The Benefits of Budgeting Time First for Multiple Goal Setting and Pursuit

by

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Business Administration
Duke University

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Dissertation submitted in partial fulfillment of
the requirements for the degree of
Doctor of Philosophy in Business Administration
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ABSTRACT

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Abstract

Consumers often have multiple goals and limited time to pursue them. Running out of time means that people may fail to achieve, or to even attempt, one or more valued goals. When time constrains multiple goal pursuit, what might encourage consumers to protect time for downstream goals (i.e., goals that occur later in a sequence)? I propose that a subtle shift in the way people think about setting multiple goals in relation to limited time can help. Nine experiments demonstrate that, compared to only setting goals, budgeting time first (i.e., allocating total time across tasks before specifying goal levels) encourages people to set more realistic (i.e., more accurate) multiple goals that better fit within the total available time. This occurs because, by disaggregating the total time available for multiple goals into distinct accounts, budgeting time reduces implicit "double dipping" into a shared time pool when setting goals. By encouraging people to set more realistic upstream goals, budgeting time first increases time spent on downstream goals, boosting how much people accomplish toward, and whether they ultimately achieve, those goals. Further, by protecting time for downstream goals, budgeting time first discourages consumers from exceeding the total time budget and spending against future periods. This research contributes to understanding of the relationship between goals and time, multiple goal setting and pursuit, and mental accounting and budgeting. The findings also have substantive implications for consumer goal pursuit and well-being.

Dedication

This dissertation is dedicated to my mother, Patricia Benelli, for showing me it was possible.

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Acknowledgements

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1 Introduction

Every day, consumers pursue multiple goals with a limited amount of time. On a weekend afternoon, a consumer might have goals for shopping, cooking meals ahead for the week, and exercise. On a weekday afternoon, the same consumer might have goals to create a presentation, answer work emails, and get home in time for family dinner.

All too often, however, people run out of time for their downstream goals (i.e., goals that occur later in a sequence; Ariely and Wertenbroch 2002; Fernbach, Kan, and Lynch 2015; Jhang and Lynch 2014). Once the shopping and cooking are done, there is little (or no) time left for exercise. Once that last email has been sent, family dinner is a lost cause. Time is a scarce resource (Etkin 2019; Shah, Shafir, and Mullainathan 2015; Spiller 2019). With only 24 hours in a day, consumers rarely have enough time to accomplish all that they would like to do. Even goals that seem unrelated to time (e.g., financial goals or healthy eating goals) can require time to pursue (e.g., researching retirement plans, meal planning and preparation).

When time constrains multiple goal pursuit, one solution is to prioritize by eliminating less-important goals entirely (Fernbach et al. 2015). However, consumers often have multiple valued goals (i.e., work, family, personal interests) that are difficult to rank order. Further, even if a goal is relatively less important (e.g., social and self-care goals may seem less important than professional and financial goals), it is still a "goal," so presumably is still something people value and would like to achieve, even if at relatively modest levels. Indeed, consumers resist eliminating valued goals and tend to do so inefficiently, if at all (Fernbach et al. 2015). Consumers can also prioritize by pursuing

the most important goal(s) first, thus implicitly eliminating downstream goals (for which there is unlikely to remain time). In many situations, however, consumers lack discretion over goal order (e.g., an important work task may not be available early in the day), and important goals may naturally be pursued later in a sequence (e.g., having dinner with family, getting a full night's sleep).

Given the limitations of eliminating or reordering goals, what else can people do? When time is constrained, what might help consumers protect time for downstream goals?

In this dissertation, I propose that a subtle shift in the way consumers think about setting multiple goals in relation to (limited) time can help protect time for downstream goals (i.e., the last goal in a sequence). In particular, I suggest that, compared to just setting goals (i.e., specifying a desired level of performance; Heath, Larrick, and Wu 1999; Locke and Latham 1990), budgeting time before setting goals (i.e., allocating total time across tasks before specifying goal levels) can encourage people to set more realistic (i.e., lower and more accurate) multiple goals. I propose this occurs because disaggregating a shared time pool reduces implicit "double dipping" into available time when setting multiple goals. By encouraging people to set more realistic upstream goals, budgeting time first should increase time spent on downstream goals and, in turn, boost how much people do on, and whether they ultimately achieve, those goals. Finally, by protecting time for downstream goals, I propose that budgeting time first discourages consumers from exceeding the total time budget and overspending time against future periods.

The remainder of this dissertation is organized as follows. First, I explore the theoretical foundation of these ideas, reviewing relevant literature and developing a theory for how and why disaggregating time influences multiple goal setting and pursuit. Then, I present empirical evidence from nine studies, focusing first on the basic effects for goal setting and pursuit (experiments 1–3), second on the underlying process for multiple goal setting (experiments 4–8), and third on a meaningful downstream consequence—overspending time (experiment 9). Finally, I discuss the theoretical contributions of this research, the implications for consumers and marketers, and directions for future research.

1.1 Goal setting with time constraints

Goal setting refers to specifying a desired level of task performance (i.e., a specific target to strive for; Bagozzi and Dholakia 1999; Heath et al. 1999; Locke and Latham 1990; Locke et al. 1981). Consumers set goals for domains typically associated with performance assessment, such as how many miles to run when training for a marathon or how many practice problems to solve when studying for an academic exam, as well as for everyday pursuits such as how many steps to take in a day, household chores to complete over a weekend, and products to buy on a shopping trip. In this research, I focus on goals that have flexible performance targets (i.e., for which consumers can flexibly determine how much to achieve in a single episode of goal pursuit). For example, when walking for exercise, how far to go on any given day is flexible (whereas a walking commute to work has a fixed requirement—one either walks all the way to the office or not at all; walking halfway there offers no benefit). Note,

however, that even goals with fixed performance requirements (e.g., completing a marathon, obtaining an academic degree, delivering a major work presentation) are often achieved by repeatedly pursuing subgoals for continuous, flexible behaviors (e.g., how many miles to run, how much to study, or how many slides to prepare on a given day; Ariely and Wertenbroch 2002; Drèze and Nunes 2011).

When time constrains goal pursuit, setting optimally challenging goals requires estimating what can be achieved within the available time (i.e., jointly estimating desirability and feasibility; Bandura and Locke 2003; Gollwitzer 1999; Lewin et al. 1944; Locke and Latham 1990; Zhang and Huang 2010). For example, a consumer heading out for a three-hour shopping trip during the holiday season brings a list with 18 items to purchase. Although completing all of her (seemingly limitless) holiday shopping would be desirable, she can't accomplish it all in one trip, so she sets a goal (i.e., shopping list) that seems possible given available time. Thus, setting an accurate goal for the shopping trip entails estimating what level of (desirably high) progress can be achieved within the time constraint. Similarly, for goals that lack an inherent upper limit on performance (e.g., exercise, learning, social activities), goal setting entails considering what can be achieved within available time (e.g., walk one mile in 20 minutes, read two chapters in one hour).

Rather than only a single goal, however, consumers often have multiple goals to pursue in a given time period. For example, what if a consumer has goals for shopping, meal prep, and exercise in a 3-hour period? Would she be able to set effective goals—and

still have time to get in a run at the end of the afternoon—when multiple goals compete for the same (limited) pool of her time?

1.2 The time-first approach to multiple goal setting

In this dissertation, I propose that a subtle shift in the way consumers think about setting multiple goals relative to (limited) time can help preserve time for downstream goals. Specifically, I propose that budgeting time before setting goals encourages people to set more realistic (i.e., lower and more accurate) multiple goals.

By a time-first approach, I mean that consumers budget the total available time for multiple goal pursuit across activities before setting goals (i.e., allocate time across tasks before specifying a desired level of performance on each). To return to the example of a consumer with goals for shopping, meal prep, and exercise on a weekend afternoon, using a "standard" approach, she would consider her overall time constraint (e.g., 3 hours) and set goals for each activity (e.g., buy 15 products, prep 5 dishes, run 3 miles). Using a time-first approach, however, she would first budget the total time available across activities (e.g., 1.5 hours for shopping, 1 hour for meal prep, and half an hour for exercise), and *then* set goals for each activity (e.g., buy 10 products, prep 3 dishes, run 3 miles).

I propose that, by disaggregating the total time available for multiple goals into distinct accounts, budgeting time first reduces implicit "double dipping" into a shared time pool when setting multiple goals. This prediction is informed by research on mental accounting, which examines the cognitive processes of assigning resources to distinct accounts and how those influence consumption (Cheema and Soman 2002, 2006, 2008;

Heath and Soll 1996; Kahneman and Tversky 1984; Morewedge, Holtzman, and Epley 2007; Soman and Cheema 2011; Sussman and Alter 2012; Thaler 1985, 1999). This stream of research finds that people are unlikely to spontaneously assess how much a single consumption episode depletes one's overall resources (e.g., how much one shopping trip depletes total financial resources, or how much one trip to the gym depletes total free time). Rather than calculating absolute values, consumers often anchor on salient resource accounts to generate relative cost assessments (Kahneman and Tversky 1984; Morewedge et al. 2007; Thaler 1985). For instance, Morewedge et al. (2007) found that when larger (vs. smaller) resource accounts are salient (e.g., total time in a week vs. a day), people perceive time spent on an activity as less costly. Consequently, they consume more time (e.g., are more willing to spend their own time cleaning vs. outsource the activity). This suggests that when the salient account is a shared time pool (vs. a goal-specific account), people are likely to anchor on the (larger) total value and underestimate how much time spent on one goal depletes time available for other goals.

Dividing a total resource pool into separate mental accounts (either implicitly or explicitly) can increase clarity about how consuming resources from one account depletes resources available for other goal accounts (e.g., how overspending a "food" account with a costly restaurant meal depletes money in other accounts, like rent). Importantly, however, mental accounts are more effective when they have clear boundaries (Cheema and Soman 2006, 2008; Heath and Soll 1996; Mishra, Mishra, Rixom, and Chatterjee 2013; Soman and Cheema 2011; Sussman and Alter 2012). When account boundaries are unclear or malleable, consumers can (and frequently do) flexibly interpret resource

consumption to enable them to engage in desired activities (e.g., accounting for the meal as entertainment or an exceptional occurrence; Cheema and Soman 2006; Sussman and Alter 2012). Further, when high performance offers greater rewards, higher (and more time-consuming) goals are more desirable. Indeed, extant research finds that people have a general tendency to set optimistic goals that represent desired—if not necessarily realistic—outcomes (Putnam-Farr and Pocheptsova Ghosh 2020; Sackett et al. 2014; Sharot 2011; Tanner and Carlson 2009). Together, these findings suggest that when account boundaries remain implicit and "fuzzy," consumers are likely to perceive more time is available for each goal than actually exists, leading them to set unrealistically high multiple goals.

I propose that, by creating distinct time accounts for each goal, budgeting time first encourages consumers to set more realistic multiple goals. Note, this prediction allows that people may still set optimistically high goals, relative to a single goal account. However, because budgeting time first reduces implicit double-dipping into the shared time pool, multiple goals should be better calibrated to available time, overall. Formally, I predict:

H1 Budgeting time before setting goals encourages more realistic (i.e., lower and more accurate) multiple goal setting

H2 This occurs because disaggregating total time into distinct accounts reduces implicit "double-dipping" into a shared resource pool when setting multiple goals

Notably, this prediction relates to how unpacking multifaceted events reduces the planning fallacy in time estimation. Consumers systematically underestimate the time required to complete multifaceted tasks (i.e., the planning fallacy; Buehler et al. 1994; Buehler, Griffin, and Ross 2002; Kahneman and Tversky 1977; Kruger and Evans 2004), in part because they tend to consider multifaceted tasks holistically, rather than in terms of their constituent parts (Kruger and Evans 2004; Savitsky et al. 2005; Tversky and Koehler 1994; Van Boven and Epley 2003; Wilson et al. 2000). Unpacking multifaceted tasks into components (e.g., unpacking "getting ready for a date" into taking a shower, drying hair, and getting dressed; Kruger and Evans 2004) makes the contribution of each part more salient, affording more accurate time estimation. But whereas the prior work argues that unpacking improves accuracy in time estimation by drawing attention to how each task element contributes to a total time requirement, I argue that "unpacking" a common time pool improves accuracy in multiple goal setting by creating distinct accounts for each goal.

1.3 Consequences for goal pursuit

I further propose that budgeting time first has meaningful consequences for multiple goal pursuit.

I predict that by encouraging more realistic goals, budgeting time first will preserve more time for downstream goals (i.e., the last goal in a sequence). Goals direct how time is spent. Goals serve as reference points that people are motivated to achieve—even for "mere goals" in which performance targets are arbitrary and rewards don't depend on goal achievement (Heath et al. 1999; Wallace and Etkin 2018; Weingarten,

Bhatia, and Mellers 2018). A large stream of research finds that high goals boost output, in part by prompting people to persist longer and spend more time in goal pursuit (Locke et al. 1981; Locke and Latham 1990, 2002, 2013). Further, consumers tend to overspend time on proximal goals, even when alternative goals are valuable (Jhang and Lynch 2014). Thus, when multiple goals compete for constrained time, unrealistically high upstream goals should encourage consumers to overspend time on those tasks, depleting time available for downstream goals (Fernbach et al. 2015; Orehek and Vazeou-Nieuwenhuis 2013; Schmidt and Dolis 2009; Schmidt, Dolis, and Tolli 2009). By encouraging more realistic multiple goal setting, budgeting time first should reduce time spent on (excessively high) upstream goals, increasing how much is available for downstream goals.

Extending this reasoning, I propose that, by increasing time spent on downstream goals, budgeting time first will boost performance on those tasks. Although many factors contribute to goal performance (e.g., motivation, focus, ability), spending time actually pursuing a goal is a basic requirement for performance (Ariely and Wertenbroch; Etkin 2019; Jhang and Lynch 2015). Further, running out of time is a key reason that consumers perform poorly on downstream goals, if they attempt them at all (Ariely and Wertenbroch 2002; Fernbach et al. 2015; Mogilner, Chance, and Norton 2012; Schmidt and Dolis 2009; Sirois 2014). Thus, by increasing time spent on downstream goals, budgeting time first should also improve performance. Formally, I predict:

H3 Budgeting time first increases time spent on downstream goals (i.e., the last goal in a sequence)

H4 Budgeting time first improves performance on downstream goals (i.e., the last goal in a sequence)

Note that, when overall time is constrained, the maximum amount that can be accomplished across goals is similarly constrained (i.e., total output is bounded, akin to a "ceiling effect"; Schmidt and Dolis 2009). Thus, my predictions suggest that budgeting time will result in a *redistribution* of time and output from earlier goals toward later goals. Relatedly, one could wonder if, by lowering goals, budgeting time first would reduce how much people do, overall. Note, however, that my theory allows that consumers may still set optimistic goals, relative to each goal account (even when budgeting time first reduces double-dipping into a shared pool of time). If this occurs, time-first goals would be more realistic, yet still high and motivating. Thus, I do not expect that budgeting time will reduce how much people do, overall. However, by encouraging people to better calibrate multiple goals to available time, I expect budgeting time will shift more time and output toward downstream goals.

Finally, I propose a meaningful downstream consequence of budgeting time first—decreasing the propensity to overspend the (total) budget. Note that my predictions thus far pertain to circumstances in which there is a "hard stop." As such, even if the demands of (unrealistically high) multiple goals exceed available time, consumers cannot continue pursuing goals once the total budget expires (akin to a bounded workday in which all work ceases when the whistle blows). However, in some circumstances consumers may continue spending beyond an overall resource budget (akin to the workday of a salaried employee, which can continue indefinitely beyond the time

ostensibly allocated to work). Indeed, when overspending a resource is possible, consumers often do so (Putnam-Farr and Pocheptsova Ghosh 2020; Mishra et al. 2013; Stilley, Inman, and Wakefield 2010; Sussman and Alter 2012). Overspending can be problematic, however, in that it merely "kicks the can down the road," depleting time from future periods and interfering with associated goals (such as when a workday bleeds into the evening, depleting time for personal goals). By encouraging consumers to fit multiple goals to available time, budgeting time first addresses an underlying cause (i.e., unrealistically high multiple goals), which should reduce the tendency to overspend. Formally, I predict:

H5 Budgeting time first decreases overspending time beyond the (total) time constraint

2 Overview of experiments

Nine experiments (and three follow-up studies) test my predictions. All follow the same basic structure. Participants were given a fixed amount of time to spend on multiple tasks. They set goals for how much to do on those tasks, and then pursued their goals. My key manipulation was whether participants budgeted time before setting goals (vs. only set goals). I tested goal setting as the total level of goals set (i.e., for correct answers) across tasks. I tested time spent on downstream goals as the amount of time spent on the last goal and the likelihood of spending any time on the last goal. I also tested the notion that budgeting time shifts more time from early toward downstream goals by examining the interaction between task (i.e., the first vs. second task in a sequence) and time spent. I tested performance on downstream goals as output on the last task (i.e., number of correct answers) and the likelihood of achieving the last goal. Consistent with time spent, I also tested the task × condition interaction on output. Finally, as a supplemental test of my theory that budgeting time first encourages more realistic (i.e., accurate) multiple goal setting, in goal performance studies I also calculated the discrepancy between goals set and output. I expected that budgeting time would decrease overall discrepancy (i.e., increase accuracy), and that this effect would be greater as participants progressed through the tasks (i.e., the task × condition would be significant).

Experiment 1 tests my core predictions for multiple goal setting and pursuit in an immersive, consumer-relevant paradigm: online shopping. Participants were given a total of seven minutes to shop for real products at two online stores. I manipulated whether they budgeted this total time across stores before setting goals (i.e., how many products

to put in each basket), and measured its effects. Experiment 2 explores generalizability by using a different ("quizzes") paradigm with a larger number of goals and diverse tasks. Experiment 3 tests for robustness by manipulating the relative value of the goals, with the last goal being the most valuable.

Experiments 4 through 8 focus on the underlying role of disaggregating a shared time pool for multiple goal setting. Experiment 4 directly tests whether budgeting time decreases "double-dipping" into a shared time pool when setting multiple goals. Experiment 5 tests whether the effect of budgeting time holds even at greater constraint, when opportunity costs are more salient. Experiment 6 tests whether the effects hold when time budgets are assigned (i.e., when participants do not actively consider trade-offs in time use), as well as for "mere goals" (i.e., when goal achievement is not incentivized). Experiment 7 tests the alternative explanations of increased elaboration on the task and on total time constraints. Experiment 8 tests whether the effect of budgeting time is greater as the number of goals (and thus time units to disaggregate) increases. Finally, experiment 9 tests a substantive downstream consequence: failing to adhere to the original (overall) budget by overspending time against future periods.

All experiments are incentive-compatible and examined real behaviors and goal setting decisions. In each experiment, participants received detailed instructions explaining the paradigm, tasks, and incentives. To reduce the length of this dissertation, key features of the procedure are reported in the main text. Details on participant instructions are included in Appendix 1, and an analysis plan for results reporting across

experiments is in Appendix 2. Ancillary results and analyses for each experiment are reported in the relevant appendices.

3 Experiment 1: Online shopping

Experiment 1 tests my predictions in an immersive, consumer-relevant paradigm: online shopping. Participants set goals for how many products to shop for in two real online stores. All participants had the same total amount of time to shop, and I manipulated whether they budgeted that time across stores before setting goals. I predicted that, by disaggregating the total time available for both goals into distinct accounts, budgeting time first would encourage people to set more realistic (i.e., lower) shopping goals that better fit within the total available time. As a result, I predicted budgeting time would increase time spent on and improve performance on the last goal.

3.1 Design and method

3.1.1 Participants

One hundred and nine university lab panelists participated in exchange for a small payment and the chance to win the products they chose during the task. In this and subsequent lab experiments, sample size was determined by participant availability and lab resources. Six participants were excluded for restarting the survey after having progressed to the task practice section,[1] leaving a final sample of $N = 103$ (average age 26.42 years, 69.9% women). Participants were randomly assigned to one of two conditions: control versus time-first.

[1] To ensure participants were equally naïve regarding the tasks and manipulations, in this and all subsequent experiments, I exclude participants who restarted the survey after seeing the practice tasks. Potential causes of restarting include technical issues (e.g., connectivity problems during tasks) and user error (e.g., accidentally closing a browser window).

3.1.2 Procedure

First, participants read detailed instructions (see Appendix 1) and completed a practice task. Participants were told that they would set goals for and complete a shopping spree in two online stores, and they would have the chance to win some of the products they selected, based on their performance.

All participants had a total of 7 minutes to spend shopping at Amazon.com and Target.com. The task entailed selecting real products and placing them into one's "cart" by entering the product URLs and prices into the survey (see Appendix 3 for stimuli). To qualify as a correct answer, selected products had to cost $10 or less, be unique items (i.e., participants could not select the same product multiple times) and be available for purchase online. Further, products could not be gift certificates, store purchasing cards, prescription drugs, alcohol, tobacco products, firearms, ammunition, pornography, or other age-restricted products. Participants were told that products not meeting these criteria would not count toward their goals, nor would they be awarded as bonus prizes.[2]

All participants familiarized themselves with the task by selecting two products from Walmart.com. The practice page included instructions for how to locate and copy product URLs, as well as suggestions for efficiently finding products priced under $10.

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[2] Prior to analyses, a hypothesis-blind research assistant validated participants' responses against the task criteria (i.e., that entered URLs were indeed real URLs from the correct retailer and selected products met the stated criteria). Five participants provided a total of 10 invalid responses (e.g., selecting a gift certificate, selecting the same product multiple times); these responses were retained but were not scored as correct answers.

On the practice and real tasks, each page prominently displayed participants' goals for that store, as well as a reminder regarding requirements for selected products.

The task was incentivized such that participants scoring in the top 20% of all those taking the survey were entered into a lottery, and a single winner received all of the real products selected from one of the two stores (store was randomly selected; participants could not choose a preferred store). The minimum requirement was to select 2 products from each store (maximum possible of 20). In each store, participants received two points per selected product once their goal was achieved, with no points until the goal was reached and no additional points for exceeding the goal (the lottery prize also excluded any products exceeding the goal). See Appendix 1 for additional details.

Second, all participants set goals, and I manipulated time budgeting. In the time-first condition, participants first budgeted time to each store (between 1 and 6 minutes per store, summing to 7) and then set goals. In the control condition, participants just set goals. Notably, in both conditions, the total time constraint was made salient on the goal-setting page ("Reminder: You have 7 minutes total to shop at both stores."). The only difference was that in the time-first condition, participants explicitly budgeted that total time across stores before setting goals.

Third, all participants pursued their shopping goals, and I measured time spent and performance on downstream goals (i.e., the second task). Shopping goals were pursued sequentially in a randomized order. Participants chose when to advance from the first store to the second, but could not go backward. On each store page, participants could observe their goal and the number of products in their shopping basket (see

Appendix 3 for stimuli). When the total time was up, the survey exited the tasks; if participants exited the tasks with extra time remaining, they went to a waiting page until the full time was up. To assess time spent on downstream goals, I measured (1) how much time participants spent on the last task and (2) whether they got to it (i.e., spent any time) at all (1 = yes, 0 = no). To assess performance on downstream goals, I measured (1) total output (i.e., number of correct answers) on the last task and (2) whether participants achieved their second goal (1 = yes, 0 = no).

Finally, as a manipulation check for the task incentive, I asked participants, "How motivated were you to try to win the bonus (of a single shopping cart)?" (1 = *Not at all motivated*, 7 = *Very motivated*). This was significantly above the scale midpoint (M = 5.67, SD = 1.73; $t(102) = 9.80$, $p < .001$), and did not differ by condition ($F < 1$).

3.2 Results

3.2.1 Multiple goal setting

As predicted, budgeting time first encouraged people to set more realistic (i.e., lower) multiple goals. In addition to an effect of store (i.e., Amazon vs. Target, $p < .001$), a mixed ANOVA (with time budgeting as the between-subjects factor and store as the within-subjects factor) revealed the predicted effect of time budgeting on goal setting ($F(1, 101) = 9.86$, $p = .002$, $\eta^2 = .09$; figure 1). Compared to the control (M = 18.71, SD = 9.62), participants in the time-first condition set lower total multiple goals (M = 13.53,

SD = 7.08). In this and subsequent experiments, see Appendices for full results and analyses for each goal.[3]

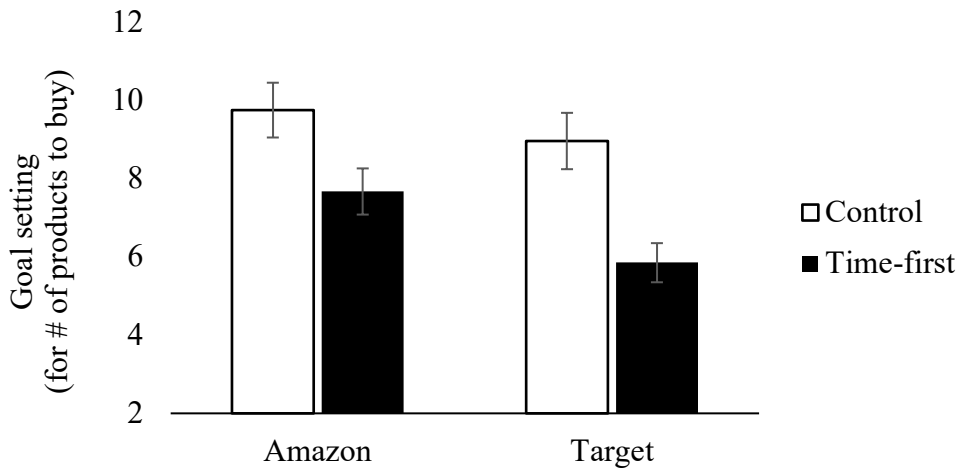

Figure 1: Budgeting time first encourages more realistic multiple goal setting (experiment 1). Note: In this and all subsequent figures, error bars represent +/- 1 SE of the mean.

3.2.2 Time spent on downstream goals

By encouraging people to set less overly optimistic multiple goals, budgeting time first increased time spent on the last task. A mixed ANOVA (with time budgeting as the between-subjects factor and store as the within-subjects factor) revealed the expected condition × store interaction on time spent ($F(1, 101) = 4.87$, $p = .030$, $\eta^2 = .03$; main

[3] To further explore how budgeting time first influenced goal setting, I examined the relationship between amount of time allocated to a store and goals set. Regressions revealed a significant positive relationship for Amazon.com ($\beta = .48$, $t(53) = 3.95$, $p < .001$, $R^2_{adj} = .21$) and a marginal positive relationship for Target.com ($\beta = .24$, $t(53) = 1.82$, $p = .074$, $R^2_{adj} = .04$). Consistent with my theory that budgeting time impacts goal setting by creating distinct goal accounts (vs. encouraging people to set lower goals, in general), the more time participants allocated to a task, the higher the goal they set for that task.

effect of condition $F < 1$; see figure 2). As predicted, compared to the control ($M = 95$ seconds, SD = 78.23), participants who budgeted time first spent more time shopping in the last store ($M = 132$ seconds, SD = 74.78; $F(1, 101) = 6.03$, $p = .016$, $\eta^2 = .06$). Budgeting time before setting goals discouraged people from overspending time on the first store, increasing the time available for downstream goals (figure 2). In this and subsequent experiments, see the relevant Appendix (here, Appendix 3) for full results and analyses for each store.

Notably, as expected, budgeting time first also increased the likelihood that participants spent *any* time pursuing their last goal ($75\%_{\text{control}}$ vs. $93\%_{\text{time-first}}$; logistic regression: $b = .99$, Wald $\chi^2(1) = 9.30$, $p = .002$, OR = 2.69). Note that, despite the incentive to spend at least some time in the last store (i.e., participants had to purchase at least 2 products in each store to receive a score), many participants in the control failed to do so. Budgeting time increased the likelihood of protecting time for downstream goals.

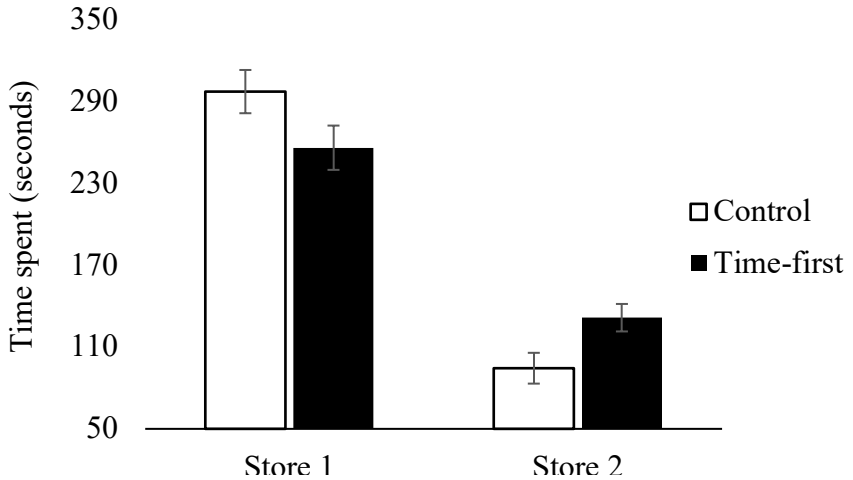

Figure 2: Budgeting time first increases time spent on downstream goals (experiment 1)

3.2.3 Performance on downstream goals

Importantly, by preserving more time for downstream goals, budgeting time first improved performance on the last task. In addition to a main effect of task ($p < .001$), a mixed ANOVA (with time budgeting as the between-subjects factor and store as the within-subjects factor) revealed the expected condition × store interaction on total shopping output ($F(1, 101) = 3.27$, $p = .074$, $\eta^2 = .02$; main effect of condition $F < 1$; see figure 3). As predicted, compared to the control ($M = 2.48$, SD = 3.54), participants who budgeted time first selected more products in the last store ($M = 3.76$, SD = 3.04; $F(1, 101) = 3.93$, $p = .050$, $\eta^2 = .04$). In this and subsequent experiments, see Appendices for full results and analyses for each store.

Finally, as expected, budgeting time first also increased the likelihood that participants achieved their last shopping goal ($15\%_{\text{control}}$ vs. $51\%_{\text{time-first}}$ logistic regression: $b = 1.84$, Wald $\chi^2(1) = 12.81$, $p < .001$, OR = 6.28). Note that, even though goal accuracy was explicitly incentivized in the experimental design (i.e., participants scored points on the task by achieving goals), a majority of participants in the control condition failed to achieve downstream goals. Budgeting time first increased chances of success.

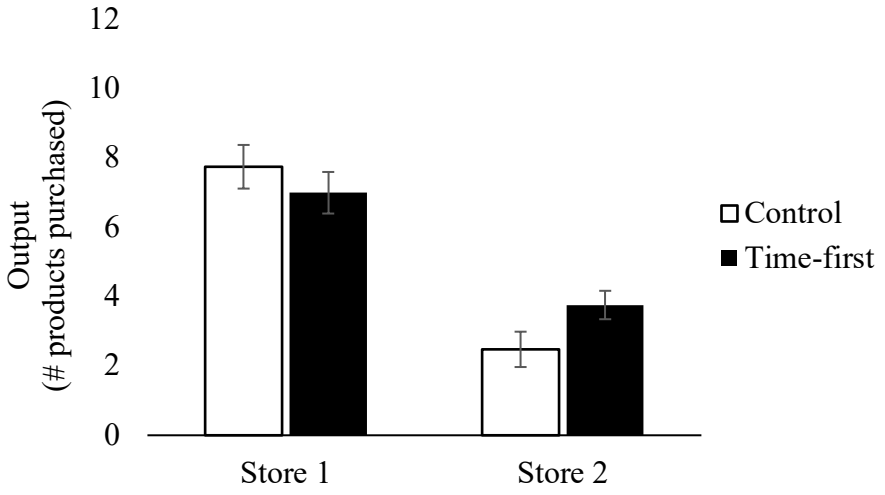

Figure 3: Budgeting time first increases performance on downstream goals (experiment 1)

3.2.4 Goal accuracy

To further test my prediction that budgeting time first encourages people to set more realistic multiple goals, I calculated a measure of goal accuracy by subtracting participants' goals for each task from their output on that task (i.e., discrepancy). Thus, a discrepancy value of 0 indicates perfect accuracy (i.e., output at the exact level of the goal), positive values indicate positive discrepancy (i.e., overperformance relative to goal), and negative values indicate negative discrepancy (i.e., underperformance relative to goal).

