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Planning for the close and distant future: The impact of temporal distance on task completion prediction

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Planning for the Close and Distant Future:

The Impact of Temporal Distance on Task Completion Prediction

by

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Abstract

Accurate project completion estimates are part of successful project completion. Thus, it is important to identify factors that reduce the tendency to make overly optimistic project completion predictions (Buehler et al., 2002). This research investigated the effect of temporal distance on project completion predictions. A review of past research provided evidence that could lead to a prediction of either increased or decreased optimism with increasing temporal distance. In a first study, participants predicted the completion date of a hypothetical school assignment that would begin either tomorrow (close future) or next term (distant future). Participants predicted to complete the project earlier in the close than in the distant condition. This relation was mediated by concreteness of thoughts about the project, as participants thought more concretely about close projects and made more optimistic predictions when thinking concretely about the project. In a second study, participants predicted the completion time of an essay task they would receive either the day after their prediction (close future) or two weeks later (distant future). Again, concreteness of thoughts about the project mediated the effect of temporal distance on the optimism of predictions. Additionally, participants were more likely to focus on possible problems in the close future condition than in the distant future condition and made less optimistic predictions if thinking about possible problems. Thus, temporal proximity increased two thought processes that had opposite effects on predictions: Concrete thoughts increased optimism whereas a focus on problems decreased optimism. When both mediators were present, they appeared to cancel out a direct effect of temporal distance on prediction optimism. Possible moderators that may enhance one mediation path over the other are discussed.

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Planning for the Close and Distant Future: The Impact of Temporal Distance on Task Completion Prediction

Planning projects is an important part of professional and personal life. A student might plan a school assignment or the purchase of a Christmas present, a family might plan their home renovation, and a business manager might plan a new business venture. In each case, people's plans are likely to involve estimates of the time that it will take to complete the task, and when it will be finished. Accurate project completion time estimates are part of successful project completion. For example, overly optimistic completion estimates may constitute a risk of failing to meet the deadline, increased time pressure might hurt the project's quality, or the overestimation of one's time resources may lead to taking on too many other projects. The main purpose of the present research is to determine whether completion time estimates are influenced by the temporal distance between prediction and start of the project.

The point in time for planning the project and the point in time for the start of the project may lie close together or far apart. For example, a student might intend to complete a long term school assignment knowing that it is impossible to start it until two weeks before the deadline of the project, due to other obligations. The student could estimate the time it would take to complete the assignment as early as possible (when receiving the instructions) or only after some time, when the start of the project draws nearer. The temporal distance between the planning of a project to its start might have consequences for the accuracy of predicted completion time. Planning a project further before its start may either increase or decrease accuracy in completion time prediction.

To determine the best moment to plan a project, it is necessary to examine the effect of temporal distance on prediction accuracy. Past research on project planning suggests two competing hypotheses. Some studies suggest that planning temporally close projects would result in a greater underestimation bias in time predictions, while other studies suggest that planning temporally distant projects would result in a greater underestimation bias in time predictions. The current research will test these hypotheses empirically and explore possible mediators for the proposed relation between temporal distance and prediction accuracy. Research on temporal distance as well as research on the planning fallacy – namely, the tendency to underestimate project completion times consistently, thus displaying an optimistic bias - will be reviewed. Mechanisms contributing to the planning fallacy will be reviewed to show that there is evidence to expect both close and distant projects to increase the planning fallacy.

Temporal Distance

Temporal distance to an event or project can be conceived of as objective temporal distance (i.e., actual calendar time) or subjective temporal distance (i.e., how far the future feels). The present research will primarily look at objective temporal distance, because the calendar time of the projects will be varied.

Subjective confidence in task performance. One example of the powerful impact of temporal distance on cognitive appraisals of a future event was provided by research investigating subjective confidence in task performance (Gilovich, Kerr, & Medvec, 1993). Students were asked to estimate how well they would do on a midterm at two points in time: On the first day of class and on the day of the exam. Students' confidence in their abilities dropped dramatically between these two points in time; their estimated percentile scores at the day of the exam were only two thirds

of the estimated percentile score at the first day of class. This study suggests that temporally close projects elicit less subjective confidence than distant projects. However, project completion predictions may be different from project outcome predictions on a number of aspects that will be discussed in a later section.

Construing events in the close and distant future. Construal Level Theory (e.g., Liberman & Trope, 1998) argues that the perception of future events depends on how the perceiver mentally construes these events. A future event can be represented on a higher level (i.e., using more abstract features) or a lower level (i.e., using more concrete features). Liberman and Trope's research indicates that one encodes events more abstractly in the distant future and more concretely in the close future.

When planning temporally close projects, one may be likely to think of concrete steps of action that have to be taken towards the completion of the project – thus, the project might be perceived as less hypothetical if its execution is close than if its execution is far away. The close future might be more likely to be construed in a concrete cognitive mindset and the distant future might be construed in an abstract mindset.

Supporting this hypothesis, Liberman and Trope (1998) found that the desirability of the task is a stronger predictor for decision processes in the distant future than feasibility, while the reverse is true for decision processes in the close future. Liberman and Trope characterize the desirability of a task as a high-level construal feature: One thinks of the desirable aspects of a task (e.g., the academic benefits of presenting a poster at a conference) when thinking about the task abstractly. In contrast, the feasibility of a task is characterized as a low-level construal feature (e.g., the money and time investments that one has to make in order to present the poster) characteristic of a more concrete mindset. Nussbaum, Trope, and

Liberman (2003) asked students to explain positive and negative future outcomes (e.g., a wage raise, an unpleasant date), as well as to predict and explain others' behaviour in a hypothetical situation, while varying temporal distance (a couple of days versus a year later). In the distant future, attribution to both positive and negative outcomes and others' behaviour were significantly more global and dispositional (high-level construal features) than in the close future.

Planning Fallacy

Research on project planning in a variety of contexts, such as honours thesis completion (Buehler, Griffin, & Ross, 1994), income tax declarations (Buehler, Griffin, & MacDonald, 1997), Christmas shopping (Buehler & Griffin, 2003; Kruger & Evans, 2003), and various group projects (Buehler, Messervey, & Griffin, 2005; Sanna, Parks, Chang, & Carter, 2005) has found repeatedly that people tend to underestimate the project completion time considerably, even though they are aware that similar tasks have taken longer in the past. Kahneman and Tversky (1979) coined the term "planning fallacy" for this optimistic prediction bias.

The planning fallacy is robust. It persists even if the planner is instructed to think pessimistically about a project. For example, in one of the first empirical tests of the planning fallacy, Buehler et al. (1994) asked psychology honours students imagine the most likely, the best case, and the worst case scenario for the date of submission of their completed thesis. Participants then predicted the number of days before the deadline they would finish the project. Participants greatly underestimated the time it would take them to complete their thesis in the most likely and best case scenarios and, although not significantly, tended to do so even in the worst case scenario. Studies assessing individual differences, like procrastination or optimism, and cross cultural research suggest that the planning fallacy generalizes across culture and

personality traits (for a review see Buehler, Griffin, & Ross, 2002). For example, procrastinators predict that they will complete projects later than non-procrastinators but finish still later than predicted (Buehler & Griffin, 2003; Pychyl, Morin, & Salmon, 2000). Thus, both procrastinators and non-procrastinators show an optimistic bias.

Several mechanisms underlying the planning fallacy have been suggested in past research. Those mechanisms most relevant to a hypothesized effect of temporal distance on completion predictions will be discussed below, including the construal level of the project, the inside versus the outside view of a problem, the focus on detailed plans, the role of past experiences, motivation, the planner's scenario of the implementation of the plan, and focalism. A review of these mechanisms suggested by past research provides evidence to expect both a positive and a negative effect of increased temporal distance on completion prediction optimism.

Prediction Optimism in the Close Future

Construal level. Construal Level Theory (Liberman & Trope, 1998) suggests that one encodes events more abstractly in the distant future and more concretely in the close future. On the basis of Construal Level Theory, one may expect both increased and decreased prediction optimism in the close future. Possible mechanisms by which Construal Level Theory could decrease optimism in the close future will be discussed in the next section. Construal Level Theory might also speak to an increased optimism when planning temporally close projects. A concrete construal in the close future may lead to focusing on singular, project specific information (e.g., the expected completion scenario) rather than distributional information (e.g., past experiences). In other words, a concrete perspective in the close future might

encourage the adoption of an 'inside' view of a problem (Kahneman & Lovallo, 1993).

