Will I Spend More in 12 Months or a Year? The Effect of Ease of Estimation and Confidence on Budget Estimates

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Consumers' budgets are influenced by the temporal frame used for the budget period. Budgets planned for the next month are much lower than recorded expenses, while those for the next year are closer to recorded expenses (study 1). The difficulty of estimating budgets for the next year imparts low confidence and leads to upward adjustment. When consumers' confidence in their estimates is increased (study 2), when their natural beliefs about the relationship between cognitive ease and accuracy are reversed (study 3), or when cognitive resources are constrained (study 4), consumers no longer adjust their budgets upward for the next year.

When consumers plan their future spending, they often set budget limits for themselves. Budgeting involves creating distinct expense categories, earmarking money for the relevant fiscal period, and tracking expenses across these limits. Budgeting enables consumers to evaluate the affordability of goods and to allocate expenses among different categories (Heath and Soll 1996; Kivetz and Simonson 2002; Schelling 1992; Thaler and Shefrin 1981) and influences consumers' estimates of their disposable income (Heath 1995; Heath and Soll 1996; Thaler 1999). Since perceived disposable income is highly correlated with consumer confidence and spending (Hall and Mishkin 1982; Okun et al. 1971; Tobin and Dolde 1971), budgets have a direct and substantial influence on consumer spending.

Despite the importance of budgeting for consumers, our knowledge about the budgeting process is limited. Recent research in mental budgeting has revealed how consumers perceive and categorize expenses vis-à-vis their budgets (Cheema and Soman 2006; Soman and Cheema 2001; Thaler and Johnson 1990). However, it is still not clear how consumers set their budgets. In this article, we examine the psychological mechanisms that underlie this budget-setting process. In particular, we investigate how and why budget estimates vary with the duration of the budget period. For any given budgeting task, consumers could use several different temporal frames, such as the next day, the coming month, or the coming year. Normatively, the temporal frame should not affect the magnitude of budget estimates; that is, under normal circumstances, if a decision maker is estimating her budget for the next year, this amount should be equal to approximately 12 times her average monthly budget estimate. However, different temporal frames can lead to differences in judgments and decisions (Buehler and Griffin 2003; Chandran and Menon 2004; Gourville 1998; Read, Loewenstein, and Rabin 1999). Our interest specifically is in examining whether framing the budget period as the next month or the next year changes unitized budget estimates.

The question, whether the temporal frame will affect unitized budget estimates, is of substantive practical importance. Several financial and credit counselors urge consumers to keep budgets on a monthly basis (e.g., Barra 2002; Lawrence

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2004). For example, financial counselors at a large American university advise students that "a monthly budget is preferable to semester or yearly budget."[1] However, the validity of these recommendations has never been empirically tested.

Framing the budget period as the next month or as the next year could have one of three possible and equally plausible effects on budget estimates. First, budgets could be temporal-frame invariant. That is, after unitizing the estimates to a common basis, we may observe no differences between estimates made under month and year frames. Second, budgets estimated in the year frame could be lower than those estimated in the month frame. Research has shown that people overestimate the length of short intervals like a month and underestimate the length of long intervals like a year (Hornik 1986; Underwood 1977) and that these biases in time perception in turn influence their buying plans (Morwitz 1997). If this bias in time perception also affects consumers' budgets, then their estimates of their annual budgets could be lower than the estimates for their monthly budgets. Third, budget estimates in the year frame could be higher than the estimates in the month frame. This could occur if people are more uncertain about their annual expenses and, consequently, they cushion their annual budgets with larger buffers.

We conducted a pilot study in order to examine whether monthly budget estimates are the same as, lower than, or higher than unitized annual estimates. One hundred and ninety-seven individuals who varied in their income levels, whether they were students or working full time, and their years of work experience were randomly assigned to estimate their budgets for either the next month or the next year. We divided the budget estimates in the "next year" condition by 12 in order to make these responses comparable with those in the "next month" condition. (From this point forward, all budget estimates will be reported on a monthly basis to ensure comparability between month and year conditions.) The results show that the temporal framing of the budget period does influence the magnitude of budget estimates. The unitized budget estimates were significantly lower for next month than for next year budgets ($M_{\text{nextmo}} = \$1{,}732$, $M_{\text{nextyr}} = \$2{,}594$; $F(1, 195) = 16.28$, $p = .00$) in aggregate and also when we look separately at students and working individuals as well as individuals at different income levels. To gain some insight into the underlying process, participants were asked to also indicate the ease of estimating the budget and their confidence in the budget. Participants found it easier to estimate their budgets for the next month than for the next year ($M_{\text{nextmo}} = 3.22$, $M_{\text{nextyr}} = 4.11$; $F(1, 195) = 12.55$, $p = .00$) and were more confident that they included all necessary expenditures in their budget estimate for the next month than for the next year ($M_{\text{nextmo}} = 4.70$, $M_{\text{nextyr}} = 3.68$; $F(1, 195) = 14.59$, $p = .00$).

Why were the estimates in the next year condition higher than those in the next month condition? What roles do ease of estimation and confidence play in the budgeting process? We believe that the answers to these questions will offer novel insights into the psychological mechanisms that underlie the budgeting process. Therefore, we oriented the conceptualization of this research and the design of our experiments to answer these questions.

