Imagine that you are trying to predict when you will finish an extensive work report due at the end of the month. Although painfully aware that you typically finish such projects just before deadline, you wish and intend to complete this one ahead of schedule, and you estimate that you will finish a week before it is due. Now what happens? One rather dispiriting possibility is that your prediction turns out to be uninformative as you end up finishing, as usual, right at the deadline. Another more intriguing possibility is that the very act of generating an optimistic forecast helps you to finish the task earlier than you would have otherwise. The present research examines whether, and when, task completion predictions have an impact on actual completion times.

Examining consequences of task completion predictions

By examining the behavioral impact of prediction, the present research extends the emerging literature on task completion forecasts in an important new direction. Research to date has focused on assessing and explaining error and bias in prediction. Much of this previous research has documented a phenomenon that Kahneman and Tversky (1979) called the planning fallacy, a form of optimistic bias wherein people underestimate the time it will take to complete an upcoming task even though they realize that similar tasks have taken longer in the past (for a review see Buehler, Griffin, & Ross, 2002). The basic tendency to underestimate task completion times has been observed for a wide range of personal, academic, and work-related tasks (e.g., Buehler & Griffin, 2003; Buehler, Griffin, & Ross, 1994; Byram, 1997; Connolly & Dean, 1997; Kruger & Evans, 2004; Roy, Christenfeld, & McKenzie, 2005; Taylor, Pham, Rivkin, & Armor, 1998). Researchers have also identified cognitive and motivational determinants of bias. People are prone to bias when they focus narrowly on planning out the steps that they will take to complete a project (Buehler et al., 2002; Kahneman & Tversky, 1979), when they base predictions on faulty memories of previous completion times (Roy et al., 2005), or when they fail to consider all the subcomponents of a multi-component task (Kruger & Evans, 2004). A strong motivation to finish tasks early, such as that produced by monetary incentives (Buehler, Griffin, & MacDonald, 1997; Byram, 1997) or the desire to please others (Pezzo, Pezzo, & Stone, 2006) can also contribute to prediction bias. The present research takes a novel approach. Rather than exploring the determinants of people’s tendency to underestimate completion times, we examine a possible adaptive consequence of optimism: could optimistic task completion estimates sometimes facilitate task completion?

This question bears resemblance to issues addressed in research on goal setting and task motivation, which concludes that specific, challenging goals can enhance performance in many tasks (Locke & Latham, 1990, 2002). However, generating predictions and setting goals are distinguishable acts: whereas goals represent desired future outcomes that people strive to attain, predictions represent be-
lies about what will actually transpire. 1 Certainly people often set goals for project completion, but there are also many circumstances in which they strive to predict as accurately as possible when a project will actually be done. They may be called upon by others – such as supervisors, co-workers, or spouses – to provide a realistic estimate. They may privately seek an accurate estimate to guide their own plans and decisions. In such circumstances it would be valuable to understand whether the forecasts people generate are likely to guide their actual completion times. For instance, if the very act of generating predictions has facilitory effects, then managers may be well advised to solicit forecasts from employees to motivate timely completion of projects. In sum, given the ubiquity of task completion forecasts, and the potential utility of the proposed behavioral effects, empirical research on this topic is clearly warranted.

Because our research question pertains specifically to task completion times (i.e., the date by which a project will be finished) as opposed to task duration (i.e., the amount of time spent working on the task itself) it is important to target tasks completed outside the lab session in which the predictions are generated. Studies that examine predicted duration for brief tasks performed immediately in the lab can shed light on basic processes of prediction (e.g., König, 2005; Thomas, Newstead, & Handley, 2003), however, they cannot adequately address the question of whether or not predicted task completion times carry on to affect actual task completion times. In laboratory studies of duration there is no variability in when participants can begin a task, and no serious possibility for unexpected interruptions from factors external to the task itself (e.g., competing demands, procrastination, unexpected interruptions) to delay when participants start and finish tasks. In contrast, tasks performed outside the lab are subject to the full range of external factors that influence when a task is started and finished. Indeed our previous research suggests that people’s tendency to underestimate completion times is driven more by these external factors than by the amount of time spent working on the task itself (Buehler et al., 2002). The key question, then, is whether task completion predictions are powerful enough to overcome the influence of factors that may normally influence when projects are actually completed.

Do predictions influence task completion times?

There are several reasons to believe that optimistic task completion predictions could facilitate task completion times. First, motivational theories (e.g., self-efficacy theory, Bandura, 1977; self-regulation theory, Carver & Scheier, 1990) posit that positive performance expectancies can often enhance task performance by affecting how hard people try and how long they persist, suggesting that an optimistic task completion prediction could elicit the effort and persistence required to finish at the desired time. Along similar lines, the vast literature on goal setting indicates that forming specific, challenging goals enhances task performance (Locke & Latham, 1990). Although predicting and goal setting are distinct acts, an early task completion prediction, once generated, could provide individuals with a salient, concrete goal or standard that will motivate them to complete the task promptly. Also, more generally, consistency theories (e.g., Festinger, 1957) imply that people will strive to maintain congruence between their self-relevant judgments and behaviors.