Adopting an inside or an outside view. Kahneman and Lovallo (1993) distinguished two modes of forecasting: The inside view versus the outside view of a problem. Those who adopt the inside view focus on singular information of the project at hand, and possible future scenarios to predict an outcome. Those who adopt an outside view ignore the details of the project at hand and try to understand the problem as one of a class of similar problems, thus to predict the outcome from past experiences or baseline information. Adopting an inside view may lead to an optimistic prediction bias in completion forecasts, as scenarios of the task completion tend to be overly optimistic (Newby-Clark, Ross, Buehler, Koehler, & Griffin, 2000), and consideration of past experiences tends to decrease the optimistic bias (Buehler et al., 1994). People might adopt the inside view more naturally when planning temporally close projects, because they are about to execute the project. As supported by Construal Level Theory (Liberman & Trope, 1998), close projects may seem more concrete and unique, inducing an inside view. Therefore, by adopting an inside view of the project in the close future, the planner might show greater prediction optimism.

The distinction between the inside versus outside view of a project is similar to the distinction between actor and observer perspectives or the distinction between first person and third person perspective. Buehler et al. (1994) examined the distinction between the actor and the observer perspective when planning a project. When predicting project completion times, observers made less optimistic predictions than actors. This finding is relevant because the perception of the project as concrete is akin to an actor perspective whereas perceiving the project abstractly is similar to the observer perspective. A concrete perception of the project implies planning the

concrete actions one will undertake towards the project completion. One thinks concretely about one's future actions, and is an actor rather than observer in the imagined project implementation. Research on the actor versus observer perspective may therefore support the hypothesis that the concrete construal of a project leads to increased prediction optimism.

Similarly, a third person perspective might be similar to the observer perspective, as one imagines observing or looking at a separate person who completes the project. A third person perspective would then be characterized as thinking in an abstract mindset. Consequently, an actor or first person perspective may be characterized by a concrete mindset about the task, and completion predictions should be more optimistic for temporally close events. Indeed, thinking of project completion in a first person perspective is likely to bias the prediction to a greater extent than thinking of the project completion in a third person perspective (Buehler, Griffin, & Deslauriers, 2005).

Thinking concretely about a project might be related to an inside view of the problem or an actor perspective or a first person perspective, all of which have been shown to increase prediction optimism.

Focus on detailed plans. In addition to the perspective or view of a problem, a focus that is solely on the project characterizes a concrete construal of the project and may increase the planning fallacy. Specifically, focusing on the implementation of a planned project may increase prediction optimism. In a 'future focus' condition, Buehler and Griffin (2003) induced a detailed focus on the project *Christmas Shopping* by asking participants to imagine and describe in detail when, where and how they would go shopping. The optimistic prediction bias was larger in the future focus condition than in a control condition. The induced focus on the implementation

of the project led to an increased planning fallacy. The future focus condition may be comparable to an inside view of the problem. Thus, participants might have perceived this year's Christmas shopping not as one of a class of similar experiences but rather as a new and unique experience. They might have considered only singular, task specific information necessary for the implementation of their plan and failed to integrate past experiences or baseline information about completion processes in general. Through this selective information processing, they arrived at an overly optimistic prediction concerning their Christmas shopping.

The work examining people's focus on detailed plans is important in this context because it is plausible to expect that temporal distance could affect the degree of focus on concrete plans. Presumably, a concrete mindset facilitates the focus on detailed plans. When thinking concretely about the implementation of a plan, more details might come to mind than when thinking abstractly about the general plan. Construal Level Theory (Liberman and Trope, 1998) suggests that one is more likely to frame an event in a concrete mindset when thinking about the temporally close future. Thus, the focus on detailed plans might be more likely to occur in the close future.

Role of past experiences. The inside view of a problem is not only characterized by thinking concretely about it, but also by neglecting past experiences (Kahneman & Lovallo, 1993). Past completion times are a valid predictor for future completion times (Buehler et al., 1994), but are generally neglected when forecasting completion times, perhaps because past experiences are judged as irrelevant when thinking about a new, unique problem.

If planners judge their past experiences to be irrelevant, they would not use them as a basis for making predictions. Investigating this explanation of neglect of

past experiences, Buehler et al. (1994) manipulated the thought focus of students planning the completion of a computer tutorial. Past experiences were connected with the future project by asking participants to indicate when they would finish the future project if they finish it as far from the deadline as they typically finish projects. When past experiences were thus made relevant for the future project, predictions were less optimistic. No effect on prediction was noted when participants were simply asked to recall their past experience, without explicitly relating this experience to the future project.

Other research suggests that the optimistic prediction bias might be due to a biased memory of past experiences rather than a neglect of past experiences (Roy, Christenfeld, & McKenzie, 2005). Roy and his colleagues argue that planners base their predictions on past experiences but, as the memories of these experiences are optimistically biased, the prediction is also optimistically biased. Whether due to an inside view of the project, or neglect of correct memory, or a biased memory, mis-use of past experience probably reduces the accuracy of completion forecasts. Kahneman and Lovallo (1993), Buehler et al. (1994), and Roy et al. (2005) all agree that accurate recall of past experience can be a valuable source of information for accurately predicting project completion. If past experience is misremembered or neglected, especially when construing a project concretely, completion predictions may be more optimistic.

Motivation. Motivation, in addition to the hypothesized negative impacts of concrete construal, may impact prediction optimism. First, the concept of motivated reasoning (Kunda, 1990) might play a role in creating overly optimistic scenarios. Buehler, Griffin, and MacDonald (1997) tested the impact of motivation on predicting tax income form completion. When motivated to complete the project early (i.e.,

when they were expecting a tax refund), planners predicted they would finish the project earlier than when not motivated (i.e., when they were expecting no refund). This impact of motivation was stronger for the prediction than for the actual behaviour, thus increasing the optimistic prediction bias. Second, Koehler and Poon (2006) found that predictions regarding the likelihood of engaging in certain activities, such as blood donation, were linked to the strength of intention to complete the activities. Again, these intentions did not translate into behaviour, thus increasing the optimistic prediction bias.

One might feel more motivated to complete a project in the close future, as any reward would be immediate. Similarly, actors might be more motivated to predict a desirable completion time than observers. The biasing influence of motivation on prediction accuracy would therefore speak for an increased planning fallacy in the close future.

Prediction Optimism in the Distant Future

Construal level of the task. Construal Level Theory (Liberman & Trope, 1998) also provides reason to expect greater prediction optimism when planning temporally distant projects. According to Construal Level Theory, the distant future is construed more abstractly than the close future. An abstract view of a project might hinder people from considering all the details that the project completion entails. For example, a student might forget that the completion of an essay includes several sub-components, such as retrieving the literature, reading, writing, editing and formatting. Thus, people might create an overly optimistic scenario of the task completion process by forgetting or underweighting some components of the task. Consistent with this possibility, Kruger and Evans (2003) argue that the planning fallacy can be reduced by prompting people to 'unpack' the task. Kruger and Evans asked Christmas

shoppers to consider all details of their Christmas shopping, specifically to list each person and each present before making a completion date prediction. Compared to a control group, 'unpacked' predictions were less optimistic and more accurate. A global representation of a task might be more likely when thinking abstractly about the task whereas an 'unpacked' representation of a task might be more likely when thinking concretely about the task. As an abstract construal of the task may be more likely in the distant future, this research suggests greater optimism in the distant future.

Kruger and Evans' (2003) "unpacking" strategy appears similar to Buehler and Griffin's (2003) future focus strategy, but these strategies were shown to have opposite effects on people's prediction. Both studies asked participants to focus on the process of their Christmas shopping, either listing the sub-components of the task (Kruger & Evans) or describing the implementation of the project (Buehler & Griffin). The results suggest that participants generated an optimistic prediction of the task completion time when asked to imagine the implementation of the project but they did not do so when asked to list all sub-components of the task. For example, in Kruger and Evans' Christmas shopping study, participants just listed the gift receivers without further details, which might not encourage step-by-step planning. It might be that in simply listing sub-components without creating a coherent scenario, Kruger and Evans' participants avoided the increased optimism that is elicited when people form step-by-step plans.

This example of contradicting effects on prediction optimism of two very similar manipulations of concrete task construal is supportive of our contention that concrete construal of a task may have opposite effects on prediction optimism. The effect of concrete task construal may depend on the aspect of concreteness that is

activated. For example, step-by-step planning might increase optimism, and unpacking the components of the task might decrease optimism.