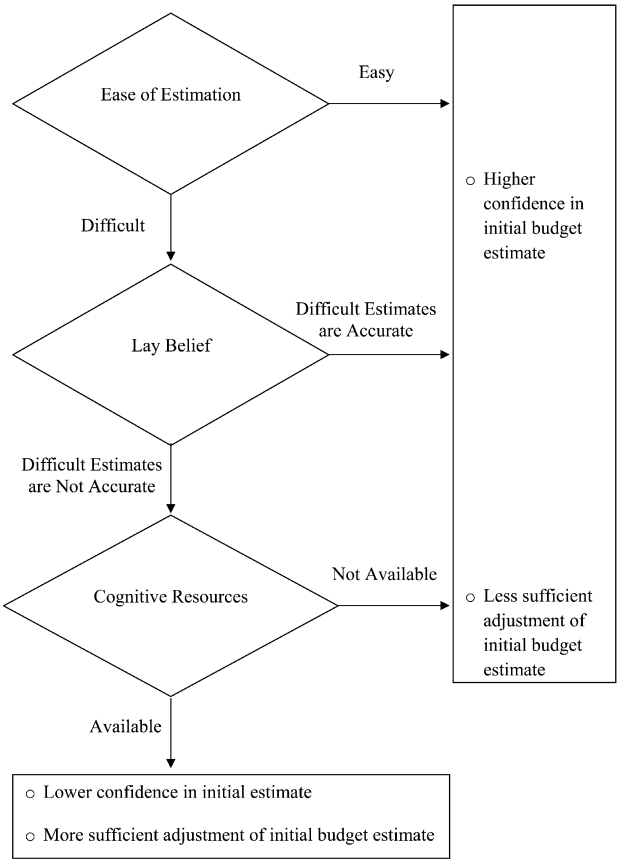
[1] See http://www.villanova.edu/enroll/finaid/debt.

CONCEPTUAL FRAMEWORK

We postulate that the budget-estimation process entails two steps: activation of an initial budget estimate and subsequent adjustment from this estimate. As depicted in figure 1, the accuracy of the final budget will depend on the amount of adjustment, which we in turn posit depends on the confidence associated with the initial budget. We suggest that this feeling of confidence is based on people's subjective interpretation of the metacognitive experience caused by the budgeting process. The conceptualization of the budgeting process depicted in figure 1 leads us to the ironic hypothesis that lack of confidence can lead to more accurate budgets. In the following sections, we discuss the basis for this hypothesis and draw on findings from previous research to develop our conceptual framework.

FIGURE 1

BUDGET-ESTIMATION PROCESS



Confidence-Induced Adjustment

Research has found that while making numeric estimates, people start with an approximate initial value and then adjust or correct this initial value by mentally simulating possible alternative values (Einhorn and Hogarth 1986; Tversky and Kahneman 1974). Such anchoring and adjustment can occur through one of two distinct types of processes. When anchors are provided externally, they can semantically prime relevant materials in memory and lead to selective accessibility (Chapman and Johnson 1994, 1999; Strack and Mussweiler 1997). Alternatively, when people internally generate anchors, a conscious process of adjustment is observed (Epley and Gilovich 2001, 2004). When estimating their budgets, it is likely that people begin with an approximate dollar amount that readily comes to mind and then adjust from this anchor to arrive at the final estimate. Since in this case the anchor is internally generated, we believe budget estimation is an example of a process that involves conscious adjustment rather than selective accessibility.

The direction of adjustment will depend on consumers' beliefs about the direction of error in their initial estimate (Wegener and Petty 1995). If consumers believe that initial estimates are likely to be lower (higher) than actual values, then they will be adjusted upward (downward). In the context of budget estimates, we posit that initial budgets will underestimate actual expenses in both the month and year frames. Research on the planning fallacy (Buehler, Griffin, and Ross 1994) and fault trees (Fischhoff, Slovic, and Lichtenstein 1978; Russo and Kolzow 1994) suggests that people are quite insensitive to contingencies and that they fail to incorporate them into their estimates spontaneously. In a similar vein, we argue that initial budgets are underestimated, because consumers fail to retrieve (i) all categories of expenses and (ii) all relevant expenses within these categories. Consumers' feelings that they have not included all necessary expenses may facilitate retrieval of some additional expense categories and more expenses within each category. Further, consumers might realize that some unexpected expenses might come up and therefore adjust their estimates up to accommodate these expenses.

The amount of adjustment from the anchor will depend on consumers' feeling of confidence. Consumers are less likely to correct their initial judgments when they "feel" confident about the accuracy of their initial estimate. Nisbett and Ross (1980) suggest that misplaced confidence often leads to erroneous inferences because such confidence discourages people from revising their initial hypothesis. This literature suggests that the temporal frame could affect the amount of adjustment in the budgeting process due to its effects on confidence. Results from the pilot study are consistent with this suggestion; participants in the year frame not only estimated higher budgets but also were less confident about them.

Ease of Estimation and Lay Beliefs as Determinants of Confidence

Why should consumers' confidence in their budgets change with the temporal frame? Two important factors together determine the level of confidence in budget estimates: ease of estimation and lay beliefs about the relationship between feelings of ease and accuracy. Some elements of the budget-estimation task, such as the level of abstractness or concreteness with which budgets are construed, the number of expense categories considered, and the ease or difficulty associated with recalling past expenses, may vary across different budget periods, making this estimation easier in some frames than in others. For example, it may be quite difficult to generate budget estimates for the next year if consumers have to think of their budgets at an abstract level, generate a large number of expense categories, and remember the previous year's expenses.

However, the effect of ease of estimation on confidence will be contingent on consumers' subjective interpretation of these feelings of ease. In most numerical estimation tasks, confidence is based on a lay belief: answers that come to mind easily are more likely to be correct (Kelley and Lindsay 1993; Nelson and Narens 1990; Simmons and Nelson 2006). In our context, estimating budgets for the next month may impart feelings of ease and make consumers more confident in their estimates, whereas estimating budgets for a year may impart feelings of difficulty and lead to lower confidence. Lower confidence in annual budgets in turn may prompt consumers to adjust their initial estimates. However, monthly budgets associated with higher confidence may be less likely to be adjusted, and when they are, they will be adjusted to a smaller degree.