In addition to an effect of store (i.e., the first vs. second store visited; $p < .001$), a mixed ANOVA (with time budgeting as the between-subjects factor and store as the within-subjects factor) revealed a significant effect of budgeting time on discrepancy ($F(1, 101) = 14.39$, $p < .001$, $\eta^2 = .12$; figure 4). As expected, budgeting time increased

goal accuracy (i.e., reduced the gap between goals and output; $M_{control}$ = -8.48, SD = 9.31 vs. $M_{time\text{-}first}$ = -2.76, SD = 5.78; full results in Appendix 3).

Notably, overall discrepancy was negative even in the time-first condition, indicating that while time-first goals were more realistic, they were still high and challenging (i.e., still exceeded how much people could do, overall).

Figure 4: Budgeting time first increases goal setting accuracy (experiment 1)

Further, consistent with my theory, the condition × store interaction was significant ($F(1, 101) = 7.50$, $p = .007$, $\eta^2 = .04$), demonstrating that budgeting time first reduced discrepancy to a greater extent as participants progressed through the stores and errors in goal setting and time use compounded.

3.3 Discussion

Experiment 1 provides initial evidence that budgeting time first encourages consumers to set more realistic multiple goals. In a real, incentive-compatible online

shopping task, budgeting a fixed amount of total time across multiple stores before setting goals (vs. only setting goals) reduced overall goal levels and increased accuracy.

Budgeting time also increased time spent on downstream goals. By discouraging participants from overspending time on optimistically high upstream goals, budgeting time increased time spent on the last goal as well as the likelihood of getting to the last goal at all (i.e., spending any time).

Finally, by preserving more time for downstream goals, budgeting time first increased performance on the last goal. Participants who budgeted time selected more products in the last store (i.e., achieved higher output) and were more likely to achieve their last shopping goal.

Notably, while time-first goals were more realistic, they were still high and challenging (i.e., exceeded what people could achieve, overall). Further, because the total time was constrained (i.e., participants could not continue shopping beyond the allowed 7 minutes), the total amount that could be accomplished, overall, was also bounded. Consistent with this notion, I did not observe effects of condition on overall time spent and total output (as reported above). However, supporting my theory, I did observe significant condition × store interactions on time spent and output, indicating that budgeting time produced a redistribution of time and output from the first goal toward the last goal. Thus, while total output was bounded by the overall time constraint, because budgeting time first encouraged people to set more realistic goals, it increased the alignment of subsequent expenditures of time and effort with multiple goals.

In summary, experiment 1 provides initial evidence that budgeting time first encourages people to set more realistic multiple goals. Consequently, budgeting time helped people protect more time for and improved performance on downstream goals.

4 Experiment 2: More goals and different tasks

Experiment 2 tests my predictions with a larger number of goals and three novel, distinct tasks (geography, spelling, and math quizzes). All participants had the same total amount of time to spend on the three tasks, and I manipulated whether they budgeted time before setting goals (i.e., for how many correct answers to get on each).

4.1 Design and method

4.1.1 Participants

One hundred fifty-four university lab panelists participated in exchange for a small payment and the chance to win one of two $45 bonuses, based on performance. Four participants were excluded for restarting the survey after seeing the task practice section, leaving a final sample of N = 150 (average age = 25.4 years, 64.0% women). Participants were randomly assigned to one of two conditions: control versus time-first.

4.1.2 Procedure

The procedure was similar to experiment 1, adapted for this new paradigm. First, participants read detailed instructions (see Appendix 1) and completed practice tasks. All participants had a total of 7 minutes to spend on three tasks: "spatial reasoning" (identify the U.S. state shown in an image), "verbal reasoning" (identify the misspelled word), and "logical reasoning" (identify two numbers that equal 10). The tasks all consisted of multiple-choice problems with four response options; see Appendix 4 for stimuli. The minimum requirement was to provide at least 10 correct answers on each task (maximum of 65), and participants received 1 bonus lottery ticket for every 10 points earned (see

Appendix 1 for full scoring details). Thus, the lottery was open to participants earning even modest scores, rather than only top performers (as in experiment 1).

Second, all participants set goals for how many correct answers to achieve on each task, and I manipulated whether they budgeted time first (vs. did not).

Third, all participants spent 7 minutes pursuing their goals (presented in random order), and I measured task output and multiple goal achievement.

Fourth, I measured perceptions of multiple goal pursuit. Because all three task goals ultimately contributed toward the same overarching goal (i.e., to maximize total performance), one could wonder if people indeed felt they had multiple distinct goals. To confirm perceptions of multiple goal pursuit, I asked participants, "While working on the tasks, how many goals did you have?" (open-response). Supporting my operationalization, three goals was the most frequent open-ended response (76.7% of all answers), and the average did not differ from three (M = 3.04 goals, SD = 1.10; t-test vs. 3, $t < 1$), nor by condition ($F < 1$).[4]

Fifth, as in experiment 1, I confirmed that the task incentive (to win one of two $45 bonuses) was motivating to participants (M = 5.95, SD = 1.49; t-test vs. scale mid-point (4); $t(149) = 16.01$, $p < .001$), and did not differ by condition ($F < 1$).

Finally, to confirm the content of the tasks was perceived as equally challenging across conditions, I measured perceived task difficulty with three measures: "How easy

[4] Following Weingarten et al. (2018), I also measured happiness with performance on each task (1 = *Very unhappy*, 4 = *Neither happy nor unhappy*, 7 = *Very happy*). Three ANOVAs using task goal achievement as a predictor of happiness with task performance further revealed significant relationships for each matched pair (Geography: $p < .001$,; Spelling: $p < .001$; Math: $p < .001$). Relationships for non-matched pairs were non-significant or weaker (see Appendix 4).

or difficult were the tasks? Spatial Reasoning, Verbal Reasoning, Logical Reasoning" (1 = *Very easy*, 4 = *Neither difficult nor easy*, 7 = *Very difficult*). Results confirmed that the tasks were perceived as moderately challenging overall, and this did not differ by condition ($M_{geography}$ = 4.21, SD = 2.05, $M_{spelling}$ = 3.53, SD = 1.75, M_{math} = 3.47, SD = 1.68; F's < 1).

4.2 Results

4.2.1 Multiple goal setting

As predicted, budgeting time first encouraged people to set more realistic multiple goals. Consistent with experiment 1, in addition to an effect of quiz (i.e., the first vs. second vs. third quiz in the sequence; $F(2, 296) = 5.99$, $p = .003$, $\eta^2 = .04$), a mixed ANOVA (with time budgeting as the between-subjects factor and quiz as the within-subjects factor) revealed the predicted effect of time budgeting on goal setting ($F(1, 148) = 9.62$, $p = .002$, $\eta^2 = .06$). Compared to the control (M = 89.19, SD = 40.69), participants in the time-first condition set lower multiple goals (M = 68.62, SD = 40.52; figure 5).

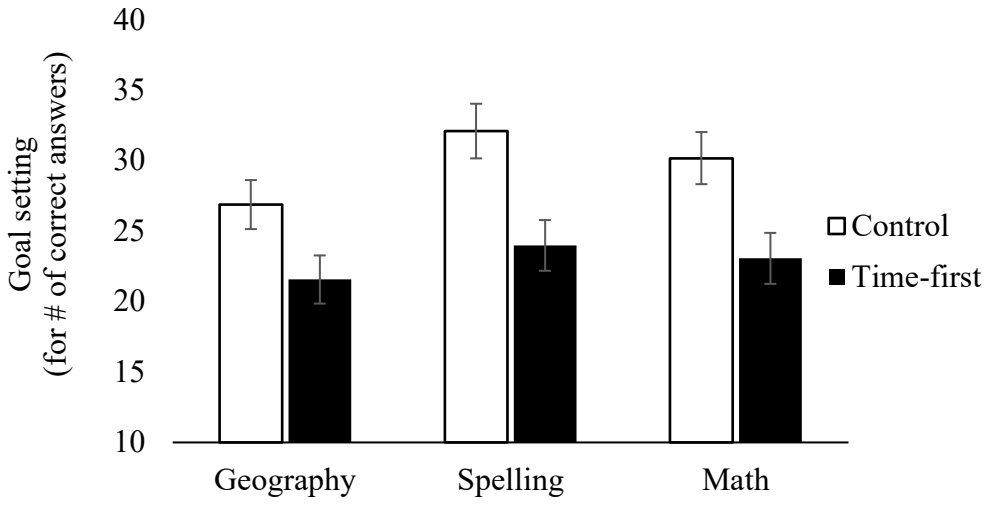

Figure 5: Budgeting time first encourages more realistic multiple goal setting (experiment 2)

4.2.2 Time spent on downstream goals

By encouraging people to set less overly optimistic multiple goals, budgeting time first increased time spent on the last task. A mixed ANOVA (with time budgeting as the between-subjects factor and store as the within-subjects factor) revealed the expected condition × task interaction on time spent ($F(2, 296) = 4.03$, $p = .019$, $\eta^2 = .02$; main effect of condition $F < 1$; see figure 6). As predicted, compared to the control ($M = 51$ seconds, SD = 54.18), participants who budgeted time first spent more time on the last task ($M = 83$ seconds, SD = 68.17; $F(1, 148) = 10.54$, $p = .001$, $\eta^2 = .07$). Budgeting time before setting goals discouraged people from overspending time on upstream tasks, increasing the time available for downstream goals (figure 6).

Notably, as expected, budgeting time first also increased the likelihood that participants spent *any* time pursuing their last goal ($62\%_{\text{control}}$ vs. $78\%_{\text{time-first}}$; logistic regression: $b = .75$, Wald $\chi^2(1) = 4.20$, $p = .049$, OR = 2.11).

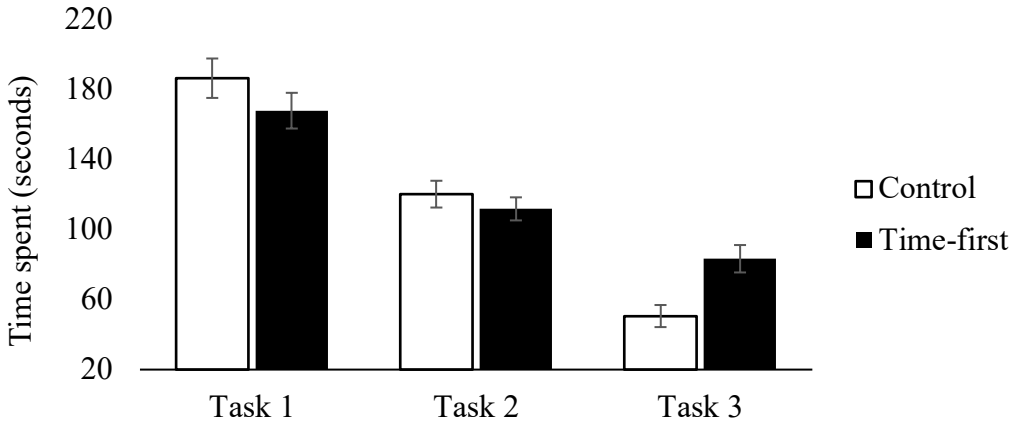

Figure 6: Budgeting time first increases time spent on downstream goals (experiment 2)

4.2.3 Performance on downstream goals

Importantly, by preserving more time for downstream goals, budgeting time first improved performance on the last task. In addition to a main effect of task ($p < .001$), a mixed ANOVA (with time budgeting as the between-subjects factor and task as the within-subjects factor) revealed the expected condition × task interaction on output ($F(2, 296) = 6.70$, $p = .001$, $\eta^2 = .04$; main effect of condition $F < 1$; see figure 7). As predicted, compared to the control ($M = 7.80$, SD = 13.20), participants who budgeted time first obtained more correct answers on the last task ($M = 13.95$, SD = 10.95; $F(1, 148) = 9.50$, $p = .002$, $\eta^2 = .06$).

Finally, as expected, budgeting time first also increased the likelihood that participants achieved their last goal ($22\%_{\text{control}}$ vs. $41\%_{\text{time-first}}$ logistic regression: $b = .92$, Wald $\chi^2(1) = 6.24$, $p = .012$, OR = 2.50).[5]

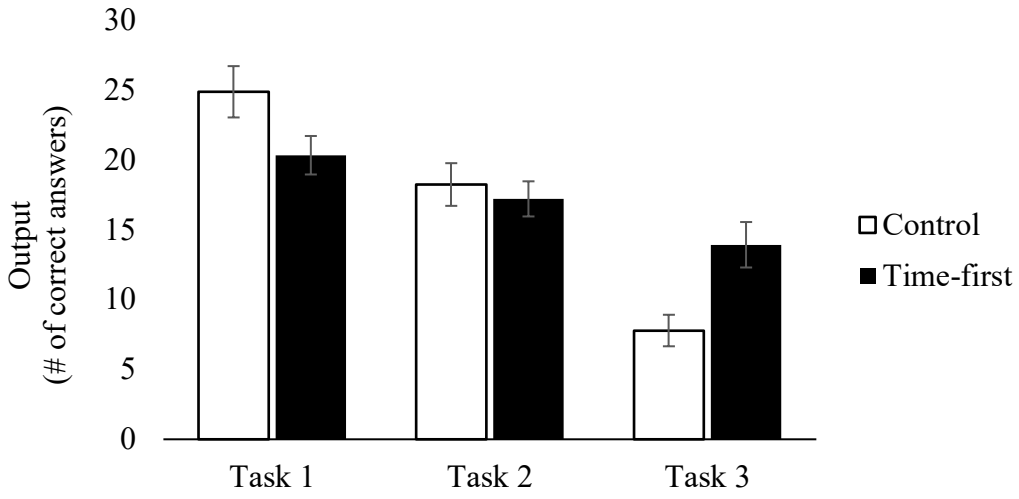

Figure 7: Budgeting time first improves performance on downstream goals (experiment 2)

4.2.4 Goal accuracy

In addition to an effect of task ($p < .001$), a mixed ANOVA (with time budgeting as the between-subjects factor and task as the within-subjects factor) revealed a significant effect of budgeting time on discrepancy ($F(1, 148) = 10.73$, $p = .001$, $\eta^2 = .07$; figure 8). As expected, budgeting time increased goal accuracy (i.e., reduced the gap

[5] To explore downstream implications of performance on the last goal for well-being, following goal pursuit I also asked participants, "How happy are you with your overall performance on the tasks?" (1 = *Very unhappy*, 4 = *Neither happy nor unhappy*, 7 = *Very happy*). By increasing output on the last task, budgeting time first increased happiness (indirect effect: *ab* = .26, 95% CI .10 to .44; direct effect of condition: $p = .144$; see Appendix 4). Notably, achieving the last goal significantly increased happiness with overall performance ($p < .001$).

between goals and output; $M_{control}$ = -38.20, SD = 41.32 vs. $M_{time\text{-}first}$ = -17.07, SD = 37.66).

Notably, overall discrepancy was negative even in the time-first condition, indicating that time-first goals were still high and challenging.

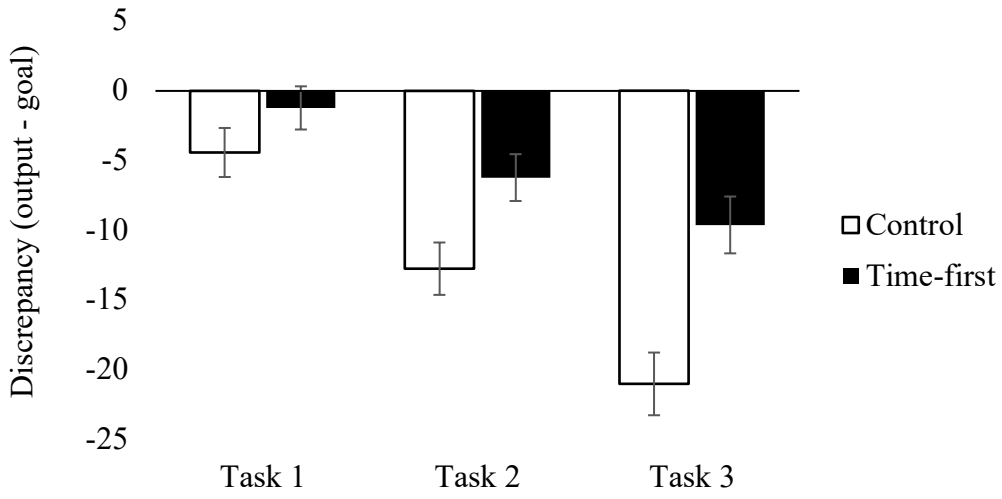

Figure 8: Budgeting time first increases goal setting accuracy (experiment 2)

Further, consistent with my theory, the condition × store interaction was significant ($F(2, 296) = 4.76$, $p = .009$, $\eta^2 = .02$), demonstrating that budgeting time first reduced discrepancy to a greater extent as participants progressed through the stores and errors in goal setting and time use compounded.

4.3 Discussion

Experiment 2 provides further support for my predictions in a novel paradigm with a greater number of goals and three new, distinct tasks (geography, spelling, and

math quizzes). First, budgeting a fixed amount of total time across multiple tasks before setting goals (vs. only setting goals) encouraged participants to set more realistic and accurate (yet still challenging) multiple goals.

Further, budgeting time increased time spent and improved performance on downstream goals. By discouraging participants from overspending time on optimistically high upstream goals, budgeting time increased time spent on the last goal (i.e., redistributed time from early toward later goals). Consequently, budgeting time increased the number of correct answers obtained as well as the likelihood of achieving the last goal.

5 Experiment 3: Last goal is more valuable

Experiment 3 provides a more conservative test of my predictions by increasing the relative value of the last goal. In the first two experiments, while participants may have had preferences for one store over another, I did not explicitly manipulate the relative value of the goals (i.e., all tasks counted equally toward the bonus incentive). One could thus wonder if budgeting time first would still influence multiple goal setting even when the last goal is more valuable and consumers are incentivized to achieve higher performance on it, relative to other goals.

To test this, I manipulate the relative value of the goals. As in experiment 2, participants set and pursued three goals. To increase the value of the last goal, I offered separate incentives for each goal, with the highest incentive for the last goal in the sequence. I predicted that even when the last goal is most valuable, budgeting time first would still encourage people to set more realistic multiple goals, thus preserving more time for and improving performance on downstream goals.

5.1 Design and method

5.1.1 Participants

Two hundred and twelve Prolific Academic panelists participated in exchange for a small payment and the chance to win one of three bonuses ($40, $50, and $60), based on performance. In this and all online experiments, I targeted a sample size of 100 participants per experimental condition, net any exclusions. Four participants were excluded for restarting the survey after progressing to the practice tasks and 8 were

excluded for extreme values of total time spent on the survey,[6] leaving a final sample of $N = 200$ (average age = 33.5 years, 54.5% women; preregistration: http://aspredicted.org/blind.php?x=9mu2wk). Participants were randomly assigned to one of two conditions: control versus time-first.

5.1.2 Procedure

The procedure was the same as in experiment 2, with three exceptions.

First, I introduced a new task: transcribing 6-character alphanumeric strings (see Appendix 5 for stimuli). To count as a correct answer, participants had to accurately transcribe the characters.

Second, the tasks were presented in the same fixed (and known) order for all participants (transcription, then spelling, then math). While randomizing task order in prior experiments enabled us to exclude the possibility that task order influenced the effects, one could wonder if the benefits of budgeting time first might be reduced if participants are aware of (and thus can plan for) task order when setting their goals. To show that the effects are robust in this case (and enable me to manipulate the value of the last goal), in experiment 3 I used the same fixed task order for all participants.

Third, I manipulated the relative value of the goals. Rather than offering a single incentive toward which all goals counted equally, I offered separate bonuses for each task: $50 for transcription, $40 for spelling, and $60 for math. Thus, the last goal in the

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[6] Given the detailed instructions and timed experimental design, for all online goal pursuit experiments I employed exclusions for failing an attention check and for extreme values on time spent on the study (goal pursuit studies only). Time outliers were time values +/- 2.5 standard deviations from the mean, calculated in two waves (following Meyvis and Van Osselaer 2017).

sequence was the most valuable. Participants scoring in the top 20% on any task were entered in the bonus lottery for that task. As in experiment 2, participants had to achieve a minimum number of correct answers (10) on *each* task to receive any score (i.e., they were required to set multiple goals).

Fourth, as a manipulation check, after goal pursuit I asked all participants "Which of the three tasks is worth the most money (has the biggest lottery bonus)?" Affirming the manipulation, a majority of participants chose the math task (73.5%), with no differences by condition ($\chi^2 < 1$).[7]

5.2 Results

5.2.1 Multiple goal setting

As predicted, budgeting time first encouraged people to set more realistic multiple goals. Consistent with prior results, in addition to an effect of task ($F(2, 396) = 5.96$, $p = .003$, $\eta^2 = .03$), a mixed ANOVA revealed the predicted effect of time budgeting on goal setting ($F(1, 198) = 11.64$, $p = .001$, $\eta^2 = .06$). Compared to the control ($M = 81.40$, SD = 44.62), participants in the time-first condition set lower multiple goals ($M = 61.35$, SD = 38.15).

[7] Transcription was selected by 20.5% of participants and spelling by 6%. However, because this question was asked after participants had spent 7 minutes pursuing their goals (vs. immediately after the instructions), it is possible that the assigned monetary value of each task was less salient than participants' goals and performance (i.e., which task they felt was worth most to them, given their goals and task performance).

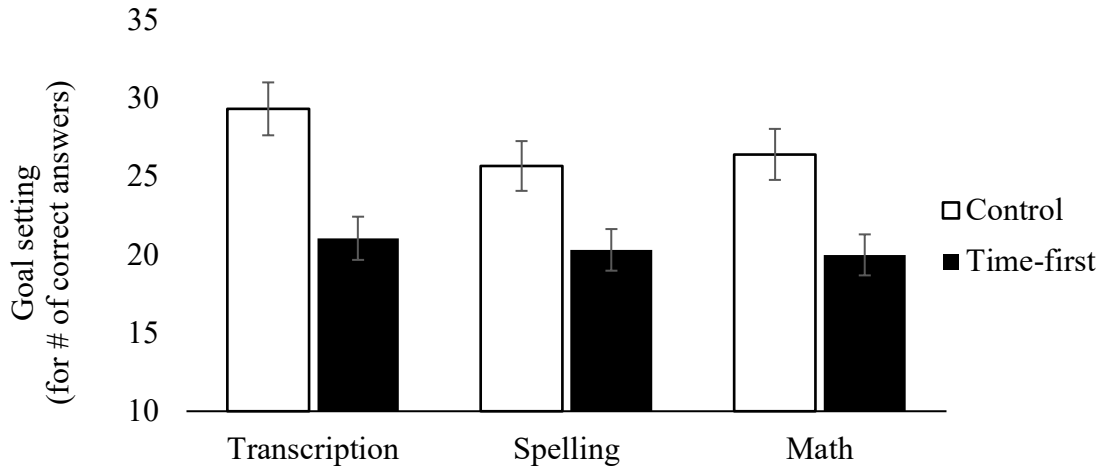

Figure 9: Budgeting time first encourages more realistic multiple goal setting (experiment 3)

5.2.2 Time spent on downstream goals

By encouraging people to set less overly optimistic multiple goals, budgeting time first increased time spent on the last (and most valuable) task. A mixed ANOVA revealed the expected condition × task interaction on time spent ($F(2, 396) = 6.52$, $p = .002$, $\eta^2 = .03$; main effect of condition $p = .103$; see figure 10). As predicted, compared to the control ($M = 79$ seconds, SD = 70.87), budgeting time first increased time spent on the last task ($M = 96$ seconds, SD = 63.05; $F(1, 198) = 3.88$, $p = .050$, $\eta^2 = .02$). By discouraging people from overspending time on upstream tasks, budgeting time before setting goals increased the time available for downstream goals (figure 10).

Notably, as expected, budgeting time first also increased the likelihood that participants spent *any* time pursuing their last goal (albeit directionally; $71\%_{\text{control}}$ vs. $81\%_{\text{time-first}}$; logistic regression: $b = .53$, Wald $\chi^2(1) = 2.46$, $p = .112$, OR = 1.70).

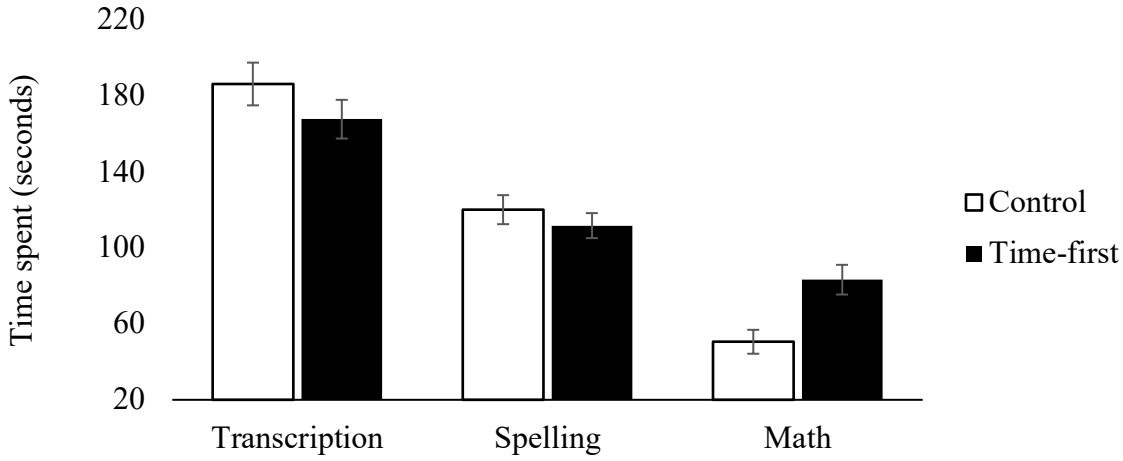

Figure 10: Budgeting time first increases time spent on downstream goals (experiment 3)

5.2.3 Performance on downstream goals

By preserving more time for downstream goals, budgeting time first improved performance on the last task. In addition to a main effect of task ($p < .001$), a mixed ANOVA (with time budgeting as the between-subjects factor and task as the within-subjects factor) revealed the expected condition × task interaction on output ($F(2, 396) = 6.70$, $p = .001$, $\eta^2 = .04$; main effect of condition $F < 1$; see figure 7). Budgeting time directionally, although not significantly, increased output on the last task ($M_{\text{control}} = 9.62$, SD = 10.18 vs. $M_{\text{time-first}} = 10.83$, SD = 7.20; $F < 1$).

As predicted, budgeting time first increased the likelihood that participants achieved their last goal ($30\%_{\text{control}}$ vs. $56\%_{\text{time-first}}$ logistic regression: $b = 1.09$, Wald $\chi^2(1) = 13.32$, $p < .001$, OR = 2.96).

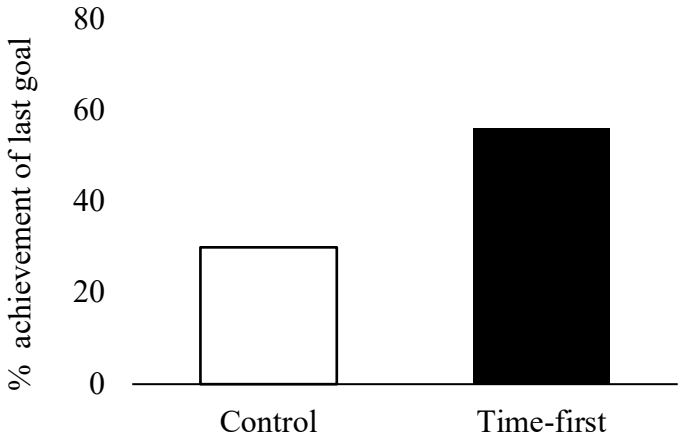

Figure 11: Budgeting time first increases achievement of more valuable downstream goals (experiment 3)

5.2.4 Goal accuracy

In addition to an effect of task ($p < .001$), a mixed ANOVA (with time budgeting as the between-subjects factor and task as the within-subjects factor) revealed the expected a significant effect of budgeting time on discrepancy ($F(1, 198) = 9.25$, $p = .003$, $\eta^2 = .04$; figure 12). As expected, budgeting time increased goal accuracy (i.e., reduced the gap between goals and output; $M_{control} = -29.76$, SD = 42.74 vs. $M_{time\text{-}first} = -13.41$, SD = 32.50). Consistent with prior results, overall discrepancy was negative even in the time-first condition, indicating that time-first goals were still high and challenging.

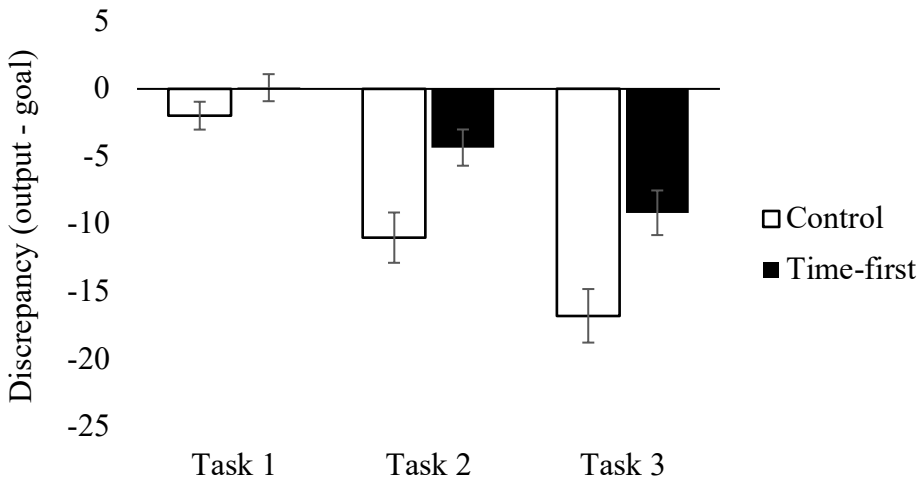

Figure 12: Budgeting time first increases goal setting accuracy (experiment 3)

Further, consistent with my theory, the condition × store interaction was significant ($F(2, 396) = 3.99$, $p = .019$, $\eta^2 = .04$), demonstrating that budgeting time first reduced discrepancy to a greater extent as participants progressed through the stores and errors in goal setting and time use compounded.

5.3 Discussion

Experiment 3 demonstrates that even when the last goal is most valuable, budgeting time first encourages people to set more realistic multiple goals. Although I did not observe prioritization of the last task in goal setting (i.e., setting relatively higher goals for the last task), participants' personal preferences for and abilities across the different tasks may also have influenced goal setting. Notably, however, participants in the time-first condition allocated relatively more time to the last task than to either of the proceeding tasks (time allocated to last goal: $M = 2.57$, vs. first goal $p = .001$, vs. second

goal $p = .001$; see Appendix 5). This suggests that, by prompting people to disaggregate a shared time pool, budgeting time may encourage prioritizing more valuable goals via greater time allocation, thus improving performance.

Further, by encouraging more accurate multiple goals, budgeting time increased time spent and performance on the last goal. While budgeting time only directionally increased output on the last goal, it may be that increasing the value encouraged participants in the control condition to achieve at least some additional output. Importantly, however, budgeting time increased achievement of the last—and most valuable—goal.[8]

[8] Moreover, ancillary performance metrics support the beneficial effects of budgeting time for performance on the last goal. Budgeting time also increased the likelihood of achieving the minimum required score on the last goal (without which participants received no score on any task; $52\%_{control}$ vs. $67\%_{time\text{-}first}$; $p = .010$); the likelihood of qualifying for the (most valuable) bonus lottery on the last goal ($11\%_{control}$ vs. $30\%_{time\text{-}first}$; $p = .001$); and the number of bonus lotteries (of the total possible 3) that participants qualified for, and thus their potential earnings ($M_{control} = .47$ vs. $M_{time\text{-}first} = .75$; $p = .021$). See Appendix 5 for full results.