Early task completion predictions might also elicit a host of related cognitive processes that facilitate task completion. To generate task completion predictions, people often develop a plan or scenario that depicts the steps they will take to finish the project by the desired time (Buehler et al., 1994, 1997). This type of cognitive focus may have facilitory effects. Individuals are more likely to achieve a goal if they are prompted to specify when, where, and how they will pursue it (e.g., Armor & Taylor, 2003; Gollwitzer, 1999) or to mentally rehearse the process of achieving it (Taylor et al., 1998). For example, Taylor et al. found that students were more likely to finish a school assignment by the time they predicted if, after generating their prediction, they mentally rehearsed the steps needed to complete it. To the extent that task completion predictions spontaneously elicit a focus on plans and plan-based scenarios, then, they may facilitate task completion.

Predicting, per se, may also have self-fulfilling effects on behavior; simply asking people to predict whether they will perform desirable actions (e.g., voting, donating to the Cancer Society) increases the probability that they will perform these acts (e.g., Greenwald, Carnot, Beach, & Young, 1987; Sherman, 1980). More recent research has referred to this phenomenon – wherein asking people to estimate their likelihood of engaging in a behavior increases the probability that they engage in the behavior – as the mere-measurement effect and explored its role in a variety of health related behaviors and consumer decisions (e.g., Fitzsimons & Williams, 2000; Morwitz & Fitzsimons, 2004; Morwitz, Johnson, & Schmittlein, 1993). The dominant explanation for the mere-measurement effect is that eliciting a likelihood estimate heightens the accessibility of the person’s attitudes and intentions toward the behavior, which in turn increases the likelihood that the behavior will be performed. Although the research has not examined task completion forecasts, or manipulated the predictions people actually generate, it lends further credence to the idea that task completion predictions could have behavioral effects.

Surprisingly, despite the theoretical bases outlined above, research indirectly manipulating task completion predictions suggests that the predictions themselves often have little or no influence on completion times. Participants instructed to create a plan-based scenario of how they would complete their Christmas shopping predicted they would finish several days earlier than control participants, but did not actually finish earlier (Buehler & Griffin, 2003). Similarly, studies have shown that people generate earlier task completion predictions to the extent that: they have monetary incentives for early completion (Buehler et al., 1997), they report the prediction publicly rather than anonymously (Pezzo, Pezzo et al., 2006), they engage in group discussion (Buehler, Messervey, & Griffin, 2005), and they do not utilize past experiences (Buehler et al., 1994). In each case, however, the factor that affected prediction did not carry through to affect actual completion times. Of course these studies did not manipulate predictions directly, and thus it is possible that the factors affecting predictions also altered the prediction–behavior link. Nevertheless, such findings imply that task completion predictions might have surprisingly little influence, and that it may be important to consider factors that moderate their impact.

Type of task (open vs. closed) as a moderator

Our challenge is to reconcile two apparently contradictory findings: first, that expressed predictions often affect subsequent behavior, and second, that indirect manipulations of predictions of
task completion times have failed to show measurable behavioral effects. We propose that predictions are more “translatable” (Koehler & Poon, 2006) into the one-time action of starting a project than into the continuing actions necessary to complete a project. This assumption has clear implications for identifying the type of tasks for which optimistic predictions will have beneficial effects. In particular, tasks that can be completed in a single, continuous session (e.g., reading a magazine article, writing a thank-you note, changing a light bulb), and thus are not usually prone to interruptions and delays once they have been started, are the type of tasks where we expect an effect of predictions on completion times. We term these “closed tasks” due to the fact that once initiated, these tasks are relatively insulated from outside disruption. In contrast, open tasks require multiple steps to be completed at different times or locations. These are the kinds of tasks that typically require several work sessions to finish (e.g., reading a textbook, writing a manuscript, completing a home renovation) and thus are relatively prone to interruptions and delays even after they have been started, and hence where differential plans, intentions, and starting times may not influence the ultimate completion times.

The distinction between closed and open tasks can be contrasted with some related task characteristics. First, the closed–open distinction is not the same as whether a task is completed in the lab or at home. Even when we restrict our analyses to tasks completed outside the lab (for the reasons noted previously) these tasks can vary widely in whether they require multiple work sessions to complete, and thus the extent to which they are prone to interruptions and delays. Second, the closed–open distinction is different from the length of actual working time that is required to carry out the task (task duration, e.g., Roy & Christenfeld, 2008). Tasks that require the same amount of actual working time can differ in how many separate work sessions are required to perform the work. Third, although the closed–open distinction overlaps partially with distinctions between simple and complex tasks (wherein complex tasks involve more distinct acts, informational cues, and co-ordination across time; Wood, Mento, & Locke, 1987), it refers more specifically to the potential for intervening factors to delay progress. Even a rather simple task, with relatively few task subcomponents, will be more open to delays from external factors if those subcomponents are spread across different times and places. Consider a homeowner who wants to hang a newly acquired painting in the hallway, a task that requires purchasing hooks, fastening them to the wall, and hanging the artwork. There are only a few, easy steps (i.e., the task is simple) and the actual working time should be less than an hour (i.e., the task is brief in duration), yet this is an open task because the steps are spread out across multiple times and places, making it prone to external interruptions. Even after starting the task, the individual could be easily sidetracked, and days or weeks might pass before the painting is on display.

Our reasoning, then, is that an early task completion prediction will exert its greatest impact on the early stages of task completion, but this impact will diminish as delaying factors are encountered. Consequently, the effects of predictions on task completion times will differ for closed and open tasks. For a closed task, an early start time should be sufficient to influence final completion times because there is little opportunity for delay once the task has been started. For an open task, an early start is much less likely to translate into an early completion time because there is great potential for delaying factors to intervene between starting and finishing the task. This reasoning is supported indirectly by evidence that constructs related to prediction such as goals (Wood et al., 1987) and self-efficacy beliefs (Stajkovic & Luthans, 1998) have a greater impact on simple tasks than on complex tasks. Further support comes from the finding that the self-fulfilling effect of measuring intentions (the mere-measurement effect) diminishes across time and repeated decisions (Chandon, Morwitz, & Reinartz, 2004).