As depicted in figure 1, the effect of ease of estimation and confidence on final budgets is likely to be moderated by the availability of cognitive resources (Einhorn and Hogarth 1986; Gilbert 2002). The adjustment process has generally been characterized as being a resource-dependent, effortful process (Gilbert 2002; Wilson, Centerbar, and Brekke 2002). Cognitive busyness studies (e.g., Gilbert, Pelham, and Krull 1988) have shown that when individuals' cognitive resources are diverted to some other task, they are unable to adjust their initial estimates. Therefore, consumers should be able to adjust their budgets only when they have sufficient cognitive resources.

Several interesting and insightful predictions emerge from this conceptualization. First, since lack of confidence triggers the adjustment process, any factor that increases the confidence in the year frame should reduce the adjustment. Second, if confidence originates from lay beliefs about the association between feelings of ease and estimation accuracy, then manipulating this lay belief should influence the effect of temporal frames on the adjustment process. Third, if this adjustment is resource dependent, any factor that reduces the amount of cognitive resources available should hinder consumers' ability to adjust budget estimates.

Outline of the Studies

We conducted a series of experiments to test these predictions. In study 1, we examine whether next month or next year budget estimates are closer to recorded diary expenses. In study 2, we manipulate participants' confidence in their estimates to test the hypothesis that confidence moderates the effect of temporal framing on budget estimates. In study 3, by manipulating participants' lay beliefs about the accuracy of easily generated estimates, we examine whether the cognitive interpretation of feelings of ease is a source of confidence in budgeting. To test whether the adjustment process is resource dependent, in study 4 we manipulate cognitive load.

STUDY 1: THE DIARY STUDY

The pilot study discussed in the preceding section demonstrated that budgets estimated in the year frame are larger than those estimated in the month frame, even after unitizing the estimates to a comparable basis. However, it was not evident whether the large disparity between the estimates was due to overestimation of the next year's budget and/or underestimation of the next month's budget. To address this question, in this study we asked participants to keep a diary of their expenses during a one-week period. Subsequently, we compared participants' unitized budget estimates with their unitized recorded expenses.

A second objective of this study was to test whether these effects occurred even for uniformly recurring expense categories such as food and entertainment and even when we held the number and nature of the categories constant. In the pilot study, the differences we observed in total budget estimates could be caused by some expense categories that are typically associated with annual but not monthly budgets, such as gifts or vacation. Although participants may consider a greater number of expense categories for the annual budgets compared to the monthly budgets, we expect that these year-specific expenses are not the main reason for the observed discrepancy between monthly and annual budgets. In this study, we control for the number and nature of the expense categories considered.

Method

Participants and Design. Eighty-seven undergraduate students participated in this three-part study in exchange for partial course credit. The first and third parts of the study were administered in a classroom setting, whereas the second part entailed participants keeping a diary of their food and entertainment expenses during a specified one-week period. We chose these two categories because they were most commonly mentioned by participants in a pretest. Analysis of the open-ended responses from the pretest suggested that all participants listed food as one of their expense categories, and 86% included some form of entertainment (e.g., partying) in their list. Temporal frame was manipulated between subjects; half the participants were randomly assigned to the next month condition while the other half were assigned to the next year condition. The order of category was also manipulated such that half the participants gave their entertainment expenses first, while the other half gave their food expenses first. Since neither the main effect nor the interaction effects of this order manipulation reached significance ($F < 1$) we do not consider this factor in the analyses.

Procedure

The study comprised three stages. In the first stage, all participants provided their food and entertainment budgets either for the next month or for the next year. After handing in their questionnaires, they received the diary booklet, in which they recorded the dollar amount, time, and a brief description of each food and entertainment expense they incurred for one week. One week later, in the final stage, participants handed in their diaries and were asked to once again estimate their food and entertainment budgets for the following period for the same time frame as in stage 1. Our intent was to examine whether making the past week's expenses salient by keeping expense diaries would eliminate the effect of temporal frame and improve estimation accuracy. We then asked participants to recall how much they actually spent during the time they kept the diary. Our intent was to determine whether any observed deviations between budgets and actual expenditures were due to lack of awareness of actual expenditures. Finally, participants were debriefed and thanked for their participation.

Results

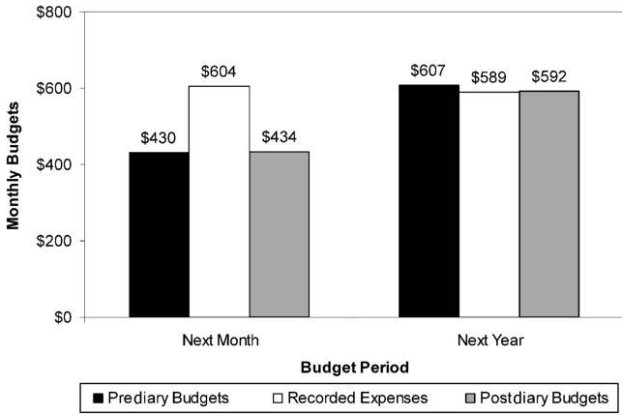
All budgets were converted to monthly figures before the analyses through simple linear transformations (next year budgets were divided by 12, and weekly expenses were multiplied by 52 and divided by 12). The data from this experiment were submitted to a 2 (temporal frame: next month, next year) × 3 (estimate type: prediary estimate, recorded expense, postdiary estimate) mixed-factorial ANOVA. The data were also analyzed for food and entertainment expenses separately by incorporating expense category (food vs. entertainment) as a repeated-measures variable in ANOVA. Since none of the interactions reached significance, we report only the results for the total estimates. These results are presented in figure 2.

The two-way interaction between temporal frame and expense type was significant ($F(2, 172) = 2.99, p = .05$). The temporal-frame manipulation affected only the budgets and not the recorded expenses. Consistent with the results from the pilot study, the prediary budget estimates by participants in the next month frame were significantly lower than those in the next year frame ($M_{\text{nextmo}} = \$430$, $M_{\text{nextyr}} = \$607$; $F(1, 84) = 5.30$, $p = .02$). However, the temporal manipulation did not affect the expenses recorded in the diary ($M_{\text{nextmo}} = \$604$, $M_{\text{nextyr}} = \$589$; $F(1, 84) = 0.12$, $p = .73$).