6 Experiment 4: The sum of the parts is greater than the whole

My theory argues that budgeting time first encourages more realistic multiple goal setting by reducing "double dipping" into a shared pool of time. When multiple goals compete for a shared time pool (vs. have distinct accounts), people anchor on the salient account of total available time, leading them to implicitly perceive there is more time available for each goal than actually exists. To test this, in experiment 4, I had participants set goals and then estimate how much time each goal would require. I predicted that budgeting time first would reduce subsequent estimates of time requirements (i.e., bring estimates closer to the total available time). This prediction is consistent with the notion that when total time is pooled, people are likely to perceive more time available for each goal, despite being able to recognize the (higher) time requirements of their (higher) multiple goals.

6.1 Design and method

6.1.1 Participants

Two hundred and five U.S. Prolific Academic panelists participated in exchange for a small payment and the chance to win a $100 bonus, based on performance. Two participants were excluded for failing an attention check, leaving a final sample of N = 203 (average age = 34 years, 52.3% women; preregistration: https://aspredicted.org/blind.php?x=zr3k8r). Participants were randomly assigned to one of two conditions: control versus time-first.

6.1.2 Procedure

The procedure was the same as in experiment 2, with the following exceptions.

First, all participants set goals for three tasks (transcription, spelling, and math). They were told they would pursue the tasks in the same fixed (and known) order for a total of 7 minutes.

Second, after participants set goals, I measured estimated time requirements for each goal. Following the goal setting page, all participants read that there were a few more questions to answer before starting the tasks. Then, they were shown the goal they had set for the transcription task and responded to the question, "How many minutes do you think it will take to achieve this goal?" Participants typed their answers into an open-response box (see Appendix 6 for stimuli).[9] Across the following two pages, they answered the same question for the spelling and math tasks.

Third, to affirm that budgeting time first prompts consumers to give greater consideration to individual time accounts (vs. total time) when setting goals, as I suggest, I measured which participants considered more ("While setting your goals, what did you think about more?" (1 = *The time available for ALL tasks*, 4 = *Both equally*, 7 = *The time available for EACH task*). Supporting the manipulation, participants in the time-first condition reported focusing more on individual (vs. total) time accounts during goal setting (M_{control} = 3.50, SD = 1.92 vs. $M_{\text{time-first}}$ = 4.20, SD = 1.97; $F(1, 201) = 6.49$, p = .012, η^2 = .03).

[9] To reduce participant entry errors and extreme outliers, I programmed the survey to accept time estimates for each goal that were positive, nonzero values no greater than 7 (the total amount of time available for all goals). The upper limit only became explicit if a value greater than 7 was entered.

Finally, participants were informed they would not need to spend 7 minutes on the tasks and would be entered into the bonus lottery. Thus, during goal setting, participants set "real" goals they expected to pursue.

6.2 Results

6.2.1 Multiple goal setting

As predicted, budgeting time first encouraged people to set more realistic multiple goals. Consistent with prior results, a mixed ANOVA (with time budgeting as the between-subjects factor and task as the within-subjects factor) revealed the predicted effect of time budgeting on goal setting ($F(1, 201) = 4.40$, $p = .037$, $\eta^2 = .02$). Compared to the control ($M = 75.86$, SD = 45.24), participants in the time-first condition set lower multiple goals ($M = 63.06$, SD = 41.55; figure 13).

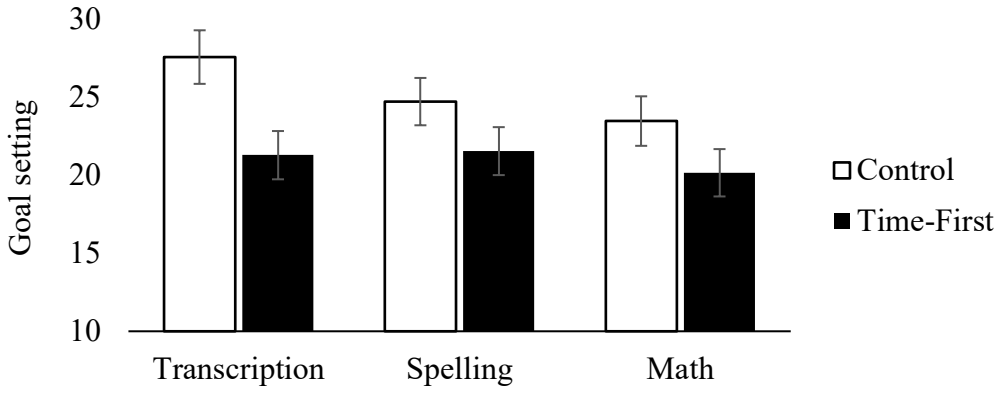

Figure 13: Budgeting time first encourages more realistic multiple goal setting (experiment 4)

6.2.2 Reverse estimation of time requirements

As predicted, budgeting time decreased subsequent estimates of how much time would be required to achieve the goals. In addition to an effect of task ($F(2, 402) = 5.87$, $p = .003$, $\eta^2 = .03$), a mixed ANOVA (with time budgeting as the between-subjects factor and task as the within-subjects factor) revealed the predicted effect of time budgeting on time estimates ($F(1, 201) = 4.35$, $p = .038$, $\eta^2 = .02$).[10] Compared to the control (M = 9.55 minutes, SD = 4.76), participants in the time-first condition estimated that achieving their goals would take less time (M = 8.33 minutes, SD = 3.45; figure 14).[11]

Further supporting my theory, time estimates mediated the effect of budgeting time on goal setting. A bias-corrected bootstrapping mediation analysis generated a 95% confidence interval around the indirect effect that excluded zero (Hayes 2018). Thus, budgeting time first reduced "double dipping" into the shared pool of time, which encouraged people to set more realistic multiple goals (ab = -2.62, 95% CI: -7.20 to -.05).

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[10] Values greater than 2.5 SD above the mean were winsorized (i.e., recoded as the next-highest value within range). Results are similar for unadjusted values; see Appendix 6 for details and analyses.

[11] Note that time estimates in both conditions exceeded the overall constraint of 7 minutes (control: $t(102) = 5.44$, $p < .001$; time-first: $t(99) = 3.81$, $p < .001$). This is consistent with results in the previous experiments, in which time-first goals were more realistic, but still optimistic and high (i.e., overall discrepancy was negative).

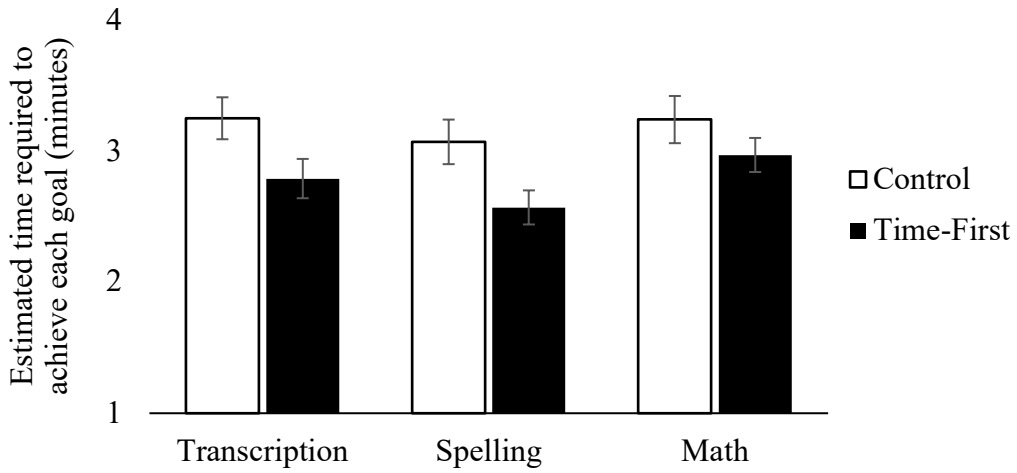

Figure 14: Budgeting time first decreases estimates of time required to achieve multiple goals (experiment 4)

6.3 Discussion

Experiment 4 supported my theory that budgeting time first encourages more realistic multiple goal setting by reducing the tendency to "double dip" into a shared time pool when setting goals. Lacking distinct goal accounts, people perceived greater time for each goal, leading them to set higher goals whose demands exceeded available time.

Given that people in the control condition were able to recognize the (greater) time demands of their goals after being prompted to separately estimate time required, one could wonder if budgeting time after setting goals would provide similar benefits as budgeting time first (i.e., if consumers might revise their goals to be more realistic). To test this, I ran a follow-up study (MTurk, $N = 297$; goal setting only) which replicated the design of experiment 2, except that that I introduced a new "goals first" condition in which participants set goals and then budgeted time. Then, participants in the goals-first condition were shown their goals and associated time allocations and asked, "Would you

like to change any of your goals before starting the tasks?" (1 = yes, 0 = no). Those who answered "yes" entered their final (revised) goals.[12] Consistent with prior results, participants in the goals-first condition set higher initial goals (M = 73.60) than those in the time-first condition (M = 58.75; p = .006), and similar to control (M = 77.71; F < 1; see Appendix 7 for full results).

Despite the explicit prompt, however, only 26% chose to revise their goals (a proportion significantly below chance, p < .001). Indeed, these revised goals were lower (M = 55.35; vs. control: p = .007; vs. time-first: p = .681), suggesting that budgeting time after setting goals may make (some) people aware that their goals exceed available time. Notably, goals of the 74% who did not revise remained unrealistic (M = 55.35; vs. time-first: p = .050). Thus, even when the relationship between multiple goals and the (limited) time available for each was made salient (and participants made a forced, active choice about revision), the option to revise was underutilized. One possible explanation is that once consumers have set a goal, they are reluctant to revise downward (i.e., if the revised goal feels like a "loss" compared to the original, more desirable goal; Heath et al. 1999, Weingarten et al. 2018). Regardless, these results indicate that budgeting time after goal setting is unlikely to produce the same benefits as putting time first.

[12] After advancing past the goal setting section, as in the main study, participants were told they would not have to do the tasks and would be entered in the bonus lottery.

7 Experiment 5: Setting goals for varied time constraint

Experiment 5 further tests my theory by manipulating the overall time constraint. One could wonder if, rather than reducing double-dipping into a shared time pool, the effect of budgeting time first is driven, more generally, by increased consideration of opportunity costs (i.e., greater awareness that spending time pursuing one goal leaves less time available for other goals; Frederick et al. 2009; Spiller 2011, 2019; Thaler 1980; Zauberman and Lynch 2005). Indeed, it stands to reason that while people budget time they become more aware of tradeoffs in time use (i.e., how allocating more time to one goal reduces time available for other goals). However, my theory predicts it is disaggregating a shared time pool into distinct goal accounts (vs. considering opportunity costs, in general) that reduces double-dipping into a shared time pool when setting multiple goals.

To test this, in experiment 5, I manipulate the level of time constraint. Extant research finds that consumers spontaneously consider opportunity costs as constraint increases (Fernbach et al. 2015; Spiller 2011, 2019). This suggests that, if the effect of budgeting time is driven by increased opportunity cost consideration, in general, it should be attenuated at higher levels of constraint (i.e., when consumers spontaneously consider opportunity costs, without the prompt of budgeting time). However, if the effect of budgeting time is driven by disaggregating a shared time pool into distinct goal accounts, as I suggest, then budgeting time first should still influence multiple goal setting at higher levels of constraint.

7.1 Design and method

7.1.1 Participants

Three hundred and fifty-seven university lab panelists participated in exchange for a small payment and the chance to win a $45 bonus based on performance (average age = 22 years, 72% women; preregistration: http://aspredicted.org/blind.php?x=9cv8k4). Participants were randomly assigned to one of four conditions in a 2 (time budgeting: control versus time-first) x 2 (time constraint: greater constraint vs. less constraint) design.

7.1.2 Procedure

The procedure was the same as in experiment 2, with the following exceptions.

First, all participants set goals for three tasks (geography, spelling, and math quizzes). They were told they would pursue the tasks in the same fixed (and known) order.

Second, I manipulated time constraint. In the more constrained condition, participants had 5 minutes for the tasks, and in the less constrained condition, participants had 7 minutes. To adjust for the greater time constraint, the minimum requirement (in all conditions) was 8 correct answers per task (rather than 10, as in experiment 2).

Third, after goal setting I asked the same question about consideration of individual time accounts (vs. total time) when setting goals from experiment 4. Again supporting the manipulation, participants in the time-first condition reported focusing more on individual (vs. total) time accounts during goal setting ($M_{control}$ = 3.46, SD = 1.85

vs. $M_{\text{time-first}}$ = 4.58, SD = 1.97; $F(1, 353) = 30.61$, $p < .001$, $\eta^2 = .08$), with no time budgeting x time constraint interaction ($F < 1$).

Fourth, as in experiment 4, after setting goals, participants were informed they would not need to spend time on the tasks and that they would be entered in the bonus lottery.

7.2 Results

7.2.1 Multiple goal setting

As predicted, budgeting time first encouraged people to set more realistic multiple goals. Consistent with prior results, a mixed ANOVA (with time budgeting and time constraint as the between-subjects factors and task as the within-subjects factor) revealed the predicted effect of time budgeting on goal setting ($F(1, 353) = 5.48$, $p = .020$, $\eta^2 = .02$). Compared to the control (M = 75.65, SD = 41.96), participants in the time-first condition set lower multiple goals (M = 65.61, SD = 38.96; figure 15).

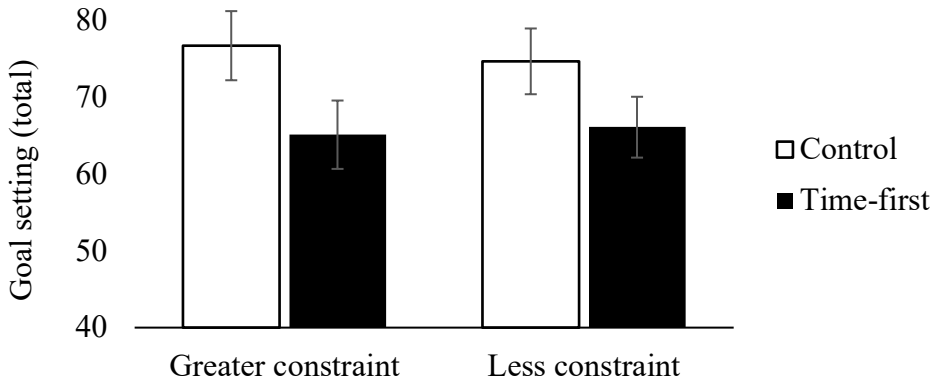

Figure 15: Budgeting time first encourages more realistic multiple goals, even as constraint increases (experiment 5)

Importantly, there was no time budgeting x time constraint interaction ($F < 1$), nor were there any significant interactions between time constraint and other variables (see Appendix 8 for full results).[13] Thus, even as time constraint increased, budgeting time still encouraged people to set more realistic multiple goals.

7.3 Discussion

Experiment 5 supports my theory that the effect of budgeting time is due to disaggregating a shared time pool into distinct goal accounts, rather than more generally increasing opportunity cost consideration. Budgeting time first encouraged more realistic multiple goal setting, even at increased levels of overall constraint (when spontaneous consideration of opportunity cost increases). Thus, even when opportunity costs were more salient, only budgeting time first encouraged more realistic multiple goal setting.

[13] I acknowledge that goals were not lower in the greater constraint condition (i.e., there was no main effect of level of constraint). While my theory doesn't offer predictions about how overall levels of constraint influence goal setting, in the 5-minute condition the time constraint may have been so great that, even when budgeting time, people could not sufficiently adjust goal levels downward. This suggests that prioritizing by eliminating some goals entirely may be necessary at more extreme levels of constraint.

8 Experiment 6: Assigned time budgets

Experiment 6 had three main objectives. First, experiment 6 further distinguishes the effects of disaggregating shared time into distinct goal accounts from increased opportunity cost consideration. To do this, I introduce a new condition in which time budgets are assigned, rather than chosen as in previous experiments. Actively budgeting time may indeed increase awareness of tradeoffs in time use. However, if budgeting time first encourages more realistic multiple goals even when time budgets are assigned—and people don't actively consider tradeoffs in time allocation—it would provide further support for distinct goal accounts as the more robust and parsimonious process.

Second, one could wonder whether the effect of budgeting time first is driven by making goal setting more difficult. To address this possibility, I measured goal-setting difficulty and tested for any potential effects.

Third, given my interest in setting multiple goals that fit available time, the experiments thus far explicitly incentivized accurate goal setting (i.e., rewards were contingent upon achieving the goal). One could wonder, however, whether the results hold when rewards accumulate incrementally and goals merely serve as reference points to guide behavior (i.e., "mere goals"; Heath et al. 1999). To test this, in experiment 6, I incentivized incremental output (i.e., each correct answer earned one point) and had participants set "mere goals" for how many correct answers to achieve on each task. I expected that, even in the absence of contingent rewards, budgeting time first would encourage people to set more realistic multiple goals.

8.1 Design and method

8.1.1 Participants

Three hundred forty-four U.S. Prolific Academic panelists participated in exchange for a small payment and the chance to win a $100 bonus. Six participants were excluded for restarting the survey after progressing to the practice tasks, two failed the attention check, and 19 were excluded for extreme values on time spent, leaving a final sample of $N = 317$ (average age = 32.9 years, 53.9% women). Participants were randomly assigned to one of three conditions: control versus chosen time budget versus assigned time budget.

8.1.2 Procedure

The procedure was the same as in experiment 2, with four exceptions. First, all participants had a total of 5 minutes for two tasks: transcription and spelling.

Second, I employed a "mere goals" design in which participants' scores (and thus chances to win the bonus) did not depend on goal achievement. Participants received one point per correct answer, regardless of the goal they set or how it compared to their output. When setting goals, participants were instructed to set desirably high, yet achievable goals ("Your goals represent the highest number of correct answers you think you can get for each task within the available time").

Third, in the new assigned time budget condition, participants first viewed a suggested time budget (3 minutes for transcription and 2 minutes for spelling)[14] and then set goals for those tasks (in a randomized order; see Appendix 9 for stimuli).

Fourth, I measured the proposed alternative process of goal setting difficulty by asking participants, "How difficult was it to set your goals?" (1 = *Not at all difficult*, 7 = *Very difficult*).[15] [16]

8.2 Results

8.2.1 Multiple goal setting

In addition to an effect of task ($F(1, 314) = 5.44$, $p = .020$, $\eta^2 = .02$), a mixed ANOVA revealed the predicted effect of time budgeting on goal setting ($F(2, 314) = 5.47$, $p = .005$, $\eta^2 = .03$). Supporting my theory, compared to the control ($M = 48.58$, SD = 28.93), participants in both time budget conditions set lower multiple goals (albeit, directionally for chosen time; $M_{\text{chosen time}} = 43.13$, SD = 27.04; $M_{\text{assigned time}} = 36.53$, SD = 23.82; chosen time vs. control: $F(1, 314) = 2.19$, $p = .140$, $\eta^2 = .01$; assigned time vs. control: $F(1, 314) = 10.91$, $p = .001$, $\eta^2 = .03$; figure 16). Thus, even when people did not actively budget time across multiple goals (and would be less likely to consider

[14] The assigned time budget of 3 and 2 minutes was informed by the previous experiments, in which most participants in the time-first condition chose whole minute, relatively balanced time distributions across tasks.
To limit additional complexity, I opted not to randomize which task was assigned 3 vs. 2 minutes.

[15] I also measured consideration of time tradeoffs and a focus on setting attainable (vs. desirable goals). See Appendix 9 for results.

[16] Due to a survey programming error, participants were shown incorrect goals while working on the tasks. Goal performance is thus not interpretable and is not discussed further.

opportunity costs), disaggregating a shared time pool encouraged more realistic multiple goal setting.

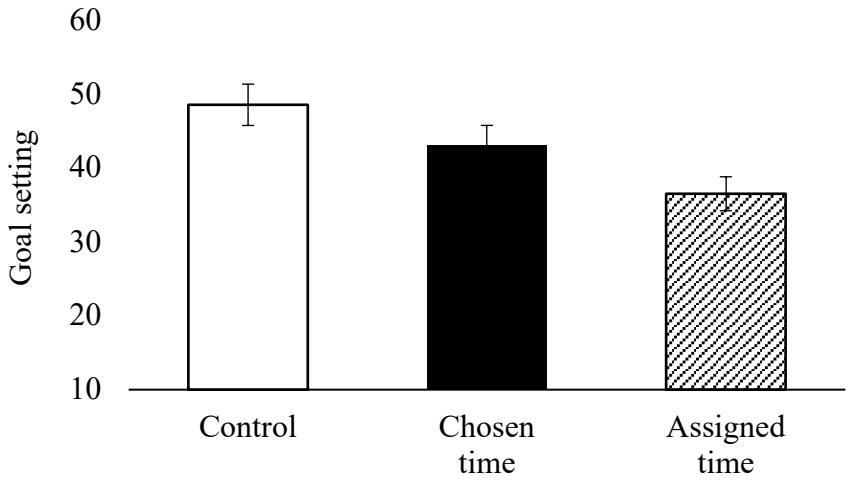

Figure 16: Budgeting time first—even when assigned—encourages more realistic multiple goal setting (experiment 6)

8.2.3 Alternative explanation

Casting doubt on the notion that budgeting time first lowers goals by increasing goal setting difficulty, there was no effect of time budget condition on the perceived difficulty of setting goals ($M_{\text{control}} = 3.91$, SD = 1.87 vs. $M_{\text{chosen time}} = 3.86$, SD = 1.79 vs. $M_{\text{assigned time}} = 4.14$, SD = 1.74; $F < 1$).

8.3 Discussion

Experiment 6 provides further evidence that budgeting time encourages more realistic multiple goal setting by reducing double-dipping into a shared time pool. Even when participants simply viewed assigned time budgets—and did not actively consider trade-offs in time allocation—the presence of distinct goal accounts encouraged more

realistic multiple goals. This further supports the presence of distinct goal accounts (vs. opportunity cost consideration, more generally) as the more robust and parsimonious process.

Second, budgeting time first did not affect the perceived difficulty of goal setting, casting doubt on the possibility that this might explain the results.

Third, experiment 6 demonstrated robustness, showing that the effect of budgeting time first held even when goal achievement per se wasn't incentivized (i.e., participants set "mere goals").

Notably, that an assigned time budget produced similar benefits suggests that marketers and consumers may be able to shape what goals others set (and subsequently spend time on and achieve) by structuring their time. Assigned (or suggested) time budgets may be a useful tool to help manage consumer expectations and facilitate interdependent goal pursuit. I return to this point in the General Discussion.

9 Experiment 7: Alternative explanations

Experiment 7 further tests my theory by addressing multiple alternative explanations.

First, because the time-first manipulation involves an additional step (i.e., allocating time across goals), one could wonder whether the difference in goal setting is due to greater elaboration on the task. That the results held in experiment 6 even when a time budget was assigned—and participants did not actively elaborate on a time allocation—casts doubt on this notion. However, to directly rule out this possibility, in experiment 7 I added a new condition in which participants engaged in concrete task elaboration (i.e., writing about how they would perform the tasks) before setting goals. If the benefits of time budgeting are due to increased task elaboration before goal setting, then goals should also be more realistic in this condition. However, if the effect is driven by creating distinct time accounts, as I predict, then increased elaboration should not influence goal setting. Further, the open responses to the elaboration manipulation allow me to explore whether people spontaneously budget time when given an opportunity.

Second, because the time-first manipulation prompts people to more deeply consider time, one could wonder whether the difference in goal setting is due to greater elaboration on time, overall. To rule out this possibility, I added a new condition in which participants elaborated on the overall time available before setting goals. If the benefits of time budgeting are due to more generally increasing time elaboration before goal setting, then goals should also be more realistic in this condition. However, if the effect is driven

by creating distinct time accounts, as I predict, then increased elaboration on overall time constraints should not influence goal setting.

9.1 Design and method

9.1.1 Participants

Four hundred and forty North American Prolific Academic panelists participated in exchange for a small payment and the chance to win a $100 bonus, based on performance. One participant was excluded for restarting the survey after seeing the practice tasks, leaving a final sample of $N = 439$ (average age = 34 years, 53.8% women; preregistration: https://aspredicted.org/blind.php?x=j65bn6). Participants were randomly assigned to one of four conditions: control versus time-first versus task elaboration versus time elaboration.

9.1.2 Procedure

The procedure was the same as in experiment 4 (transcription, spelling, and math tasks), with the following exceptions.

First, all participants were told they would pursue the tasks in the same fixed (and known) order for a total of 6 minutes.

Second, I introduced a new condition in which participants engaged in increased task elaboration before goal setting, using a paradigm adapted from McCrea et al. 2008. Following the task instructions, participants in this condition read, “Before setting your goals, take a moment to think about how you will do the tasks. Write 1-2 sentences about this below.” See Appendix 10 for stimuli.

Third, I introduced a new condition in which participants engaged in increased time elaboration before goal setting. Following the task instructions, participants in this condition read, "Before setting your goals, take a moment to think about how much time you have in total for all three tasks (6 minutes). Type the number 6 into the box below." See Appendix 10 for stimuli.

Consistent with experiment 4, after goal setting, I measured the extent to which participants considered individual time accounts (vs. total time) when setting goals (using the same question from experiment 4). Affirming the manipulation, there was a significant effect of condition ($F(3, 435) = 6.86$, $p < .001$, $\eta^2 = .05$). Participants in the time-first condition focused more on individual (vs. total) time accounts ($M = 4.34$) when setting goals compared to the control ($M = 3.59$, $p = .006$), task elaboration ($M = 3.16$, $p < .001$), and time elaboration conditions ($M = 3.44$, $p = .001$).

9.2 Results

9.2.1 Multiple goal setting

In addition to an effect of task ($F(2, 870) = 5.8.42$, $p < .001$, $\eta^2 = .02$), a mixed ANOVA revealed the predicted effect of condition on goal setting ($F(3, 435) = 5.13$, $p = .002$, $\eta^2 = .03$). Consistent with prior results, compared to the control ($M = 76.41$, SD = 45.47), participants in the time-first condition set lower multiple goals ($M = 58.29$, SD = 37.71; $F(1, 435) = 9.14$, $p = .003$, $\eta^2 = .02$; figure 17).

Importantly, supporting my theory, budgeting time also reduced goal levels compared to both the task elaboration condition ($M = 76.97$, SD = 41.16; $F(1, 435) = 9.59$, $p = .002$, $\eta^2 = .02$) and the time elaboration condition ($M = 78.91$, SD = 51.90; $F(1,$

435) = 11.84, p = .001, η^2 = .03). Further, neither of these conditions differed from the control (F's < 1). Thus, only disaggregating time into separate goal accounts—not elaborating on the task or the total time constraint—influenced goal setting.

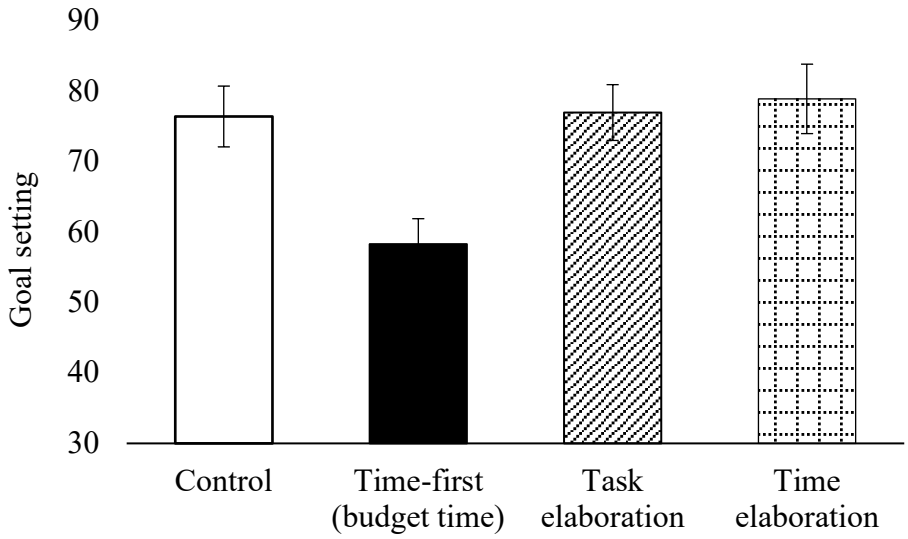

Figure 17: Budgeting time first—not increase task or time elaboration—encourages more realistic multiple goal setting (experiment 7)

Further, to explore whether participants in the task elaboration condition spontaneously budgeted time, I coded participants' open responses for any mention of creating separate time accounts. Consistent with the notion that consumers are unlikely to spontaneously disaggregate a shared time pool, only 2 responses (1.9%) mentioned budgeting time ("I will divide my time to dedicate 2 minutes to each of the 3 tasks" and "Allocate time to each task as a maximum and set goals"). See Appendix 10 for additional coding details and results. That so few participants spontaneously budgeted

time—even when required to elaborate on the task before setting goals—underscores the value of explicit prompts to budget time (or assigned time budgets, as in experiment 6).

9.3 Discussion

Experiment 7 provides additional support for the proposed underlying process by ruling out two alternative accounts: increased elaboration on the task and increased elaboration on time constraints (in general) before setting goals. Consistent with prior experiments, compared to the control, budgeting time encouraged people to set more realistic multiple goals. Casting doubt on the notion that increased elaboration about the task or about overall time constraint drive the effect, neither of these manipulations similarly influenced on goal setting.

Additionally, examining the open responses to the task elaboration manipulation allowed me to explore whether people will spontaneously budget time when prompted to think concretely about their goals prior to goal setting. Consistent with my suggestion that consumers are unlikely to spontaneously disaggregate a shared pool of time, fewer than 2 percent of participants did so. To further explore consumers' spontaneous preferences, I asked lab participants (N = 119) to complete the instructions and practice sections from experiment 2 and then indicate how they preferred to set their goals ("set my goals," "allocate time to each task and then set my goals," or "set my goals and then allocate time to each task"). Less than a third of participants indicated a preference for budgeting time first ($31.1\%_{\text{goals only}}$, $31.1\%_{\text{time-first,}}$ $37.8\%_{\text{goals-first}}$; $\chi^2(1) = 1.08$, $p = .584$;

time-first vs. 50%, $p < .001$).[17] Moreover, I asked a separate sample of online panelists ($N = 121$) about their preferred strategy when they have multiple goals for constrained time in their daily lives. Only a small minority (3.3%) indicated that they typically budget time first ("block time for different goals and then make a to-do list (decide what/how much to do)").

In summary, experiment 7 supports my theory that budgeting time first encourages more realistic multiple goals by disaggregating a shared pool of time. Further, the results suggest that consumers are unlikely to spontaneously budget time first, underscoring the value of explicit prompts.

[17] Participants who chose to budget time first set directionally lower goals overall ($M_{\text{goals only}} = 83.86$, $M_{\text{time-first}} = 68.86$, $M_{\text{goals-first}} = 83.86$; time-first vs. goals only: $p = .118$; time-first vs. goals-first: $p = .104$; goals-first vs. goals-only: $p = .990$), suggesting that people who chose other strategies would have benefited from a time-first approach.

10 Experiment 8: Moderation by number of goals

My theory argues that budgeting time first influences multiple goal setting by disaggregating a shared pool of time. This suggests that the benefits of budgeting time should increase as the number of goals—and thus number of time units to disaggregate—increase. To test this, in experiment 8, I manipulate the number of goals that participants set (one vs. two vs. three). I predicted that when people had only a single goal, and thus no shared time pool to disaggregate, budgeting time first would not influence goal setting. When participants had multiple goals, however, I predicted that budgeting time would encourage people to set more realistic (i.e., lower) multiple goals, and that this effect would be greater as the number of goals increased.

10.1 Design and method

10.1.1 Participants

Six hundred forty-eight U.S. Prolific Academic panelists participated in exchange for a small payment and the chance to win a $100 bonus, based on performance. Fourteen participants were excluded for restarting the survey after progressing to the practice tasks, one failed an attention check, and twenty-nine were excluded as extreme values for time spent on the survey, leaving a final sample of $N = 604$ (average age = 33.9 years, 50.2% men). Participants were randomly assigned to one of six conditions in a 3 (number of goals: 1, 2, 3) x 2 (time budgeting: control versus time-first) design.

10.1.2 Procedure

The procedure was the same as in experiment 2, with two exceptions.