Scenario of the project completion process. Apart from missing sub-components of the task, another reason for overly optimistic predictions may be failing to account for possible problems and interruptions that delay the project completion. If one imagines the project implementation to occur without any interruptions and unforeseen problems delaying the completion (best case scenario), one's completion prediction may be more optimistic than if one thinks of all the things that can go wrong during project implementation (worst case scenario).

Newby-Clark et al. (2000) asked students to describe the best case scenario, the worst case scenario, and a realistic scenario of the completion of a school assignment. Both optimistic and realistic scenarios were judged to be more likely to occur by the planners themselves. Uninvolved observers reading the scenario description rated the realistic scenario as more similar to the optimistic scenario than to the pessimistic scenario. Participants appeared to spontaneously generate optimistic rather than pessimistic scenarios. However, contrary to participants' beliefs, the completion prediction implied by the worst case scenario proved to be the most accurate. This research suggests that failing to account for possible problems and interruptions increases the optimistic bias in predictions.

Accounting for time competing activities. There is some evidence that people consider possible interruption to a lesser degree in the distant future than in the close future. Specifically, increasing temporal distance appears to create an illusion of unlimited time resources (Liberman & Trope, 1998; Zauberman & Lynch, 2005).

Liberman and Trope (1998) asked students to indicate how many hours they would like to spend on two academic and seven non-academic activities. As time is a

finite resource, desirable (non-academic activities) and necessary (academic activities) activities should be perceived as competing for time. Thus, if time spent on non-academic projects increases, then time spent on academic projects should decrease. Participants treated academic and non-academic activities as competing for time resources only when thinking about the close future but not when thinking about the distant future. This finding suggests that people would be less inclined to perceive other activities in the distant future as competing for their time. Thus, they might fail to consider possible interruptions in the project's completion process by these activities.

Along similar lines, Zauberman and Lynch (2005) found that people believe there will be fewer activities overall in the future than there are in the present. Participants were asked to rate their available spare time at the present time, on a day in three weeks and on a day in three weeks plus two days. Respondents believed that they would have more spare time on both future days than they had at present. Ratings of increased spare time did not differ between the two future days. As time drew nearer, however, participants' predictions changed. When asked at the first of the two future days to predict the spare time they would have at the second future day, they again predicted an increase in spare time resources from the first future day to the second future day.

This research may suggest that people not only fail to treat activities as competing for one's time in the distant future (Liberman & Trope, 1998), but they also believe they have more time overall in the distant future (Zauberman & Lynch). Both these fallacies may contribute to overly optimistic project completion scenarios (Newby-Clark et al., 2000) and thus increase prediction optimism in the distant future.

Focalism. The concept of focalism may explain the tendency to perceive inflated time resources. Focalism may be defined as the tendency to fail to consider nonfocal events when focusing on one future focal event (Wilson, Wheatley, Meyers, Gilbert, & Axsom, 2000)

Wilson et al. (2000) asked football fans to predict their own overall happiness on the day after an important football game in case their team won or lost. Actual happiness on this day was assessed with a previously distributed questionnaire the participants were instructed to open on that day. People's predictions were overly extreme in both cases; they expected to be happier than they actually were when the team won and they expected to be less happy than they actually were when the team lost. This may be due to a focus on the focal event, while forgetting other events that would occur at the same time. To investigate this explanation, Wilson et al. asked some participants to complete a defocus manipulation prior to their happiness prediction, listing all other thoughts that they would probably be concerned with on that day. This intervention was intended to decrease participants' focus on the football game. In the defocused condition, predicted and actual happiness did not differ. Participants were better able to predict their own feelings after the focal event when reminded of other simultaneously occurring activities that might distract their thoughts from the focal event.

Wilson and colleagues (2000) proposed that focalism is likely to increase the planning fallacy, because failing to think about nonfocal events might lead to forgetting possible interruptions and delays during the project completion. However, empirical research supporting this theory has yet to be conducted. Focalism may be more likely to occur in the temporally distant future. Zauberman and Lynch's (2005)

research showing an increase in perceived spare time implies that participants had fewer plans in the distant future.

Predicting performance. Further supporting the thesis that overly optimistic predictions are more likely to occur in the temporally distant future, several studies suggest that people focus more on the possibility and causes for success in the distant future and more on the possibility and causes of failure in the close condition (Eyal, Liberman, Trope, & Walther, 2004; Gilovich et al., 1993; Savitsky, Medvec, Charlton, & Gilovich, 1998). Considering success rather than failure may lead to overly optimistic scenarios and to overly optimistic completion predictions.

Gilovich et al. (1993) asked students to estimate how well they would do on several short experimental tasks (e.g., recalling nonsense syllables) in the immediate or delayed future. Students also listed the factors that would lead them to do well or do poorly on the task. Those participants who were told that they would have to complete the tasks immediately were less confident and listed more reasons for failure than those who were told that they would have to complete the task later in the semester. Participants in the distant condition gave more favourable estimates of their success and also identified more reasons for superior performance than participants in the close condition. Gilovich et al. (1993) discuss the imminence of feedback for close future predictions as a possible mechanism for this effect. Savitsky et al. (1998) replicated the effect of temporal distance on confidence, but offer an alternative explanation: Participants might mis-attribute the physical arousal they feel about an immediate test to a lack of confidence, thus focusing more on reasons for failure.

These findings suggest that people might be more optimistic when thinking about the distant future than the close future. However, it is important to consider that Gilovich et al.'s (1993) and Savitsky et al.'s (1998) research focussed on the

prediction of successful task performance rather than on completion time predictions. The discussed mechanisms (i.e., feedback imminence, physical arousal) may not influence predictions in project planning. For example, even when the start of a project is close, the end of the project is still relatively remote and feedback therefore suspended. Similarly, physical arousal might be more likely to occur close to a final deadline than close to the start of the project. Keeping this in mind, the research on performance prediction may not directly transfer to completion time prediction. It does, however, suggest evidence for greater optimism in the distant future.

Motivation. Although there are reasons to believe that motivation increases optimism in the close future (e.g. imminence of rewards), there may be reasons to expect an increase of motivation in the distant future as well. According to Construal Level Theory, the desirability aspect of a project is more salient for the distant future while the feasibility aspect of the project is more salient for the close future (Trope & Liberman, 1998). Thus, people might focus more on the desirability of project completion and less on its feasibility when predicting distant projects. A heightened focus on desirability might increase motivation to complete distant projects. Therefore, the biasing influence of motivation on prediction accuracy may lead to expect an increase in prediction optimism for the distant future.

Overview of the Present Research

The current research seeks to examine the role of temporal distance in project completion predictions. Past research has repeatedly found an optimistic bias for project completion predictions (Buehler et al., 2002). Temporal distance to the project might play a role in determining the degree of optimism for completion prediction.

Some of the research reviewed above suggests increased optimism for temporally distant projects. Distant projects are construed more abstractly (Liberman

& Trope, 1998), which could lead participants to fail to consider all aspects of the project (Kruger & Evans, 2003). When planning temporally distant events one may also be less likely to consider other time competing events (Liberman & Trope, 1998, Wilson et al., 2000; Zauberman & Lynch, 2005) and be generally optimistic (Eyal et al., 2004; Liberman & Trope, 1993; Savitsky et al., 1998) thus creating an overly optimistic project completion scenario. Overly optimistic scenarios may create overly optimistic completion predictions (Newby-Clark et al., 2000). Lastly, one might focus more on the desirability of a task, rather than its feasibility, when the task is distant (Liberman & Trope, 1998), thus increasing motivation to complete the task. Increased motivation may increase the planning fallacy (Buehler et al., 1997; Koehler & Poon, 2006).

Other research suggests increased optimism for temporally close events. Close projects are construed more concretely (Liberman & Trope, 1998). A concrete construal of a project might elicit an inside view or an actor perspective on the project, both of which have been shown to increase the planning fallacy (Buehler et al., 1994; Buehler & Griffin, 2003; Kahneman & Lovallo, 1993). Additionally, one might be more motivated to complete a temporally close project, because any reward for completion would be immediate. Increased motivation may increase the planning fallacy (Buehler et al., 1997; Koehler & Poon, 2006).

As past research provides evidence for two competing hypotheses, we treated the impact of temporal distance on completion prediction as an empirical question guiding our two studies. Possible mediators, particularly construal level of the project and focalism were examined. Study 1 explored the impact of temporal distance on optimism of completion predictions for a hypothetical school assignment. Study 2

investigated the effect of temporal distance on prediction optimism for a real project, specifically the completion of an essay task. Study 2 also manipulated focalism with a defocus manipulation similar to Wilson et al.'s (2000).