We also compared the prediary budgets with the expenses

FIGURE 2

STUDY 1: BUDGET ESTIMATES AND RECORDED EXPENSES ACROSS MONTH AND YEAR FRAMES



NOTE.—All expenses were converted to a monthly basis. Budgets were estimated for food and entertainment expenses.

that participants reported incurring during the one-week diary period. When the budget period was framed as next year, there was no significant difference between estimated prediary budgets and recorded expenses (M_{est} = \$607, M_{rec} = \$589; $F(1, 172) = 0.06$, $p = .81$). However, when the budget period was framed as next month, participants significantly underestimated these expenditures (M_{est} = \$430, M_{rec} = \$604; $F(1, 172) = 11.62$, $p = .00$). These data show that annual budgets were closer to recorded expenses, whereas monthly budgets underestimated recorded expenses.

In order to see whether keeping a diary helped reduce the amount of underbudgeting in the month condition, we compared the recorded expenses with the postdiary budgets. Surprisingly, keeping an expense diary did not reduce the discrepancy between budgets and recorded expenses for those in the month frame. Specifically, when the budget period was framed as next year, there was no significant difference between recorded and estimated postdiary budgets (M_{est} = \$592, M_{rec} = \$589; $F(1, 172) = 0.46$, $p = .49$). However, when the budget period was framed as next month, participants still underestimated their expenditures (M_{est} = \$434, M_{rec} = \$604; $F(1, 172) = 12.69$, $p = .00$). These results indicate that keeping an expense diary did not alleviate the underestimation in the next month frame (see fig. 2).

In the third part of the diary study, after handing in their diaries, participants were also asked to recall their actual food and entertainment expenditures during the one-week period in which they kept the diary. Recalled expenses were not significantly different from recorded expenses (M_{nextmo} = \$549, M_{nextyr} = \$623; $F(1, 78) = .64$, $p = .48$) in aggregate and in each of the two conditions. It appears that participants were aware of their actual expenditures and could correctly recall them. However, participants in the next month condition did not appear to use this information correctly for making budget estimates for the following period.

Discussion

Intuitively, one would expect to find a smaller difference between the recorded expenses and the budget estimates for the next month compared to those for the next year. However, our results suggest the opposite: budgets estimated in the next year frame were closer to recorded expenses, whereas budgets in the next month frame were underestimated. What could be the reason behind this counterintuitive finding? As with other estimation tasks, we suggest that in a budgeting task, decision makers start with an initial estimate and then adjust their estimate until they are confident that the adjusted estimate is close enough to the actual expense. Because in this context we expect the initial estimate to be lower than the actual expense, if decision makers do not adjust their initial estimates sufficiently, they will underestimate their expenses. Data from the present experiment suggest that decision makers in the year frame, due to the uncertainty associated with the year frame, make large adjustments to their initial estimate, which result in larger budgets, closer to recorded expenses. Decision makers in the month frame, in contrast, fail to make the required adjustments and consequently underestimate their expenses. So, paradoxically, the high confidence experienced in the month frame increases the discrepancy between recorded expenses and budget estimates.

The phenomenon under scrutiny, therefore, seems to be similar to the overconfidence and feeling-of-knowing effects discussed in the psychological literature. It has been shown that feeling-of-knowing dissuades participants from systematically processing numerical problems (Reder and Ritter 1992), induces complacency in new-product learning (Wood and Lynch 2002), and discourages people from making exhaustive searches (Nisbett and Ross 1980). Our results are also consistent with past findings on the divergence between confidence and accuracy (see Einhorn and Hogarth 1978; Fischhoff, Slovic, and Lichtenstein 1986).

Participants' open-ended responses collected during the debriefing exercise support the notion that those in the year frame adjust their initial estimate upward. When asked to describe how they arrived at their budget estimates, all participants mentioned that they added their main food and entertainment expenses. Moreover, participants in the next year condition frequently mentioned that on top of this sum, they added a lump sum amount that they called "room for error," "hidden costs," "unknown expenses," "extra things," or "buffer amount." Participants in the next year condition seemed to anticipate making some unexpected expenses. It is interesting to note that participants in the next month condition did not seem to expect the unexpected and therefore failed to adjust their estimates upward. The three experiments that follow are designed to critically examine this adjustment hypothesis.

STUDY 2: CONFIDENCE MANIPULATION

Our conceptualization and the evidence thus far suggest that the observed phenomenon is due to the lower confidence in the next year frame. If this is true, then increasing participants' confidence in their estimates should moderate the bias induced by temporal framing. We put this proposition to test in this experiment by manipulating participants' confidence in their estimates.

Method

Participants and Design. One hundred and fourteen undergraduate students participated in the study in exchange for partial course credit. The experiment used a 2 × 2 between-subjects design, and participants were randomly assigned to one of the four conditions. The two factors manipulated were temporal frame (next month, next year) and confidence (low, high).

Procedure. Following Maki (1998), we relied on a very simple procedure to manipulate participants' confidence in their estimates. Before making their budget estimate, participants in the low (high) confidence condition were told that the majority of students who have done this task before were quite inaccurate (accurate) in estimating their budget. Participants then provided an estimate of their total budget either for the next month or for the next year.

Results

A 2 (temporal frame: next month, next year) × 2 (confidence: low, high) ANOVA was conducted on the total budget estimates. The main effects of temporal frame and confidence were not significant. However, the two-way interaction between these factors was significant ($F(1, 110) = 4.76$, $p = .03$). In the low-confidence condition, as in the previous studies, the mean budget estimate for the next month was lower than that for the next year ($M_{\text{nextmo}} = \$591$, $M_{\text{nextyr}} = \$1{,}288$; $F(1, 110) = 6.62$, $p = .01$). However, in the high-confidence condition, there was no significant difference between these two cells ($M_{\text{next mo}} = \$882$, $M_{\text{nextyr}} = \$743$; $F(1, 110) = 0.26$, $p = .61$). These results suggest that when participants were led to believe that their estimates were accurate, they did not adjust their budgets upward. The adjustment occurred only when they believed that their estimates were not correct.