First, I varied the number of goals. Participants were randomly assigned to set goals for one, two, or three tasks. Participants in the one-goal condition did transcription, those in the two-goal condition did transcription and spelling, and those in the three-goal condition did transcription, spelling, and math.[18]

Second, all participants had 6 minutes total to pursue their goal(s), and the number of goals they pursued in that time differed across conditions.

Given that goal setting is the primary outcome of interest in experiment 8, to limit the length of this paper, full results for time spent and goal performance are reported in Appendix 11.[19] I found that, consistent with prior results, budgeting time first boosted time spent and performance on downstream goals.

10.2 Results

10.2.1 Multiple goal setting

As predicted and consistent with prior results, budgeting time first encouraged people to set more realistic multiple goals. In addition to an effect of number of goals ($F(2, 598) = 52.86$, $p < .001$, $\eta^2 = .14$), a two-way ANOVA revealed a main effect of time budgeting on goal setting ($F(1, 598) = 20.81$, $p < .001$, $\eta^2 = .03$; see figure 18).

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[18] Note that, although participants in the one goal, time-first condition did not disaggregate time across multiple goals, they still went through the time budgeting procedure. After the task instructions, they were taken to a page where they read, "Before setting your goal, indicate how many minutes (of the total 6) you intend to spend on the task," and they typed 6 next to the transcription task (see Appendix 11 for stimuli).

[19] Following goal pursuit, I also measured consideration of trade-offs in time use (as in experiment 6). Further, to explore how achievement of downstream goals affects subjective well-being, I measured self-efficacy and positive and negative affect (Bandura and Locke 2003; Brunstein 1993; Weingarten et al. 2018). Supporting the notion that achieving downstream goals is a meaningful outcome for consumers, achieving the last goal significantly boosted subjective well-being (on all measures; see Appendix 11 for details and full results).

Overall, budgeting time reduced goal levels ($M_{control}$ = 59.78, SD = 36.30 vs. $M_{time\text{-}first}$ = 28.80, SD = 25.31).

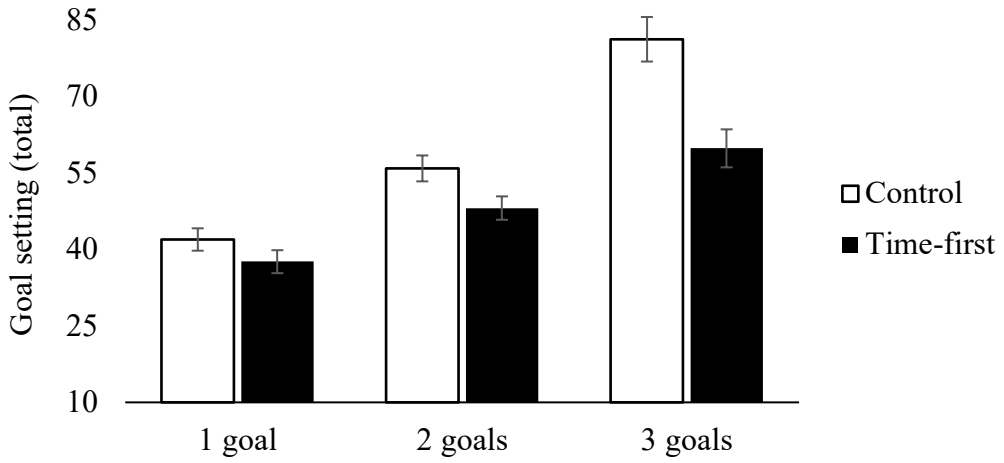


Figure 18: The effect of budgeting time first on multiple goal setting is greater as the number of goals increases (experiment 8)

Importantly, these effects were qualified by the predicted interaction (F(2, 598) = 4.45, p = .012, η^2 = .01). Supporting my theory, when participants had multiple goals, budgeting time encouraged them to set more realistic goals (two goals: $M_{control}$ = 56.00, SD = 25.61 vs. $M_{time\text{-}first}$ = 48.20, SD = 23.08, F(1, 598) = 3.38, p = .066, η^2 = .01; three goals: $M_{control}$ = 81.39, SD = 44.67 vs. $M_{time\text{-}first}$ = 59.94, SD = 35.52, F(1, 598) = 24.44, p < .001, η^2 = .04). When participants had only one goal (and thus no time to disaggregate), budgeting time had no effect ($M_{control}$ = 42.02, SD = 22.57 vs. $M_{time\text{-}first}$ = 37.66, SD = 22.91, F(1, 598) = 1.09, p = .297).

Further, as predicted, the condition × goal number interaction for 2 vs. 3 goals was also significant (F(1, 598) = 5.06, p = .025, η^2 = .01). Thus, as the number of goals

and units of time to disaggregate increased, budgeting time had a greater effect on goal setting.

10.3 Discussion

Experiment 8 supports my theory that, by disaggregating a shared pool of time, budgeting time first encourages people to set more realistic multiple goals. The benefits of disaggregating time into separate goal accounts were greater when people had more goals competing for the same total time pool, and thus more possibilities to make errors by "double dipping" into the available time when setting goals.

11 Experiment 9: Overspending time

Experiment 9 examines a meaningful downstream consequence of budgeting time: reducing overspending against future periods. Throughout the previous goal pursuit experiments, all participants experienced the same hard time constraint and could not continue pursuing their goals once the total time had expired. But what would happen if the overall time constraint is not enforced? I predicted that, by encouraging people to set more realistic multiple goals, budgeting time first would discourage people from failing to adhere to the original budget and overspend time against future periods. To test this, in experiment 9, I allowed participants to continue pursuing their goals beyond the original time budget, and I measured how much time they overspent.

11.1 Design and method

11.1.1 Participants

Two hundred and twenty-three U.S. Prolific Academic panelists participated in exchange for a small payment and the chance to win a $100 bonus, based on performance. Two participants were excluded for restarting the survey after progressing to the practice tasks, one failed an attention check, and seven were excluded as extreme values for time spent on the survey, leaving a final sample of $N = 214$ (average age = 34 years, 52.3% women; preregistration: https://aspredicted.org/blind.php?x=kq4dp4). Participants were randomly assigned to one of two conditions: control versus time-first.

11.1.2 Procedure

The procedure was the same as in experiment 2, with the following exceptions.

First, all participants set goals for and pursued three tasks (transcription, spelling, and math) in the same fixed (and known) order. As in prior experiments, throughout the instructions and goal setting sections, participants were told they would have a fixed total amount of time (7 minutes) beyond which they would not continue in the tasks. Thus, consistent with prior designs, participants set multiple goals for the same overall time constraint, which they believed was inflexible.

Second, I gave participants the option to overspend time during goal pursuit. When the full 7 minutes had expired, if participants were still working on the tasks, they saw a pop-up message that said, "7 minutes are up! You can move on now, or spend *extra* time on the tasks" (see Appendix 12 for stimuli). Participants had to click on the pop-up message to continue. At that point, they could either exit the tasks and complete the survey, or continue in the tasks and overspend time. The survey was programmed to allow up to two additional minutes of overspending; the limit on overspending was not revealed to participants unless they reached it. Because this study was conducted online and the payment was calibrated to the stated task time of 7 minutes, participants who overspent time were choosing to incur opportunity costs to continue pursuing their goals (e.g., foregoing time spent and earnings on other studies).

Note that, because goal pursuit in this study is not bounded by an overall time constraint, my theory does not offer predictions regarding time spent and performance on the last goal. Accordingly, results for goal setting and overspending time are reported in the main text; full results for time spent (overall) and performance on the last goal are reported in Appendix 12.

11.2 Results

11.2.1 Multiple goal setting

As predicted, budgeting time first encouraged people to set more realistic multiple goals. Consistent with prior results, in addition to an effect of task ($F(2, 424) = 10.71$, $p < .001$, $\eta^2 = .05$), a mixed ANOVA (with time budgeting as the between-subjects factor and task as the within-subjects factor) revealed the predicted effect of time budgeting on goal setting ($F(1, 212) = 3.65$, $p = .058$, $\eta^2 = .02$). Compared to the control ($M = 71.34$, SD = 41.48), participants in the time-first condition set lower multiple goals ($M = 60.85$, SD = 38.56; figure 19).

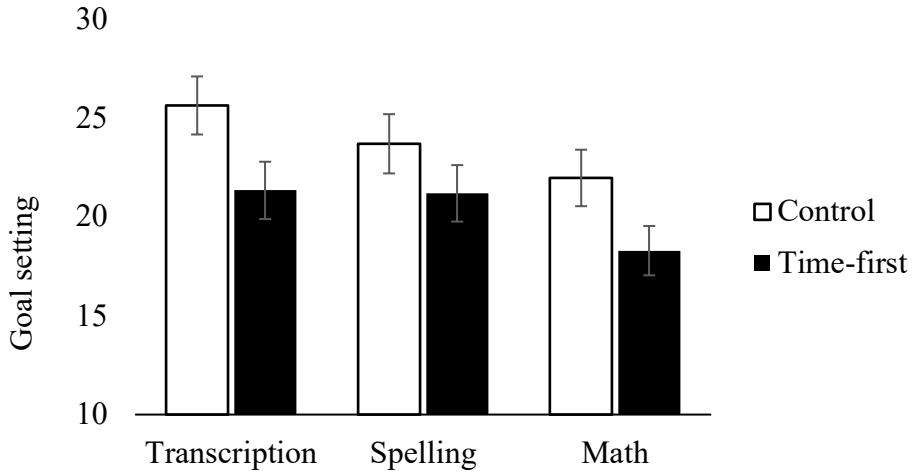


Figure 19: Budgeting time first encourages more realistic multiple goal setting (experiment 9)

11.2.2 Overspending time

By encouraging people to set less overly optimistic multiple goals, budgeting time first discouraged overspending time against future periods. A one-way ANOVA on

overspending (i.e., time spent beyond the original constraint of 7 minutes) revealed a significant effect of budgeting time ($F(2, 296) = 4.03$, $p = .019$, $\eta^2 = .02$). As predicted, compared to the control ($M = 51$ seconds, SD = 54.18), participants who budgeted time first overspent less time ($M = 83$ seconds, SD = 68.17; $F(1, 148) = 10.54$, $p = .001$, $\eta^2 = .07$). Budgeting time before setting goals discouraged people from overspending time on upstream tasks, increasing the time available for downstream goals.

11.3 Discussion

Experiment 9 demonstrates a meaningful downstream consequence of budgeting time first: reducing additional time overspent on (overly optimistic) goals. This occurred even though participants in this online experiment received no direct compensation for extra time spent, and indeed incurred opportunity costs (i.e., less time to spend earning money in other studies).

Notably, despite overspending more time, participants in the control condition did not enjoy offsetting performance improvements on the last goal. While my theory does not offer predictions regarding performance on downstream goals when overall time isn't constrained, I did examine performance on the last goal (full results in Appendix 12). Compared to the time-first condition, those in the control did not obtain more correct answers on the last goal ($M_{\text{control}} = 9.99$ vs. $M_{\text{time-first}} = 10.97$; $p = .399$) or overall ($M_{\text{control}} = 51.08$ vs. $M_{\text{time-first}} = 49.02$; $F < 1$), and they were not more likely to achieve the last goal ($42\%_{\text{control}}$ vs. $53\%_{\text{time-first}}$; $p = .109$). Overspending more time attenuated the detrimental effects of overly optimistic multiple goals in the control condition, it did not produce performance benefits.

In summary, experiment 9 demonstrates that the benefits of budgeting time first extend beyond the goals pertaining to a specific time period. By discouraging overspending against future periods, budgeting time first helps consumers protect time for what comes next.

12 General discussion

Multiple goal pursuit is a part of everyday life. Consumers have many goals (e.g., career, social, health, and personal interests) and only 24 hours a day to pursue them. When the requirements of consumers' multiple goals exceed available time, consumers often run out of time for goals that are pursued later in a sequence. Given limited time, how can consumers protect time for downstream goals?

Nine experiments (and three follow-up studies) demonstrated that budgeting time before setting multiple goals (vs. only setting goals) encourages people to set more realistic multiple goals. This occurred because, by disaggregating a shared pool of time, budgeting time first reduced "double-dipping" into a shared time pool when setting multiple goals (experiment 4). Budgeting time influenced goal setting even at higher levels of overall constraint (when opportunity cost consideration is increased; experiment 5) and when time budgets were assigned (experiment 6). The effect of budgeting time was greater as the number of goals (and thus time units to disaggregate) increased (experiment 8). Importantly, increased elaboration about the tasks or the total time constraint did not produce the same effect as budgeting time first (experiment 7).

By encouraging more realistic multiple goals, budgeting time benefitted multiple goal pursuit. Budgeting time first protected time for downstream goals, increasing the amount of time spent and the likelihood of spending any time on the last goal (experiments 1, 2, 3). Consequently, budgeting time boosted performance on the last goal (experiments 1, 2, 3). While budgeting time increased accuracy in goal setting (particularly for later goals in the sequence), goals were still high and challenging (i.e.,

overall discrepancy was negative; experiments 1, 2, 3). Notably, budgeting time helped protect time for downstream goals even when the last goal was most valuable (experiment 3).

Across experiments, the benefits of time budgeting were highly robust. We found consistent results across different tasks requiring diverse skill sets (e.g., online shopping, transcription, solving math problems). The effect of budgeting time held when overall performance was incentivized (experiments 1-2, 4-9), when performance on each goal was separately incentivized (and the last goal was most valuable; experiment 3), as well as when goal accuracy was incentivized (experiments 1-6, 7-9) and when participants set "mere goals" (experiment 6). Moreover, results held for tasks pursued in a random (experiments 1 and 2) and fixed order (experiments 3 and 8).

Further, the results underscore the value of explicit prompts to budget time first. We found that consumers are unlikely to spontaneously disaggregate a shared time pool before setting goals (experiment 7 and two follow-up experiments), and that people are less likely to benefit from budgeting time after goal setting (experiment 4 follow-up).

Finally, the experiments demonstrate an important downstream consequence for overspending time. By encouraging more realistic multiple goals, budgeting time first reduced the propensity to overspend time against future periods (experiment 9).

12.1 Theoretical contributions

12.1.1 Goals and time

The findings make four main contributions. First, they advance understanding of the relationship between goals and time in two ways. A significant amount of research

has identified how errors in time use can undermine goal achievement (Ariely and Wertenbroch 2002; Buehler et al. 1994; Fernbach et al. 2015; Jhang and Lynch 2014; Kahneman and Tversky 1977; Zauberman and Lynch 2005). But while these prior findings relate to the misallocation of time while *pursuing* goals, the current work explores the implications of time allocation while *setting* goals. I find that, by double-dipping into a shared time pool, budgeting time across goals before specifying a desired level of performance improves accuracy in goal setting. Note that, unlike reactive downward goal revision, in which goal levels are reduced following goal failure (Donovan and Williams 2003; Wang and Mukhopadhyay 2012), allocating time first is a proactive approach that encourages consumers to better incorporate time constraints into initial performance estimates.

Further, this research advances understanding of the bidirectional relationship between goals and time. Time constraints shape which goals consumers adopt and pursue and can create conflict between goals (Fernbach et al. 2015; Shah, Mullainathan, and Shafir 2012; Sharif and Shu 2017; Spiller 2011; Tu and Soman 2014). Conversely, the goals that consumers hold shape how time is perceived, allocated, and spent (Etkin, Aaker, and Evangelidis 2015; Hsee, Yang, and Wang 2010; Tonietto, Malkoc, and Nowlis 2019; Zauberman and Lynch 2005). Much of the prior work on goals and personal resources, however, has focused on just one of these directions. Contributing to emerging work on the relationship between goals and personal resources (Cannon, Goldsmith, and Roux 2019; Etkin et al. 2015; Fernbach et al. 2015; Hsee, Zhang, Cai and Zhang 2013; Jhang and Lynch 2015; Shaddy and Fishbach 2018), this research

demonstrates both how budgeting time influences goal setting and how those goals influence subsequent time expenditures.

12.1.2 Goals in time-constrained environments

Relatedly, this research contributes to understanding of multiple goal pursuit in time-constrained environments. I identify proactively fitting multiple goals to available resources as an effective (yet underutilized) way to pursue multiple goals under time constraint. Prior work has identified efficiency planning (i.e., stretching a resource to fit one's goals) and prioritization (i.e., eliminating less-important goals; Fernbach et al. 2015; Geers, Wellman, and Lassiter 2009; Kernan and Lord 1990; Sun and Frese 2013) as two distinct strategies for responding to resource constraint. Fernbach et al. (2015) compare these strategies to packing a small suitcase. Efficiency planning entails squeezing in the maximum possible items, whereas priority planning entails freeing up space by leaving out some items (e.g., not bringing workout clothes). In both efficiency and priority planning, however, the scope of one's goals are ostensibly determined *before* resources are considered. Thus, the solutions are limited to stretching the resource—which requires additional time spent planning, and may ultimately prove insufficient—or eliminating valued goals entirely—which consumers understandably dislike and tend to do too late, if at all (Fernbach et al. 2015).

In contrast, budgeting time first entails a substantial shift in mindset by encouraging consumers to proactively fit their multiple goals to available time. To extend the suitcase analogy, budgeting time first is like using packing cubes. The total available space is divided across multiple cubes, each serving different goals (e.g., casual clothes

vs. toiletries vs. business suit). By fitting each goal (i.e., how much to take) to its corresponding cube, everything is more likely to fit. Further, budgeting time should reduce the need for reactive downward goal revision (e.g., realizing that you've misjudged space and having to remove everything and repack).

Importantly, budgeting time first allows for—and may even encourage—*relative* prioritization in resource allocation and goal setting. On a work trip, for instance, a large packing cube is allocated to (more important) business clothing and a small cube to (less important) casual wear. Similarly for time, on a business trip being held at a beach resort, a consumer would budget greater time to (more important) work-related activities and set higher goals for that domain. However, by proactively fitting multiple goals to available time, a consumer is more likely to preserve time to enjoy leisure at the end of the trip. Thus, budgeting time first is a third, complementary strategy that offers distinct benefits compared to efficiency planning (i.e., working as fast as possible to squeeze in some beach time; taking work calls while on the beach) and priority planning (i.e., foregoing the beach altogether).

12.1.3 Multiple goal setting

Second, the findings expand knowledge of multiple goal setting. A robust body of research finds that setting specific, high goals increase performance (i.e., output) on a single focal goal (Locke and Latham 1990, 2002). However, despite the prevalence (and difficulty) of multiple goal pursuit in daily life, relatively little is known about setting effective *multiple* goals (Erez, Gopher, and Arzi 1990; Dalton and Spiller 2012; Kernan and Lord 1990; Latham and Locke 2006, 2013; Sun and Frese 2013). The current

research demonstrates that, in contrast to the performance benefits for single goal pursuit (Locke et al. 1981; Locke and Latham 1990, 2002; Sackett et al. 2014), for multiple goal pursuit, being overly optimistic comes at a cost. Spending more time on high upstream goals depletes time available for downstream goals, decreasing the chance those will be achieved. Thus, when consumers have multiple valued goals and constrained resources, setting more accurate (vs. unrealistically high) goals should make them better off.

12.1.4 Mental accounting and budgeting

Finally, the findings contribute to research on mental accounting and budgeting. Prior research has focused on mental accounting and budgeting as tools to limit resource consumption (i.e., reducing overspending; Cheema and Soman 2006, 2008; Kan, Lynch, and Fernbach 2015; Mishra et al. 2013; Sussman and Alter 2012). Consistent with these findings, I find that budgeting time first reduces overspending against future periods. Importantly, however, the current work investigates budgeting as a way to extract *added value* from the budgeted resource (e.g., leveraging the same amount of total time more effectively across multiple goals) by influencing how the time is spent. When total resources are constrained, I find that budgeting time before setting goals increases value obtained by helping consumers better align time expenditures with multiple goals. Further, the majority of prior research has examined accounting for money (Heath and Soll 1996; Putnam-Farr and Pocheptsova Ghosh 2020; Soman and Cheema 2011; Sussman and Alter 2012; Thaler 1985, 1999). I contribute to emerging research on accounting for time (Tonietto and Malkoc 2016; Tonietto et al. 2019; Morewedge et al.

2007), demonstrating that creating distinct mental accounts with clear boundaries for time affords more accurate multiple goal setting.

Finally, prior research consistently finds that for budgeting to be effective, consumers must not only set appropriate budget allocations, but must also track resource consumption during goal pursuit and assign expenditures to the appropriate accounts (Ball et al. 1998; Heath and Soll 1996; Fernbach et al. 2015; Kan et al. 2015; Krishnamurthy and Prokopec 2010; Sheehan and Van Ittersum 2018; Stilley, Inman, and Wakefield 2010; Sussman and Alter 2012; Ülkümen, Thomas, and Moorwitz 2008). This multistep process is effortful and prone to error. A step notably lacking in existing budget models, however, is setting "performance" goals. (i.e., specifying what goals to achieve within the associated resource allocation, such as how many and what type of restaurant meals to consume within a $150 budget allocation). Going beyond simply imposing spending limits, budgeting time first encourages consumers to calibrate their multiple goals to available resources. Importantly, I find that when multiple goals are more accurate, tracking resource consumption during goal pursuit is not necessary (i.e., there was no visible timer in my studies). While pursuing goals, the content of an activity (e.g., while shopping, whether one has found the items on a shopping list) is naturally more salient than resource consumption (e.g., how much time has passed or money has been spent). Thus, my findings suggest that by encouraging consumers to set more accurate multiple goals that fit available time, budgeting time first may reduce the cognitive (and emotional) burden of "watching the clock" during goal pursuit.

12.2 Implications for consumers

12.2.1 Consumer well-being

This research has substantive implications for consumers. First, running out of time to achieve valued downstream goals is an everyday struggle. Even holding constant total output, failing to achieve goals harms well-being and can lead to goal disengagement (Bandura and Locke 2003; Brunstein 1993; Heath et al. 1999; Soman and Cheema 2004; Weingarten et al. 2018). Further, when consumers have constrained time, they are likely to pursue self-care and leisure goals last (if at all), as these activities feel less justified than more productive activities (Etkin and Memmi 2020; Gershuny 2005; Hofmann, Vohs, and Baumeister 2012). Despite this, consumers desire leisure (Hofmann et al. 2012) and it provides many benefits for physical and psychological well-being (Reich and Zautra 1981; Tinsley and Tinsley 1986). My findings suggest that budgeting time first can help consumers protect time for (downstream) leisure goals, and thus reap the associated benefits.

Note that, while one could wonder if budgeting time first would reduce enjoyment of leisure (i.e., by activating a work-oriented "calendar mindset"; Tonietto and Malkoc 2016), the time-first approach is compatible with rough scheduling (i.e., planning to engage in an activity without scheduling a specific start time), which does not interfere with enjoyment. Indeed, by encouraging consumers to set goals that fit available time, budgeting time first may reduce the need to schedule and monitor time consumption during experiences, boosting enjoyment. Further, even when some activities require

scheduling, time budgeting could also be used to preserve open time for impromptu experiences.

12.2.2 Budgeting time for fixed or implicit goals

Second, while this research focuses on setting flexible goals (i.e., performance targets that can be flexibly scaled in relationship to available time), the benefits of budgeting time first are likely to generalize to circumstances in which consumers have a mix of flexible and fixed goals. A consumer with 30 minutes to spend on walking for health, for instance, can scale her goal for how far to walk during that time accordingly. She cannot, however, similarly scale a 30-minute driving commute to work. Whereas doing some walking for health is better than none (and walking more is generally better than walking less), walking only half-way to the office offers no benefits. Thus, while this consumer may not be able to flexibly adjust her commute, budgeting time first should still reduce double-dipping into a shared pool of time and help her set more realistic multiple goals for her day, overall. Further, if budgeting time makes it clearer how devoting an hour of her limited time to commuting is interfering with pursuing other goals, it may still encourage her to set more realistic multiple goals by spending less time commuting (e.g., by arranging to work from home a few days a week).

12.3 Implications for marketers

12.3.1 Employee management

Putting time-first should be useful for interdependent goal pursuits, where setting accurate multiple goals is particularly valuable. The results of experiment 6 suggest that assigned time structures could be leveraged in organizational contexts to shape employee

goals. Within a work team, for instance, a manager might ask a direct report to conduct an analysis, prepare a presentation, and write a report within a single time constraint. If the employee's goals for each task (i.e., for the scope of the work) are unrealistic given available time, the report is likely to be delivered too late (if at all). However, by suggesting a time allocation of 2 hours for the analysis, 1 hour for the presentation, and 3 hours for the written report, the manager could encourage accurate expectations (and priority levels) for each task, increasing the likelihood that all required work is delivered in time.

This further suggests that, when multiple work responsibilities draw on a shared pool of time, firms are likely to assign unrealistically high multiple goals to employees (an all-too-familiar experience for many workers). Given the incentives for firms to extract high output and even overspend against employees' total time budget, people setting goals for subordinates may be especially susceptible to double-dipping into a shared time pool. Although very granular time budgets could make workers feel micromanaged, broader time budgets—especially if shared collectively—may be well-received. For example, a manager of a creative team could determine how much weekly time to budget to creative work, meetings, and administrative tasks and then set goals accordingly (i.e., require only as many meetings and administrative tasks as fit within the time budget, thus preserving sufficient time for creative output). Setting more realistic multiple goals by budgeting time first could reduce employee stress and burnout while increasing alignment between individual time expenditures and firm objectives.

Finally, budgeting time may be especially important for workers who have schedules that are flexible or less structured. The temporal boundaries of the workplace are increasingly fading, as careers once confined to a physical office during business hours shift to telecommuting and flextime, and more than a quarter of American workers participate in the fluid "gig" economy (Bureau of Labor Statistics 2017; Gig Economy Data Hub 2020; Mateyka, Rapino and Landivar 2012). With this shift, the natural time structures of work (e.g., clearly bounded work hours, scheduled meetings and tasks) disappear, and consumers are left to structure their own time and goals as they see fit. While this is intuitively appealing, my findings suggest that lacking external time structures, consumers may struggle with unrealistic multiple goals and overspending time (e.g., working from home at all hours). Tools that encourage time budgeting (and thus more realistic multiple goals) may help.

12.3.2 Time management products

Relatedly, my findings point to an unserved gap in the broad product category of personal time management software. These products fall primarily into two types. Task management software enables consumers to specify goals and track progress, but goals are disconnected from time requirements. Calendaring software facilitates planning for time, but time use is disconnected from goals. Products designed for personal financial budgeting (e.g., You Need A Budget, Quicken) may offer useful inspiration. Such systems prompt consumers to allocate money across multiple goals (i.e., spending categories), and they reveal how well subsequent spending corresponds. "Zero-sum" systems, in which all available resources are assigned to goals, are particularly likely to

reduce double-dipping into a shared time pool when setting multiple goals. Applications that more effectively connect time allocation and use to associated goals could provide substantial value to consumers.

12.3.3 Customer experience management

Finally, marketers of experiential offerings could offer suggested time budgets to help consumers formulate realistic multiple goals and end experiences on a high note. For example, a resort could help consumers budget time (and thus form realistic goals for) dining, touring local sites, activities, and simply relaxing. Time structures could further be tailored to different segments (e.g., epicurians vs. adventure seekers) to help guide consumers toward activities they value. By encouraging consumers to set realistic expectations, marketers increase the likelihood that people preserve time for and achieve their final goal. This may be particularly important for satisfaction, given that the conclusion of a sequence of events is more memorable and perceived as diagnostic of the overall experience (Garbinsky, Morewedge, and Shiv 2014; Kahneman, Fredrickson, Schreiber, and Redelmeier 1993; Redelmeier and Kahneman 1996). Indeed, in experiment 8, I found that achievement of the last goal boosted positive affect. By encouraging consumers to protect time to find the last item on their shopping list or enjoy that last activity, firms may increase satisfaction.

12.4 Implications for future research

12.4.1 Who is likely to budget time/plan?

These findings raise many questions for future research. First, future work could investigate when people naturally consider time budgeting before setting goals. Given

that it requires planning, consumers high in propensity-to-plan may be more likely to spontaneously budget time before setting goals (Lynch et al. 2010). Future research could further explore when (or which) consumers are likely to spontaneously budget time first.

12.4.2 Resources other than time

Second, how will resource allocation function for resources other than time? Specifically, would budgeting money first similarly benefit consumers? Consumers are more accurate at predicting future demands on money than time (Zauberman and Lynch 2005) and are less likely to rely on heuristics for spending money, in part because (more tangible) expenditures of money are easier to track and account for (Saini and Monga 2008; Soman 2001). These suggest that consumers may be naturally more adept at mapping multiple goals to their total financial resources than to their time. Errors in financial forecasting are, nonetheless, common. When spending categories correspond to multiple competing goals and purchases (e.g., categories for food or entertainment), consumers often mispredict and overspend (Peetz and Buehler 2009; Putnam-Farr and Pocheptsova Ghosh 2020; Stilley et al. 2010; Sussman and Alter 2012; Sussman and O'Brien 2016). My findings suggest that reducing the number of goals within a spending category may increase accuracy.

Further, my findings suggest that budgeting money may be more effective if consumers budget money and then specify consumption goals (vs. only allocate money according to desired spending limits; Putnam-Farr and Pocheptsova Ghosh 2020). For example, rather than simply budgeting $200 a month for eating out, a consumer could also specify (more realistic) goals for how many and what type of meals to eat (e.g., three

family meals a month at casual restaurants plus a weekday coffee habit). Without setting consumption goals, the same consumer may not recognize that his (implicit) desired level of eating out is unrealistically high. Thus, budgeting money before setting goals may help people shape consumption habits that better fit total available money. In so doing, consumers may protect more money for downstream goals—whether enjoying a dinner out at the end of the month or a comfortable retirement at the end of one's career.

12.4.3 Flexible goal setting and persistence

Third, future research could explore the role of budgeting time first for flexible goal setting and persistence. Demands on consumers' resources vary over time. Thus, even for single goal pursuit, setting goals in relationship to the available time should encourage flexible goal setting. For example, rather than setting a goal to walk 10,000 steps every day, a flexible goal would adjust in relationship to how much time is available (e.g., 7,000 steps on workdays vs. 11,000 on weekends). Consumers reap substantial benefits from consistently achieving even modest goals in many domains (e.g., physical activity, retirement savings, social engagement, learning a skill). Flexible goals set in relationship to available time should be more likely to be achieved within that time, boosting persistence (and thus overall performance) across time periods.

12.4.4 Nonspecific goals

Finally, while the current research has focused on specific goals, time budgeting may also have benefits for pursuing nonspecific goals (i.e., "do your best" goals). Despite being prevalent and important, such goals are less motivating than specific goals because they lack relevant endpoints (Wallace and Etkin 2018). Similarly, in some domains,

incremental goal progress can be difficult to observe or measure (e.g., learning, creative endeavors). For such goals, budgeting time first (e.g., setting a goal to spend a specific amount of time on an activity) may increase motivation by providing salient reference points.

13 Conclusion

Every day, consumers have limited time and multiple goals. But all too often, people run out of time for downstream goals. This research finds that budgeting time before setting goals can help. By encouraging consumers to proactively fit multiple goals to available time, budgeting time first preserves time for valued downstream goals—whether eating dinner with family after work, exercising after running errands, or getting a full night's rest at the end of a busy day.

Appendix 1: Detailed participant instructions

Instructions

First, participants read detailed instructions (including all of the information described in this section) and completed practice questions to familiarize themselves with the tasks. Forced-choice questions were used throughout the instructions to ensure participants understood key features of the tasks and procedure.

In all experiments, participants read they had the same total amount of time to spend on multiple tasks. Tasks were completed sequentially, such that participants chose when to move ahead to the next task (i.e., the survey did not automatically transition between tasks), but they could not go backwards. Participants were always informed about the order in which tasks would be presented, which varied across studies (fixed vs. random).

When the total time was up, the survey exited all tasks, regardless of where a participant was in the questions. No timer was displayed. If participants exited the final task with extra time remaining, they went to a waiting page until the full task time had expired (i.e., participants could not finish the study early by skipping the tasks).

The practice section consisted of a limited number of representative questions for each task. On both the practice and the real tasks, each page prominently displayed participants' goals and current score for the task (sample stimuli in relevant Appendices). There was no time limit on practice tasks. To help participants estimate the time requirements of the tasks, at the end of each practice task the total time spent was

displayed, along with the number attempted and number correct (e.g., "You answered 2 out of 3 practice questions correctly in 15 seconds.").