Study 1

The present study examined the impact of temporal distance to a project on the optimism of project completion predictions. The target project was a hypothetical school assignment. A prediction was defined as more optimistic to the extent that it was further before the deadline. Relative optimism was defined as predicting to finish the project further before the deadline than similar past projects. Participants were asked to imagine the hypothetical project to start either at the time of the prediction (close future) or four months after the prediction (distant future).

Past research suggests two competing hypotheses for the effect of temporal distance on prediction. Participants might plan more optimistically for the close future than for the distant future (*Hypothesis 1*) or participants might plan more optimistically for the distant future than for the close future (*Hypothesis 2*).

Hypothesis 1 is based on the presumption that people think more concretely about close events than about distant events (Liberman & Trope, 1998). Thinking concretely about a project may be linked to an inside view or actor perspective, which in turn would lead to increased optimism. Perceiving the project as concrete and focusing on its implementation might also lead to a disregard for relevant past experiences with similar projects. Hypothesis 2 is based on the presumption that an abstract perspective may lead the planner to overlook details of the project completion process and fail to consider other time competing events. People might also be generally more optimistic about temporally distant projects, just as they are more optimistic about distant performance outcomes. We treated these competing

hypotheses as an empirical question and measured possible mediators to shed light on the mechanisms by which temporal distance might affect prediction optimism.

Method

Participants

One hundred and forty-five undergraduate students at Wilfrid Laurier University were recruited via the online research participation pool and compensated with course credit. Six participants were excluded because the main dependent measure had not been completed, 2 more participants were excluded because the main dependent measure was more than 3 standard deviations above the mean score and 7 participants were excluded from the analyses because the recalled past experiences differed more than 3 standard deviations from the mean completion time of past experiences or was not completed.

The final sample of 127 participants included 105 (83%) female students and 24 (17%) male students. Age ranged from 17 to 24 years ($M = 18.74$, $SD = 1.47$). The two temporal distance conditions contained similar numbers of participants: 66 in the close condition versus 61 in the distant condition.

Materials and Procedure

The study was conducted online. Eighty-two (65%) of the participants reported completing the study from a computer at school, 36 (28%) of the participants completed the study at home and 7 (6%) completed the study at the home of a friend or in a café. All participants were asked to imagine that they had been given a hypothetical school assignment that was described to them as follows:

> One of your course instructors gives out an assignment for which completion you will have to read one chapter in your text book and write a summary about it, as well as answering 5 questions related to the chapter's content. You have two weeks time to complete this assignment.

Participants then recalled and described a personal experience they had with a similar past project. Specifically, they were asked to describe how many days before the deadline they had expected to complete the past project and when they had actually completed it. They were also asked how long they had expected the past project to take and how long it had actually taken. The actual completion time and the actual duration time were used as covariates in later analyses. Participants were also asked to rate the valence of the past experience, its typicality for their usual task completion time, its importance then and now, their clarity of memory about the recalled experience and whether they remembered any interruptions during the past project completion process, using 5-point Likert scales.

Temporal distance manipulation. Participants were randomly assigned to one of two temporal distance conditions [1]. For the close future condition, the instructions specified that the hypothetical assignment had to be completed now *(Imagine now, that you **just received** the formerly described assignment in one of your courses.).* For the distant future condition the instructions specified that the assignment had to be completed in about four month's time *(Imagine now, that you **will receive** the formerly described assignment at **this time next term**).* Participants recorded a measure of the subjective distance they felt to the deadline after reading the instruction [2] (See Appendix A for the manipulation of temporal distance).

Main dependent variables. The main dependent variables were participants' time predictions concerning the assignment. Participants predicted how many days before the deadline they would start working on the project, how many actual hours they would spend working on the project, and how many days before the deadline they would complete the project. Predictions were considered as more optimistic when subjects predicted to start further before the deadline, predicted a shorter

duration, and predicted a completion date further before the deadline (See Appendix B for the prediction measures). Participants were considered relatively more optimistic, if they predicted to complete the hypothetical assignment earlier than they had completed a past similar project. Of these four measures of optimism, predicted completion time is the main measure of optimism, in line with past research (Buehler et al., 2002).

Measures of thought focus. After they had made the prediction, participants listed the thoughts they had while generating the prediction (See Appendix C for the thought focus measures). This thought list was coded by two coders for the presence or absence of a reference to: Past experiences, task characteristics (singular information), concrete steps of action, dispositional factors, and other time competing activities (see Table 1). If the participant did not list any thoughts, an absence of thoughts to every category was recorded. The category of task characteristics or singular information about the task was characterized by a reference to the scope of the task (e.g., I will have to read one chapter in the textbook). A concrete plan of action was defined as a reference to steps of action that were expected to be taken in order to accomplish the task (e.g., I will answer the question as I read the chapter). These two categories seemed very similar and were pooled in the category concrete thoughts after the coding was complete, so that this category contained three levels of concreteness: No concrete thoughts, one concrete thought (e.g., a reference to either task scope or steps of action) and two concrete thoughts (e.g., a reference to both task scope and steps of action). The coders were blind to participants' temporal distance condition while coding the thought listing. Inter-rater agreement for the coding categories assessing references to past experiences, personality, other time competing

activities and concrete thoughts were .73, .78, .85 and .72, respectively. The coding from the primary coder was used in the analyses.

After the open-ended measure of thought focus, participants also rated the extent to which they had based their prediction on several factors on a scale of 1 (*not at all*) to 5 (*very much*). Participants rated the extent to which they had based their prediction on a plan of action, their hopes and wishes, possible problems, possible interruptions, their past experiences and their knowledge of how long people in general take to complete similar tasks (See Appendix C for the thought focus measures).

Exploratory personality variables. Finally, several personality variables were assessed for exploratory purposes [3]: Procrastination (Lay, 1988), self-esteem (Rosenberg, 1965), optimism (Scheier, Carver, & Bridges, 1994), dialectic thinking (Spencer-Rogers, Peng, Wang, & Hou, 2001), views about past and future (Buehler & Wilson, 2003), and perfectionism (Frost, Marten, Lahart, & Rosenblate, 1990).

Results

Recalled and Predicted Completion Times

The reported project completion time for the past project was highly correlated with the predicted completion time for the target assignment, $r(125) = .65$, $p < .001$. However, participants expected to complete the target assignment further before the deadline ($M = 1.45$, $SD = 1.65$) than the recalled project ($M = 1.14$, $SD = 1.79$), $t(126) = -2.40$, $p = .02$. The recalled past experience was judged as moderately similar to the hypothetical project, with a mean of 2.50 ($SD = .96$) on a scale ranging from 1 (very similar) to 5 (very different).

Recalled and Predicted Duration Times

Overall, the reported project duration for the past project was highly correlated with the predicted duration for the target assignment, $r(106) = .43$, $p < .001$. The recalled working hours for the past project ($M = 3.79$, $SD = 3.10$) did not differ significantly from the predicted working hours for the target assignment ($M = 3.78$, $SD = 3.06$), $t(107) = -.03$, *ns*.

Effects of Temporal Distance on Predictions

Each of the prediction measures was submitted to a one-way ANOVA with temporal distance as a between-subjects factor (See Table 4 for means of predictions by condition). Temporal distance had no effect on the predicted project start time, $F(1, 121) = .47$, *ns*. Participants predicted they would start about 5 days before the deadline in both the close ($M = 5.24$, $SD = .38$) and the distant ($M = 4.86$, $SD = .41$) condition [4].

Temporal distance had a significant effect on predicted project duration, $F(1, 115) = 6.43$, $p = .01$. Participants predicted they would work on the project longer when it was close than when it was distant. Thus, providing tentative support for Hypothesis 2, participants were more optimistic when predicting the duration of temporally distant projects than when predicting the duration of temporally close projects. The effect of temporal distance on predicted duration remained significant when controlling for the duration of the recalled project by including it as a covariate in the analysis, $F(1, 105) = 5.63$, $p = .02$.

The ANOVA for predicted completion time revealed a significant effect of the temporal distance manipulation, $F(1, 125) = 5.48$, $p = .02$. Participants predicted to complete the project closer to the deadline in the distant condition than in the close condition. Thus, participants' predictions were more optimistic in the temporally close

condition than in the distant condition. This effect of temporal distance on project completion prediction supports Hypothesis 1 and is contrary to the effect of temporal distance on project duration prediction. Indeed, project duration predictions correlated negatively with project completion prediction, $r(115) = -.27, p < .01$.