As an initial test of our theoretical rationale, we performed a quantitative review of studies that have examined the impact of various factors on predicted and actual completion times. Recall that this research has often found that factors affecting prediction do not have a corresponding effect on behavior. But according to our reasoning, the extent to which this pattern is obtained should depend on whether the tasks are open or closed. Thus, we identified studies in which researchers examined tasks completed outside of the lab (i.e., tasks free to vary in when they were started and finished), manipulated a factor to influence predicted completion times, and reported means for both predicted and actual completion times. Two research assistants independently coded the target tasks as being either relatively closed (Buehler et al., 1994, Study 4; Koole & Van’t Spijker, 2000, Study 1; Pezzo, Pezzo et al., 2006, Study 1; Pezzo, Litman, & Pezzo, 2006, Study 1) or relatively open (Buehler et al., 1997, Study 1; Newby-Clark, Ross, Buehler, Koehler, & Griffin, 2000, Studies 1, 3, and 4; Buehler & Griffin, 2003, Studies 1 & 2) (Inter-rater agreement = 93%). We then examined the effect of the manipulation (i.e., the mean difference across conditions) on predicted and actual completion times and created a behavioral effect index by dividing the effect on behavior by the effect on prediction. This index represents the extent to which an effect on prediction was accompanied by a corresponding effect on behavior, where a score of 0 means a complete absence of a behavioral effect and a score of 1 indicates that the effect on behavior was equal to the effect on prediction. The behavioral effect index scores were significantly higher for closed tasks than for open tasks (Ms = .76 vs. .31), t(12) = 2.60, p = .02, indicating that differences in prediction were more likely to carry through to behavior for closed tasks than for open tasks.

The pattern of effects is generally consistent with our reasoning about the moderating role of open vs. closed tasks. However, note that the previous studies did not manipulate predictions directly, and thus it is plausible that the manipulated factors influenced both predicted and actual completion times, without a causal role of prediction. To assign a causal role to prediction, researchers need to manipulate predictions more directly. We borrow a manipulation developed by Cervone and Peake (1986) in their study of the effects of performance expectancies on behavioral persistence. Cervone and Peake overcame the difficult practical problem of how to randomly assign people to different performance expectations by using an “anchoring” manipulation. Following the logic of the anchoring and adjustment heuristic (Tversky & Kahneman, 1974), Cervone and Peake provided participants with an ostensibly random value (the anchor) that was either relatively high or low and asked them to adjust this value until it represented their estimate of the number of anagrams they could solve. Such adjustments are typically insufficient, and thus the participants estimated that they would solve more anagrams when they were provided with a high initial anchor rather than a low anchor value. These differences in performance expectancies resulted in differences in perseverance on the anagram task which contained many insoluble puzzles.

The present studies

In four studies across six different tasks we used anchoring procedures to manipulate participants’ task completion predictions and then examined actual completion times. We test three central hypotheses derived from our theorizing. First, we expect that manipulations of task completion predictions can, at least sometimes, influence actual completion times. Second, we expect that manipulating predictions will result in stronger behavioral effects on completion times for closed tasks than for open tasks (Studies 1–3). Third, we expect that even for open tasks, manipulating pre-
dictions will result in behavioral effects on start times (Study 4). To test our hypotheses about the moderating role of task characteristics, we varied whether the target tasks were relatively open or closed across studies (Studies 1 and 2) and within a study (Study 3). Our final study included measures of when participants started the target tasks as well as when they finished (Studies 4a and 4b).

**Study 1: computer tutorial**

This study examined task completion predictions for a closed task – a computer tutorial that could be finished easily in one sitting. We used an anchoring manipulation to induce participants to predict relatively early or late completion times, and then examined when they actually finished. Given the relatively closed nature of the task, we expected that the manipulated differences in prediction would carry through to a corresponding impact on actual completion times.

**Method**

**Participants**

Participants were 34 (23 females and 11 males) introductory psychology students ranging in age from 18 to 29 years (M = 19.28, SD = 2.53) who were paid $5 for their participation.

**Procedure**

Participants were recruited for individual sessions in a study examining students’ experiences with computer-based instruction. Accordingly, they first answered several questions concerning their familiarity with computers and computer-based instruction. Participants were then given instructions for completing the target assignment, which involved going to a student computer lab and working through specified modules of an interactive tutorial program for psychology. The tutorial modules took less than an hour to complete and required participants only to read through information and respond to queries. Thus the assignment constituted a closed task: it was relatively brief and hence could be completed in one sitting and in one place, and was not prone to delays after it was started. Participants were informed that they could complete the assignment any time in the next 3 weeks. They were then asked to predict when they would finish the assignment and were informed that the researchers were trying out a new response-eliciting procedure. They were told that an initial “starting point” for their prediction would be randomly determined by a card draw of numbers between 1 and 21, and that they should adjust their predictions away from the given value until they reached their prediction would carry through to a corresponding impact on actual completion times.