It is interesting to note that manipulating confidence had a bigger effect on budget estimates in the year frame than in the month frame. Reassuring participants in the next year condition that their estimates will likely be accurate (vs. inaccurate) led to a significant decrease in budget estimates ($M_{\text{lowconf}} = \$1{,}288, M_{\text{highconf}} = \$743; F(1, 110) = 3.98, p = .05$). In the next month condition, the warning that their estimates will likely be inaccurate (vs. accurate) led to a directional decrease rather than increase in budgets; however, this decrease was not statistically significant ($M_{\text{lowconf}} = \$591$, $M_{\text{highconf}} = \$882$; $F(1, 110) = 1.17$, $p = .28$).

Discussion

Study 2 demonstrates the pivotal role confidence plays in the adjustment process. The adjustment in the annual budgets occurred only when participants lacked confidence in the accuracy of these budgets. Intrigued by the lack of sufficient adjustment in the month frame, we ran another experiment in which we explicitly told participants about the possible direction of the error in their estimates. Before estimating their budgets, participants in the too low (too high) condition were told that the majority of students who have done this task before provided budget estimates that were too low (too high). The results revealed that for participants who were told that their estimates could be too high, there was no significant difference between budgets in the next month and next year frames. However, it is interesting to note that telling participants that their estimates could be too low affected only those who were making estimates for the next year who then gave higher budget estimates. Those who were making monthly budgets continued to provide low estimates.

Together, these results suggest that, unfortunately, reducing the magnitude of adjustment in the year frame seems to be easier than increasing the magnitude of adjustment in the month frame. Note that in these studies, we directly manipulated confidence. A more effective way to increase the amount of adjustment in monthly budgets may be to identify the source of confidence and to manipulate this source. We do this in the next study.

STUDY 3: EASE OF ESTIMATION

People use their metacognitive experiences, that is, the phenomenal experiences or the feelings associated with cognitive processes, as a source of information and interpret their experiences based on their lay beliefs (Schwarz 2004; Schwarz et al. 1991). In the context of budgeting, our hypothesis is that the effect of temporal frame is caused by feelings of confidence, which in turn are based on peoples' interpretations of their ease of budget estimation (see fig. 1). A feeling of difficulty is an indication that the estimate might be inaccurate. In contrast, if the estimation process is easy, then chances are that the estimate will be accurate. This hypothesis assumes that people have beliefs about the relationship between ease and accuracy and that changes in these beliefs will moderate the effect of temporal frames on budgets. In order to test this assumption, in this study we manipulate participants' beliefs about the relationship between ease and accuracy. Prior to the budget-estimation task, half the participants were led to believe that feelings of ease lead to accurate estimates, while the other half were led to believe that feelings of difficulty lead to accurate estimates.

Method

Participants and Design. Seventy-nine undergraduate students participated in this experiment for partial course credit. Participants were randomly assigned to one of the

four conditions of a 2 (temporal frame: next month, next year) × 2 (lay belief: easy-is-accurate, difficult-is-accurate) between-subjects design.

Procedure. The budgeting-task and the temporal-frame manipulations were identical to those in the previous experiment. Using a procedure adopted from Briñol, Petty, and Tormala (2006), before the budgeting task, participants assigned to the ease-is-accurate conditions read the following information:

> Most studies in cognitive psychology indicate that people who are good at an estimation task experience a feeling of ease when they come up with their estimates. Bad estimators, on the other hand, often experience a feeling of difficulty while making their estimates.

In contrast, participants assigned to the difficult-is-accurate conditions read that people who are good at estimation usually experience a feeling of difficulty. After reading this information, participants submitted their budgets for either the next month or the next year.

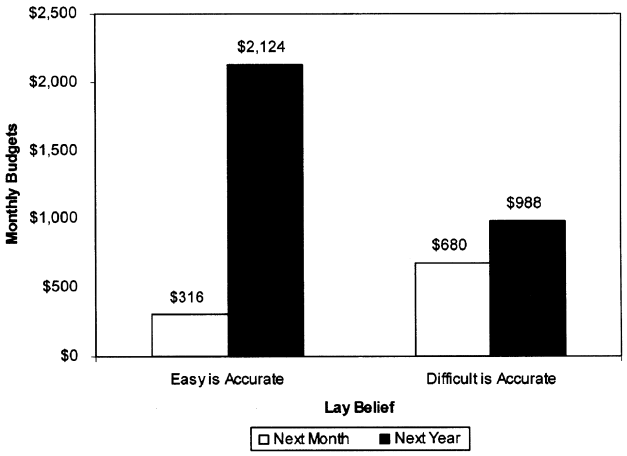
Results

Total Budgets. A 2 (temporal frame: next month, next year) × 2 (lay belief: easy-is-accurate, difficult-is-accurate) ANOVA on total budget estimates revealed a significant main effect of temporal frame ($F(1, 75) = 13.95$, $p = .00$) and a significant two-way interaction ($F(1, 75) = 7.01$, $p = .01$). Budgets for the next year were significantly higher than those for the next month when participants were led to believe that feelings of ease lead to accurate estimates ($M_{\text{next mo}} = \$316$, $M_{\text{next yr}} = \$2{,}124$; $F(1, 75) = 18.02$, $p = .00$; see fig. 3). However, when participants were led to believe that feelings of difficulty lead to accurate estimates, there was no significant difference between next month and next year budgets ($M_{\text{next mo}} = \$680$, $M_{\text{next yr}} = \$988$; $F(1, 75) = 1.21$, $p = .28$).