In order to examine optimism in completion time predictions relative to previous completion times, an ANOVA was conducted with the recalled completion time as covariate and temporal distance as between subject factor and predicted completion time as dependent variable. Greater relative optimism was found for participants in the close condition, $F(1, 124) = 7.21, p < .01$. Relative to their past experience, participants in the close condition predicted they would complete the target assignment earlier ($M = 1.73$, $SD = .15$) than did participants in the distant condition ($M = 1.14$, $SD = .16$), measured in days before the deadline.

Effects of Temporal Distance on Thought Focus

First we examined the coded variables, reflecting participants' thought focus. In the open-ended thought listing, the most commonly listed thought (50%) was about past experiences (See Table 5 for frequencies of open-ended thought listings by condition).

The frequencies for each coding category were tested with separate Chi-Square tests with temporal distance as a between-subject factor. Concrete plans were mentioned more often in the close condition ($N = 31$) than in the distant condition ($N = 18$). This difference was significant, X^2 $(2, N = 127) = 3.99, p = .05$. The temporal distance manipulation had no effect on references to past experiences, references to personality traits, and references to time competing activities, X^2s $(2, N = 127) < 1.33$, $ps > .16$.

Next, we examined the closed-ended questions, in which participants rated the extent to which they focused on each type of thought (See Table 6 for means of closed-ended thought focus measure by condition). Participants reported a stronger focus on past experiences than on the other types of thought [5]. The closed-ended thought focus measures were entered in separate one-way ANOVAs with temporal distance as the between-subjects factor. Temporal distance had no effect on participants' closed-ended thought focus measures, Fs < 1.88, ps > .35. Correlational analyses revealed that only thoughts about a plan of action were correlated with completion predictions, $r(123) = .19$, $p < .05$. To the extent that participants thought concretely about the project, they predicted to finish earlier (See Table 8 for correlations of closed-ended thought focus measure with predictions).

Mediation Analysis

The analysis reported above indicated that temporal distance influenced optimism and relative optimism in completion prediction as well as the concreteness of participants' thoughts. We next tested whether the effect of temporal distance on predictions relative to past completion times was mediated by the degree of concrete thoughts. First, the correlation of coded concreteness of thoughts and completion prediction was computed. The open-ended measure of concreteness of thoughts correlated significantly with the completion prediction, when controlling for past project completion time, $r(122) = .19$, $p = .03$. Participants who listed concrete thoughts predicted they would finish the target assignment earlier, relative to their past completion time, than those who did not list concrete thoughts [6].

The paths comprising the mediating variable suggest a mediation of concrete thoughts for the effect of temporal distance on project completion prediction (McKinnon et al., 2002) (See Figure 1 for a model). The predictor variable in the

model was significantly related to the mediator, $\beta = -.18$, $p < .05$, and the mediator was significantly related to the dependent variable, after controlling for the predictor, $\beta = .13$, *F-Change* = 3.6, $p = .06$. However, both paths are not strong and thus it is likely that concreteness of thoughts may be only one of several mediators explaining the effect of temporal distance on optimism of prediction [7].

It is notable that the trend toward mediation of concreteness of thoughts was only found for the open-ended coded thought listing. The closed-ended assessment of concrete thoughts while making the prediction (*How much did you base your prediction on a concrete plan of action?*) was not affected by the manipulation of temporal distance, $F(1, 124) = 1.19$, *ns*, although being connected with predicted completion times, $r(123) = .19$, $p < .05$. This result may be due to the 5-point scale format of the closed-ended thought focus measure. Such a rough measure might not be an adequate tool to pick up relatively small differences in this single item measure. Predicted duration of the project was not related to concrete thoughts about the project, $r(115) = -.12$, *ns* (open-ended thought listing) and $r(114) = .01$, ns (closed-ended thought focus measure), respectively.

Discussion

As hypothesized, the temporal distance to the project influenced participants' project completion predictions. Supporting Hypothesis 1, participants generated more optimistic completion predictions for temporally close projects than for temporally distant projects. Overall, participants also expected to finish the future project earlier than their past experience would project, therefore showing not only optimism, but optimism relative to their past experience. Providing further evidence for Hypothesis 1, relative optimism was enhanced when planning temporally close projects. These results suggest that planning temporally close to the start of a project might increase

the planning fallacy, because one's predictions may be more optimistic when predicting close events.

Predicted duration of the target project, another measure of optimism of prediction, decreased when planning a temporally distant project. This inconsistency with the main measure of prediction optimism (completion prediction) led us to reconsider our definition of prediction optimism. Previously, we had defined optimism as predicting shorter duration times of the target project. Contrary to this assumption, it may be that predicting longer duration times indicates optimism. Predicting longer project working time implies that one believes there will be enough time and mental resources to work long hours on the project. In reality, the completion process of one project may be time constrained by other tasks and circumstances, such as fatigue. Predicting longer project working time might therefore be wishful thinking rather than a realistic estimation and thus show increased optimism. We concluded that predicting to work longer hours on the project may likely reflect participants' optimism. According to this assumption, Hypothesis 1 is supported for both duration and completion prediction optimism.

When investigating our main measure of optimism, project completion predictions, we found some evidence for a mediation of the effect of temporal distance on project completion predictions by concreteness of thoughts. First, participants spontaneously mentioned concrete plans of action about the project more often in the close condition than in the distant condition. Second, the presence of concrete thoughts about the project was positively related to project completion optimism. This mediation effect was significant (McKinnon et al., 2002), though not strong.

The weakness of the mediation pattern might be due to the low degree of similarity between a hypothetical project and real world experiences. In this case, the mediation effect might be augmented and reach significance in research using a more valid representation of real world project planning. Empirical research supports the position that predictions for hypothetical and real events might differ dramatically (Armor & Sackett, 2006).

Armor and Sackett's (2006) research suggests that people exhibit greater optimism when predicting the outcome of a hypothetical event than when predicting the outcome of a real event. Specifically, Armor and Sackett asked participants to predict their performance in a subset of GRE questions. Some participants expected to take the test after their prediction and to receive feedback on their performance (real event), some participants expected to take the test but were told that no one would see their test results, and some participants did not expect to take the test after their prediction (hypothetical event). The study revealed that all participants expecting to take the test made more modest, and therefore, more accurate performance predictions than participants who believed their prediction was hypothetical. This difference could not be explained by the expectation that they would be evaluated on their performance, as there was no significant difference between the feedback group and the no feedback group.

The results of the present study do not appear to support Armor and Sackett's (2006) finding that predictions are more optimistic for hypothetical than for real events. Completion predictions for a hypothetical project in this study were less optimistic (relative to past experiences) than has been documented in many other studies concerning real target assignments (see Buehler et al., 2002, for a review). Similarly, a project imagined to take place in four month's time might appear even

more hypothetical to participants than a project imagined to take place at present. In this case, the present study suggests further evidence against greater optimism for hypothetical events, as participants were less optimistic for the distant event. We did not, however, directly compare hypothetical and real assignments. It may also be important to note that Armor and Sackett asked participants to give performance predictions (outcome of behaviour) rather than completion time predictions (behaviour), and these types of prediction might be differentially affected by the hypotheticality of events.

The second factor discussed previously that may be important for the effect of temporal distance is the disregard of other time competing activities (i.e., focalism). We hypothesized that participants would consider time competing activities to a greater extent when thinking about the close future than the distant future. This hypothesis was not supported by the results; neither open-ended thought listings nor the closed-ended thought focus measure assessing thoughts about time competing activities differed across temporal distance conditions. Furthermore, the focalism explanation could not account for the pattern of optimism in the close and distant future. Focalism was hypothesized to increase optimism in the distant future whereas concreteness of thoughts was hypothesized to increase optimism in the close future. As optimism was increased in the close future, however, our focalism account was not supported.

Replicating earlier studies, participants in this study predicted to complete the project earlier than past projects. The relative optimism in the current study was small compared to previous research (e.g., Buehler et al., 1994), which might be due to methodological differences between the current study and past research. For example, the study was, contrary to previous research, conducted online. Participants might

have been less willing to pay close attention to the questionnaires and might have been disturbed or distracted during the questionnaire session. However, only 6 (5%) participants indicated that they experienced many disturbances while completing the study. Conducting research online might increase the error variance in the data but should not lead to systematic error, and thus this methodological feature does not account readily for the small amount of optimism.