As anticipated, participants predicted they would finish the assignment further before the deadline in the early anchor (M = 16.84 days, SD = 3.29) than in the late anchor condition (M = 11.80 days, SD = 4.06), t(32) = 4.01, p < .001. Thus, the anchor procedure affected participants’ predictions and permitted an examination of whether the manipulated differences in prediction would influence actual completion times. Consistent with our hypothesis, participants in the early anchor condition, who were induced to predict relatively early completion times, also finished the assignment further before deadline (M = 14.26 days, SD = 6.14) than those in the late anchor condition (M = 9.00 days, SD = 8.01), t(32) = 2.17, p = .04, and the eta-squared effect size of .13 was indeed substantial and approached the standard cutoff for a “large” effect.

Comparisons of predicted and actual completion times indicated that participants generally predicted to finish further before the deadline (M = 14.62 days, SD = 4.40) than they actually did (M = 11.94, SD = 7.40), t(32) = 2.22, p = .03. Because the effects of the anchor on completion times were roughly equal to the effects on prediction, the magnitude of the optimistic bias did not differ across the early anchor (M difference = 2.58, SD = 6.33) and late anchor conditions (M = 2.80 days, SD = 8.06), t(32) = −.09, p = .93. In sum, the study provides an initial demonstration that for a closed task, manipulated differences in task completion predictions can affect actual task completion times.

**Study 2: literature search assignment**

In the second study we elicited predictions for a school assignment that was much more extensive and prone to interruption (i.e., an open task) than the computer tutorial. We again attempted, using differential anchors, to induce participants to generate relatively early or late task completion predictions and examined when they actually finished the task. Given the open nature of the task, we expected that the prediction manipulation would have little or no impact on actual completion times.

**Method**

**Participants**

Participants were 32 (20 females and 12 males) introductory psychology students aged 18 to 34 years (M = 20.19, SD = 3.16) who were compensated with course credit.

**Procedure**

Participants were recruited for a study examining the academic activities of university students and participated individually. They first completed a brief survey concerning their current course load, and then were asked to think in particular about an upcoming literature search assignment for their introductory psychology course. The assignment constituted an open task because it re-

\[2\] In this study and each subsequent study, the reported sample does not include participants who took part in the initial session but then did not actually do the target assignment (or could not be reached for the follow-up interview that assessed whether they did it). These participants were distributed equally across the anchor conditions, as follows: Study 1 (1 early, 0 late); Study 2 (3 early, 2 late); Study 3 (17 early, 19 late); Study 4 (1 early, 2 late) and Study 5 (4 early, 3 late).
required several distinct steps to be completed at more than one location. Students needed to find a journal article at the library, read it, conduct a literature search yielding three related articles, and obtain copies of the articles. Students were asked to predict the date they would finish and we attempted to induce relatively early or late predictions. Predictions were elicited using a “time-line” apparatus that was mounted on the laboratory wall and included dates spanning from the present to the assignment deadline. The experimenter slowly moved a sliding arrow across the time-line until participants instructed her to stop at the predicted date of completion. The experimenter’s starting point (current date or final deadline) was randomly determined and constituted the anchor manipulation: she either began at the present date (early anchor condition) and moved forward toward the deadline or began at the deadline date (late anchor condition) and moved back toward the present. Previous research suggests that people’s judgments about time are influenced by whether they use starting points or stopping points as referents (e.g., Paese, 1995) and that people predict shorter task completion times when they are induced to focus on the present and move forward, rather than focusing on the task deadline (LeBœuf & Shafir, 2009; Sanna, Parks, Chang, & Carter, 2005). Thus we expected that participants would predict shorter completion times in the early than in the late anchor condition.

One week after the assignment deadline, participants were contacted by phone and asked to report when they had finished the target assignment.

### Results and discussion

The anchor manipulation was effective: participants predicted they would finish the assignment further before the deadline in the early anchor (M = 16.36 days, SD = 5.78) than in the late anchor condition (M = 10.58 days, SD = 3.77), t(30) = 3.35, p = .002. How-

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### Table 1

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Note: Values represent days before project deadline. Means in the same row that do not share a common subscript differ at p < .05.
ever, consistent with our hypothesis, there was no corresponding effect on actual completion times. Indeed, there was a mild reversal such that participants finished non-significantly closer to the deadline in the early anchor (M = 7.36 days, SD = 4.98) than in the late anchor condition (M = 8.43 days, SD = 4.53), t(30) = −0.64, p = .53. Comparisons of predicted and actual times indicated that participants tended to underestimate their actual completion times in both the early anchor, t(15) = 5.99, p < .001, and late anchor condition, t(15) = 1.94, p = .07. However, this bias was greater in the early anchor condition (M difference = 9.00 days, SD = 6.01) than in the late anchor condition (M difference = 2.15 days, SD = 4.44), t(30) = 3.67, p = .001.

The results of this study provide further evidence that people predict earlier completion times when they are anchored on the present date and move forward in time to make their prediction than when they are anchored on the deadline date (see also LeBœuf & Shafir, 2009; Sanna et al., 2005). The results also support the hypothesis that manipulated differences in prediction would have relatively little impact on the actual completion times of an open task. Although this conclusion rests on the interpretation of a null effect, and thus warrants caution, the pattern of effects is quite striking: a relatively large difference in predictions (eta-squared = .27) yielded no difference in actual completion times (eta-squared = .01, in the reverse direction). This finding, together with the results of Study 1, supports our proposal that the behavioral impact of task completion predictions depends upon the nature of the task. However, so far the type of task has been varied across studies that also differed on many other dimensions (e.g., the anchor procedure, the assignment importance, the length of the deadline) that might account for the pattern of effects.

