minor medical procedure a week from tomorrow and needs someone to accompany her to and from the hospital. She would need your help for about 2 hours in the afternoon a week from tomorrow. Consider other commitments you may have and tasks you may need to accomplish at that time. How willing are you to commit to helping?

Short Run Propensity to Plan for Time scale (Lynch et al., 2009)

1. I set goals for the next few days for what I want to achieve with my time.
2. I decide beforehand how my time will be used in the next few days.
3. I actively consider the steps I need to take to stick to my time schedule the next few days.
4. I consult my planner to see how much time I have left for the next few days.
5. I like to look to my planner for the next few days in order to get a better view of using my time in the future.
6. It makes me feel better to have my time planned out in the next few days.

Data Tables

The following tables summarize the results for our main willingness to commit measure, manipulation checks and slack (for study 2). All measures are in the form mean(SD).

Study 1:

Willingness to commit: Your friend is having a minor medical procedure tomorrow and needs someone to accompany her to and from the hospital. She would need your help from 3pm to 5pm tomorrow afternoon. Consider other commitments you may have and tasks you may need to accomplish at that time. How willing are you to commit to helping? (11-point Likert scale 1-*Very unwilling* to 11-*Very willing*) (example of Defined/Opportunity condition prompt)

	No OC	OC	Bracketing Main Effect (p=0.30)
Defined	9.42 (2.15)	8.31 (2.87)	8.88 (2.58)
Ambiguous	9.56 (1.80)	8.76 (2.86)	9.17 (2.40)
OC Main Effect (p<0.00)**	9.49 (1.97)	8.53 (2.87)	

Manipulation check 1: To what extent do you agree with the following statement? I considered my other time commitments and available spare time tomorrow when deciding how willing I would be to commit. (6-point Likert scale 1-*Strongly Disagree* to 6-*Strongly Disagree*)

	No OC	OC	Bracketing Main Effect (p=0.03)*
Defined	4.67 (1.24)	5.09 (0.96)	4.88 (1.13)
Ambiguous	4.27 (1.43)	4.92 (1.06)	4.60 (1.30)
OC Main Effect (p<0.00)**	4.47 (1.35)	5.01 (1.01)	

Manipulation check 2: To what extent do you agree with the following statement? Helping my friend tomorrow would limit my ability to complete other things that I need to do. (6-point Likert scale 1-*Strongly Disagree* to 6-*Strongly Disagree*)

	No OC	OC	Bracketing Main Effect (p=0.24)
Defined	3.71 (1.38)	4.29 (1.33)	4.00 (1.38)
Ambiguous	4.00 (1.28)	4.35 (1.25)	4.17 (1.27)
OC Main Effect (p<0.00)**	3.86 (1.34)	4.32 (1.29)	

Study 2:

Willingness to commit: Your friend is having a minor medical procedure a week from tomorrow and needs someone to accompany her to and from the doctor's office. She would need your help from 3pm to 5pm a week from tomorrow. Consider other commitments you may have and tasks you may need to accomplish at that time. How willing are you to commit to helping? (11-point Likert scale 1-*Very unwilling* to 11-*Very willing*) (example of Defined/Opportunity condition prompt)

	No OC	OC	Bracketing Main Effect (p=0.38)
Defined	9.28 (2.25)	8.94 (2.26)	9.12 (2.58)
Ambiguous	8.99 (2.27)	8.72 (2.68)	8.85 (2.49)
OC Main Effect (p=.28)	9.14 (2.26)	8.83 (2.48)	

Manipulation check 1: To what extent do you agree with the following statement? I considered my other time commitments and available spare time tomorrow when deciding how willing I would be to commit. (6-point Likert scale 1-*Strongly Disagree* to 6-*Strongly Disagree*)

	No OC	OC	Bracketing Main Effect (p=0.14)
Defined	4.61 (1.20)	5.14 (0.92)	4.86 (1.10)
Ambiguous	4.58 (1.22)	4.75 (1.07)	4.67 (1.15)
OC Main Effect (p=0.01)*	4.60 (1.10)	4.94 (1.14)	

Manipulation check 2: To what extent do you agree with the following statement? Helping my friend tomorrow would limit my ability to complete other things that I need to do. (6-point Likert scale 1-*Strongly Disagree* to 6-*Strongly Disagree*)

	No OC	OC	Bracketing Main Effect (p=0.06)
Defined	3.62 (1.53)	3.62 (1.41)	3.62 (1.47)
Ambiguous	4.05 (1.32)	3.83 (1.38)	3.93 (1.35)
OC Main Effect (p=0.56)**	3.82 (1.44)	3.72 (1.39)	

Slack: Think about your activities tomorrow and your available spare time. Now consider your likely activities and available spare time for the same day of the week next week. On which day do you expect to have more spare time? (10-point Likert scale 1-*much more time available today* to 10-*much more time available next week*)

	No OC	OC	Bracketing Main Effect (p=0.45)
Defined	6.87 (2.41)	6.17 (2.59)	6.54 (2.51)
Ambiguous	6.82 (2.19)	5.78 (2.42)	6.28 (2.36)
OC Main Effect (p<0.00)**	6.85 (2.30)	5.97 (2.50)	

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