Another explanation for the small amount of optimism in this study might be the relative anonymity of an online study. Pezzo, Pezzo and Stone (2005) postulated that self-presentational concerns contribute to the planning fallacy. Pezzo et al. manipulated self-presentational concerns by asking some participants to predict their completion times for a task in the company of the experimenter (questioned verbally) while other participants gave anonymous predictions (writing the prediction on a sheet of paper). Participants' actual task completion time was assessed and a bias score created. Participants' predictions were only biased if their prediction was made publicly, not if their prediction was made anonymously. Online studies might appear more anonymous to students than laboratory studies with an experimenter. The present study might have induced low self-presentation concerns in participants and thus failed to motivate optimistic completion predictions.

Another explanation might have been that past experience of project completion was made more salient in this study than in other studies, as participants were asked to recall and write down a past experience similar to the hypothetical project before they made their prediction. Although subjects were not asked to consider past completion times and other project properties that might be relevant for future predictions before they made their prediction, the majority reported having based their prediction on past experiences [8]. This result is inconsistent with Buehler et

al.'s (1994) finding that participants did not relate their past experiences to future predictions, even if their past experiences were made salient. However, Buehler et al. asked participants to recall their general experiences with completing projects, whereas participants in this study were asked to recall one particular experience. One particular past experience might have appeared more relevant to participants than their general experiences. Another explanation for participants' surprising reliance on their past experience might be possible suspicions on the part of the participants. Being asked for their past experiences so early in the experiment, they might have suspected that the study aimed to assess the link between past experiences and future predictions. This assumption might have led them to generate predictions similar to past experiences.

Furthermore, the characterization of the project as hypothetical might have failed to motivate participants as much as a real project. Motivation to complete a project early contributes to the planning fallacy (Buehler et al., 1997) and the lack thereof might have lead to the relatively low optimism in predictions in the current study. The employment of a hypothetical project may be a poor representation of the real world experience of planning for tasks. On the other hand, there were some advantages to the use of a hypothetical target project. Using a hypothetical event, we were able to vary the temporal distance to a greater extent than would have been feasible with an actual target project. It would be difficult to find a sufficiently large group of students with the prospect to complete the same project immediately or in four month's time. Using a hypothetical event, we were able to hold constant all aspects of the target while varying only temporal distance.

Lastly, a methodological concern arises from the low inter-rater agreement in coding the open-ended thought listing. Specifically, the coders apparently found it

difficult to code for thoughts about a plan of action. It might be that each coder had a slightly different concept of that category. It is possible, therefore, that the variable *concreteness of thoughts* assesses a different construct of concrete construal than anticipated. This methodological concern might lower the internal validity of the present study.

In sum, the results of this study should be interpreted cautiously as the findings might not generalize to actual project completion predictions. The study does, however, suggest that temporal distance produces decreases in prediction optimism, and that this effect is mediated by the concreteness of thoughts about the project.

Study 2

The present study was designed to extend the findings of Study 1 in a number of ways. First, as Study 1 did not include a measure of actual completion, the current study extends it by using a project that is actually completed and includes measures of actual completion times. Also, besides the effect of temporal distance, this study tests the impact of focalism on project completion predictions. Although Study 1 did not show focalism to impact prediction optimism, such a result might have depended on the lack of realism in Study 1. As the present study was different from Study 1 in various aspects, we continued to investigate the role of focalism in Study 2.

Participants were asked to complete a real project involving the retrieving of newspapers, choosing and evaluating three newspaper articles, and submitting short essays electronically. This project was designed to capture several important aspects of real world projects: It is relatively effortful, has a fixed deadline, and consists of multiple components, allowing for various interruptions. Subjective distance to the start of the project was varied by two weeks, while the distance between start and end

of the project was held constant. Although this two week time difference might appear small, past research suggests that time differences of a fortnight can trigger significant changes in people's predictions and behaviour. For example, Buehler et al. (1994) showed significant differences in people's predictions for tasks with a 14-day deadline than for tasks with a 7-day deadline.

Project completion predictions for temporally close projects were expected to be more optimistic (predicting to finish early) and also more optimistically biased (predicting to finish earlier than the actual completion time) *(Hypothesis 1a)*. In light of Study 1's results, this effect is expected to be mediated by the concreteness of participants' thoughts about the project (*Hypothesis 1b*). However, due to differences between hypothetical and actual events, the temporal distance effect on optimistic prediction might be augmented in this study, might disappear altogether or else might be reversed. Thus, it is possible that participants are more optimistic in the distant future (*Hypothesis 2*).

Although focalism did not show an effect in the first study, this finding might have been due to the use of a hypothetical project. Additionally, effects of focalism might have been overlooked, because actual completion time was not assessed in the first study. Therefore, in addition to the temporal distance manipulation, we manipulated focalism. Some participants were reminded of their typical activities and the time that these activities consume in their daily and weekly routines. This intervention is similar to defocusing interventions used in previous research (Lam, Buehler, McFarland, Ross, & Cheung, 2005; Wilson et al., 2000) and was expected to reduce participants' disregard of other time competing activities. Failing to consider other time competing activities that delay task completion (focalism) might increase the optimistic bias in completion prediction. An intervention decreasing focalism

should decrease the optimism and the optimistic bias of participants' completion predictions (*Hypothesis 3*).

Ideally, a factor impacting participants' predicted completion time would not impact their actual completion time. Participants' actual completion times in past studies were not influenced by any manipulations (Buehler et al., 2002; Buehler & Griffin, 1997; Kruger & Evans, 2003). Thus, we expect that the temporal distance manipulation will not yield a main effect on actual project completion time.

However, it is also plausible that participants in the close condition may actually complete the project a little earlier than participants in the distant condition. Completing the project soon after predicting it might trigger carry-over effects of the implemental mindset that the planner will adopt. An implemental mindset may be defined as the post-decisional phase of project, specifically the phase of concrete step-by-step planning. The opposite of an implemental mindset may be called deliberative mindset, characterizing the pre-decisional phase of a project, when one does not yet know whether one will complete the project or not (Taylor & Gollwitzer, 1995). Armor and Taylor (2003) showed that an implemental mindset can influence both prediction and behaviour. In Armor and Taylor's study, students predicted and completed a scavenger hunt on campus. Before they made a prediction of the number of items they would hunt down, some participants knew that they would complete the task (implemental mindset), whereas some others thought they might complete the scavenger hunt or another task (deliberative mindset). Participants with an implemental mindset found significantly more items in the scavenger hunt than participants with a deliberative mindset. As participants in the close condition are expected to have an implemental mindset (think concretely about the project) they might complete the assignment earlier than participants in the distant condition.

Method

Participants

One hundred and ten WLU undergraduate students were recruited through Wilfrid Laurier's online research participation system and were compensated with 2 course credits. One credit was applied after an initial questionnaire session and one credit was applied after completion of any part of a take home project. Three participants were excluded from the analyses because they did not complete all measures. An additional 4 participants were excluded because they failed to follow instructions. The final sample consisted of 27 (26%) male and 76 (74%) female participants, ranging in age from 18 to 22 years (M = 18.76 years).

Materials and Procedure

Participants arrived at the lab alone or in groups of up to 4 people and were randomly assigned to one of four conditions in a 2 (temporal distance: close vs. distant) x 2 (focalism: defocused vs. control) between-groups design. Participants were told that the study concerned how people accomplish tasks with multiple components over a time frame of more than one day, and thus they would be asked to complete an assignment that included writing three essays over the course of 7 days (See Appendix D for the introduction of the target task):

> In this experiment you will be asked to write three essays [a short evaluation or review] of about half a page about three different articles in different editions of the newspaper "Toronto Star". (...)You will have **one week (7 days) time** to write three essays about three articles of three different editions (3 separate days). **You are only allowed to submit one essay per day.** (...) You will submit the essays via e-mail.

Participants were further asked to write a sample essay to practice the target task. All participants received a complete edition of the Toronto Star newspaper, from which they could choose any article for their sample essay. We expected that by writing a sample essay participants would be provided with an idea of the time it

would take to complete the target project as well as some relevant knowledge of the task.

Temporal distance manipulation. Participants in the close temporal distance condition were told that their essay project would start the day after the initial questionnaire session. Participants in the distant condition were told that their project would start two weeks after the initial session. All participants were told that they would receive an email reminder at the start day of the project. Participants then completed a measure of subjective temporal distance (Wilson & Ross, 2003) of the target assignment (See Appendix E for the temporal distance manipulation).