**Study 3: emails vs. letters**

In this study we manipulated task type more directly using an experimental design. Participants received a standard writing assignment, but we altered the submission requirements to vary the extent to which it constituted a closed or open task. Participants predicted when they would submit the assignment, and we again used the time-line procedure to induce relatively early or late predictions. Thus the study consisted of a 2 (task type: closed vs. open) by 2 (anchor: early vs. late) between subjects design. We expected an interaction effect wherein the anchor manipulation would affect actual completion times for the closed task, but this effect would be diminished or disappear completely for the open task.

**Method**

**Participants**

Participants were 78 university students (61 females and 17 males) ranging in age from 17 to 26 years (M = 18.74, SD = 1.51) who were compensated with course credit.

**Procedure**

Students participated individually in a study said to be examining the daily experiences of university students. After some preliminary questions concerning their typical daily activities, participants were given a take-home writing assignment to be completed any time during the next 2 weeks. Participants were instructed to write three short stories (approximately 200 words) that each provided a lively description of an event they had experienced in the past few days. The stories were to be composed on a computer word processor. We attempted to manipulate the extent to which the assignment constituted a closed or open task by varying the submission format. In the closed task condition, participants were allowed to send their stories to the experimenter by email: after writing a story they needed only to attach it to an email and hit “send”. In the open task condition, participants were required to print and mail each story by postal mail: thus after writing a story they needed to print it out, address the envelope, find or purchase a stamp, and then go to a mail box to post the letter. Participants were provided with envelopes and $2 to cover the cost of stamps. Task completion predictions were again elicited using the time-line procedure and, as in Study 2, participants were randomly assigned to either the early or late anchor condition. Before leaving, participants were reminded that they were free to finish the writing assignment at any time during the next 2 weeks. Actual task completion times were assessed unobtrusively by examining the email dates (closed task condition) or postal stamps (open task condition) indicating when the stories were sent.

We reasoned that, in comparison to the email version, the letter version of the assignment constituted a relatively open task because it involved a greater number of steps being completed at different times and locations, and thus would be relatively prone to interruptions and delays. As a manipulation check, we conducted a pilot study wherein an independent sample of 16 students received closed and open task instructions (in counterbalanced order) and rated the extent to which the task would be prone to interruption (1 = not at all, 7 = extremely). Participants rated the task as more prone to interruption in the open (multi-step postal version) than the closed (single-step email version) task condition (Ms = 4.94 and 4.00, respectively), t(15) = 2.22, p < .05, suggesting that the manipulation of task type was effective.

**Results and discussion**

The anchoring manipulation again affected task completion predictions for both task types. A 2 (task: open vs. closed) by 2 (anchor: early vs. late) ANOVA performed on the task completion predictions yielded only a significant main effect of the anchor manipulation, indicating that participants predicted to submit the assignment further before the deadline in the early anchor (M = 6.83 days, SD = 2.26) than in the late anchor condition (M = 3.53 days, SD = 2.12), F(1, 71) = 43.26, p < .001. Simple effect planned contrasts revealed that the anchor effect was significant within both the open condition, (Ms = 6.13 vs. 3.72), t(71) = 4.82, p < .001, and the closed condition, (Ms = 7.50 vs. 3.33), t(71) = 8.34, p < .001.

A 2 (task: closed vs. open) by 2 (anchor: early vs. late) ANOVA performed on the actual task completion times revealed a main effect of task type, indicating that participants generally took longer to finish the assignment in the open than in the closed task condition, F(1, 71) = 20.57, p < .001. More importantly, the analysis yielded a significant interaction effect, F(1, 71) = 4.87, p = .03, and an examination of the relevant means and contrasts supported our hypotheses. Within the closed task condition, participants finished further before the deadline in the early anchor (M = 8.10 days, SD = 4.18) than the late anchor condition (M = 4.94 days, SD = 3.39), t(71) = 3.79, p < .001, effect size = .15. Within the open task condition, completion times barely differed across the early anchor (M = 2.47 days, SD = 3.45) and late anchor conditions (M = 3.00 days, SD = 3.29), t(71) = −.64, p = .52, effect size = .01. Thus, as hypothesized, the manipulated differences in prediction carried over to affect the completion times of the closed task but did not have any measurable impact on the open task.

Comparisons of predicted and actual completion times revealed that participants tended to underestimate their completion times only for the open task. For the closed task, participants exhibited only a slight and non-significant pessimistic bias in the early anchor condition (M difference = −.60, SD = 2.68), t(19) = 1.00, p = .33, and a small but significant pessimistic bias in the late anchor condition (M difference = −1.61, SD = 2.55), t(17) = 2.68, p = .02. For the open task, participants were optimistically biased,
however, this bias was significant in the early anchor condition (M difference = 3.66, SD = 3.16, t(18) = 5.04, p < .001) and not in the late anchor condition (M difference = .72, SD = 2.52, t(17) = 1.22, p = .24), and differed in magnitude across the two conditions, t(35) = 3.11, p = .004. Notably, then, participants were most inclined to underestimate their completion time when they were induced to predict an early finish for an open task – the type of task that does not appear to be affected by predictions. In contrast, participants induced to predict an early finish for a closed task did not underestimate their completion times.