Participants who provided their budget for the next year—a task that normally imparts feelings of difficulty—felt more confident and therefore did not feel the need to adjust their estimates up and generated lower budget estimates when they were led to believe that feelings of difficulty lead to accurate estimates compared to when they were led to believe that feelings of ease lead to accurate estimates ($F(1, 75) = 5.23$; $p = .03$). More importantly, those who provided their estimate for the next month—a task that normally imparts feelings of ease—felt less confident and therefore adjusted their estimates up and provided higher budget estimates when they were led to believe that feelings of difficulty lead to accurate estimates compared to when they were led to believe that feelings of ease lead to accurate estimates ($F(1, 75) = 10.64$, $p = .00$).

FIGURE 3

STUDY 3: THE EFFECT OF LAY BELIEFS ON BUDGET ESTIMATES ACROSS MONTH AND YEAR FRAMES



Discussion

This experiment reveals that consumers feel more confident about their budget estimates for the next month (vs. next year) because it is easier for them to perform this task, and they misattribute these feelings to the accuracy of their estimates. These results demonstrate the importance of lay beliefs consumers hold about the meaning of metacognitive experiences. Reinforcing naturally held lay beliefs exacerbated the budgeting bias. Reversing these lay beliefs led to a significant increase in the amount of adjustment for next month budgets and attenuated the differences across time frames. This finding suggests that to debias monthly budgets, consumers should remind themselves that experienced ease does not always signal estimation accuracy.

STUDY 4: COGNITIVE BUSYNESS

Most perspectives on anchoring and adjustment agree that while generating the initial estimate is relatively effortless, the ensuing adjustment process can occur only when adequate cognitive resources are available (e.g., Gilbert 2002). The aim of the present study is to investigate whether the adjustment in budget estimates is an effortful correction process or some form of implicit adjustment (see Wilson et al. 2002). If the adjustment process is resource dependent, then putting the decision makers in a cognitively busy state should affect the magnitude of the adjustment (see fig. 1). Therefore, in this study we manipulated the availability of cognitive resources through a cognitive load manipulation. We also examine the effect of temporal frames on response times. If participants estimating their budgets for the next year adjust their estimates, then this adjustment process should be reflected in longer response times.

Method

Participants and Design. One hundred and twenty-three undergraduate students participated in the study in exchange for partial course credit. The design was 2 (temporal frame: next month, next year) × 2 (cognitive load: low, high) between subjects. Participants were randomly assigned to one of the four between-subject conditions.

Procedure. Following Fitzsimons and Williams (2000), cognitive busyness was induced by asking participants to count the number of times they blinked their eyes. In the beginning of the study, participants were told that the study investigated the relationship between eye blinking and information processing, and they were asked to keep a mental count of their eye blinks as they simultaneously worked on some other tasks. All participants worked on three tasks: two short filler tasks that involved evaluating posters and paintings on slider scales, followed by the target budget-estimation task. In the high-cognitive-load condition, participants were instructed to start counting their blinks in the beginning of the study. They worked on the two short filler tasks and then provided their budget estimates as they continued counting their blinks. Finally, they were asked to stop counting and to report the number of times they blinked. In the low-cognitive-load condition, participants started to count their blinks and then worked on the first short filler task. Next, they were asked to stop counting and to report the number of times they blinked. Then they worked on the second filler task, and, finally, they provided their budget estimates. (We inserted the second filler task between participants' self-report of the number of blinks and their budget estimate in order to avoid any possible effects of the former response on the latter.) We unobtrusively recorded participants' reaction times as they provided their budget estimates.

Results

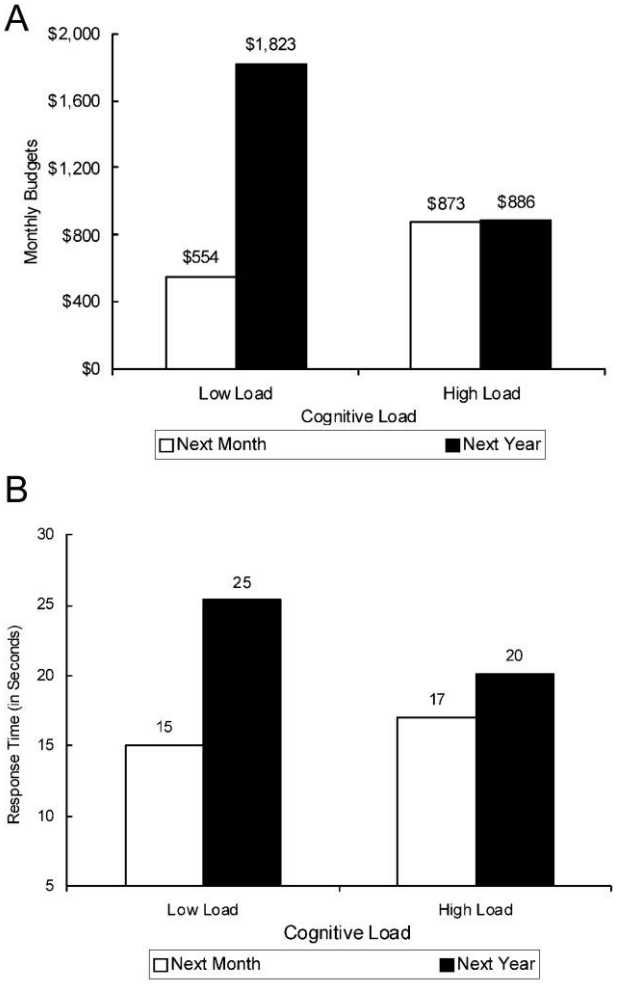
Number of Eye Blinks. As a manipulation check, we conducted a 2 (temporal frame: next month, next year) × 2 (cognitive load: low, high) ANOVA on participants' self-report of the number of eye blinks. As expected, only the main effect of cognitive load was significant ($F(1, 118) = 29.79$, $p = .00$). Participants reported a greater number of eye blinks in the high-load condition than in the low-load condition ($M_{\text{high load}} = 29$, $M_{\text{low load}} = 10$), indicating that the cognitive-load manipulation was successful.