Focalism manipulation. Participants in the defocused condition were asked to list their own typical daily and weekly activities before making predictions about task completion times. In addition to their open-ended responses they also indicated the amount of time they would spend on several activities during a typical day (*getting dressed, eating breakfast, eating lunch, eating dinner, telephoning friends, hanging out with friends, walking to places, sitting in class, playing/ working at the computer, watching TV, sleeping*) and a typical week (*grocery shopping, shopping, sports, working, homework*). Participants in the control condition did not complete these thought focus measures until the end of the experiment.

Main dependent variables. All participants then predicted, separately for each of the essays, how many days after the start of the project (i.e. the day of the email reminder) they expected to submit the essays by email (See Appendix F for the prediction instructions). Predictions were judged to be more optimistic to the extent that they predicted to start sooner and finish the entire task (submit final essay) sooner. Predictions were judged to be more optimistically biased to the extent that predicted times were sooner than actual completion time.

Measure of thought focus. As in Study 1, participants were asked to list the thoughts underlying their task completion prediction. This open-ended question was coded similarly to Study 1, using the following coding categories: References to personality, references to possible interruptions, references to a plan of action, and references to past experiences. Participants' thought listings were coded independently by two raters, resulting in inter-rater correlations of .89, .92, .78, and .89, respectively. The remaining inconsistencies were resolved by discussion.

Participants then rated their thoughts on several 10-point Likert scales, ranging from 1 (*not at all*) to 10 (*a great deal*). The scale format of the thought focus measure was changed from a 5-point scale (Study 1) to a 10-point scale in order to provide a finer measure of response options. Specifically, participants rated the extent to which they had based their prediction on a plan of action, their hopes and wishes, possible problems, possible interruptions, their past experiences, how long it took them to write the sample essay in the beginning of the experiment, and their knowledge of how long people in general take to complete similar tasks (See Appendix G for the thought focus measure).

Usual project completion rating. Participants were then asked to indicate on a segmented timeline their usual project completion time in days before the deadline. They also recalled a more specific past experience: They estimated the time they took to complete the sample essay at the beginning of the experiment in minutes.

Exploratory dispositional variables. Finally, several personality scales were included for exploratory purposes [9]: Procrastination (Lay, 1988), views about past and future (Buehler & Wilson, 2003), optimism (Scheier, Carver, & Bridges, 1994), action construal level (Vallacher & Wegner, 1989), academic locus of control (Trice, 1985), and perfectionism (Frost et al., 1990).

Target project completion. At the appointed time, participants received an email reminding them about the study as well as repeating the instructions, emphasizing that the project was to be started after having received the email and to be completed within one week (See Appendix H for the reminder email). The reminder email also instructed participants to hit the "Reply" button and send the email back as soon as they received it. If a participant did not send the email back within one day, they were sent another reminder email and so forth. All participants responded within three days by sending back the email. The date that each of the e-mailed submissions was received was recorded. Participants received their second course credit if they submitted at least one essay. Participants who did not complete any essay did not receive their second credit.

Results

Manipulation Checks

The measure of subjective distance was submitted to a one-way ANOVA with temporal distance as between-participant predictor. The temporal distance manipulation significantly influenced participants' perception of the distance of the task, $F(1, 96) = 43.08$, $p < .001$. Participants in the close condition felt significantly closer to the start of the project, marking the start of the project nearer to the "today" end of the timeline ($M = 3.25$ cm, $SD = .43$) than participants in the distant condition ($M = 7.36$ cm, $SD = .45$).

The defocus manipulation failed to increase participants' spontaneous thoughts about activities besides the target project (coded from participants' open-ended thought listing), $F(1, 96) = .13$, *ns* or their closed-ended ratings of consideration of time competing activities, $F(1, 101) = .15$, *ns* (See Table 10 for means by focalism condition). Similarly, completing the defocus manipulation before

the predictions or at the end of the experiment, did not alter participants' estimated daily hours of activities, $F(1, 100) = 1.40$, *ns* or their listed number of daily and weekly activities, $F(1, 100) = 1.40$, *ns* [10]. Furthermore, the defocused and the control group did not differ in any of the main dependent variables, such as predicted submission of the last essay, mean prediction of all three essays, submission of the last essay or mean submission of all three essays, Fs < 1.21, ps > .40. There were no significant interaction effects with the temporal distance manipulation, Fs < 2.56, ps > .11. As participants' responses did not differ across the conditions of the focalism condition and the manipulation failed to show an impact even on the manipulation checks, all further analyses were collapsed across the focalism conditions. Hypothesis 2 could not be tested, because the manipulation of focalism appeared to have failed.

Usual, Predicted, and Actual Completion Times

Paired t-tests were performed to compare usual completion time with the predicted completion time, and to compare predicted completion time with the actual completion time. Overall, people predicted they would submit the final essay earlier (M = 1.70 days before the deadline, SD = 1.29) than they usually finish projects (M = 1.43 days before the deadline, SD = 1.27), $t(101) = -2.14$, $p < .04$. In reality, participants finished much closer to the deadline (M = .84 days, SD = 1.74) than they had predicted[11] (M = 1.79 days, SD = 1.17), $t(56) = 3.82$, $p < .001$. These results suggest evidence of the planning fallacy. However, it may be important to note that unlike previous studies investigating the planning fallacy (Buehler et al., 2002), participants submitted the final essay even closer to the deadline (M = .82 days, SD = 1.75) than their usual completion date (M = 1.52 days, SD = 1.26), $t(55) = 2.88$, p = .01.

When investigating participants' essay submissions, a large attrition rate was apparent. Of the 103 participants who completed the initial questionnaire session, 65 (63%) participants submitted at least one essay and only 57 (55%) participants submitted all three essays. This attrition rate was more notable in the distant condition (39%), compared to the close condition (73%). People in the distant condition also wrote significantly shorter essays ($M = 252.34$ words, SD = 76.99) than people in the close condition ($M = 291.01$ words, SD = 67.49), $F(1, 65) = 4.72$, $p = .03$. Both essay length and attrition rate might be indicators of a significant reduction of motivation to complete the target project in the distant condition. The exaggerated attrition rate might reduce accuracy in measuring the effect of our main manipulation on completion prediction bias.

Previous studies demonstrating a planning fallacy (Buehler et al., 1997; Kruger & Evans, 2003) showed a bias in people's predicted completion time while actual completion time was consistent. In the present study, any variability in optimistic prediction bias would be driven by participants' actual completion time, not their prediction. Thus, in light of the differential attrition across condition, we decided to drop the planned analyses of actual project completion behaviour and concentrate on predictions of project completion instead. Despite dropping the behavioural measures, this study still extends the initial study in that participants thought about an actual project, which they intended to complete at the time of their prediction, rather than a hypothetical prediction. As noted previously, cognitive processes based on actual projects may differ from processes based on hypothetical projects (Armor & Sackett, 2005).

Effect of Temporal Distance on Prediction

The predicted completion time of each of the essays was submitted to a separate one-way ANOVA with temporal distance as the between-subjects factor. Completion predictions in the close condition did not differ from completion predictions in the distant condition (See Table 11 for mean predictions by temporal distance condition). The temporal distance manipulation did not show an effect for any of the three essay completion predictions or the mean completion prediction [12], Fs $< .36$, ps > 1.75.

Effect of Temporal Distance on Thought Focus

Thoughts about past experiences. Unlike Study 1, participants did not base their predictions primarily on their past experiences. Only 26 (26%) participants spontaneously mentioned past experiences (See Table 12 for open-ended thought listings by temporal distance condition). This finding is consistent with earlier research (Buehler et al., 1994). Although non-significant, references to past experiences were more frequent in the distant condition (33%) than in the close condition (20%). Closed-ended responses mirrored this pattern (See Table 13 for means of all closed-ended thought focus measures by temporal distance condition). Participants in the distant condition reported basing their prediction to a greater degree on past experiences ($M = 7.31$, $SD = .32$) than participants in the close condition ($M = 6.39$, $SD = .32$), $F(1, 101) = 4.15$, $p = .04$.