In sum, results supported the hypothesis that task completion predictions would have a greater impact on the completion times of closed tasks than of open tasks, and furthermore that the open tasks would be unaffected by the prediction manipulation. This finding replicates the pattern observed across the first two studies and, importantly, does so using an experimental design that eliminates many of the potential confounds that hinder cross-study comparisons. Of course the effects of task type might still be attributable to other differences, created by the experimental manipulation, such as the extent to which the target task was simple or complex. As noted previously there may often be overlap in the open–closed and simple–complex task distinctions. However, in the context of this study, we believe that the pattern of effects has more to do with the potential for interruptions during the completion of the task than with the level of task complexity. The additional steps required in the open task condition (printing the essays, purchasing a stamp, and posting the letter) were not ones that would be seen as difficult or complex by most students, and thus we would not be inclined to characterize the open version of the task as being much higher in complexity than the closed version. However, we do believe that the open task was much more prone to interruptions than the closed task – it would have been very easy for students to get delayed or sidetracked in between the steps of the task. Thus we believe that, consistent with our theoretical framework, the pattern of effects emerge because predictions exert an impact at the early phases of task completion that diminishes over the course of an open task. To provide a further test of this account, the final study explored the time course of predictions for two relatively open tasks, assessing not only when participants finished tasks but also when they started.

### Study 4a: starting major tasks

The main purpose of Study 4a was to test our third central hypothesis that people’s predictions can and do affect start times even for open tasks. In Study 4a, we targeted major school assignments with considerable scope for external interruptions; in Study 4b, we targeted tax form submission predictions. This latter task is typically a tedious and time consuming chore that involves collecting information slips (e.g., employment income records, receipts for deductible expenses), compiling the information, filling out the tax forms, and mailing the completed forms. People generally underestimate how long it will take to complete both tasks (Buehler et al., 1997; Newby-Clark et al., 2000). In both studies, we manipulated task completion predictions using the time-line procedure. We expected that manipulated differences in prediction would influence start times but would not carry through to affect final completion times.

### Method

**Participants**

**Study 4a.** Participants were 73 undergraduate students (52 females and 21 males) ranging in age from 18 to 35 years (M = 20.04, SD = 2.74) who received $5 for taking part in the study.

**Study 4b.** Participants were 28 university students (19 females and 9 males) ranging in age from 18 to 47 years (M = 23.86, SD = 6.92) who received $5 for participating.

**Procedure**

**Study 4a.** Participants were asked to identify an upcoming school assignment that had a deadline in the next month, was not yet started, and would require extensive effort across more than one day to complete. Participants described the assignment in a few words and indicated the deadline and the percentage of their course grade that the assignment was worth. Next, participants were asked to predict as accurately as possible when they would finish the assignment. The predictions were elicited using the time-line procedure and participants were randomly assigned to either the early or late anchor condition. A few days after the reported deadline, participants were contacted by phone for a brief follow-up interview. The interviewer reminded participants of the date they had participated, their target assignment, and its deadline. Participants were asked to report when they finished the assignment as well as when they started it (defined as taking the first step toward completing the assignment, beyond thinking about it).

**Study 4b.** The tax prediction study was conducted about 2 months prior to the April 30 (Canadian) tax filing deadline. Students were recruited by advertisements on campus for a study examining their experiences in completing income tax forms. They were eligible to participate if they would be filing an income tax form this year but had not yet started working on it. After filling out a brief questionnaire concerning their tax status (e.g., their sources of income, deductible expenses) participants predicted when they would file their income tax forms (i.e., the date they would actually mail their forms) using the time-line procedure. Participants were telephoned the week after the tax deadline. The interviewer reminded participants of the study they had participated in, and then asked them to report when they had submitted their tax return and when they had first started working on it.

### Results and discussion

**Study 4a**

The anchoring manipulation had a substantial impact on assignment completion predictions. Participants estimated that they would finish their assignments further before the deadline in the early anchor condition (M = 2.69 days, SD = 2.41) than in the late anchor condition (M = 1.31 days, SD = 1.15), t(71) = 3.10, p < .003. Consistent with our third hypothesis, participants started their assignment further in advance of the deadline in the early anchor condition (M = 10.80 days, SD = 9.25) than in the late anchor condition (M = 7.07 days, SD = 5.74), t(71) = 2.06, p = .04, effect size = .06, a medium effect. However, in accordance with our second hypothesis, the actual completion times did not differ significantly across condition. Participants finished very close to the deadline in both the early anchor (M = .92 days, SD = 3.27) and late anchor condition (M = .92 days, SD = 2.17), t(71) = .97, p = .34, effect size = .01, a small effect. Note that participants tended to underestimate their actual completion times in both the early anchor condition (M difference = 1.77, SD = 3.54, t(36) = 3.04, p = .004), and the late anchor condition (M difference = 1.03 days, SD = 2.26, t(35) = 2.73, p = .01), and underestimation did not differ between conditions, t(71) = 1.07, p = .29.

**Study 4b**

The anchoring manipulation was also effective for the tax form completion estimates: participants predicted they would file their taxes much further before the deadline in the early anchor
studies are presented graphically in Figs. 1 and 2.