Tasks were incentive-compatible. Participants earned points for correct answers, and top performers (e.g., those scoring in the top 20%; except in experiment 2) were entered into a lottery for a substantial bonus prize (e.g., $100). The scoring system incentivized participants to set multiple goals that were challenging and achievable (i.e., accurate). On each task (except experiment 6, in which scores did not depend on goal achievement), participants received 2 points per correct answer once their goal was achieved, with no points until the goal was reached and no additional points for exceeding the goal. To reinforce multiple goal pursuit, participants had to achieve a minimum on each task (e.g., 10 correct answers) to receive a score. There were no explicit maximum goals; I told participants that each task had a limited number of questions and if a goal exceeded that limit, the effective goal would be to answer all available questions correctly. Thus, participants could maximize chances for a bonus by setting goals that represented the highest output they could achieve within the total time allowed.

Goal setting

Following the instructions and practice section, participants set their goals for how many correct answers to obtain on each task. Throughout the studies, my key manipulation is whether participants first budget time to each task before setting goals (vs. only set goals). In the time-first condition, I asked participants to first indicate how many minutes (of the total X minutes) they intended to spend on each task. I told

participants the survey would enforce only the total time limit and not the time budgeted to each goal (e.g., "Note: This is for your planning; the computer will not enforce the individual task times"). In the control condition, participants did not see this question.

Next, all participants set their goals for each task. In time-first condition, participants' intended time allocation per task was displayed following the task name (e.g., "Spelling (3 minutes)"), whereas in the control condition participants saw only the tasks.

Notably, for all participants, all goals were set on a single page displaying a reminder regarding the total task time (e.g., "Reminder: You have 7 minutes total for all tasks."). Thus, participants viewed all goals together, and, even in the control condition, the total available time was salient during goal setting.

Goal pursuit

After goal setting, participants pursued their goals (goal pursuit experiments only), and I measured performance. Consistent with the instructions, participants' goals and running scores for correct answers were displayed on each page throughout the tasks. No timer was displayed, although participants were not prevented from monitoring time through other means (e.g., on a computer monitor). Participants chose when to advance to the next task in the sequence, but they could not go backward. When the total time was up, the survey exited the tasks; if participants exited the tasks with extra time remaining, they went to a waiting page until the full time was up.

Following goal pursuit, participants completed any additional measures (as described in individual experiments), responded to demographic questions, and were given information about when the lottery bonus(es) would be awarded.

Appendix 2: Data Analysis Plan

Measures

I test my predictions using the measures described below. These measures and analyses are reported in the main text results for each goal pursuit experiment (goal setting-only experiments report goal setting measures). Supplemental measures and analyses are reported in the Appendices. For experiment 8, in which goal number was manipulated between subjects, between-subjects measures are reported. For experiment 9, in which participants could overspend time, only time use measures are reported in the main text. For follow-up experiments, primary measures are reported in the Appendices. Additional supplemental analyses for specific experiments are as referenced in the main text.

Multiple goal setting

I tested goal setting as the main effect of time budgeting on goals set (i.e., total goals). When significant, main effects of task are also reported in the main text. Analyses of the time budgeting × task interaction are reported in the supplemental analyses. Analyses are conducted using effective goals (i.e., adjusted for outliers). Consistent with the instructions given to participants, if a goal exceeded available questions, the effective goal became to answer all task questions correctly (i.e., if a participant set a goal of 75 for correct answers on a task with 65 questions, the effective goal was 65). The upper limits for available questions were set generously (i.e., output was not artificially restricted), and the number of goals subject to the outlier adjustment is limited (< 4% on average). Supplemental analyses reported in the Appendices:

- Full results for a between (condition) x within (task) mixed ANOVA on final goals set (i.e., after adjusting for outliers), with contrasts for the effect of condition within each task
- Full results for a between (condition) x within (task) mixed ANOVA on raw goals set (i.e., not adjusted for outliers)
- For both adjusted and raw goal values, means and standard deviations for total goals set and goals set for each task.
- Number and percentage of goals subject to outlier adjustment (i.e., goals that exceeded the upper limit of task questions and were recoded accordingly)

Time spent on downstream goals

I tested time spent on downstream goals (i.e., the last goal in a sequence) with two measures: (1) the total time spent on the last task and (2) the likelihood of spending any time on the last task (i.e., whether people got to the last task at all). In experiment 9, in which participants could overspend time, I tested overspending time with the measure of time spent beyond the (ostensibly) allowed time. Supplemental analyses reported in the Appendices:

- Full results for a between (condition) x within (task) mixed ANOVA on time spent
- Means and standard deviations for total time spent and time spent for each task, with contrasts for the effect of condition within each task
- In experiment 9, the likelihood of overspending *any* time, with a logistic regression testing differences by condition

Performance on downstream goals

I tested performance on downstream goals (i.e., the last goal in a sequence) with two measures: (1) total output (i.e., total number of correct answers) on the last task and (2) the likelihood of achieving the last goal. Supplemental analyses reported in the Appendices:

- Full results for a between (condition) x within (task) mixed ANOVA on total output (i.e., number of correct answers)
- Means and standard deviations for total output and output for each task, with contrasts for the effect of condition within each task
- Percent goal achievement for each task

Additional supplemental analyses reported in the Appendices

Goal accuracy

To measure goal setting accuracy, I subtracted participants' goals for each task from their output on that task (i.e., discrepancy). Thus, a discrepancy value of 0 indicates perfect accuracy (i.e., output at the exact level of the goal), positive values indicate a positive discrepancy (i.e., overperformance relative to goal), and negative values indicate a negative discrepancy (i.e., underperformance relative to goal).

- Full results for a between (condition) x within (task) mixed ANOVA on discrepancy scores
- Means and standard deviations for total discrepancy and discrepancy for each task, with contrasts for the effect of condition within each task

Ancillary time use measures

- Means and standard deviations for time spent setting goals (when measured) and ANOVA results testing differences by condition
- Means and standard deviations for time spent on the task waiting page (i.e., unused task time) and ANOVA results testing differences by condition
- For time budgeting conditions, means and standard deviations for time spent allocating time (when measured)

Ancillary scoring measures

- Percent of participants who achieved the minimum requirement (e.g., obtained at least 10 correct answers on each task) on the last task and across all tasks, with logistic regressions testing differences by condition
- As applicable, final scores earned on the last task and across all tasks, with Mann-Whitney U tests (due to nonnormality of the distribution) testing differences by condition
- As applicable, percent of participants who qualified for the bonus lottery, the threshold score for the lottery, and logistic regressions testing differences by condition

Time budgeting

- For time budgeting conditions, time allocated to each task and regressions of time allocated to a task predicting time spent on that task

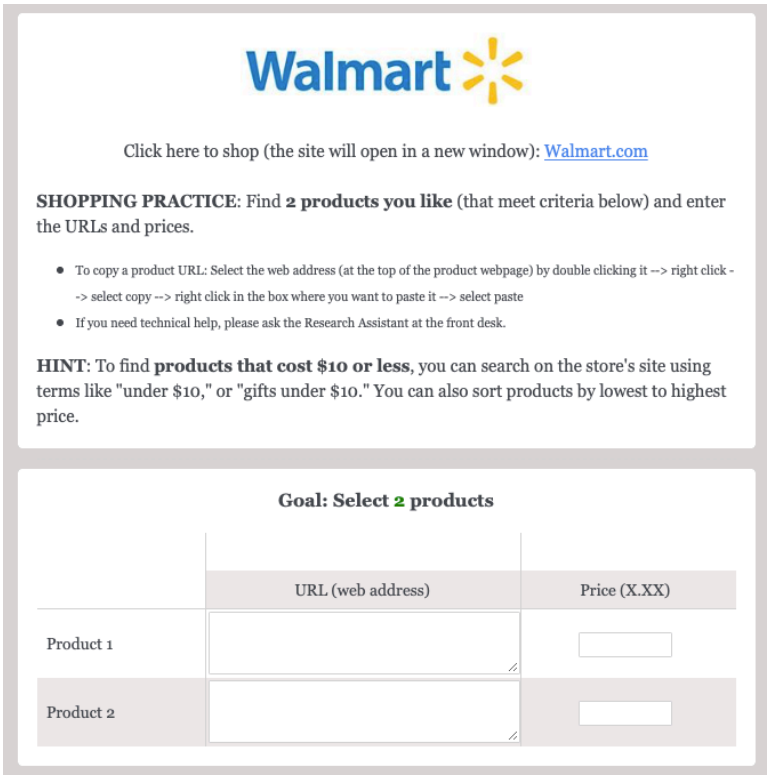
Exclusions

- Number of participants subject to exclusions, by condition, and logistic regressions testing differences by condition

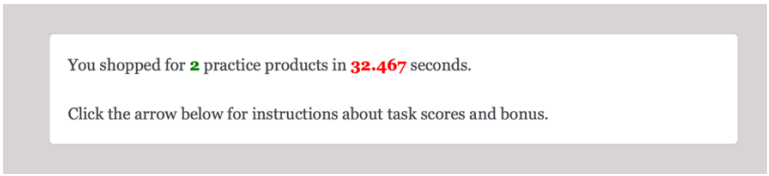
Appendix 3: Experiment 1 supplemental analyses and materials

Stimuli

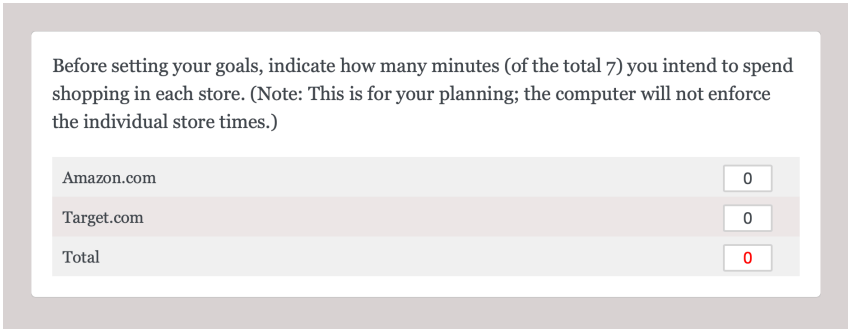
Shopping practice



Shopping practice feedback page

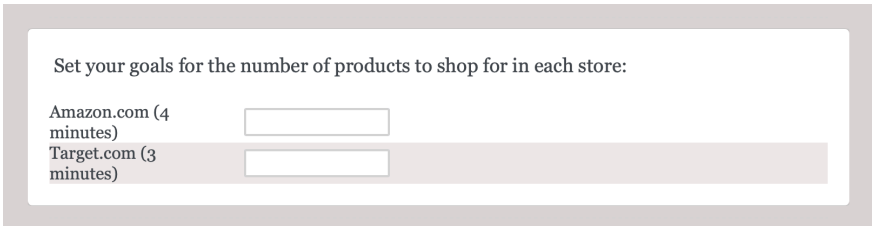


Time budgeting

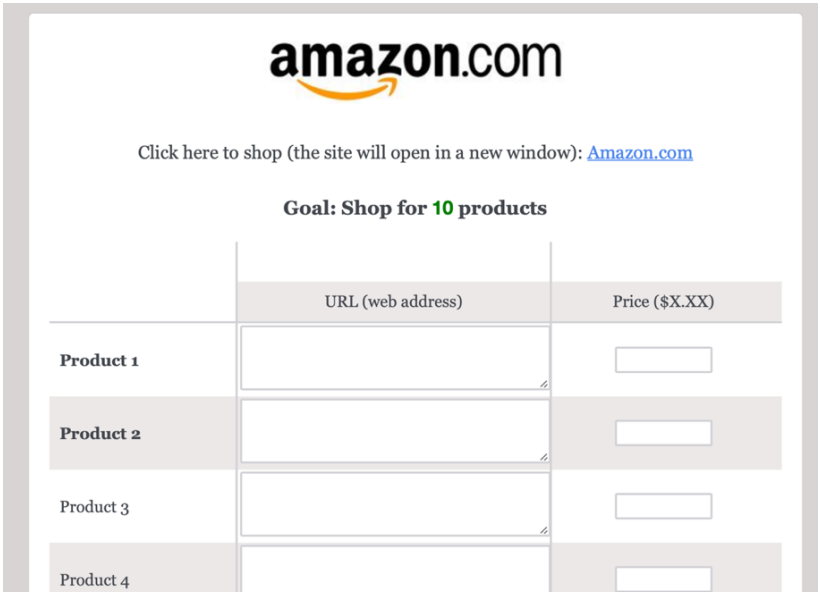


Goal setting–control condition

Goal setting–time-first condition



Shopping example



Goal setting

Final goals (adjusted for outliers)

Between (condition) x within (store) mixed ANOVA

EFFECT	TEST
Store	$F(1, 101) = 16.54$, $p < .001$, $\eta^2 = .14$
Condition	$F(1, 101) = 9.85$, $p = .002$, $\eta^2 = .09$
Condition × store	$F(1, 101) = 2.56$, $p = .113$, $\eta^2 = .02$

STORE	CONTROL	TIME-FIRST	Total	Contrast
Amazon	$M = 9.75$, SD = 4.88	$M = 7.67$, SD = 4.38	$M = 8.64$, SD = 4.71	$F(1, 101) = 5.18$, $p = .025$, $\eta^2 = .05$
Target	$M = 8.96$, SD = 4.98	$M = 5.85$, SD = 3.70	$M = 7.30$, SD = 4.60	$F(1, 101) = 13.08$, $p < .001$, $\eta^2 = .11$
Total	$M = 18.71$, SD = 9.62	$M = 13.53$, SD = 7.08	$M = 15.94$, SD = 8.71	

Outlier adjustment

Three goals (1.46% of the total 206) exceeded the limit (20 products per store) and were recoded as 20.

Raw goals (not adjusted for outliers)

Between (condition) x within (store) mixed ANOVA

EFFECT	TEST
Store	$F(1, 101) = 15.70$, $p < .001$, $\eta^2 = .13$
Condition	$F(1, 101) = 9.28$, $p = .003$, $\eta^2 = .08$
Condition × store	$F(1, 101) = 2.69$, $p = .104$, $\eta^2 = .02$

STORE	CONTROL	TIME-FIRST	Contrast
Amazon	$M = 9.96$, SD = 5.50	$M = 7.76$, SD = 4.68	$F(1, 101) = 4.79$, $p = .031$, $\eta^2 = .05$
Target	$M = 9.17$, SD = 5.62	$M = 5.85$, SD = 3.70	$F(1, 101) = 12.76$, $p = .001$, $\eta^2 = .11$
Total	$M = 19.13$, SD = 10.91	$M = 13.62$, SD = 7.29	

Time spent on downstream goals

Between (condition) x within (store) mixed ANOVA, dependent variable is time spent (in seconds)

EFFECT	TEST
Store	$F(1, 101) = 85.49$, $p < .001$, $\eta^2 = .45$
Condition	$F < 1$
Condition × Store	$F(1, 101) = 4.87$, $p = .030$, $\eta^2 = .03$

STORE	CONTROL	TIME-FIRST	CONTRAST
Store 1	$M = 297.33$, SD = 109.90	$M = 256.17$, SD = 120.41	$F(1, 101) = 3.25$, $p = .075$, $\eta^2 = .03$
Store 2	$M = 94.47$, SD = 74.7	$M = 131.52$, SD = 74.78	$F(1, 101) = 6.03$, $p = .016$, $\eta^2 = .06$
Total	$M = 391.80$, 70.44	$M = 387.69$, SD = 85.92	

Performance on downstream goals

Output

Between (condition) x within (store) mixed ANOVA, dependent variable is total output (number of products selected)

EFFECT	TEST
Store	$F(1, 101) = 57.17$, $p < .001$, $\eta^2 = .35$
Condition	$F < 1$
Condition × Store	$F(1, 101) = 3.27$, $p = .074$, $\eta^2 = .02$

STORE	CONTROL	TIME-FIRST	CONTRAST
Store 1	$M = 7.75$, SD = 4.36	$M = 7.00$, SD = 4.42	$F < 1$
Store 2	$M = 2.48$, SD = 3.54	$M = 3.76$, SD = 3.04	$F(1, 101) = 3.93$, $p = .050$, $\eta^2 = .04$
Total	$M = 10.23$, SD = 5.45	$M = 10.76$, SD = 5.09	

Goal achievement

STORE	CONTROL	TIME-FIRST	Logistic regression
Store 1	62%	82%	$b = .99$, Wald $\chi^2(1) = 4.67$, $p = .031$, OR = 2.70
Store 2	15%	51%	$b = 1.80$, Wald $\chi^2(1) = 13.56$, $p < .001$, OR = 6.07
Amazon	40%	65%	$b = 1.06$, Wald $\chi^2(1) = 6.73$, $p = .009$, OR = 2.89
Target	38%	67%	$b = 1.23$, Wald $\chi^2(1) = 8.84$, $p = .003$, OR = 3.43

Goal accuracy

Between (condition) x within (store) mixed ANOVA, dependent variable is goal discrepancy (output – goal).

EFFECT	TEST

Store	$F(1, 101) = 58.52$, $p < .001$, $\eta^2 = .35$
Condition	$F(1, 101) = 14.39$, $p < .001$, $\eta^2 = .12$
Condition × Store	$F(1, 101) = 7.50$, $p = .007$, $\eta^2 = .04$

STORE	CONTROL	TIME-FIRST	Contrast
Store 1	M = -1.62, SD = 5.06	M = -0.15, SD = 2.94	$F(1, 101) = 3.39$, $p = .068$, $\eta^2 = .03$
Store 2	M = -6.85, SD = 6.00	M = -2.62, SD = 4.06	$F(1, 101) = 18.00$, $p < .001$, $\eta^2 = .15$
Total	M = -8.48, SD = 9.31	M = -2.76, SD = 5.78	

Ancillary time use measures

Time spent on goal setting page (seconds)

$M_{control}$ = 30.29, SD = 30.54 vs. $M_{time\text{-}first}$ = 32.11, SD = 23.86; $F(1, 101) = .15$, $p = .735$

Time spent on waiting page (seconds)

$M_{control}$ = 27.44, SD = 62.28 vs. $M_{time\text{-}first}$ = 43.96, SD = 69.51; F (1, 101) = 1.59, $p = .21$, $\eta^2 = .02$

Ancillary scoring measures

Minimum qualification

Percent of participants meeting the minimum requirement on the *last* task (obtaining at least two correct answers): Control 54%, Time-first 78%; $b = 1.10$, Wald $\chi^2(1) = 6.46$, $p = .011$, OR = 3.03

Percent of participants meeting the minimum requirement across *all* tasks (obtaining at least two correct answers in each store): Control 54%, Time-first 78%; $b = 1.10$, Wald $\chi^2(1) = 6.46$, $p = .011$, OR = 3.03

Final scores

Final scores on the last task: Control Mdn = 0, Time-first Mdn = 4; Mann-Whitney $U = 1784$, $p < .001$

Final scores across all tasks: Control Mdn = 0, Time-first Mdn = 10; Mann-Whitney $U = 1643$, $p = .027$

Lottery qualification

Percent of participants who qualified for the bonus lottery by earning scores in the top 20% (> = 24 points): Control 36%, Time-first 42%; $b = .49$, Wald $\chi^2(1) = .88$, $p = .348$

Time budgeting measures

Time spent on time budgeting page (seconds):

$M = 27.56$, SD = 19.07

Time allocated to each store (minutes):

- Amazon: $M = 3.72$, SD = .80
- Target: $M = 3.28$, SD = .80

Regression of time allocated on time spent for each store:

- Amazon: $\beta = .35$, $t(53) = 2.72$, $p = .009$, $R^2_{adj} = .11$
- Target: $\beta = .31$, $t(53) = 1.82$, $p = .021$, $R^2_{adj} = .08$

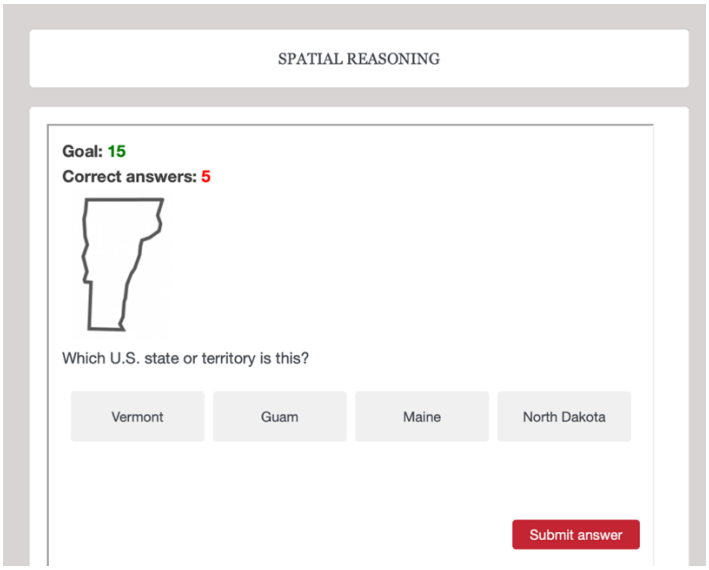
Exclusions

Percent of participants subject to exclusions, by condition: Control, n = 4, Time-first n = 2; $b = .839$, Wald $\chi^2(1) = .87$, $p = .351$

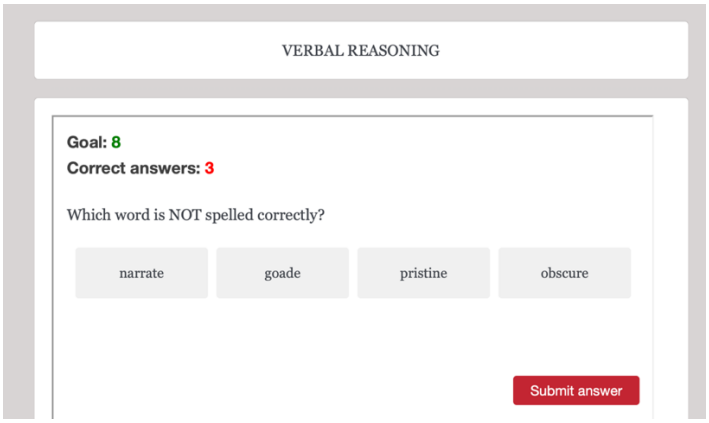
Appendix 4: Experiment 2 supplemental analyses and materials

Stimuli

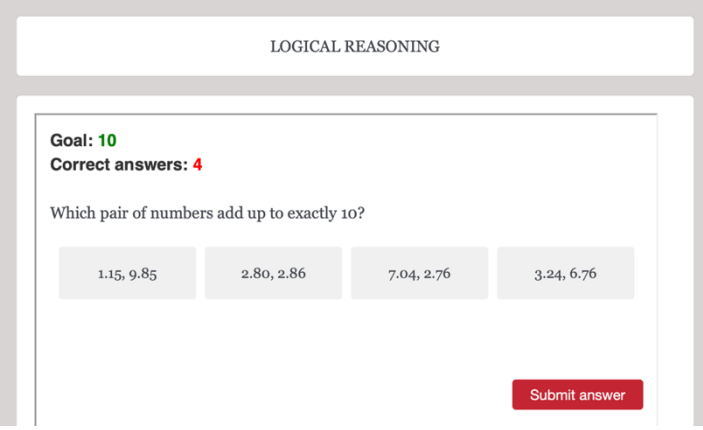
Geography quiz example



Spelling quiz example



Math quiz example



Goal setting

Final goals (adjusted for outliers)

Between (condition) x within (task) mixed ANOVA

EFFECT	TEST
Task	$F(2, 296) = 5.99$, $p = .003$, $\eta^2 = .04$
Condition	$F(1, 148) = 9.62$, $p = .002$, $\eta^2 = .06$
Condition × task	$F < 1$

QUIZ	CONTROL	TIME-FIRST	Contrast
Geography	$M = 26.89$, SD = 14.97	$M = 21.57$, SD = 4.92	$F(1, 148) = 4.76$, $p = .031$, $\eta^2 = .03$
Spelling	$M = 32.11$, SD = 16.68	$M = 23.99$, SD = 15.72	$F(1, 148) = 9.42$, $p = .003$, $\eta^2 = .06$
Math	$M = 30.19$, SD = 15.89	$M = 23.07$, SD = 15.75	$F(1, 148) = 7.60$, $p = .007$, $\eta^2 = .05$
Total	$M = 89.19$, SD = 40.69	$M = 68.62$, SD = 40.52	

Outlier adjustment

Eleven goals (2.44% of the total 450) exceeded the limit (65 answers per task) and were recoded as 65.

Raw goals (not adjusted for outliers)

Between (condition) x within (task) mixed ANOVA

EFFECT	TEST
Task	$F(2, 296) = 3.73$, $p = .025$, $\eta^2 = .02$
Condition	$F(1, 148) = 8.94$, $p = .003$, $\eta^2 = .06$
Condition × task	$F(2, 296) = 1.27$, $p = .281$, $\eta^2 = .01$

QUIZ	CONTROL	TIME-FIRST	Contrast
Geography	$M = 26.96$, SD = 15.15	$M = 21.70$, SD = 15.33	$F(1, 148) = 4.47$, $p = .036$, $\eta^2 = .03$
Spelling	$M = 36.16$, SD = 40.57	$M = 24.38$, SD = 16.98	$F(1, 148) = 5.43$, $p = .021$, $\eta^2 = .04$
Math	$M = 30.19$, SD = 15.89	$M = 23.79$, SD = 18.13	$F(1, 148) = 5.28$, $p = .023$, $\eta^2 = .03$
Total	$M = 93.31$, SD = 52.53	$M = 69.87$, SD = 43.13	

Time spent on downstream goals

Between (condition) x within (task) mixed ANOVA, dependent variable is time spent (in seconds)

EFFECT	TEST
Task	$F(2, 296) = 66.58$, $p < .001$, $\eta^2 = .30$
Condition	$F < 1$
Condition × task	$F(2, 296) = 4.03$, $p = .019$, $\eta^2 = .02$

QUIZ	CONTROL	TIME-FIRST	Contrast
Task 1	$M = 186.27$, SD = 96.76	$M = 167.74$, SD = 88.79	$F(1, 148) = 1.50$, $p = .223$
Task 2	$M = 120.11$, SD = 65.73	$M = 111.71$, SD = 57.37	$F < 1$
Task 3	$M = 50.55$, SD = 54.18	$M = 83.25$, SD = 68.17	$F(1, 148) = 10.54$, $p = .001$, $\eta^2 = .07$
Total	$M = 356.93$, SD = 95.10	$M = 362.70$, SD = 77.68	

Performance on downstream goals

Output

Between (condition) x within (task) mixed ANOVA, dependent variable is output (# correct answers)

EFFECT	TEST
Task	$F(2, 296) = 31.52$, $p < .001$, $\eta^2 = .17$
Condition	$F < 1$
Condition × task	$F(2, 296) = 6.70$, $p = .001$, $\eta^2 = .04$

QUIZ	CONTROL	TIME-FIRST	Contrast
Task 1	$M = 24.92$, SD = 15.80	$M = 20.37$, SD = 12.02	$F(1, 148) = 3.95$, $p = .049$, $\eta^2 = .03$
Task 2	$M = 18.27$, SD = 13.20	$M = 17.24$, SD = 10.95	$F < 1$
Task 3	$M = 7.80$, SD = 9.74	$M = 13.95$, SD = 14.22	$F(1, 148) = 9.50$, $p = .002$, $\eta^2 = .06$
Total	$M = 50.99$, SD = 23.34	$M = 51.55$, SD = 20.36	

Goal achievement

QUIZ	CONTROL	TIME-FIRST	Logistic regression
Task 1	68%	83%	$b = .84$, Wald $\chi^2(1) = 4.61$, $p = .032$, OR = 2.33
Task 2	45%	63%	$b = .76$, Wald $\chi^2(1) = 5.14$, $p = .023$, OR = 2.13
Task 3	22%	41%	$b = .92$, Wald $\chi^2(1) = 6.24$, $p = .012$, OR = 2.50
Geography	49%	62%	$b = .54$, Wald $\chi^2(1) = 2.62$, $p = .105$, OR = 1.71
Spelling	42%	63%	$b = .87$, Wald $\chi^2(1) = 6.70$, $p = .010$, OR = 2.38
Math	43%	62%	$b = .76$, Wald $\chi^2(1) = 5.14$, $p = .023$, OR = 2.13

Goal accuracy

Between (condition) x within (task) mixed ANOVA, dependent variable is goal discrepancy (output – goal).

EFFECT	TEST
Task	$F(2, 296) = 43.68$, $p < .001$, $\eta^2 = .22$
Condition	$F(1, 148) = 10.73$, $p = .001$, $\eta^2 = .07$
Condition × task	$F(2, 296) = 4.76$, $p = .009$, $\eta^2 = .02$

QUIZ	CONTROL	TIME-FIRST	Contrast
Task 1	M = -4.42, SD = 15.18	M = -1.22, SD = 13.51	$F(1, 148) = 1.86$, $p = .175$, $\eta^2 = .01$
Task 2	M = -12.76, SD = 16.17	M = -6.22, SD = 14.63	$F(1, 148) = 6.74$, $p = .010$, $\eta^2 = .04$
Task 3	M = -21.03, SD = 19.40	M = -9.62, SD = 17.76	$F(1, 148) = 14.13$, $p < .001$, $\eta^2 = .09$
Total	M = -38.20, SD = 41.32	M = -17.07, SD = 37.66	

Ancillary time use measures

Time spent on waiting page (seconds)

M_{control} = 52.75, SD = 93.63 vs. $M_{\text{time-first}}$ = 47.22, SD = 76.99; $F(1, 148) = .16$, $p = .693$

Ancillary scoring measures

Minimum qualification

Percent of participants meeting the minimum requirement on the *last* task (obtaining at least two correct answers): Control 36%, Time-first 61%; $b = 98$, Wald $\chi^2(1) = 8.50$, $p = .004$, OR = 2.67

Percent of participants meeting the minimum requirement (obtaining at least 10 correct answers on each task): Control 35% vs. Time-first 57%; $b = .88$, Wald $\chi^2(1) = 6.83$, $p = .009$, OR = 2.41

Final scores

Final scores on the last task: Control Mdn = 0, Time-first Mdn = 0; Mann-Whitney $U = 3306$, $p = .021$

Final scores across all tasks: Control Mdn = 0, Time-first Mdn = 40; Mann-Whitney $U = 3186$, $p = .120$

Lottery tickets earned

$M_{control} = 3.60$, SD = 5.61 vs. $M_{time\text{-}first} = 4.40$, SD = 4.75; $F(1, 148) = .89$, $p = .347$

Time budgeting measures

Time spent on time budgeting page (seconds)

$M = 2.12$, SD = .56

Time allocated to each task (minutes):

- Geography: $M = 2.12$, SD = .56
- Spelling: $M = 2.04$, SD = .63
- Math: $M = 2.84$, SD = .80

Regression of time allocated on time spent for each task

- Geography: $\beta = .01$, $t(74) = .11$, $p = .909$
- Spelling: $\beta = .09$, $t(74) = 80$, $p = .428$
- Math: $\beta = -.09$, $t(74) =$, $p = .445$

Perception of multiple goal pursuit

Number of perceived goals: $M_{control} = 3.04$, SD = 1.08 vs. $M_{time\text{-}first} = 3.03$, SD = 1.13; ANOVA: $F(1, 148) = .01$, $p = .937$

Subjective well-being

Overall happiness with task performance: M_{control} = 3.95, SD = 1.86 vs. $M_{\text{time-first}}$ = 4.38, SD = 1.77; ANOVA: $F(1, 148) = 2.16$, $p = .144$, $\eta^2 = .01$

Bivariate correlations between goal achievement and happiness with performance

	Geography quiz happiness	Spelling quiz happiness	Math quiz happiness
Geography goal achievement	.39***	.06	-.06
Spelling goal achievement	.23**	.45***	.19*
Math goal achievement	.17	.19*	.47***

* $p < .05$, ** $p < .01$, *** $p < .001$

Exclusions

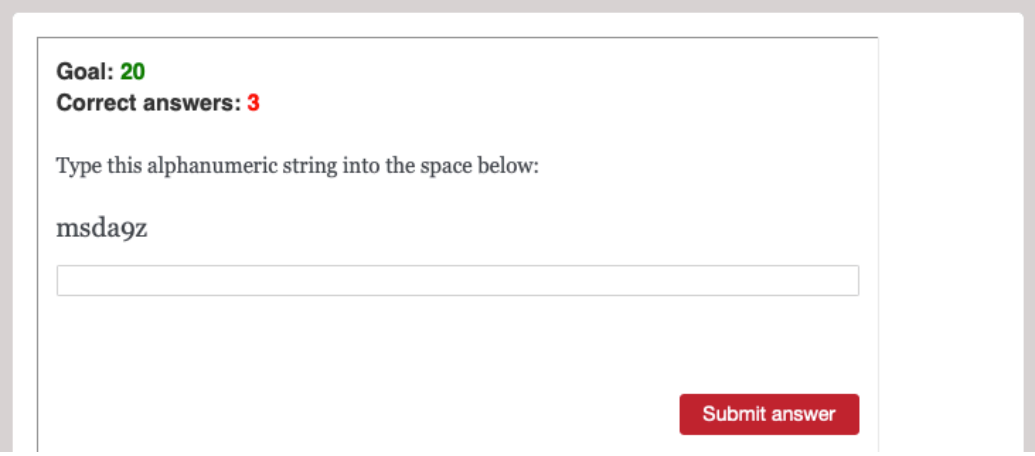
Percent of participants subject to exclusions, by condition: Control, n = 1, Time-first n = 3; b = -1.07, Wald $\chi^2(1) = .75$, $p = .358$

Appendix 5: Experiment 3 supplemental analyses and materials

Stimuli

Transcription task

Note, the survey was programmed to prevent participants from copying and pasting the alphanumeric strings.