Budget Estimates. A 2 (temporal frame: next month, next year) × 2 (cognitive load: low, high) ANOVA on the budget estimates revealed a significant main effect of temporal frame ($F(1, 119) = 10.19$, $p = .00$). This effect was qualified by a significant two-way interaction ($F(1, 119) = 9.77$, $p = .00$). When participants were not cognitively busy, we replicated the difference in budgets with temporal frame ($M_{\text{next mo}} = \$554$, $M_{\text{next yr}} = \$1{,}823$; $F(1, 119) = 20.82$, $p = .00$). However, when participants were cognitively busy counting their eye blinks, those in the next year condition did not adjust their budgets upward ($M_{\text{next mo}} = \$873$, $M_{\text{next yr}} = \$886$; $F(1, 119) = 0.00$, $p = .96$). The pattern of means is depicted in figure 4*A*.

Reaction Time. Reaction-time data also support the hypothesis that cognitive busyness prevents adjustment (see fig. 4*B*). The main effect of temporal frame ($F(1, 119) = 14.08$, $p = .00$) was, again, qualified by a two-way interaction ($F(1, 119) = 4.06$, $p = .04$). In the low-cognitive-load condition, participants took a longer time to provide their budget for the next year than for the next month ($M_{\text{next yr}} = 25.38$ seconds, $M_{\text{next mo}} = 15.07$ seconds; $F(1, 119) = 17.35$, $p = .00$). However, in the high-cognitive-load condition, there was no significant difference between response times ($M_{\text{next yr}} = 20.14$ seconds, $M_{\text{next mo}} = 17.04$ seconds; $F(1, 119) = 1.45$, $p = .23$).

FIGURE 4

STUDY 4: THE EFFECTS OF COGNITIVE LOAD ON (A) BUDGET ESTIMATES AND (B) ESTIMATION TIME ACROSS MONTH AND YEAR FRAMES



Discussion

The budget estimates as well as the response-time data suggest that the adjustment process in mental budgeting is resource dependent. If decision makers are cognitively busy, then they will not be able to adjust their budgets upward, and, consequently, they are likely to underestimate their budgets. When participants were asked to keep track of their eye blinks, their minds were so preoccupied with the task that the temporal-frame manipulation had no effect on their budget estimates. Although participants in the annual frame might have experienced a sense of uncertainty, they were unable to act on it because they were cognitively busy.

GENERAL DISCUSSION

Summary of Findings

The temporal framing of the budget period systematically affects ease of estimation and confidence and, in turn, budget estimates. Budget estimates for the next year are significantly higher than the comparable budget estimates for the next month when they are unitized to a common monthly basis. Consumers' default tendency is to underestimate their budgets for both next month and next year frames. Budgets for the next year are closer to recorded expenses because consumers feel less confident when estimating these budgets and therefore adjust them upward. Thus, the budget-estimation process entails an anchoring and adjustment mechanism in which initial estimates are too low, and the amount of upward adjustment depends on the degree of confidence and the availability of cognitive resources.

One important factor that determines the level of confidence in budgets is the cognitive ease or difficulty of the estimation task. Consumers' lay beliefs about the accuracy of easily generated budget estimates make them more confident in a next month frame. Reversing these lay beliefs by informing consumers that feelings of ease do not signal accuracy lead to a significant increase in the amount of adjustment for next month budgets.

Practical Implications

In terms of practical significance, the tentative recommendation from our research is that budgets are likely to be closer to expenditures when estimated for longer durations such as a year, and therefore financial consultants should recommend the use of longer budgeting periods. Also, when budgeting, it seems to be wiser to assume that one's knowledge is unreliable. This suggests that analysts and budgeting programs should question consumers so that they doubt the accuracy of their initial budgets. Ironically, lack of confidence, in the context of budget estimation, seems to be a virtue.

If the temporal framing of the budget period influences consumers' budget estimates, this could affect their spending decisions. If the higher budget estimate in the year frame is interpreted as higher discretionary income, consumers could be more likely to incur a discretionary expense when planning for their annual budgets than when planning their monthly budgets. Similarly, underestimating monthly spending could undermine consumers' ability to save. Future research should examine the effects of temporal framing on consumers' willingness to spend and their success in saving.

We found that participants persistently underestimated their expenditures for the next month even when the budget estimates were elicited only seconds after participants reported their earlier period's actual expenditures. Although surprising, this observation is consistent with the finding that people may fail to incorporate past experiences into their predictions (Buehler et al. 1994; Jacoby et al. 1984; Sniezek 1980). This finding highlights the robustness of the effect, even across multiple estimates made by the same person. Future research should examine the influence of incentives or training on the robust effect of temporal framing on budget estimates.

Although we focused solely on consumer budgeting, our results may have implications for project management as well. Historical evidence suggests that budget estimates have been poor predictors of actual costs. Errors in budget estimates cause significant planning and management problems for governments and industry, as well as delayed and more expensive public services for consumers. If planning for longer time horizons such as a year helps reduce errors in budget estimates, adjustments for cost errors should take into consideration the effects of both the planning fallacy and biases in budget estimates, which may be exacerbated by errors in duration estimates.

Contributing Factors

This research suggests that when consumers construct budgets for the next month or the next year, their confidence in their initial budgets differs, which leads to different amounts of adjustment. However, it is also important to note that budgets estimated for the next month and for the next year differ from each other in several other important ways. We conducted an exploratory study to examine the possible role of some of these differences. In this study, we asked participants to list the expense categories they consider for either the next month, the next year, a typical month, or the coming month one year from now. Participants then indicated their budgets for each of these categories and also estimated their total budget for the specified period.