...consistent with our third hypothesis, participants reported that they began working on their income tax forms further before the deadline in the early anchor condition \((M = 13.25\) days, \(SD = 21.57\)) than in the late anchor condition \((M = 7.24\) days, \(SD = 19.51\)), \(t(26) = 3.78, p = .006\), effect size = .15. However, the actual completion times for this open task did not differ significantly across the two conditions: participants did not finish significantly further before the deadline in the early anchor condition \((M = 11.27\) days, \(SD = 19.51\)) than in the late anchor condition \((M = 13.10\) days, \(SD = 20.44\)), \(t(26) = 2.11, p = .04\), effect size = .02. Note also that, because the anchors affected predictions but not behavior, the degree of bias differed significantly across the early anchor \((M = 15.30\) days, \(SD = 16.45\)) and late anchor conditions \((M = 1.91\) days, \(SD = 16.77\)), \(t(26) = 2.13, p = .04\). Indeed, participants underestimated their actual completion times significantly in the early anchor condition, \(t(12) = 3.36, p = .006\), but not in the late anchor condition, \(t(14) = .44, p = .67\).

Studies 4a and 4b provided converging evidence that for consequential tasks in both academic and personal finance settings, completion predictions have an initial impact on behavior that diminishes after the task has been started. Results from the two studies are presented graphically in Figs. 1 and 2.

![Fig. 1. Predicted completion times, start times, and actual completion times by anchor condition (Study 4a).](image)

![Fig. 2. Predicted completion times, start times, and actual completion times by anchor condition (Study 4b).](image)

**General discussion**

The scenario that opened this paper raised the hopeful possibility that – at least under some conditions – making more optimistic predictions may lead to finishing tasks sooner. The present research demonstrates that such effects are possible, and are more likely to occur for the type of task that can be completed in a single continuous session (closed tasks) than tasks that require many steps to be completed across different times and places (open tasks). More specifically, the results supported our three guiding hypotheses about the behavioral impact of task completion predictions. First, we found evidence that predictions can, at least sometimes, exert a causal impact on task completion behavior. Second, predictions had a greater effect on the actual completion times of closed tasks (e.g., a computer tutorial, a simple writing assignment) than of open tasks (e.g., major school assignments, income tax returns). Third, even though predictions did not influence completion times for open tasks, the predictions did influence when the open tasks were started. This is consistent with the theory that completion predictions have their greatest impact on the beginning phases of a project, particularly the initiation time, and this effect diminishes over the course of a multi-stage project.

Although the studies were designed primarily to assess behavioral consequences of prediction, we also explored implications for prediction bias. A consistent pattern was that people were more likely to underestimate completion times for open tasks than for closed tasks. This finding extends previous research which has shown that people are more inclined to underestimate task duration for long tasks than short ones (Roy & Christenfeld, 2008) by examining task completion predictions. Notably, in our studies tasks that were quite similar in duration showed markedly different completion times depending on how prone they were to interruptions and delays, suggesting that task completion times are determined to a great extent by factors other than the duration of a task itself (see also Buehler et al., 2002). An additional pattern that emerged in some of our studies was that generating earlier predictions resulted in greater underestimation; however, this effect appeared to depend greatly on the type of task. Generating earlier predictions typically increased the bias for open tasks (where predictions did not have corresponding effects on completion times) but not for closed tasks (where predictions had corresponding effects on completion times). Thus the degree to which people underestimate completion times appears to depend not only on how early they predict a task will be completed, but also on qualities of tasks that make them more or less amenable to self-fulfilling effects.4

This research extends our understanding of task completion predictions considerably. The present studies represent the first program of research designed to examine systematically the behavioral consequences of task completion predictions, and tested a theoretical framework derived from relevant previous work. According to our theorizing, task completion predictions are most likely to exert an impact at the early stages of task com-

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4 In addition to mean-level comparisons, it can be informative to examine correlations between predicted and actual completion times (Buehler et al., 1994; Buehler et al., 2002). In particular, our theorizing suggests that the predicted-actual correlation may be stronger for open tasks than for closed tasks. In the one study (Study 3) that allowed a test of this hypothesis (because it experimentally varied open vs. closed tasks) this appeared to be the case. There was a stronger correlation between predicted and actual completion times in the closed task condition \((r[36] = .77, p < .001)\) than in the open task condition \((r[35] = .40, p < .01);\) the Fisher Z score was 2.41, \(p < .02\). Interestingly, the difference in predicted-actual correlations between open and closed tasks was obtained in the early anchor condition \((z = .78 vs. .40)\) but not the late anchor condition \((z = .66 vs. .64);\) the evidence of a stronger predicted-actual correlation for open than closed tasks supplements the mean-level comparisons indicating that predictions correspond more closely to actual completion times for open than for closed tasks.
pletion and, consequently, will have a greater impact on the final completion times of closed tasks (because there is little potential for delay once the task has been started) relative to open tasks (because there is great potential for delaying factors to intervene between the start and completion of the task). The studies yielded convergent support for this theoretical framework and thus shed new light on the relations between task completion predictions and behavioral outcomes.

The findings also help to address a theoretical puzzle evident in our review of relevant literature. On the one hand, previous research offered compelling reasons to believe that task completion predictions could have behavioral effects, along with evidence that predictions in other domains yield self-fulfilling effects on behavior (e.g., Greenwald et al., 1987; Morwitz & Fitzsimons, 2004; Sherman, 1980). On the other hand, past research on task completion predictions has found that many factors affecting prediction do not carry through to affect actual completion times (e.g., Buehler & Griffin, 2003; Newby-Clark et al., 2000; Pezzo, Pezzo et al., 2006). Our findings may speak to this apparent paradox. The previous research on self-fulfilling predictions has typically involved discrete, one-shot behaviors and, consistent with this pattern, we find that predictions have self-fulfilling effects on completion times for closed tasks (and on start times for open tasks). The previous research on task completion predictions has often involved extensive tasks that are prone to delays across time, and consistent with this research we find that task completion predictions have little impact on completion times for such tasks. Thus our findings imply that one reason previous research on task completion predictions has not found self-fulfilling effects is that it has typically targeted open tasks, that is, extensive tasks that are prone to interruptions across time.