Goal setting

Final goals (adjusted for outliers)

Between (condition) x within (task) mixed ANOVA

EFFECT	TEST
Task	$F(2, 396) = 5.96$, $p = .003$, $\eta^2 = .30$
Condition	$F(1, 198) = 11.64$, $p = .001$, $\eta^2 = .06$
Condition × task	$F(2, 396) = 2.20$, $p = .112$, $\eta^2 = .01$

TASK	CONTROL	TIME-FIRST	Contrast
Transcription	$M = 29.32$, SD = 16.97	$M = 21.05$, SD = 13.72	$F(1, 198) = 14.32$, $p < .001$, $\eta^2 = .07$
Spelling	$M = 25.67$, SD = 16.01	$M = 20.31$, SD = 13.2	$F(1, 198) = 6.66$, $p = .011$, $\eta^2 = .03$
Math	$M = 26.41$, SD = 16.36	$M = 19.99$, SD = 13.02	$F(1, 198) = 9.39$, $p = .002$, $\eta^2 = .05$
Total	$M = 81.4$, SD = 44.62	$M = 61.35$, SD = 38.15	

Outlier adjustment

24 goals (4% of the total 600) exceeded the limit (65 answers per task) and were recoded as 65.

Raw goals (not adjusted for outliers)

Between (condition) x within (task) mixed ANOVA

EFFECT	TEST
Task	$F(2, 396) = 6.12$, $p = .002$, $\eta^2 = .03$
Condition	$F(1, 198) = 9.92$, $p = .002$, $\eta^2 = .05$
Condition × task	$F(2, 396) = 2.52$, $p = .082$, $\eta^2 = .01$

TASK	CONTROL	TIME-FIRST	Contrast
Transcription	$M = 30.95$, SD = 21.33	$M = 21.66$, SD = 16.14	$F(1, 198) = 12.04$, $p = .001$, $\eta^2 = .06$
Spelling	$M = 26.71$, SD = 19.16	$M = 20.82$, SD = 15.25	$F(1, 198) = 5.78$, $p = .017$, $\eta^2 = .03$
Math	$M = 28.29$, SD = 21.96	$M = 20.39$, SD = 14.8	$F(1, 198) = 8.85$, $p = .003$, $\eta^2 = .04$
Total	$M = 85.95$, SD = 58.08	$M = 62.87$, SD = 44.55	

Time spent on downstream goals

Between (condition) x within (task) mixed ANOVA, dependent variable is time spent (in seconds)

EFFECT	TEST
Task	$F(2, 396) = 40.38$, $p < .001$, $\eta^2 = .16$
Condition	$F(1, 198) = 2.68$, $p = .103$, $\eta^2 = .01$
Condition × task	$F(2, 396) = 6.52$, $p = .002$, $\eta^2 = .03$

TASK	CONTROL	TIME-FIRST	Contrast
Transcription	$M = 187.09$, SD = 106.32	$M = 145.65$, SD = 83.22	$F(1, 198) = 9.40$, $p = .002$, $\eta^2 = .05$
Spelling	$M = 113.03$, SD = 64.02	$M = 121.91$, SD = 55.57	$F(1, 198) = 1.10$, $p = .297$, $\eta^2 = .01$

Math	M = 77.91, SD = 69.51	M = 96.29, SD = 62.19	$F(1, 198) = 3.88$, p = .050, η^2 = .02
Total	M = 378.03, SD = 64.52	M = 363.85, SD = 57.61	

Performance on downstream goals

Output

Between (condition) x within (task) mixed ANOVA, dependent variable is output (# correct answers)

EFFECT	TEST
Task	$F(2, 396) = 73.00$, $p < .001$, $\eta^2 = .26$
Condition	$F(1, 198) = 2.90$, $p = .090$, $\eta^2 = .01$
Condition × task	$F(2, 396) = 6.70$, $p = .001$, $\eta^2 = .02$

TASK	CONTROL	TIME-FIRST	Contrast
Transcription	M = 27.34, SD = 15.12	M = 21.14, SD = 11.87	$F(1, 198) = 10.36$, p = .002, $\eta^2 = .05$
Spelling	M = 14.67, SD = 9.87	M = 15.97, SD = 9.17	$F < 1$
Math	M = 9.62, SD = 10.18	M = 10.83, SD = 7.20	$F < 1$
Total	M = 51.63, SD = 15.98	M = 47.94, SD = 14.63	

Goal achievement

TASK	CONTROL	TIME-FIRST	Logistic regression
Transcription	79%	87%	b = .55, Wald $\chi^2(1) = 2.05$, p = .152
Spelling	61%	73%	b = .52, Wald $\chi^2(1) = 2.89$, p = .089, OR = 1.68
Math	30%	56%	b = 1.09, Wald $\chi^2(1)$ = 13.32, $p < .001$, OR = 2.96

Goal accuracy

Between (condition) x within (task) mixed ANOVA, dependent variable is goal discrepancy (output – goal).

EFFECT	TEST
Task	$F(2, 396) = 65.97$, $p < .001$, $\eta^2 = .25$
Condition	$F(1, 198) = 9.25$, $p = .003$, $\eta^2 = .04$
Condition × task	$F(2, 396) = 3.99$, $p = .019$, $\eta^2 = .01$

TASK	CONTROL	TIME-FIRST	Contrast
Transcription	M = -1.98, SD = 10.35	M = .09, SD = 9.97	$F(1, 198) = 2.08$, $p = .151$, $\eta^2 = .01$
Spelling	M = -11.00, SD = 18.69	M = -4.34, SD = 13.31	$F(1, 198) = 8.39$, $p = .004$, $\eta^2 = .04$
Math	M = -16.78, SD = 19.93	M = -9.16, SD = 16.44	$F(1, 198) = 8.68$, $p = .004$, $\eta^2 = .04$
Total	M = -29.76, SD = 42.74	M = -13.41, SD = 32.50	

Ancillary time use measures

Time spent on setting goals (seconds)

$M_{control}$ = 63.18, SD = 63.98 vs. $M_{time\text{-}first}$ = 57.22, SD = 36.83; $F(1, 198) = .65$, $p = .422$

Time spent on waiting page (seconds)

$M_{control}$ = 30.94, SD = 62.73 vs. $M_{time\text{-}first}$ = 45.60, SD = 58.50; $F(1, 198) = 2.92$, $p = .089$, $\eta^2 = .01$

Ancillary scoring measures

Minimum qualification

Percent of participants meeting the minimum requirement on the *last* task (obtaining at least two correct answers): Control 52%, Time-first 67%; $b = .59$, Wald $\chi^2(1) = 4.14$, $p = .042$, OR = 1.81

Percent of participants meeting the minimum requirement (obtaining at least 10 correct answers on each task): Control 48%, Time-first 66%; $b = .75$, Wald $\chi^2(1) = 6.61$, $p = .010$, OR = 2.11

Final scores

Final scores on the last task: Control Mdn = 0, Time-first Mdn = 20; Mann-Whitney $U = 6438$, $p < .001$

Final scores across all tasks: Control Mdn = 0, Time-first Mdn = 60; Mann-Whitney $U = 5831$, $p = .033$

Lottery qualification

Percent of participants who qualified for the bonus lottery by earning scores in the top 20% on each task

TASK	CONTROL	TIME-FIRST	Contrast
Transcription (score >= 40)	21%	22%	$b = .09$, Wald $\chi^2(1) = .06$, $p = .806$
Spelling (score >= 32)	15%	22%	$b = .49$, Wald $\chi^2(1) = 1.78$, $p = .182$
Math (score >= 24)	11%	30%	$b = 1.27$, Wald $\chi^2(1) = 10.75$, $p = .001$
Total (mean of # lotteries entered)	$M = .47$, SD = .80	$M = .75$, SD = 1.05	$F(1, 198) = 4.59$, $p = .033$, $\eta^2 = .02$

Time budgeting measures

Time spent on time budgeting page (seconds)

$M = 37.51$, SD = 20.16

Time allocated to each task (minutes):

- Transcription: $M = 2.23$, SD = .50
- Spelling: $M = 2.21$, SD = .56
- Math: $M = 2.57$, SD =.64

Regression of time allocated on time spent for each task:

- Transcription: $\beta = -.06$, $t(97) = -.61$, $p = .542$
- Spelling: $\beta = -.09$, $t(97) = -.88$, $p = .384$

- Math: β = -.002, $t(97)$ = -.02, p = .987

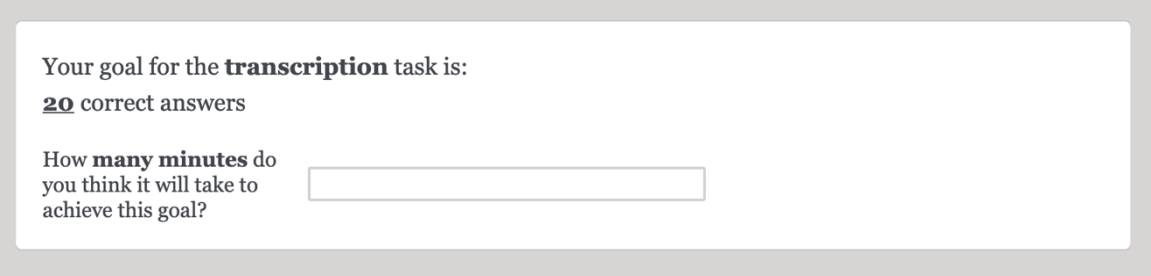
Exclusions

Percent of participants subject to exclusions, by condition: Control, n = 4, Time-first n = 8; b = -.71, Wald $\chi^2(1)$ = 1.29, p = .257

Appendix 6: Experiment 4 supplemental analyses and materials

Stimuli

Reverse time estimation



Goal setting

Final goals (adjusted for outliers)

Between (condition) x within (task) mixed ANOVA

EFFECT	TEST
Task	$F(2, 402) = 5.50$, $p = .004$, $\eta^2 = .03$
Condition	$F(1, 201) = 4.40$, $p = .037$, $\eta^2 = .02$
Condition × task	$F(2, 402) = 2.49$, $p = .084$, $\eta^2 = .01$

TASK	CONTROL	TIME-FIRST	Contrast
Transcription	$M = 27.61$, SD = 17.43	$M = 21.31$, SD = 15.51	$F(1, 201) = 7.39$, $p = .007$, $\eta^2 = .04$
Spelling	$M = 24.75$, SD = 15.43	$M = 21.57$, SD = 15.38	$F(1, 201) = 2.16$, $p = .143$, $\eta^2 = .01$
Math	$M = 23.50$, SD = 16.14	$M = 20.18$, SD = 15.22	$F(1, 201) = 2.28$, $p = .133$, $\eta^2 = .01$
Total	$M = 75.86$, SD = 45.24	$M = 63.06$, SD = 41.55	

Outlier adjustment

25 goals (4.12% of the total 609) exceeded the limit (65 answers per task) and were recoded as 65.

Raw goals (not adjusted for outliers)

Between (condition) x within (task) mixed ANOVA

EFFECT	TEST
Task	$F(2, 402) = 3.86$, $p = .022$, $\eta^2 = .02$
Condition	$F(1, 201) = 4.69$, $p = .032$, $\eta^2 = .02$
Condition × task	$F(2, 402) = 1.15$, $p = .318$, $\eta^2 = .01$

TASK	CONTROL	TIME-FIRST	Contrast
Transcription	$M = 28.92$, SD = 20.91	$M = 21.91$, SD = 17.51	$F(1, 201) = 6.69$, $p = .010$, $\eta^2 = .03$
Spelling	$M = 26.50$, SD = 21.73	$M = 22.17$, SD = 17.45	$F(1, 201) = 2.44$, $p = .120$, $\eta^2 = .01$
Math	$M = 24.96$, SD = 20.65	$M = 20.43$, SD = 16.04	$F(1, 201) = 3.04$, $p = .083$, $\eta^2 = .01$
Total	$M = 80.38$, SD = 57.25	$M = 64.51$, SD = 46.44	

Estimated time requirements

Estimated time (adjusted for outliers)

Between (condition) x within (task) mixed ANOVA

EFFECT	TEST
Task	$F(2, 402) = 5.874$, $p = .003$, $\eta^2 = .03$
Condition	$F(1, 201) = 4.346$, $p = .038$, $\eta^2 = .01$
Condition × task	$F(2, 402) = 1.053$, $p = .350$, $\eta^2 = .01$

TASK	CONTROL	TIME-FIRST	Contrast
Transcription	$M = 3.25$, SD = 1.64	$M = 2.79$, SD = 1.52	$F(1, 201) = 4.19$, $p = .042$, $\eta^2 = .02$
Spelling	$M = 3.07$, SD = 1.69	$M = 2.57$, SD = 1.26	$F(1, 201) = 5.71$, $p = .018$, $\eta^2 = .03$
Math	$M = 3.24$, SD = 1.84	$M = 2.97$, SD = 1.32	$F(1, 201) = 1.38$, $p = .242$, $\eta^2 = .01$
Total	$M = 9.55$, SD = 4.76	$M = 8.33$, SD = 3.45	

Outlier adjustment

Time estimates that exceeded 2.5 SD above the mean were winsorized (recoded as the next-highest value within range). There were no outliers in the control condition. In the time-first condition, the cutoff values were: transcription = 6.74 (n = 7), spelling = 6.05 (n = 4), and math = 6.5 (n = 6).

Raw time estimates (not adjusted for outliers)

Between (condition) x within (task) mixed ANOVA

EFFECT	TEST
Task	$F(2, 402) = 5.55$, $p = .004$, $\eta^2 = .03$
Condition	$F(1, 201) = 3.56$, $p = .061$, $\eta^2 = .02$
Condition × task	$F(2, 402) = 1.23$, $p = .358$

TASK	CONTROL	TIME-FIRST	Contrast
Transcription	$M = 3.25$, SD = 1.64	$M = 2.81$, SD = 1.57	$F(1, 201) = 3.75$, $p = .054$, $\eta^2 = .02$
Spelling	$M = 3.07$, SD = 1.69	$M = 2.60$, SD = 1.38	$F(1, 201) = 4.57$, $p = .034$, $\eta^2 = .02$
Math	$M = 3.24$, SD = 1.84	$M = 3.00$, SD = 1.40	$F(1, 201) = 1.04$, $p = .310$, $\eta^2 = .01$
Total	$M = 9.55$, SD = 4.76	$M = 8.42$, SD = 3.71	

Ancillary time use measures

Time spent on setting goals (seconds)

$M_{control} = 45.97$, SD = 36.73 vs. $M_{time\text{-}first} = 50.45$, SD = 41.27; $F < 1$

Time budgeting measures

Time spent on time budgeting page (seconds)

$M = 33.16$, SD = 26.07

Time allocated to each task (minutes):

- Transcription: $M = 2.17$, SD = .68
- Spelling: $M = 2.30$, SD = .82
- Math: $M = 2.52$, SD = .76

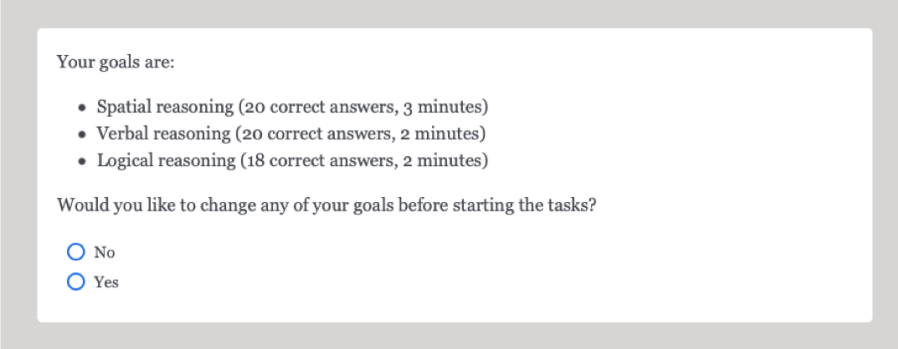
Exclusions

Percent of participants subject to exclusions, by condition: Control, n = 0, Time-first n = 2; Wald $\chi^2(1) < 1$

Appendix 7: Experiment 4 Follow-up study–Goal revision

Stimuli

Goal revision page (goals-first condition only)



Participants and procedure

Three hundred thirty-five Amazon MTurk panelists completed the study. Eleven were excluded for failing an attention check, six for restarting the survey after seeing the practice section, and 23 for extreme values on time spent, leaving a final $N = 297$ (mean age = 36.19 years, 57.2% men). Participants were randomly assigned to one of three conditions: control versus time-first versus goals-first.

The design was similar to experiment 4 (participants had 7 minutes for three tasks: geography, spelling and math quizzes), except that in the goals-first condition, participants set goals, budgeted time, were then shown their goals and time allocation, and were asked if they wanted to revise their goals before starting the tasks (see stimuli above). Following goal setting/revision, participants were informed they did not need to spend 7 minutes doing the tasks and would be entered in the bonus lottery.

Goal setting

Consistent with other experiments, prior to any revision, participants in the goals-first condition set higher goals ($M = 73.60$) than those in the time-first condition ($M = 58.75$), and similar to control ($M = 77.71$; see tables below).

Between (condition) x within (task) mixed ANOVA (original goals adjusted for outliers*, prior to goal revision)

EFFECT	TEST
Task	$F(2, 588) = 5.31$, $p = .005$, $\eta^2 = .02$
Condition	$F(2, 294) = 6.88$, $p = .001$, $\eta^2 = .04$
Condition × task	$F(4, 588) = 1.86$, $p = .115$, $\eta^2 = .01$

Condition within geography	$F(2, 294) = 8.76$, $p < .001$, $\eta^2 = .06$
Condition within spelling	$F(2, 294) = 4.80$, $p = .009$, $\eta^2 = .03$
Condition within math	$F(2, 294) = 5.33$, $p = .005$, $\eta^2 = .03$
Time-first vs. control	$F(2, 294) = 12.35$, $p = .001$, $\eta^2 = .04$
Time-first vs. goals-first	$F(2, 294) = 7.65$, $p = 006$, $\eta^2 = .03$
Goals-first vs. control	$F < 1$

TASK	CONTROL	TIME-FIRST	GOALS-FIRST
Geography	$M = 26.36$, SD = 13.25	$M = 18.63$, SD = 12.55	$M = 23.30$, SD = 13.50
Spelling	$M = 25.99$, SD = 13.00	$M = 20.74$, SD = 13.94	$M = 26.11$, SD = 14.95
Math	$M = 25.36$, SD = 14.13	$M = 19.38$, SD = 12.98	$M = 24.18$, SD = 14.03
Total	$M = 77.71$, SD = 37.88	$M = 58.75$, SD = 36.79	$M = 73.60$, SD = 39.16

*Thirty-five goals (3.93% of the total 891) exceeded the limit (56 questions per task) and were recoded as 56.

Goal revision

Only 26% percent of participants in the goals-first condition ($N = 26$) chose to revise their goals (a proportion significantly below chance, one-sample binomial test $p < .001$).

Indeed, these revised goals were lower ($M = 55.35$; vs. control: $p = .007$; vs. time-first: $p = .681$; see table below). Notably, goals of the 74% who did not revise remained overly optimistic ($M = 55.35$; vs. time-first: $p = .050$).

Final goals, splitting goals-first condition into revised and not revised

Between (condition) x within (task) mixed ANOVA

EFFECT	TEST
Task	$F(2, 586) = 3.37$, $p = .035$, $\eta^2 = .01$
Condition	$F(3, 293) = 5.23$, $p = .002$, $\eta^2 = .05$
Condition × task	$F(6, 586) = 1.15$, $p = .333$
Condition within geography	$F(3, 293) = 6.52$, $p < .001$, $\eta^2 = .06$
Condition within spelling	$F(3, 293) = 3.50$, $p = .016$, $\eta^2 = .03$
Condition within math	$F(3, 293) = 4.27$, $p = .006$, $\eta^2 = .04$
Goals-first/revised vs. control	$F(1, 293) = 7.25$, $p = .007$, $\eta^2 = .02$
Goals-first/revised vs. time-first	$F < 1$
Goals-first/not revised vs. control	$F(1, 293) = 1.69$, $p = .195$, $\eta^2 = .01$
Goals-first/not revised vs. time-first	$F(1, 293) = 3.88$, $p = .050$, $\eta^2 = .01$

QUIZ	CONTROL	TIME-FIRST	GOALS-FIRST, REVISED	GOALS-FIRST, NOT REVISED
Geography	*M* = 26.36, SD = 13.25	*M* = 18.63, SD = 12.55	*M* = 18.54, SD = 11.01	*M* = 22.33, SD = 13.92
Spelling	*M* = 25.99, SD = 13.00	*M* = 20.74, SD = 13.94	*M* = 19.12, SD = 9.68	*M* = 24.84, SD = 15.58
Math	*M* = 25.36, SD = 14.13	*M* = 19.38, SD = 12.98	*M* = 17.69, SD = 10.46	*M* = 22.97, SD = 14.35
Total	*M* = 77.71, SD = 37.88	*M* = 58.75, SD = 36.79	*M* = 55.35, SD = 29.51	*M* = 70.14, SD = 40.73

Appendix 8: Experiment 5 supplemental analyses

Goal setting

Final goals (adjusted for outliers)

3 (task:, within subjects) x 2 (time budget: control vs. time-first, between subjects) x 2 (time constraint: more vs. less constrained) mixed ANOVA

EFFECT	TEST
Task	$F(2, 706) = 1.45$, $p = .235$
Time budgeting	$F(1, 353) = 5.48$, $p = .020$, $\eta^2 = .02$
Time constraint	$F < 1$
Time budgeting × task	$F(2, 706) = 1.30$, $p = .273$
Time constraint × task	$F(2, 706) = 1.80$, $p = .166$, $\eta^2 = .01$
Time budgeting × time constraint	$F < 1$
Time budgeting × time constraint × task	$F(2, 706) = 1.16$, $p = .315$
Time budgeting within geography	$F(1, 353) = 3.09$, $p = .080$, $\eta^2 = .01$
Time budgeting within spelling	$F(1, 353) = 2.47$, $p = .117$, $\eta^2 = .01$
Time budgeting within math	$F(1, 353) = 8.03$, $p = .005$, $\eta^2 = .02$

STORE	STORE ORDER	CONTROL	TIME-FIRST
Geography	MORE CONSTRAINT	$M = 25.62$, SD = 17.11	$M = 21.79$, SD = 16.18
	LESS CONSTRAINT	$M = 23.19$, SD = 14.77	$M = 21.13$, SD = 15.19
Spelling	MORE CONSTRAINT	$M = 26.01$, SD = 16.48	$M = 22.19$, SD = 14.80
	LESS CONSTRAINT	$M = 24.69$, SD = 14.89	$M = 23.46$, SD = 14.50
Math	MORE CONSTRAINT	$M = 25.07$, SD = 14.56	$M = 21.13$, SD = 15.01
	LESS CONSTRAINT	$M = 26.78$, SD = 17.51	$M = 21.49$, SD = 13.95
Total	MORE CONSTRAINT	$M = 76.70$, SD = 42.46	$M = 65.11$, SD = 40.82
	LESS CONSTRAINT	$M = 74.66$, SD = 41.68	$M = 66.09$, SD = 37.34
	Total	$M = 75.65$, SD = 41.96	$M = 65.61$, SD = 38.96

Outlier adjustment

54 goals (5.04% of the total 1,071) exceeded the limit (65 answers per task) and were recoded as 65.

Raw goals (not adjusted for outliers)

3 (task:, within subjects) x 2 (time budget: control vs. time-first, between subjects) x 2 (time constraint: more vs. less constrained) mixed ANOVA

EFFECT	TEST
Task	$F < 1$
Time budgeting	$F(1, 353) = 1.09$, $p = .297$
Time constraint	$F(1, 353) = 1.03$, $p = .310$
Time budgeting × task	$F(2, 706) = 1.08$, $p = .340$
Time constraint × task	$F < 1$
Time budgeting × time constraint	$F < 1$
Time budgeting × time constraint × task	$F(2, 706) = 1.30$, $p = .273$
Time budgeting within geography	$F(1, 353) = 1.06$, $p = .304$
Time budgeting within spelling	$F(1, 353) = 1.07$, $p = .302$
Time budgeting within math	$F(1, 353) = 1.14$, $p = .286$

STORE	STORE ORDER	CONTROL	TIME-FIRST
Geography	MORE CONSTRAINT	$M = 138.03$, SD = 1057.42	$M = 23.99$, SD = 26.20
	LESS CONSTRAINT	$M = 23.61$, SD = 16.34	$M = 22.48$, SD = 21.08
Spelling	MORE CONSTRAINT	$M = 138.03$, SD = 1057.39	$M = 24.21$, SD = 24.99
	LESS CONSTRAINT	$M = 25.27$, SD = 16.86	$M = 23.46$, SD = 14.50
Math	MORE CONSTRAINT	$M = 137.31$, SD = 1057.45	$M = 23.57$, SD = 26.17
	LESS CONSTRAINT	$M = 27.46$, SD = 19.37	$M = 21.49$, SD = 13.95
Total	MORE CONSTRAINT	$M = 413.38$, SD = 3172.12	$M = 71.77$, SD = 73.91
	LESS CONSTRAINT	$M = 76.35$, SD = 45.06	$M = 67.44$, SD = 40.64
	Total	$M = 239.37$, SD = 2206.42	$M = 69.54$, SD = 59.05

Ancillary time use measures

Time spent on setting goals (seconds)

2 (time budgeting) x 2 (time constraint) between-subjects ANOVA

EFFECT	TEST
Time budgeting	$F < 1$
Time constraint	$F(1, 353) = 5.48$, $p = .167$, $\eta^2 = .01$
Time budgeting × time constraint	$F < 1$

	CONTROL	TIME-FIRST
GREATER CONSTRAINT	$M = 33.39$, SD = 19.78	$M = 33.64$, SD = 17.91
LESS CONSTRAINT	$M = 39.08$, SD = 29.79	$M = 34.58$, SD = 20.25

Time budgeting measures

Time spent on time budgeting page (seconds)

$M_{\text{greater constraint}} = 29.73$, SD = 16.28 vs. $M_{\text{less constraint}} = 27.31$, SD = 22.96

Time allocated to each task (minutes)

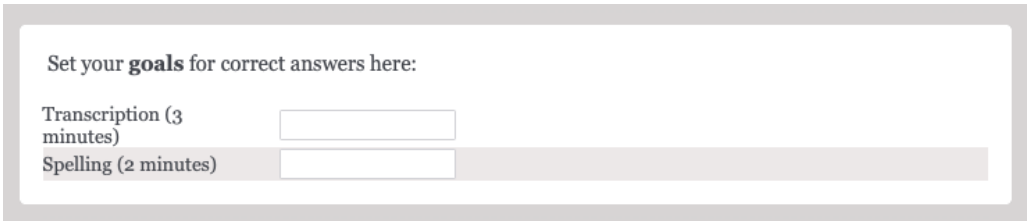
	GREATER CONSTRAINT	LESS CONSTRAINT
Geography	$M = 1.48$, SD = .58	$M = 2.17$, SD = .67
Spelling	$M = 1.61$, SD = .53	$M = 2.35$, SD = .76
Math	$M = 1.91$, SD = .68	$M = 2.48$, SD = .75

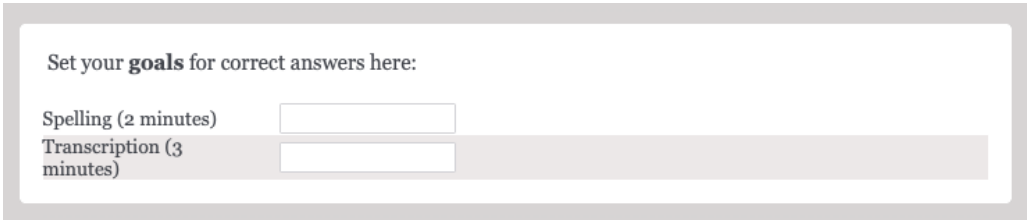
Appendix 9: Experiment 6 supplemental analyses and materials

Stimuli

Goal setting page stimuli

All participants were randomly assigned to see either the transcription or the spelling task first on the goal setting page (examples below show time budgeting conditions).





Goal setting

Final goals (adjusted for outliers)

Between (condition) x within (task) mixed ANOVA

EFFECT	TEST
Task	$F(1, 314) = 5.44$, $p = .020$, $\eta^2 = .04$
Condition	$F(2, 314) = 5.47$, $p = .005$, $\eta^2 = .03$
Condition × task	$F < 1$
Condition within transcription	$F(2, 314) = 4.45$, $p = .012$, $\eta^2 = .03$
Condition within spelling	$F(2, 314) = 5.29$, $p = .005$, $\eta^2 = .03$

TASK	CONTROL	CHOSEN TIME	ASSIGNED TIME
Transcription	$M = 24.75$, SD = 15.85	$M = 22.43$, SD = 14.55	$M = 18.86$, SD = 13.09
Spelling	$M = 23.83$, SD = 14.34	$M = 20.70$, SD = 14.40	$M = 17.67$, SD = 12.76
Total	$M = 48.58$, SD = 28.93	$M = 43.13$, SD = 27.04	$M = 36.53$, SD = 23.82

Outlier adjustment

Twenty-two goals (3.47% of the total 634) exceeded the limit (65 answers per task) and were recoded as 65.

Raw goals (not adjusted for outliers)

Between (condition) x within (task) mixed ANOVA

EFFECT	TEST
Task	$F(1, 314) = 2.37$, $p = .124$, $\eta^2 = .01$
Condition	$F(2, 314) = 2.76$, $p = .065$, $\eta^2 = .02$
Condition × task	$F < 1$
Condition within transcription	$F(2, 314) = 2.38$, $p = .095$, $\eta^2 = .01$
Condition within spelling	$F(2, 314) = 2.10$, $p = .125$, $\eta^2 = .01$

TASK	CONTROL	CHOSEN TIME	ASSIGNED TIME
Transcription	$M = 25.87$, SD = 19.26	$M = 24.71$, SD = 26.85	$M = 19.84$, SD = 17.22
Spelling	$M = 24.63$, SD = 17.22	$M = 21.23$, SD = 16.41	$M = 19.40$, SD = 22.49
Total	$M = 50.50$, SD = 35.09	$M = 45.94$, SD = 36.98	$M = 39.24$, SD = 33.60

Ancillary time use measures

Time spent setting goals (seconds)

$M_{\text{control}} = 28.22$, SD = 16.22 vs. $M_{\text{chosen time}} = 31.10$, SD = 23.65 vs. $M_{\text{assigned time}} = 36.51$, SD = 25.33; $F(2, 314) = 3.89$, $p = .021$, $\eta^2 = .02$)

Time budgeting measures

Time spent on time budgeting page (seconds)

$M_{\text{chosen time}} = 32.56$, SD = 23.67 vs. $M_{\text{assigned time}} = 21.92$, SD = 7.99

Time allocated to each task

The chosen time allocations ($M_{transcription}$ = 2.50, SD = .66; $M_{spelling}$ = 2.50, SD = .66) differed significantly from assigned time allocations (*t*-test vs. assigned transcription time value of 3: $t(102) = -7.78$, $p < .001$; *t*-test vs. assigned spelling time value of 2: $t(102) = -7.78$, $p < .001$).