Participants in the next year condition not only provided higher total budget estimates than those in the 3 month conditions ($M_{\text{nextyr}} = \$1{,}773$, $M_{\text{nextmo}} = \$576$, $M_{\text{monextyr}} = \$894$, $M_{\text{typmo}} = \$935$), but they also considered a larger number of expense categories ($M_{\text{nextyr}} = 8.1$, $M_{\text{nextmo}} = 5.4$, $M_{\text{monextyr}} = 6.3$, $M_{\text{typmo}} = 6.6$). However, we believe that the observed effects on budget estimates across the next month and next year frames cannot entirely be attributed to expense categories that are typically associated with annual planning, since when we look at the average per category budget, we see that the average size of expense categories also differs across the next month and next year frames.

Moreover, when we examine individual expense categories such as food ($M_{\text{nextyr}} = \$399$, $M_{\text{nextmo}} = \$209$) and clothing ($M_{\text{nextyr}} = \$173$, $M_{\text{nextmo}} = \$89$), the budget differences still manifest.

This study also tested whether the effect of temporal frame on budgeting is due to temporal duration or temporal distance. Budget estimates in the month-next-year condition were noticeably higher than those in the next month condition. Although this difference was not statistically significant, temporal distance may still be contributing to the difference between next month and next year budgets. However, across all dependent variables, we consistently observed that observations in the month-next-year condition were always lower than those in the next year condition, suggesting that level of construal (see Trope and Liberman 2003) alone cannot entirely account for our findings.

Across all studies, our results reveal several important differences in budgets across next month and next year frames. When budgeting for the next year (vs. next month), consumers consider a greater number of expense categories, think of a time period that is temporally more distant, and find it difficult to remember their expenses from the past year. Controlling for these factors individually reduced but did not completely eliminate the effect of time frame on budgets, suggesting that none of these factors alone caused this effect. Instead, these factors seem to be conjointly influencing difficulty of estimation, which in turn might be influencing confidence and the budget estimates.

Relationship to Previous Findings

Predictions from support theory (Tversky and Koehler 2002) might be useful in understanding the mental-budgeting process. Support theory postulates that unpacking an implicit hypothesis into its components increases its judged probability. Although this theory was conceived of to explain probability judgments, its predictions could be extended to judgments under uncertainty in general. Budgeting presumably entails unpacking expense categories into their components. Two very different forms of unpacking are possible. The total budget for the given period might be unpacked into smaller subcategories (e.g., sum of the food budget or entertainment budget), or it could be unpacked into its temporal subcomponents (e.g., sum of the 12 monthly budgets). The mode of unpacking may be contingent on the nature of framing. The fact that the year frame evokes more components than month frames could perhaps be contributing to the budgeting bias, along with the uncertainty-induced adjustment. Future research should examine the interactive effects of unpacking and adjustment on the budget-estimation process.

There are apparent similarities between our findings and the research on the planning fallacy (Buehler et al. 1994). We find that the dominant tendency in budgeting is to underestimate actual future expenses, and the planning fallacy refers to the tendency to underestimate task-completion times. We suggest that the initial budgets underestimate actual expenses in both the next month and the next year conditions, due to a biased retrieval mechanism similar to that in the planning fallacy.

Another relevant finding comes from Kahneman and Lovallo (1993), who distinguish between two modes of forecasting: the inside view focuses on the specifics of the case at hand, whereas the outside view focuses on the statistics of a family of cases similar to the case at hand. The former approach results in exceedingly optimistic forecasts, and the latter approach results in more accurate forecasts. Our findings extend this framework by suggesting that the length of the decision frame and the resulting effects on confidence are critical determinants of which point of view decision makers choose to adopt. Our research shows that while making budget estimates, people start by considering the specific expenses they expect to make and consequently underestimate their expenses. The year frame, by decreasing their confidence, may encourage people to take an outside view and perhaps consider a distribution of possible expenses.

Another finding that is of interest to us is that people anticipate slack for money to be greater in the future than in the present (Zauberman and Lynch 2005), in which case they should make higher budget estimates for the next year than for the next month. On the surface, this seems to be a plausible account for our findings. However, this account neither offers an explanation for the moderating effect of cognitive busyness on the budgeting bias nor explains why people in the year frame take more time for budgeting.

Directions for Future Research

Consumers' experience with budgeting may moderate the magnitude of this effect, and we recommend that future studies further examine the role of experience. Although the results from our pilot study demonstrated that the effect manifested for students and for working professionals, consumers may be more susceptible to this bias in transition periods when they experience a change in their lifestyle (e.g., first job after graduation) and may be less susceptible if they typically budget and carefully track expenditures against budgets.

Future research should also aim to identify interventions in order to reduce the effect of temporal frames on budgets. It is possible that increasing the costs of underestimation (e.g., when one needs to tide over monthly finances by withdrawing money from an interest-bearing account or by borrowing with a high interest rate) or increasing the salience of such costs may help reduce the magnitude of this effect.

We posit that the differences in total budgets across the next month and next year frames should also be observed in individual expense categories. However, it is possible that the size of this effect depends on characteristics of the type of expense category. Some categories such as housing and utility bills are strongly associated with monthly planning due to regular monthly pay and billing cycles. For expenses like these, consumers most likely think of a month frame when they budget, and this perspective is unlikely to be changed even when they are asked to create annual budgets, when they might simply multiply their typical monthly bud-

get by 12. In such special expense categories, with frequent and regular expenses, budgets may not differ according to the temporal frame. Future research should examine the role of this and other characteristics of expense categories.

According to our conceptual model, confidence is treated as a process measure or as a driver of budget estimates. It is important to note that confidence can also be conceptualized as a parallel result of budget estimation or even as an output of this exercise. It is a fruitful research avenue to investigate the interplay of the different roles confidence can play in budgeting.

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