In addition to these theoretical contributions, the studies have clear practical implications. First, they speak to the complex question of whether, or when, it may be beneficial to predict an early task completion time. People hoping to finish a task early may be well advised to predict an early completion time if the task is relatively closed, because here the predictions appear to facilitate early completion times without increasing proneness to underestimation (and any costs that might accompany this bias). When the task is relatively open, people may be advised to make more conservative forecasts, especially if there are serious costs associated with underestimation, because the predictions appear to have little benefit for actual completion times but have clear potential to exacerbate bias. When an earlier starting time has value in itself, then optimistic forecasts may be valuable regardless of the nature of the task. These findings also provide guidance for inducing desired task completion times in others, at least when tasks are relatively closed. Anchoring techniques such as the time-line used in our studies could be adapted for use in a range of applied settings where practitioners (e.g., teachers, managers, co-workers) wish to encourage others to complete tasks well before a final deadline. A particular benefit of anchoring procedures, relative to simply imposing a goal on others, is that they may be less likely to jeopardize the individual’s commitment to finish at the desired time (Hinsz, Kalnbach, & Lorentz, 1997).

An avenue for future research is to examine more precisely the process by which predictions exert a behavioral impact. Our review of the literature suggested several potential mechanisms that merit investigation. An early task completion prediction might help to initiate action because: it serves as a guiding goal or standard (Locke & Latham, 1990, 2002); it operates like other performance expectancies to increase people’s confidence, effort, and persistence (Bandura, 1977; Carver & Scheier, 1998; Cervone & Peake, 1986); it induces consistency motives (Festinger, 1957); it elicits concrete plans or scenarios that specify when, where, and how the task can be completed promptly (Armour & Taylor, 2003; Gollwitzer, 1999; Taylor et al., 1998); or it heightens the accessibility of the person’s attitudes and intentions toward the behavior (Greenwald et al., 1987; Morwitz & Fitzsimons, 2004; Sherman, 1980). Our goal in this initial investigation was not to disentangle these potential mechanisms, and indeed, the processes are largely complementary in that they would yield similar behavioral effects. However, given that each of these processes has been shown to facilitate desired behaviors and outcomes in other domains, researchers could attempt to explicate their roles as mechanisms for effects of task completion predictions.

In addition to exploring the processes underlying behavioral effects, future research should examine more closely the process by which the predictions lose their impact. Our findings imply that the effects of predictions diminish somewhere between the start and completion of a long term task. Future research could examine the time-line more closely, and pinpoint the factors that disrupt the behavioral effects. These may include factors residing within individuals (e.g., procrastination, changes in motivation) as well as external events that intervene between the start and completion of a task (e.g., unexpected interruptions, competing goals and demands).

In this regard, a particularly intriguing aspect of the findings was that, for open tasks, predictions influenced start times but then did not influence when a task was finished. Thus it was not simply the case that external factors intervened and delayed task completion by a uniform amount of time. Instead, people took longer to finish the task (after starting it) when they made early predictions than when they made late predictions. One possible explanation for this pattern is that people spent more time working at the task itself when they had started it early, however, we suspect this is unlikely. An implication is that participants should have produced higher quality of work when they started early; however, in the one study where we were able to test this possibility by obtaining the grades participants received on their target assignment, we found no supporting evidence.5 Also, as noted previously, completion times are often driven more by external factors than by how long people spend working at the task itself (Buehler et al., 2002).

Another intriguing possibility is suggested by research demonstrating that an initial action toward a goal can sometimes lead people to disengage from the goal, particularly if that action engenders a sense of accomplishment that justifies a momentary disengagement from the goal to pursue other goals (Fishbach & Dhar, 2005; Fishbach, Dhar, & Zhang, 2006). After starting a task early, individuals might infer that they are making good progress, which justifies a momentary disengagement from the task and makes them prone to subsequent delays.

Finally, we believe that to fully understand the pattern of moderation, it is necessary to explore the role of deadlines in guiding task completion behavior. Note that each of our target tasks had a firm deadline for completion, and previous research has shown that such deadlines exert a powerful impact on when people actually finish their tasks—even when people hope to finish well in advance of a deadline, their actual time ends up being driven largely by deadlines (Ariely & Wertenbroch, 2002; Buehler et al., 1994, 2002). We suspect that for open tasks the salience of an early prediction (and perhaps the task itself) may fade until a looming deadline pulls it back into focus. That is, people’s final task completion times may be a function of two psychological forces—people’s plans to finish early and their deadlines. Optimistic plans to finish early may get tasks started, but then the effects of external factors take over and it is the force of deadlines that controls actual completion times. Future research that explores the role of deadlines

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5 The percentage grade that participants received on the assignment (obtained from the course instructor) did not differ across the early anchor (M = 80.65, SD = 8.61) and late anchor conditions (M = 77.46, SD = 12.29), t(30) = .87, ns.
on completion times (for open vs. closed tasks) may shed light on why people take longer to finish a task (after starting it) when they have generated earlier completion predictions. More generally, by continuing to explore the ways in which predictions diminish in impact across time, we will arrive at a better understanding of how people can generate forecasts that have the power to create their own realties.

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