Examining the distribution of chosen time allocations (below) suggests that for a majority of participants in the assigned-time condition, the assigned time budget was inconsistent with their personal preferences.

Transcription (minutes allocated)	Spelling (minutes allocated)	Percent of participants in chosen-time condition choosing this allocation
1	4	4.9%
2	3	39.8%
2.5	2.5	13.6%
3	2	35.9%
4	1	5.8%

Consideration of trade-offs in time use

To further explore opportunity cost consideration, I measured the consideration of trade-offs in time use. I asked participants, "While setting each of your goals, to what extent did you consider how the time spent on that goal would take away from the time available for the other goal?" (1 = *Not at all*, 7 = *Very much*).

Consistent with the notion that budgeting time could prompt people to consider trade-offs in time use, there was a significant effect of condition ($p < .001$). Compared to the control, participants in the chosen time ($p < .001$) and assigned time ($p = .012$) conditions considered trade-offs in time use to a greater degree.

Notably, however, although goals were lowest in the assigned time condition, participants in that condition did not more strongly consider time trade-offs. This is consistent with the notion that the effect of budgeting time on goal setting is driven by disaggregating time into distinct accounts, rather than consideration of trade-offs in time use.

EFFECT	TEST
One-way ANOVA	$F(2, 314) = 8.90$, $p < .001$, $\eta^2 = .05$
Chosen time vs. control	$F(1, 314) = 17.53$, $p < .001$, $\eta^2 = .02$
Assigned time vs. control	$F(1, 314) = 6.36$, $p = .012$, $\eta^2 = .01$
Chosen vs. assigned time	$F(1, 314) = 2.85$, $p = .092$, $\eta^2 = .01$

CONTROL	CHOSEN TIME	ASSIGNED TIME
M = 3.74, SD = 1.99	M = 4.83, SD = 1.65	M = 4.39, SD = 2.02

Desirability (vs. feasibility) focus

To explore how budgeting time might influence a general focus on setting achievable (vs. desirable) goals, I asked participants, "While setting your goals, did you think more about ..." (1 = *How much I could achieve*, 4 = *Both equally*, 7 = *How much I wanted to achieve*). There was a marginal effect of condition on setting achievable (vs. desirable) goals (p = .082). Compared to the control (p = .025), participants in the chosen time condition focused more on setting achievable (vs. desirable) goals. Notably, however, the assigned time condition was not different from the control (p = .237). That assigned time budgets encouraged more realistic multiple goal setting—despite not increasing a general focus on setting achievable goals—casts doubt on the notion that a general attainability focus drives the effect.

EFFECT	TEST
One-way ANOVA	$F(2, 314) = 2.53$, $p = .082$, $\eta^2 = .02$
Chosen time vs. control	$F(1, 314) = 5.05$, $p = .025$, $\eta^2 = .02$
Assigned time vs. control	$F(1, 314) = 1.15$, $p = .284$
Chosen vs. assigned time	$F(1, 314) = 1.40$, $p = .237$

CONTROL	CHOSEN TIME	ASSIGNED TIME
M = 3.97, SD = 2.01	M = 3.36, SD = 1.96	M = 3.68, SD = 1.96

Exclusions

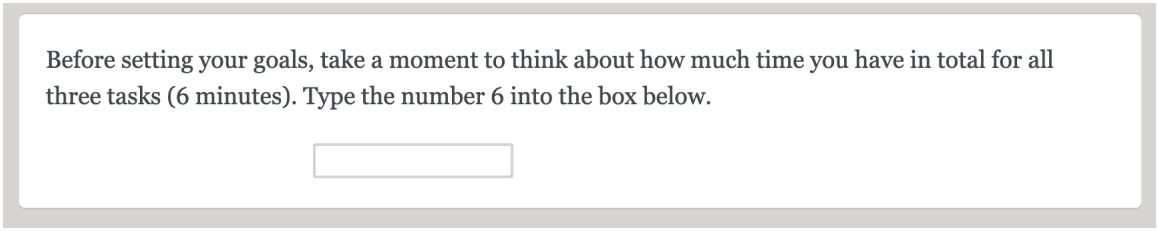
Number of participants subject to exclusions, by condition: Control: n = 5, Chosen time: n = 11 Assigned time: n = 10; Wald $\chi^2(2) = 2.41$, $p = .300$

Appendix 10: Experiment 7 supplemental analyses and materials

Stimuli

Task elaboration manipulation

Time elaboration manipulation



Goal setting

Final goals (adjusted for outliers)

Between (condition) x within (task) mixed ANOVA

EFFECT	TEST
Task	$F(2, 870) = 8.42$, $p < .001$, $\eta^2 = .02$
Condition	$F(3, 435) = 5.13$, $p = .002$, $\eta^2 = .03$
Condition × task	$F(6, 870) = 1.90$, $p = .079$, $\eta^2 = .01$
Condition w/in transcription	$F(3, 435) = 5.21$, $p = .002$, $\eta^2 = .03$
Condition w/in spelling	$F(3, 435) = 3.07$, $p = .028$, $\eta^2 = .02$
Condition w/in math	$F(3, 435) = 5.77$, $p = .001$, $\eta^2 = .04$

TASK	CONTROL	TIME-FIRST	TASK ELABORATION	TIME ELABORATION
Transcription	$M = 26.81$, SD = 16.96	$M = 20.00$, SD = 13.46	$M = 26.91$, SD = 15.57	$M = 27.35$, SD = 18.06
Spelling	$M = 25.95$, SD = 16.52	$M = 20.17$, SD = 13.72	$M = 25.20$, SD = 14.69	$M = 25.01$, SD = 17.80

Math	M = 23.64, SD = 15.35	M = 18.13, SD = 12.94	M = 24.86, SD = 16.12	M = 26.55, SD = 18.54
Total	M = 76.41, SD = 45.47	M = 58.29, SD = 37.71	M = 76.97, SD = 41.16	M = 78.91, SD = 51.90

Outlier adjustment

62 goals (5% of the total 1317) exceeded the limit (65 answers per task) and were recoded as 65.

Raw goals (not adjusted for outliers)

Between (condition) x within (task) mixed ANOVA

EFFECT	TEST
Task	$F(2, 870) = 10.54$, $p < .001$, $\eta^2 = .02$
Condition	$F(3, 435) = 4.71$, $p = .003$, $\eta^2 = .03$
Condition × task	$F(6, 870) = 1.75$, $p = .106$, $\eta^2 = .01$
Condition w/in transcription	$F(3, 435) = 4.82$, $p = .003$, $\eta^2 = .03$
Condition w/in spelling	$F(3, 435) = 2.91$, $p = .035$, $\eta^2 = .02$
Condition w/in math	$F(3, 435) = 5.28$, $p = .001$, $\eta^2 = .04$

TASK	CONTROL	TIME-FIRST	TASK ELABORATION	TIME ELABORATION
Transcription	M = 29.20, SD = 24.11	M = 20.32, SD = 14.89	M = 28.30, SD = 20.11	M = 30.19, SD = 25.32
Spelling	M = 27.67, SD = 21.40	M = 20.67, SD = 15.77	M = 25.85, SD = 17.04	M = 27.26, SD = 23.78
Math	M = 24.81, SD = 19.19	M = 18.45, SD = 14.45	M = 25.74, SD = 18.95	M = 28.44, SD = 23.37
Total	M = 81.68, SD = 60.39	M = 59.44, SD = 42.84	M = 79.89, SD = 50.47	M = 85.89, SD = 69.81

Ancillary time use measures

Time spent setting goals (seconds)

One-way ANOVA: $F(3, 435) = 1.23$, $p = .298$

CONTROL	TIME-FIRST	TASK ELABORATION	TIME ELABORATION

M = 49.02, SD = 38.99	*M* = 57.99, SD = 73.92	*M* = 63.52, SD = 105.19	*M* = 48.32, SD = 35.46

Time spent budgeting time and elaborating on the task or total time (in seconds):

- Time budgeting page: *M* = 32.81, SD = 19.00
- Task elaboration page: *M* = 47.00, SD = 32.98
- Time elaboration page: *M* = 12.61, SD = 1.91

Time budgeting measures

Time allocated to each task (minutes)

- Transcription: *M* = 1.91, SD = .51
- Spelling: *M* = 1.87, SD = .55
- Math: *M* = 2.22, SD = .64

Time focus when setting goals

One-way ANOVA: $F(3, 435) = 6.86$, $p < .001$, $\eta^2 = .05$

CONTROL	TIME-FIRST	TASK ELABORATION	TIME ELABORATION
M = 3.59, SD = 2.07	*M* = 4.34, SD = 1.97	*M* = 3.16, SD = 2.01	*M* = 3.44, SD = 1.98

Task elaboration responses

The table below displays the percentage of open text responses (categories are not mutually exclusive) that mentioned each of the corresponding topics.

TOPIC	n (of 108)	%	EXAMPLES
Any mention of time	38	35.2%	"Take my time and read the questions and really think about them before locking in an answer"

			"I'm concerned with the total time limit but I feel I will still do well."
Budgeting time	2	1.9%	"I will do my tasks as quickly as possible. I will divide my time to dedicate 2 minutes to each of the 3 tasks." "Allocate time to each task as a maximum and set goals. And then diligently execute."
Goals or goal setting	16	14.8%	"as quickly as possible until my goal is met, then I move on to next section." "I will probably set an easy goal (because I'm no good at math) and then I will just be sure to get them right."
Task focus, attention, accuracy	47	43.5%	"take my time in answering the questions. accuracy is most important than speed." "pay attention and do my best" "i will try to think logically and focus on the question and try to complete as much as i can"

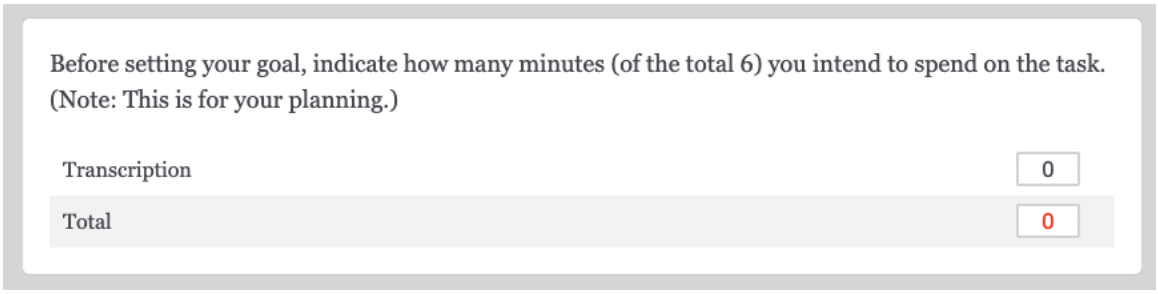
Exclusions

One participant, in the time elaboration condition, was subject to exclusions

Appendix 11: Experiment 8 supplemental analyses

Stimuli

Time budgeting in the single-goal condition



Goal setting

Final goals (adjusted for outliers)

2 (time budget) x 3 (number of goals) between-subjects ANOVA

EFFECT	TEST
Goals	$F(2, 598) = 52.86$, $p < .001$, $\eta^2 = .14$
Time budget	$F(1, 598) = 20.81$, $p < .001$, $\eta^2 = .03$
Time budget × goals	$F(2, 598) = 4.45$, $p = .012$, $\eta^2 = .01$
Time budget within 1 goal	$F(1, 598) = 1.09$, $p = .297$
Time budget within 2 goals	$F(1, 598) = 3.38$, $p = .066$, $\eta^2 = .01$
Time budget within 3 goals	$F(1, 598) = 24.44$, $p < .001$, $\eta^2 = .04$

TASK	GOALS	CONTROL	TIME-FIRST
Transcription	1 GOAL	$M = 42.02$, SD = 22.57	$M = 37.66$, SD = 22.91
	2 GOALS	$M = 29.36$, SD = 14.47	$M = 24.27$, SD = 12.12
	3 GOALS	$M = 28.53$, SD = 15.72	$M = 20.67$, SD = 13.15
Spelling	2 GOALS	$M = 26.64$, SD = 14.07	$M = 23.93$, SD = 13.22
	3 GOALS	$M = 27.47$, SD = 16.14	$M = 20.46$, SD = 13.03
Math	3 GOALS	$M = 25.39$, SD = 16.00	$M = 18.82$, SD = 12.32
Total	1 GOAL	$M = 42.02$, SD = 22.57	$M = 37.66$, SD = 22.91

	2 GOALS	*M* = 56.00, SD = 25.61	*M* = 48.20, SD = 23.08
	3 GOALS	*M* = 81.39, SD = 44.67	*M* = 59.94, SD = 35.52
	Total	*M* = 59.78, SD = 36.30	*M* = 48.10, SD = 28.80

Outlier adjustment

Seventeen goals (1.42% of the total 1,194) exceeded the limit and were recoded. Questions were scaled across goal-number conditions to give participants equivalent opportunity to respond (1-goal condition: 96; 2-goal condition: 80 per task; 3-goal condition: 65 per task).

Raw goals (not adjusted for outliers)

2 (time budget) x 3 (number of goals) between-subjects ANOVA

EFFECT	TEST
Goals	$F(2, 598) = 42.08$, $p < .001$, $\eta^2 = .12$
Time budget	$F(1, 598) = 19.19$, $p < .001$, $\eta^2 = .03$
Time budget × goals	$F(2, 598) = 3.91$, $p = .021$, $\eta^2 = .01$
Time budget within 1 goal	$F(1, 598) = 1.51$, $p = .219$
Time budget within 2 goals	$F(1, 598) = 2.43$, $p = .120$
Time budget within 3 goals	$F(1, 598) = 22.37$, $p < .001$, $\eta^2 = .04$

TASK	GOALS	CONTROL	TIME-FIRST	Total
Transcription	1 GOAL	*M* = 44.11, SD = 30.19	*M* = 38.05, SD = 24.02	*M* = 41.11, SD = 27.41
	2 GOALS	*M* = 29.36, SD = 14.47	*M* = 24.27, SD = 12.12	*M* = 26.81, SD = 13.56
	3 GOALS	*M* = 29.06, SD = 17.31	*M* = 21.06, SD = 14.88	*M* = 25.35, SD = 16.67
Spelling	2 GOALS	*M* = 26.64, SD = 14.07	*M* = 23.93, SD = 13.22	*M* = 25.29, SD = 13.69
	3 GOALS	*M* = 30.60, SD = 32.39	*M* = 20.84, SD = 14.78	*M* = 26.07, SD = 26.16
Math	3 GOALS	*M* = 25.73, SD = 17.16	*M* = 19.27, SD = 14.39	*M* = 22.73, SD = 16.22
Total	1 GOAL	*M* = 44.11, SD = 30.19	*M* = 38.05, SD = 24.02	*M* = 41.11, SD = 27.41
	2 GOALS	*M* = 56.00, SD = 25.61	*M* = 48.20, SD = 23.08	*M* = 52.10, SD = 24.63
	3 GOALS	*M* = 85.38, SD = 56.72	*M* = 61.17, SD = 41.41	*M* = 74.15, SD = 51.52

	Total	M = 61.83, SD = 43.54	M = 48.61, SD = 31.48	M = 55.40, SD = 38.69

Time spent on downstream goals

Time spent on the last goal

As predicted, in both the 2- and 3-goal conditions, budgeting time first increased time spent on downstream goals. Further, as expected, the task × condition interactions were significant.

2 (time budget) x 3 (number of goals) between-subjects ANOVA, DV is total time spent on tasks

EFFECT	TEST
Goals	$F(2, 598) = 19.09$, $p < .001$, $\eta^2 = .06$
Time budget	$F(1, 598) = 1.43$, $p = .233$
Time budget × goals	$F < 1$

Two-goal condition: Between (condition) x within (task) mixed ANOVA on time spent

EFFECT	TEST
Task	$F(1, 200) = 45.00$, $p < .001$, $\eta^2 = .22$
Condition	$F(1, 200) = 2.46$, $p = .118$, $\eta^2 = .01$
Condition × task	$F(1, 200) = 10.01$, $p = .002$, $\eta^2 = .05$

Three-goal condition: Between (condition) x within (task) mixed ANOVA on time spent

EFFECT	TEST
Task	$F(2, 384) = 71.42$, $p < .001$, $\eta^2 = .37$
Condition	$F < 1$
Condition × task	$F(2, 384) = 7.01$, $p = .001$, $\eta^2 = .04$

TASK	GOALS	CONTROL	TIME-FIRST	TEST (for output on last goal)
Transcription	1 GOAL	M = 281.62, SD = 96.36	M = 279.44, SD = 102.65	
	2 GOALS	M = 207.34, SD = 98.19	M = 166.56, SD = 85.93	
	3 GOALS	M = 180.78, SD = 97.59	M = 142.34, SD = 81.12	
Spelling	2 GOALS	M = 105.59, SD = 72.58	M = 130.04, SD = 68.08	$F(1, 200) = 6.10$, $p = .014$, $\eta^2 = .03$
	3 GOALS	M = 100.64, SD = 60.78	M = 115.09, SD = 60.26	

Math	3 GOALS	M = 48.59, SD = 53.25	M = 68.61, SD = 60.41	$F(1, 192) = 6.02$, $p = .015$, $\eta^2 = .03$
Total	1 GOAL	M = 281.62, SD = 96.36	M = 279.44, SD = 102.65	
	2 GOALS	M = 312.93, SD = 72.00	M = 296.60, SD = 75.91	
	3 GOALS	M = 330.01, SD = 41.86	M = 326.04, SD = 50.39	
	Total	M = 308.05, SD = 76.12	M = 299.60, SD = 82.26	

Likelihood of spending any time on last goal

As predicted, budgeting time first increased the likelihood of spending any time spent on downstream goals (albeit marginally in the 3-goal condition.

GOALS	CONTROL	TIME-FIRST	TEST
2 GOALS	83%	93%	$b = 1$, Wald $\chi^2(1) = 4.46$, $p = .035$, OR = 2.72
3 GOALS	58%	70%	$b = .54$, Wald $\chi^2(1) = 3.13$, $p = .077$, OR = 1.71

Performance on downstream goals

Output

As predicted, in both the 2- and 3-goal conditions, budgeting time first increased output on downstream goals. Further, as expected, the task × condition interactions were significant.

2 (time budget) x 3 (number of goals) between-subjects ANOVA, DV is total output

EFFECT	TEST
Goals	$F < 1$
Time budget	$F(1, 598) = 1.57$, $p = .211$
Time budget × goals	$F < 1$

Two-goal condition only: Between (condition) x within (task) mixed ANOVA on output

EFFECT	TEST

Task	$F(1, 200) = 69.68$, $p < .001$, $\eta^2 = .25$
Condition	$F < 1$
Condition × task	$F(1, 200) = 8.99$, $p = .003$, $\eta^2 = .03$

Three-goal condition only: Between (condition) x within (task) mixed ANOVA on output

EFFECT	TEST
Task	$F(2, 384) = 109.54$, $p < .001$, $\eta^2 = .35$
Condition	$F < 1$
Condition × task	$F(2, 384) = 7.94$, $p < .001$, $\eta^2 = .03$

TASK	GOALS	CONTROL	TIME-FIRST	TEST (for output on last goal)
Transcription	1 GOAL	$M = 45.36$, SD = 19.93	$M = 43.23$, SD = 20.75	
	2 GOALS	$M = 30.80$, SD = 15.18	$M = 25.72$, SD = 14.08	
	3 GOALS	$M = 26.59$, SD = 15.24	$M = 20.78$, SD = 12.06	
Spelling	2 GOALS	$M = 14.78$, SD = 12.20	$M = 18.17$, SD = 11.70	$F(1, 200) = 4.05$, $p = .045$, $\eta^2 = .02$
	3 GOALS	$M = 13.15$, SD = 8.83	$M = 15.39$, SD = 8.95	
Math	3 GOALS	$M = 5.78$, SD = 7.12	$M = 7.73$, SD = 7.60	$F(1, 192) = 3.42$, $p = .066$, $\eta^2 = .02$
Total	1 GOAL	$M = 45.36$, SD = 19.93	$M = 43.23$, SD = 20.75	
	2 GOALS	$M = 45.58$, SD = 17.47	$M = 43.89$, SD = 17.84	
	3 GOALS	$M = 45.52$, SD = 14.46	$M = 43.90$, SD = 14.86	
	Total	$M = 45.49$, SD = 17.38	$M = 43.66$, SD = 18.05	

Goal achievement

As predicted, in the 2-goal condition, budgeting time increased the likelihood of achieving downstream goals. In the 3-goal condition, budgeting time directionally increased achievement of the last goal. In this condition, budgeting time did significantly increase achievement of the second goal, yet achievement of the third and final goal was low across both time budgeting conditions. This suggests that, while budgeting time did increase time spent and output on the last goal, in this case it was insufficient to significantly boost achievement of the last goal.

TASK	GOALS	CONTROL	TIME-FIRST	TEST (for likelihood of achieving the last goal)
Transcription	1 GOAL	77%	80%	
	2 GOALS	86%	87%	
	3 GOALS	79%	82%	
	Total	81%	83%	
Spelling	2 GOALS	37%	55%	b = .77, Wald $\chi^2(1)$ = 7.10, p = .008, OR = 1.89
	3 GOALS	48%	67%	b = 1.15, Wald $\chi^2(1)$ = 7.61, p = .006, OR = 3.16
	Total	42%	61%	
Math	3 GOALS	23%	30%	b = .37, Wald $\chi^2(1)$ = 1.50, p = .22

Goal accuracy

As predicted, in both the 2- and 3-goal conditions, budgeting time first decreased output-goal discrepancy, overall and on the last goal. Further, as expected, the task × condition interactions were significant.

2 (condition) x 3 (goals) between-subjects ANOVA, DV is total output-goal discrepancy

EFFECT	TEST
Goals	$F(2, 598) = 68.59$, $p < .001$, $\eta^2 = .18$
Time budget	$F(1, 598) = 19.37$ $p < .001$, $\eta^2 = .03$
Time budget × goals	$F(2, 598) = 6.20$, $p = .002$, $\eta^2 = .02$
Time budget within 1 goal	$F < 1$
Time budget within 2 goals	$F(1, 598) = 2.71$, $p = .100$, $\eta^2 = .00$
Time budget within 3 goals	$F(1, 598) = 27.78$, $p < .001$, $\eta^2 = .04$

Two-goal condition only: Between (condition) x within (task) mixed ANOVA on discrepancy

EFFECT	TEST
Task	$F(1, 200) = 66.26$, $p < .001$, $\eta^2 = .24$
Condition	$F(1, 200) = 5.49$, $p = 020$, $\eta^2 = .03$
Condition × task	$F(1, 200) = 5.77$, $p = .017$, $\eta^2 = .02$

Three-goal condition only: Between (condition) x within (task) mixed ANOVA on discrepancy

EFFECT	TEST
Task	$F(2, 384) = 83.51$, $p < .001$, $\eta^2 = .30$
Condition	$F(1, 192) = 13.83$, $p < .001$, $\eta^2 = .07$
Condition × task	$F(2, 384) = 6.20$, $p = .002$, $\eta^2 = .02$

TASK	GOALS	CONTROL	TIME-FIRST	TEST (for discrepancy on last goal)
Transcription	1 GOAL	$M = 3.34$, SD = 18.78	$M = 5.57$, SD = 20.00	
	2 GOALS	$M = 1.45$, SD = 12.34	$M = 1.46$, SD = 9.90	
	3 GOALS	$M = -1.94$, SD = 10.83	$M = .11$, SD = 13.25	
Spelling	2 GOALS	$M = -11.81$, SD = 16.04	$M = -5.76$, SD = 12.24	$F(1, 200) = 9.08$, $p = .003$, $\eta^2 = .04$
	3 GOALS	$M = -14.32$, SD = 18.80	$M = -5.07$, SD = 12.20	
Math	3 GOALS	$M = -19.62$, SD = 18.82	$M = -11.09$, SD = 15.34	$F(1, 192) = 11.73$, $p = .001$, $\eta^2 = .06$
Total	1 GOAL	$M = 3.34$, SD = 18.78	$M = 5.57$, SD = 20.00	
	2 GOALS	$M = -10.37$, SD = 20.57	$M = -4.31$, SD = 15.90	
	3 GOALS	$M = -35.87$, SD = 39.93	$M = -16.04$, SD = 33.38	
	Total	$M = -14.28$, SD = 32.48	$M = -4.44$, SD = 25.31	

Ancillary time use measures

Time spent on setting goals (seconds)

	CONTROL	TIME-FIRST
1 GOAL	$M = 37.68$, SD = 25.47	$M = 36.34$, SD = 21.63
2 GOALS	$M = 40.35$, SD = 37.35	$M = 50.97$, SD = 43.84
3 GOALS	$M = 50.94$, SD = 46.09	$M = 51.61$, SD = 35.47

Time spent on waiting page (seconds)

2 (time budget) x 3 (number of goals) between-subjects ANOVA

EFFECT	TEST
Goals	$F(2, 598) = 25.52$, $p < .001$, $\eta^2 = .08$
Time budget	$F(1, 598) = 1.29$, $p = .256$
Time budget × goals	$F < 1$

	CONTROL	TIME-FIRST
1 GOAL	$M = 75.11$, SD = 95.27	$M = 78.43$, SD = 104.06
2 GOALS	$M = 40.18$, SD = 72.21	$M = 54.97$, SD = 76.35
3 GOALS	$M = 20.16$, SD = 42.13	$M = 23.46$, SD = 49.55

Ancillary scoring measures

Minimum qualification

Percent of participants meeting the minimum requirement on the *last* task (obtaining at least 10 correct answers)

	CONTROL	TIME-FIRST	Logistic regression
1 GOAL	98%	97%	$b = -.44$, Wald $\chi^2(1) = .22$, $p = .638$
2 GOALS	65%	79%	$b = .67$, Wald $\chi^2(1) = 4.58$, $p = .032$, OR = 1.96
3 GOALS	34%	42%	$b = .31$, Wald $\chi^2(1) = 1.08$, $p = .298$
Total	66%	74%	

Percent of participants meeting the minimum requirement on *each* task (obtaining at least 10 correct answers)

	CONTROL	TIME-FIRST	Logistic regression
1 GOAL	98%	97%	$b = -.44$, Wald $\chi^2(1) = .22$, $p = .638$
2 GOALS	63%	77%	$b = .67$, Wald $\chi^2(1) = 4.58$, $p = .032$, OR = 1.96
3 GOALS	32%	39%	$b = .31$, Wald $\chi^2(1) = 1.08$, $p = .298$, OR = 1.37
Total	65%	72%	

Final scores

Final scores on the last task

	CONTROL (median)	TIME-FIRST (median)	Mann-Whitney test
2 GOALS	0	20	M-W U = 6074, p = .010
3 GOALS	0	0	M-W U = 4977, p = .314

Final scores across all tasks

	CONTROL (median)	TIME-FIRST (median)	Mann-Whitney test
1 GOAL	60	46	M-W U = 5204.5, p = .637
2 GOALS	40	60	M-W U = 5815.5, p = .078
3 GOALS	0	0	M-W U = 4970, p = .366

Lottery qualification

Percent of participants who qualified for the bonus lottery by earning scores in the top 20% (calculated separately for each goal number condition: 1 goal = 100, 2 goals = 86, 3 goals = 70)

	CONTROL	TIME-FIRST	Logistic regression
1 GOAL	23%	24%	b = .03, Wald $\chi^2(1)$ = .001, p = .939
2 GOALS	18%	22%	b = .24, Wald $\chi^2(1)$ = .45, p = .502
3 GOALS	17%	22%	b = .33, Wald $\chi^2(1)$ = .80, p = .372

Time budgeting measures

Time spent on time budgeting page (seconds)

- One goal: M = 22.22, SD = 16.73

- Two goals: $M = 26.60$, SD = 20.59
- Three goals: $M = 33.09$, SD = 18.02

Time allocated to each task (minutes)

	1 GOAL	2 GOALS	3 GOALS
Transcription	$M = 6.00$, SD = 0	$M = 3.01$, SD = .70	$M = 1.92$, SD = .72
Spelling		$M = 2.99$, SD = .70	$M = 2.07$, SD = .79
Math			$M = 2.22$, SD = .75

Regressions of time allocated on time spent for each task

	2 GOALS	3 GOALS
Transcription	$\beta = .20$, $t(99) = 2.06$, $p = .042$, $R^2_{adj} = .03$	$\beta = .16$, $t(88) = 1.49$, $p = .141$, $R^2_{adj} = .01$
Spelling	$\beta = .23$, $t(99) = 2.36$, $p = .020$, $R^2_{adj} = .04$	$\beta = .07$, $t(88) = .61$, $p = .543$
Math		$\beta = -.07$, $t(88) = -.68$, $p = .498$

*One-goal condition not tested given 0 variance in time allocation of 6 minutes

Subjective well-being

Self-efficacy

To measure self-efficacy, following goal pursuit, I asked participants, "Please rate your overall competence in the survey tasks (1 = *Not at all competent*, 4 = *Moderately competent*, 7 = *Extremely competent*).

Consistent with the notion that achieving downstream goals is a meaningful outcome for consumers, participants in the multiple goal conditions who achieved their last goal perceived greater self-efficacy in the tasks, overall ($p < .001$).

The direct effect of condition on perceived self-efficacy was not significant ($M_{control} = 4.59$, SD = 1.30 vs. $M_{time\text{-}first} = 4.74$, SD = 1.33; $F < 1$).

2 (number of goals) x 2 (achieve last goal: 0 = no, 1 = yes) between-subjects ANOVA

EFFECT	TEST
Number of goals	$F < 1$
Achieve last goal	$F(1, 392) = 37.36$, $p < .001$, $\eta^2 = .09$
Achieve last goal × number goals	$F(1, 392) = 1.29$, $p = .260$
Achieve last goal within 2 goals	$F(1, 392) = 14.51$, $p < .001$, $\eta^2 = .04$
Achieve last goal within 3 goals	$F(1, 392) = 22.92$, $p < .001$, $\eta^2 = .06$

	FAILED TO ACHIEVE LAST GOAL	ACHIEVED LAST GOAL
2 GOALS	$M = 4.50$, SD = 1.39	$M = 5.22$, SD = 1.11
3 GOALS	$M = 4.21$, SD = 1.448	$M = 5.25$, SD = 1.28
Total	$M = 4.33$, SD = 1.43	$M = 5.23$, SD = 1.17

Positive affect

To measure positive affect, following goal pursuit, I asked participants to "Please indicate to what extent you feel this way right now" (1 = *Very slightly or not at all*, 3 = *Moderately*, 5 = *Extremely*; happy, satisfied, and proud; $\alpha = .91$)

Participants in the multiple goal conditions who achieved their last goal experienced greater positive affect ($p < .001$).

Further, there was a (directional) direct effect of condition, indicating that budgeting time increased positive affect following goal pursuit ($M_{control} = 2.19$, SD = .98 vs. $M_{time\text{-}first} = 2.36$, SD = 1.11; $F(1, 392) = 2.72$, $p = .100$, $\eta^2 = .01$).

2 (number of goals) x 2 (achieve last goal: 0 = no, 1 = yes) between-subjects ANOVA

EFFECT	TEST
Number of goals	$F < 1$
Achieve last goal	$F(1, 392) = 48.04$, $p < .001$, $\eta^2 = .11$
Achieve last goal × number goals	$F(1, 392) = 7.37$, $p = .007$, $\eta^2 = .02$
Achieve last goal within 2 goals	$F(1, 392) = 10.38$, $p = .001$, $\eta^2 = .03$
Achieve last goal within 3 goals	$F(1, 392) = 40.69$, $p < .001$, $\eta^2 = .09$

	FAILED TO ACHIEVE LAST GOAL	ACHIEVED LAST GOAL
2 GOALS	$M = 2.16$, SD = .97	$M = 2.60$, SD = 1.07
3 GOALS	$M = 1.91$, SD = .92	$M = 2.93$, SD = 1.00
Total	$M = 2.02$, SD = .95	$M = 2.72$, SD = 1.05

Negative affect

To measure negative affect, following goal pursuit, I asked participants to "Please indicate to what extent you feel this way right now" (1 = Very slightly or not at all, 3 = Moderately, 5 = Extremely; upset, frustrated, disappointed; $\alpha = .89$).

Participants in the multiple goal conditions who achieved their last goal experienced less negative affect ($p < .001$).

Further, there was a significant direct effect of condition, indicating that budgeting time decreased negative affect following goal pursuit ($M_{control} = 2.46$, SD = 1.12 vs. $M_{time\text{-}first} = 2.18$, SD = 1.08; $F(1, 392) = 5.88$, $p = .016$, $\eta^2 = .01$).

2 (number of goals) x 2 (achieve last goal: 0 = no, 1 = yes) between-subjects ANOVA

EFFECT	TEST
Number of goals	$F(1, 392) = 4.04$, $p = .045$, $\eta^2 = .01$
Achieve last goal	$F(1, 392) = 66.24$, $p < .001$, $\eta^2 = .14$
Achieve last goal × number goals	$F(1, 392) = 2.89$, $p = .090$, $\eta^2 = .01$
Achieve last goal within 2 goals	$F(1, 392) = 24.20$, $p < .001$, $\eta^2 = .06$
Achieve last goal within 3 goals	$F(1, 392) = 42.33$, $p < .001$, $\eta^2 = .10$

	FAILED TO ACHIEVE LAST GOAL	ACHIEVED LAST GOAL
2 GOALS	$M = 2.43$, SD = 1.06	$M = 1.73$, SD = .90
3 GOALS	$M = 2.83$, SD = 1.08	$M = 1.76$, SD = .87
Total	$M = 2.66$, SD = 1.09	$M = 1.74$, SD = .88

Consideration of time trade-offs

Consistent with experiment 6, budgeting time increased the consideration of trade-offs in time use ($p = .002$).

2 (time budget) x 3 (number of goals) between-subjects ANOVA

EFFECT	TEST
Goals	$F < 1$
Time budget	$F(1, 392) = 10.06$, $p = .002$, $\eta^2 = .02$
Time budget × goals	$F < 1$

	CONTROL	TIME-FIRST
2 GOALS	*M* = 4.16, SD = 1.84	*M* = 4.84, SD = 1.65
3 GOALS	*M* = 4.11, SD = 1.99	*M* = 4.60, SD = 1.87
Total	*M* = 4.13, SD = 1.92	*M* = 4.73, SD = 1.76

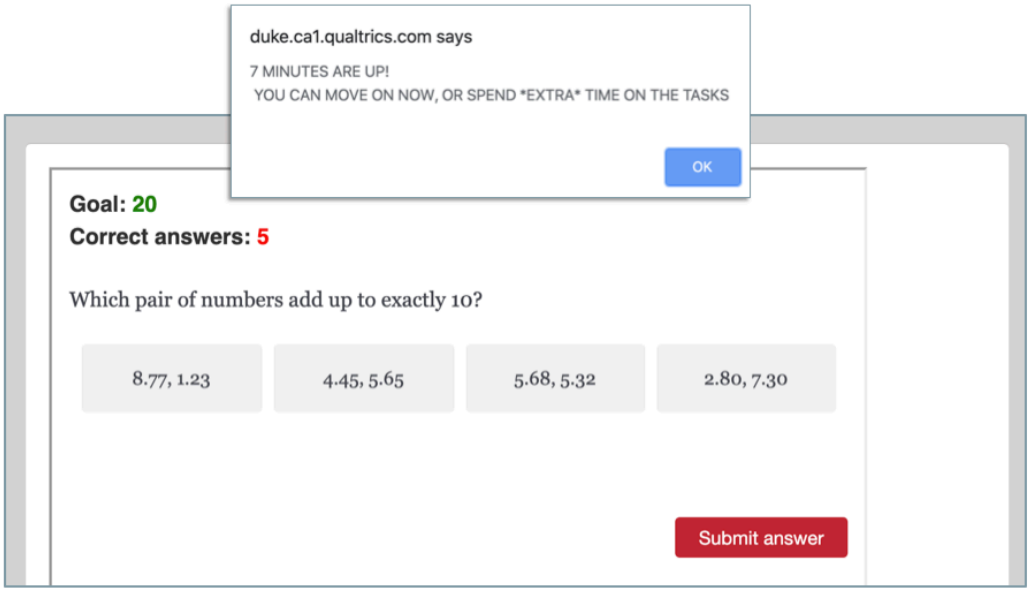
Exclusions

Number of participants subject to exclusions, by condition: Control: n = 19, Time-first: n = 25; Wald $\chi^2(2) = 1.90$, $p = .297$

Appendix 12: Experiment 9 supplemental analyses and materials

Stimuli

Time expired pop-up notification



Goal setting

Final goals (adjusted for outliers)

Between (condition) x within (task) mixed ANOVA

EFFECT	TEST
Task	$F(2, 424) = 10.71$, $p < .001$, $\eta^2 = .05$
Condition	$F(1, 212) = 3.65$, $p = .058$, $\eta^2 = .02$
Condition × task	$F < 1$

TASK	CONTROL	TIME-FIRST	Contrast
Transcription	$M = 25.65$, SD = 15.58	$M = 21.35$, SD = 14.62	$F(1, 212) = 4.31$, $p = .039$, $\eta^2 = .02$
Spelling	$M = 23.71$, SD = 15.84	$M = 21.2$, SD = 14.41	$F(1, 212) = 1.46$, $p = .228$, $\eta^2 = .01$
Math	$M = 21.98$, SD = 15.08	$M = 18.3$, SD = 12.63	$F(1, 212) = 3.70$, $p = .056$, $\eta^2 = .02$

Total	M = 71.34, SD = 41.48	M = 60.85, SD = 38.56	

Outlier adjustment

24 goals (3.7% of the total 642) exceeded the limit (65 answers per task) and were recoded as 65.

Raw goals (not adjusted for outliers)

Between (condition) x within (task) mixed ANOVA

EFFECT	TEST
Task	$F(2, 424) = 1.48$, $p = .229$
Condition	$F < 1$
Condition × task	$F < 1$

TASK	CONTROL	TIME-FIRST	Contrast
Transcription	M = 26.86, SD = 19.39	M = 51.55, SD = 299.37	$F < 1$
Spelling	M = 24.91, SD = 19.72	M = 22.08, SD = 17.65	$F(1, 212) = 1.22$, $p = .271$
Math	M = 22.65, SD = 17.53	M = , SD = 15.919.04	$F(1, 212) = 2.48$, $p = .117$, $\eta^2 = .01$
Total	M = 74.42, SD = 51.71	M = 92.67, SD = 303.63	

Time spent on downstream goals

Between (condition) x within (task) mixed ANOVA, dependent variable is time spent (in seconds)

EFFECT	TEST
Task	$F(2, 424) = 24.10$, $p < .001$, $\eta^2 = .10$
Condition	$F(1, 212) = 3.72$, $p = .055$, $\eta^2 = .02$
Condition × task	$F < 1$

TASK	CONTROL	TIME-FIRST	Contrast
Transcription	M = 172.66, SD = 104.11	M = 157.81, SD = 97.04	$F(1, 212) = 1.16$, $p = .283$, $\eta^2 = .01$

Spelling	M = 151.78, SD = 75.13	M = 135.66, SD = 74.37	$F(1, 212) = 2.48$, p = .117, η^2 = .01
Math	M = 106.16, SD = 69.87	M = 106.82, SD = 60.43	$F < 1$
Total	M = 430.6, SD = 121.09	M = 400.29, SD = 107.56	

Overspending time

Likelihood of overspending *any* time (0 = overspent 0 seconds, 1 = overspent at least 1 second): $62\%_{\text{control}}$ vs. $55\%_{\text{time-first}}$; logistic regression: b = -.28, Wald $\chi^2(1)$ = .99, p = .321

Given the findings throughout the experiments that time-first goals are more realistic but still high and challenging (i.e., exceed what can be achieved within the overall time constraint) it is not surprising that many participants in the time-first condition overspent at least some time. Importantly, however, they overspent significantly *less* time than people in the control (as reported in the main text).

Performance on downstream goals

Output

Between (condition) x within (task) mixed ANOVA, dependent variable is output (# correct answers)

EFFECT	TEST
Task	$F(2, 424) = 69.78$, $p < .001$, $\eta^2 = .25$
Condition	$F < 1$
Condition × task	$F(2, 424) = 1.02$, p = .360

TASK	CONTROL	TIME-FIRST	Contrast
Transcription	M = 23.98, SD = 14.66	M = 22.00, SD = 13.38	$F(1, 212) = 1.06$, p = .304
Spelling	M = 17.11, SD = 10.65	M = 16.05, SD = 8.79	$F < 1$
Math	M = 9.99, SD = 9.15	M = 10.97, SD = 7.64	$F < 1$
Total	M = 51.08, SD = 20.53	M = 49.02, SD = 18.18	

Goal achievement

TASK	CONTROL	TIME-FIRST	Logistic regression
Transcription	79%	82%	b = .24, Wald $\chi^2(1)$ = .48, p = .487
Spelling	66%	73%	b = .31, Wald $\chi^2(1)$ = 1.05, p = .306
Math	42%	53%	b = .44, Wald $\chi^2(1)$ = 2.57, p = .109, OR = 1.56

Goal accuracy

Between (condition) x within (task) mixed ANOVA, dependent variable is goal discrepancy (output – goal).

EFFECT	TEST
Task	$F(2, 424) = 45.22$, $p < .001$, $\eta^2 = .17$
Condition	$F(1, 212) = 3.26$, $p = .072$, $\eta^2 = .02$
Condition × task	$F(2, 424) = 1.47$, $p = .231$, $\eta^2 = .01$

TASK	CONTROL	TIME-FIRST	Contrast
Transcription	M = -4.42, SD = 15.18	M = -1.22, SD = 13.51	$F(1, 212) = 1.99$, $p = .160$, $\eta^2 = .01$
Spelling	M = -12.76, SD = 16.17	M = -6.22, SD = 14.63	$F < 1$
Math	M = -21.03, SD = 19.40	M = -9.62, SD = 17.76	$F(1, 212) = 4.83$, $p = .029$, $\eta^2 = .02$
Total	M = -38.20, SD = 41.32	M = -17.07, SD = 37.66	

Ancillary time use measures

Time spent on setting goals (seconds)

$M_{control}$ = 46.10, SD = 31.35 vs. $M_{time\text{-}first}$ = 53.45, SD = 28.30; $F(1, 212) = 2.38$, p = .125

Time spent on waiting page (seconds)

$M_{control}$ = 42.32, SD = 81.10 vs. $M_{time\text{-}first}$ = 49.12, SD = 81.16; $F < 1$

Ancillary scoring measures

Minimum qualification

Percent of participants meeting the minimum requirement on the *last* task (obtaining at least two correct answers): Control 57%, Time-first 65%; $b =$, Wald $\chi^2(1) = .32$, $p = .258$

Percent of participants meeting the minimum requirement (obtaining at least 10 correct answers on each task): Control 54%, Time-first 63%; $b = .34$, Wald $\chi^2(1) = 1.84$, $p = .175$, OR = 1.46

Final scores

Final scores on the last task: Control Mdn = 0, Time-first Mdn = 20; Mann-Whitney $U = 6389$, $p = .099$

Final scores across all tasks: Control Mdn = 0, Time-first Mdn = 60; Mann-Whitney $U = 6190$, $p = .264$

Lottery qualification

Percent of participants who qualified for the bonus lottery by earning scores in the top 20% (> = 100 points): Control 21%, Time-first 23%; $b = .07$, Wald $\chi^2(1) = .04$, $p = .843$

Time budgeting measures

Time spent on time budgeting page (seconds)

$M = 35.48$, SD = 19.93

Time allocated to each task (minutes):

- Transcription: $M = 2.23$, SD = .64
- Spelling: $M = 2.18$, SD = .58
- Math: $M = 2.60$, SD = .73

Regression of time allocated on time spent for each task

- Transcription: β = .13, $t(100)$ = 1.32, p = .190
- Spelling: β = .11, $t(100)$ = 1.08, p = .283
- Math: β = -.05, $t(100)$ = -.04, p = .643

Exclusions

Percent of participants subject to exclusions, by condition: Control, n = 3, Time-first n = 6; $\chi^2(1) = 1.25$, p = .264

References

Ariely, Dan and Klaus Wertenbroch (2002), "Procrastination, Deadlines, and Performance: Self-Control by Precommitment," *Psychological Science*, 13(3), 219–24.

Bagozzi, Richard P. and Utpal Dholakia (1999), "Goal Setting and Goal Striving in Consumer Behavior," *Journal of Marketing*, 63, 19–32.

Ball, Christopher T., Harvey J. Langholtz, Jaqueline Auble, and Barron Sopchak (1998), "Resource-Allocation Strategies: A Verbal Protocol Analysis," *Organizational Behavior and Human Decision Processes*, 76(1), 70–88.

Bandura, Albert and Edwin A. Locke (2003), "Negative Self-Efficacy and Goal Effects Revisited," *Journal of Applied Psychology*, 88(1), 87–99.

Brunstein, Joachim C. (1993), "Personal Goals and Subjective Well-Being: A Longitudinal Study," *Journal of Personality and Social Psychology*, 65(5), 1061–70.

Buehler, Roger, Dale Griffin, and Michael Ross (1994), "Exploring the Planning Fallacy–Why People Underestimate Their Task Completion Times," *Journal of Personality and Social Psychology*, 67(3), 366–81.

Buehler, Roger, Dale Griffin, and Michael Ross (2002), "Inside the Planning Fallacy: The Causes and Consequences of Optimistic Time Predictions," in *Heuristics and Biases the Psychology of Intuitive Judgment*, eds. Thomas Gilovich, Dale Griffin, and Daniel Kahneman, New York, 250–70.

Bureau of Labor Statistics, U.S. Department of Labor (2017), "American Time Use Survey," retrieved from https://www.bls.gov/news.release/pdf/atus.pdf

Cannon, Christopher, Kelly Goldsmith, and Caroline Roux (2019), "A Self-Regulatory Model of Resource Scarcity," *Journal of Consumer Psychology*, 29(1), 104–27.

Cheema, Amar and Dilip Soman (2008), "The Effect of Partitions on Controlling Consumption," *Journal of Marketing Research*, 45 (6), 665–75.

Cheema, Amar and Dilip Soman (2006), "Malleable Mental Accounting: The Effect of Flexibility on the Justification of Attractive Spending and Consumption Decisions," *Journal of Consumer Psychology*, 16 (1), 33–44.

Dalton, Amy N. and Stephen A. Spiller (2012), "Too Much of a Good Thing: The Benefits of Implementation Intentions Depend on the Number of Goals," *Journal of Consumer Research*, 39(3), 600–614.

Donovan, John J. and Kevin J. Williams (2003), "Missing the Mark: Effects of Time and Causal Attributions on Goal Revision in Response to Goal-Performance Discrepancies," *Journal of Applied Psychology*, 88(3), 379–90.

Drèze, Xavier and Joseph C. Nunes (2011), "Recurring Goals and Learning: The Impact of Successful Reward Attainment on Purchase Behavior," *Journal of Marketing Research*, 48(2), 268–81.

Erez, Miriam, Daniel Gopher, and Nira Arzi (1990), "Effects of Goal Difficulty, Self-Set Goals, and Monetary Rewards on Dual Task-Performance," *Organizational Behavior and Human Decision Processes*, 47(2), 247–69.

Etkin, Jordan (2019), "Time in Relation to Goals," *Current Opinion in Psychology*, 26, 32–36.

Etkin, Jordan, Ioannis Evangelidis, and Jennifer Aaker (2015), "Pressed For Time? Goal Conflict Shapes How Time is Perceived, Spent, and Valued," *Journal of Marketing Research*, 52(3), 394–406.

Etkin, Jordan and Sarah A. Memmi (2020), "Goal Conflict Encourages Work and Discourages Leisure," *Journal of Consumer Research*, forthcoming.

Fernbach, Philip, Christina Kan, and John G. Lynch Jr. (2015), "Squeezed: Coping with Constraint Through Efficiency and Prioritization," *Journal of Consumer Research*, 41(5), 1204–27.

Frederick, Shane, Nathan Novemsky, Jing Wang, Ravi Dhar, and Stephen Nowlis (2009), "Opportunity Cost Neglect," *Journal of Consumer Research*, 36(4), 553–61.

Garbinsky, Emily N., Carey K Morewedge, and Baba Shiv (2014), "Interference of the End," *Psychological Science*, 25 (7), 1466–74.

Geers, Andrew L, Justin A. Wellman, and G. Daniel Lassiter (2009), "Dispositional Optimism and Engagement: The Moderating Influence of Goal Prioritization," *Journal of Personality and Social Psychology*, 96(4), 913–32.

Gershuny, Jonathan (2005), "Busyness as the badge of honor for the new superordinate working class," *Social Research*, 72(2), 287–314.

Gig Economy Data Hub (2020), "How Many Gig Workers Are There?" published by the Cornell University ILR School and the Aspen Institute, retrieved from https://www.gigeconomydata.org/basics/how-many-gig-workers-are-there

Gollwitzer, Peter M. (1999), "Implementation Intentions: Strong Effects of Simple Plans," *American Psychologist*, 54(7), 493–503.

Hayes, Andrew F. (2018), *Introduction to Mediation, Moderation, and Conditional Process Analysis*, New York: Guilford Press.

Heath, Chip and Jack B. Soll (1996), "Mental Budgeting and Consumer Decisions," *Journal of Consumer Research*, 23(1), 40–52.

Heath, Chip, Rick P. Larrick, and George Wu (1999), "Goals as Reference Points," *Cognitive Psychology*, 38(1), 79–109.

Hofmann, Wilhelm, Kathleen D. Vohs, and Roy F. Baumeister (2012), "What People Desire, Feel Conflicted About, and Try to Resist in Everyday Life," *Psychological Science*, 23(6), 582–88.

Hsee, Christopher K., Adelle X. Yang, and Liangyan Wang (2010), "Idleness Aversion and the Need for Justifiable Busyness," *Psychological Science*, 21(7), 926–30.

Hsee, Christopher K., Jiao Zhang, Cindy F. Cai, and Shirley Zhang (2013), "Overearning," *Psychological Science*, 24(6), 852–59.

Jhang, Ji Hoon and John G. Lynch Jr. (2014), "Pardon the Interruption: Goal Proximity, Perceived Spare Time, and Impatience," *Journal of Consumer Research*, 41(5), 1267–83.

Kahneman, Daniel, Barbara L Fredrickson, Charles A Schreiber, and Donald A Redelmeier (1993), "When More Pain Is Preferred to Less: Adding a Better End," *Psychological Science*, 4(6), 401–5.

Kahneman, Daniel and Amos Tversky (1977), "Intuitive Prediction: Biases and Corrective Procedures," *Advanced Decision Technology*.

Kahneman, Daniel and Amos Tversky (1984), "Choices, Values, and Frames," *American Psychologist*, 39(4), 341–50.

Kan, Christina, John Lynch, and Philip Fernbach (2015), "How Budgeting Helps Consumers Achieve Financial Goals," in NA - Advances in Consumer Research Volume 43, eds. Kristin Diehl and Carolyn Yoon, Duluth, MN: Association for Consumer Research, 74–79.

Kernan, Mary C. and Robert G. Lord (1990), "Effects of Valence, Expectancies, and Goal Performance Discrepancies in Single and Multiple Goal Environments," *Journal of Applied Psychology*, 75(2), 194–203.

Krishnamurthy, Parthasarathy and Sonja Prokopec (2010), "Resisting That Triple-Chocolate Cake: Mental Budgets and Self-Control," *Journal of Consumer Research*, 37(1), 68–79.

Kruger, Justin and Matt Evans (2004), "If You Don't Want to Be Late, Enumerate: Unpacking Reduces the Planning Fallacy," *Journal of Experimental Social Psychology*, 40(5), 586–98.

Lewin, Kurt, Tamara Dumbo, Leon Festinger, and Pauline S. Sears (1944), "Level of Aspiration," in *Personality and the Behavior Disorders*, ed. Joseph McVicker Hunt, Oxford, England, 333–78.

Locke, Edwin A. and Gary P. Latham (1990), *A Theory of Goal Setting*, Englewood Cliffs, NJ: Simon & Schuster.

Locke, Edwin A. and Gary P. Latham (2002), "Building a Practically Useful Theory of Goal Setting and Task Motivation," *The American psychologist*, 57(9), 705–17.

Locke, Edwin A. and Gary P. Latham, Eds. (2013), *New Developments in Goal Setting and Task Performance*, New York: Routledge.

Locke, Edwin A., Lise M. Saari, Karyll N. Shaw, and Gary P. Latham (1981), "Goal Setting and Task-Performance - 1969-1980," *Psychological Bulletin*, 90(1), 125–52.

Lynch, John G., Jr., Richard G. Netemeyer, Stephen A. Spiller, and Alessandra Zammit (2010), "A Generalizable Scale of Propensity to Plan: the Long and the Short of Planning for Time and for Money," *Journal of Consumer Research*, 37(1), 108–28.

Mateyka, Peter J, Melanie A. Rapino, and Liana Christin Landivar (2012), "Home-Based Workers in the United States: 2010" (U.S. Census Bureau Report No. P70-132), retrieved from https://www.census.gov/library/publications/2012/demo/p70-132.html

Meyvis, Tom and Stijn M. J. Van Osselaer (2018), "Increasing the Power of Your Study by Increasing the Effect Size," *Journal of Consumer Research*, 44, 1157–73.

Mishra, Himanshu, Arul Mishra, Jessica Rixom, and Promothesh Chatterjee (2013), "Influence of Motivated Reasoning on Saving and Spending Decisions," *Organizational Behavior and Human Decision Processes*, 121(1), 13–23.

Mogilner, Cassie, Zoe Chance, and Michael I. Norton (2012), "Giving Time Gives You Time," *Psychological Science*, 23 (10), 1233-8.

Morewedge, Carey K., Leif Holtzman, and Nicholas Epley (2007), "Unfixed Resources: Perceived Costs, Consumption, and the Accessible Account Effect," *Journal of Consumer Research*, 34(4), 459–67.

Orehek, Edward and Anna Vazeou-Nieuwenhuis (2013), "Sequential and Concurrent Strategies of Multiple Goal Pursuit," *Review of General Psychology*, 17(3), 339–49.

Peetz, Johanna and Roger Buehler (2009), "Is There a Budget Fallacy? The Role of Savings Goals in the Prediction of Personal Spending," *Personality and Social Psychology Bulletin*, 35(12), 1579–91.

Putnam-Farr, Eleanor and Anastasiya Pocheptsova Ghosh (2020), "How Spending Categorization Impacts Budget Optimism and Likelihood of Success," *Manuscript under review*.

Plantinga, Arnoud, Job M. T. Krijnen, Marcel Zeelenberg, and Seger M. Breugelmans (2017), "Evidence for Opportunity Cost Neglect in the Poor," *Journal of Behavioral Decision Making*, 31(1), 65–73.

Polivy, Janet and C. Peter Herman (2002), "If at First You Don't Succeed," *American Psychologist*, 57(9), 677–89.

Redelmeier, Donald A. and Daniel Kahneman (1996), "Patients' Memories of Painful Medical Treatments: Real-Time and Retrospective Evaluations of Two Minimally Invasive Procedures," *Pain*, 66 (1), 3–8.

Reich, John W. and Alex Zautra (1981), "Life Events and Personal Causation: Some Relationships With Satisfaction and Distress," *Journal of Personality and Social Psychology*, 41(5), 1002–12.

Sackett, Aaron M., George Wu, Rebecca J. White, and Alex B. Markle (2014), "Harnessing Optimism: How Eliciting Goals Improves Performance," *SSRN Electronic Journal*, 1–24.

Saini, Ritesh and Ashwani Monga (2008), "How I Decide Depends on What I Spend: Use of Heuristics Is Greater for Time than for Money," *Journal of Consumer Research*, 34(6), 914–22.

Savitsky, Kenneth, Leaf Van Boven, Nicholas Epley, and Wayne M. Wight (2005), "The Unpacking Effect in Allocations of Responsibility for Group Tasks," *Journal of Experimental Social Psychology*, 41(5), 447–57.

Schmidt, Aaron M. and Chad M. Dolis (2009), "Something's Got to Give: The Effects of Dual-Goal Difficulty, Goal Progress, and Expectancies on Resource Allocation," *Journal of Applied Psychology*, 94(3), 678–91.

Schmid, Aaron M., Chad M. Dolis, and Adam P. Tolli (2009), "A Matter of Time: Individual Differences, Contextual Dynamics, and Goal Progress Effects on Multiple-Goal Self-Regulation," *Journal of Applied Psychology*, 94(3), 692–709.

Shaddy, Franklin and Ayelet Fishbach (2018), "Eyes on the Prize: The Preference to Invest Resources in Goals over Means," *Journal of Personality and Social Psychology*, 115(4), 624–37.

Shah, Anuj K., Eldar Shafir, and Sendhil Mullainathan (2015), "Scarcity Frames Value," *Psychological Science*, 26(4), 402–12.

Shah, Anuj K., Sendhil Mullainathan, and Eldar Shafir (2012), "Some Consequences of Having Too Little," *Science*, 338(6107), 682–85.

Sharif, Marissa A. and Suzanne B. Shu (2017), "The Benefits of Emergency Reserves: Greater Preference and Persistence for Goals That Have Slack with a Cost," *Journal of Marketing Research*, 54(3), 495–509.

Sharot, Tali (2011), "The Optimism Bias," *Current Biology*, 21(23), R941–45.

Sheehan, Daniel and Koert Van Ittersum (2018), "In-Store Spending Dynamics: How Budgets Invert Relative-Spending Patterns," *Journal of Consumer Research*, 45(1), 49–67.

Sirois, Fuschia M. (2014), "Absorbed in the Moment? An Investigation of Procrastination, Absorption and Cognitive Failures," *Personality and Individual Differences*, 71(C), 30–34.

Soman, Dilip (2001), "The Mental Accounting of Sunk Time Costs: Why Time Is Not Like Money," *Journal of Behavioral Decision Making*, 14(3), 169–85.

Soman, Dilip and Amar Cheema (2011), "Earmarking and Partitioning: Increasing Saving by Low-Income Households," *Journal of Marketing Research*, 48(SPL), S14–S22.

Spiller, Stephen A. (2011), "Opportunity Cost Consideration," *Journal of Consumer Research*, 38(4), 595–610.

Spiller, Stephen A. (2019), "Opportunity Cost Neglect and Consideration in the Domain of Time," *Current Opinion in Psychology*, 26, 98–102.

Stilley, Karen M., J. Jeffrey Inman, and Kirk L. Wakefield (2010), "Planning to Make Unplanned Purchases? The Role of In-Store Slack in Budget Deviation," *Journal of Consumer Research*, 37(2), 264–78.

Sun, Shu Hua and Michael Frese (2013), "Multiple Goal Pursuit," in *New Developments in Goal Setting and Task Performance*, eds. Edwin A. Locke and Gary P. Latham, New York: Routledge.

Sussman, Abigail B. and Adam L. Alter (2012), "The Exception Is the Rule: Underestimating and Overspending on Exceptional Expenses," *Journal of Consumer Research*, 39(4), 800–814.

Sussman, Abigail B. and Rourke L. O'Brien (2015), "Knowing When to Spend: Unintended Financial Consequences of Earmarking to Encourage Savings," *Journal of Marketing Research*, 53(5), 790–803.

Tanner, Robin J. and Kurt A. Carlson (2009), "Unrealistically Optimistic Consumers: A Selective Hypothesis Testing Account for Optimism in Predictions of Future Behavior," *Journal of Consumer Research*, 35(5), 810–22.

Thaler, Richard (1980), "Toward a Positive Theory of Consumer Choice," *Journal of Economic Behavior & Organization*, 1, 39–60.

Thaler, Richard H. (1999), "Mental Accounting Matters," *Journal of Behavioral Decision Making*, 12(3), 183–206.

Thaler, Richard (1985), "Mental Accounting and Consumer Choice," *Marketing Science*, 4(3), 199–214.

Tinsley, Howard E. A. and Barbara D Eldredge (1995), "Psychological Benefits of Leisure Participation: A Taxonomy of Leisure Activities Based on Their Need-Gratifying Properties," *Journal of Counseling Psychology*, 42(2), 123.

Tonietto, Gabriela N. and Selin A. Malkoc (2016), "The Calendar Mindset: Scheduling Takes the Fun Out and Puts the Work in," *Journal of Marketing Research*, 53(6), 922–36.

Tonietto, Gabriela N., Selin A. Malkoc, and Stephen M. Nowlis (2019), "When an Hour Feels Shorter: Future Boundary Tasks Alter Consumption by Contracting Time," *Journal of Consumer Research*, 45(5), 1085–1102.

Tu, Yanping and Dilip Soman (2014), "The Categorization of Time and Its Impact on Task Initiation," *Journal of Consumer Research*, 41(3), 810–22.

Tversky, Amos and Derek J. Koehler (1994), "Support Theory: A Nonextensional Representation of Subjective Probability," *Psychological Review*, 101(4), 547–67.

Ülkümen, Gülden, Manoj Thomas, and Vicki G. Morwitz (2008), "Will I Spend More in 12 Months or a Year? the Effect of Ease of Estimation and Confidence on Budget Estimates," *Journal of Consumer Research*, 35(2), 245–56.

Van Boven, Leaf and Nicholas Epley (2003), "The Unpacking Effect in Evaluative Judgments: When the Whole Is Less Than the Sum of Its Parts," *Journal of Experimental Social Psychology*, 39(3), 263–69.

Wallace, Scott G. and Jordan Etkin (2018), "How Goal Specificity Shapes Motivation: A Reference Points Perspective," *Journal of Consumer Research*, 44(5), 1033–51.

Wang, Chen and Anirban Mukhopadhyay (2012), "The Dynamics of Goal Revision: a Cybernetic Multiperiod Test-Operate-Test-Adjust-Loop (TOTAL) Model of Self-Regulation," *Journal of Consumer Research*, 38(5), 815–32.

Weingarten, Evan, Sudeep Bhatia, and Barbara Mellers (2018), "Multiple Goals as Reference Points: One Failure Makes Everything Else Feel Worse," *Management Science*, 1–18.

Wilson, Timothy D., Thalia Wheatley, Jonathan M. Meyers, Daniel T. Gilbert, and Danny Axsom (2000), "Focalism: A Source of Durability Bias in Affective Forecasting," *Journal of Personality and Social Psychology*, 78(5), 821–36.

Zauberman, Gal and John Lynch (2005), "Resource Slack and Propensity to Discount Delayed Investments of Time Versus Money," *Journal of Experimental Psychology: General*, 134(1), 23–37.

Zhang, Ying and Szu-Chi Huang (2010), "How endowed versus earned progress affects consumer goal commitment and motivation," *Journal of Consumer Research*, 37(4), 641–54.

Biography

Sarah Memmi was born and grew up in southern Vermont. She received her BA from the University of Vermont, where she graduated with honors, magna cum laude, and Phi Beta Kappa. She majored in English literature and minored in Italian language and literature. While pursuing a career in marketing communications, she discovered behavioral science via her lifelong passion for horses and animal training. In 2014, she began graduate studies at Duke University in Durham, North Carolina, where she earned a PhD in marketing. Her research focuses on the relationship between consumers' goals and personal resources (such as time, money, and social support). She has published the following academic articles: "Goal Conflict Encourages Work and Discourages Leisure," in the *Journal of Consumer Research* (2020) with Jordan Etkin, and "Emotions and Intentions are Understood from Biological Motion Across Remote Cultures," in *Emotion* (2017) with Carolyn Parkinson, Trent Walker, and Thalia Wheatley. In fall 2020, she will join the University of Louisville as an assistant professor of marketing, with an affiliation in the Equine Industry Program.