Overall, usual completion time was related to predicted completion time, $r(100) = -.43$, $p < .001$. Participants who usually finish tasks further before the deadline (higher numbers = early completion) predicted to complete the essay task sooner after receiving the reminder email (higher numbers = late completion). In the distant condition, participants' completion predictions were more strongly associated

with their usual completion time, $r(49) = -.71$, $p < .001$, than in the close condition, $r(49) = -.29$, $p = .04$. A Fisher's z test revealed that this difference was significant, $z = -2.88$, $p < .01$. The temporal distance manipulation did not influence reported usual completion time, $F(1,100) = 1.64$, *ns*.

Concreteness of thoughts. Participants in the close condition spontaneously mentioned concrete thoughts about the project more frequently (36%) than participants in the distant condition (20%). This difference was marginally significant, X^2 $(2, N = 127) = 2.97$, $p < .09$. The closed-ended thought focus measure mirrored this pattern. Participants' ratings of the extent to which they considered a concrete plan of action while generating their prediction was submitted to a one-way ANOVA with temporal distance a between-subjects factor. As in Study 1, temporal distance influenced the concreteness of participants' thoughts [13]. Participants reported basing their prediction on a concrete plan of action to a greater degree in the close ($M = 6.21$, $SD = .33$) than in the distant condition ($M = 5.31$, $SD = .33$), $F(1, 101) = 3.67$, $p = .05$.

Thoughts about problems and interruptions. Participants' ratings of the extent to which they considered possible problems and interruptions while generating their predictions were combined into one variable, $r(101) = .34$, $p < .001$, and submitted to a one-way ANOVA with temporal distance as between-subjects factor. Temporal distance also influenced participants' thoughts about problems and interruptions [13]. Participants reported basing their predictions on possible problems and interruptions to a greater degree in the close ($M = 6.27$, $SD = .27$) than in the distant condition ($M = 5.51$, $SD = .27$), $F(1, 101) = 3.88$, $p = .05$. Participants' thought listing mirrored this pattern of results. Although not significant, participants in the close condition spontaneously mentioned concrete thoughts about the project more frequently (72%) than participants in the distant condition (57%).

Mediation Analyses

Next, we examined possible mediators of an indirect relation between temporal distance and project completion predictions. Specifically, we examined those measures of thought focus that were affected by temporal distance and their relation to project completion predictions. (See Table 14 for correlations of all thought focus measures with completion prediction).

Past experiences. Neither open-ended nor closed-ended measures of thoughts about past experiences were significantly related to participants' final essay completion predictions, rs < .05, ps > .45 or to participants' mean predicted completion time, rs < .03, ps > .63.

Concreteness of thoughts. The closed-ended measure of a concrete plan of action was negatively correlated with project completion predictions. Participants predicted they would submit the last essay further before the deadline if they thought more about a concrete plan of action, $r(101) = -.21$, $p = .03$. This correlation was also significant for the average of all essay completion predictions, $r(101) = -.23$, $p = .02$.

According to McKinnon et al. (2002) and Shrout and Bolger (2002), mediation may be shown, even in cases where the predictor did not have a significant effect on the dependent variable, if there is a "joint significance of the two effects comprising the intervening variable effect" (McKinnon et al., 2002, p.83). According to this approach, both the path connecting predictor and mediator and the path connecting mediator and dependent variable while controlling for the predictor, must be significant in order to show mediation.

To test the role of concreteness of thoughts as a mediator, we conducted regression analyses, in which we first entered the temporal distance manipulation as a predictor and the measure of concreteness of thought focus measure as a dependent

variable. Temporal distance was found to significantly impact extent of concrete thoughts, $\beta = -.19$, $p = .05$. Next, we entered concreteness of thoughts as a predicting variable in a second step of the regression analysis, and entered the completion prediction of the final essay as dependent variable. Concrete thoughts were significantly related to the completion prediction of the final essay, when controlling for temporal distance, $\beta = -.21$, *F-Change* = 4.50, $p = .04$ (See Figure 2 for a model). Concrete thoughts were also significantly related to the average completion prediction of all three essays, when controlling for temporal distance, $\beta = -.23$, *F-Change* = 5.34, $p = .02$. Concreteness of thoughts thus appeared to be a mediator of temporal distance, hereby supporting Hypothesis 1b.

Thoughts about problems and interruptions. Consideration of possible problems and interruptions was positively correlated with completion predictions. Participants predicted to submit the last essay later if they thought about possible problems and interruptions, $r(101) = .24$, $p < .02$. This correlation is also significant for the average of all essay completion predictions, $r(101) = .26$, $p < .01$.

To test the role of thoughts about possible problems and interruptions as a mediator, we conducted regression analyses, in which we first entered the temporal distance manipulation as a predictor and the measure of problems and interruptions thought focus measure as a dependent variable. Temporal distance was found to significantly impact the extent to which problems and interruptions were considered, $\beta = -.19$, $p = .05$. Next, we entered thoughts about problems and interruptions as a predicting variable in a second step of the regression analysis, and entered the completion prediction of the final essay as dependent variable. Thoughts about possible problems and interruptions were significantly related to completion prediction of the last essay, when controlling for temporal distance, $\beta = .26$, *F-Change*

= 6.81, p = .01 (See Figure 3 for a model). Thoughts about possible problems and interruptions were also significantly related to the average completion prediction of all three essays, when controlling for temporal distance, β = .27, *F-Change* = 7.75, p < .01. Thoughts about possible problems and interruptions thus appeared to be a mediator of temporal distance.

Relation between the mediators. The closed-ended thought focus measure of concrete thoughts and the thought focus measure of thoughts about possible problems and interruptions were not correlated, $r(101) = .11$, *ns*. This correlation did not differ for the close, $r(50) = .15$, *ns*, and the distant future, $r(49) = .02$, *ns*, $z = .63$, *ns*.

Discussion

The present study tested optimism of prediction (completion predictions) rather than, as initially intended, optimistic bias of prediction (completion predictions in relation to actual completion), because the analyses of actual completion times was not deemed appropriate due to high attrition rates that also differed across conditions. The present study differs from Study 1, however, as participants in Study 2 made their predictions with the intention to actually complete the target assignment (all participants responded to the email-reminder). Cognitions about a real task may differ from cognitions about a hypothetical task (Armor & Sackett, 2006). In order for this cognitive difference to take place, it may not be relevant whether this task is actually completed or not [14].

Unlike Study 1, there was no direct effect of temporal distance on the optimism of prediction, thus Hypothesis 1a was not supported. Nevertheless, the present study supported Hypothesis 1b by showing the same pattern of mediation involving concreteness of thoughts for the effect of temporal distance on prediction optimism that was seen in Study 1. Participants were thinking more concretely about

the close than distant project, and participants' concreteness of thoughts was positively related to prediction optimism.

This study also revealed a second mediator of temporal distance. Participants were thinking more about possible problems and interruptions that might occur during the completion of a close than a distant project. Participants, who thought about problems and interruptions to a greater extent, were less optimistic about the project completion. This effect may be interpreted as partial support for Hypothesis 2. It may be worth considering, however, that the effect sizes for both mediations in Study 2 are not strong.

Note, then, that temporal proximity increases two thought processes that have directly opposite effects on prediction. Temporal proximity of a project increases the concreteness of thoughts, which increases prediction optimism, but also increases awareness of possible problems and interruptions, which decreases prediction optimism. The absence of a direct effect of temporal distance on prediction might be due to these two opposite processes cancelling each other out.

It is also worth noting that the consideration of possible problems and interruptions may be considered as absence of focalism. Thus, processes related to focalism were indeed important for the effect of temporal distance on prediction optimism, even though the experimental manipulation of focalism was not effective. Hypothesis 3 could not be tested directly but there appears to be some indirect evidence that reduced focalism reduces prediction optimism.

Although not a mediator of the effect of temporal distance, thoughts about past experiences were influenced by temporal distance. Interestingly, participants' notion in the distant condition of having based their prediction to a greater extent on past experiences was confirmed by a stronger correlation between usual completion times

and predicted completion times in the distant condition. For the distant future, participants did not only report basing their experience more on past experiences, their predictions were strongly linked with their past experiences. Kahneman and Lovallo (1993) juxtapose thoughts about past experiences and concrete thoughts as opposite ways of construing an event. The present finding of more concrete thoughts in the close future and more thoughts about past experiences in the distant future is in line with Kahneman and Lovallo's proposition [15].

When assessing past experiences with project completion time, the two studies took a different approach. In Study 1, participants recalled a *specific* experience with a similar past project, while in Study 2 participants reported their *general* experience with project completion. Past experiences may be more salient and appear more meaningful when recalling a specific instance rather than a class of experiences. This difference in recall may account for past experience being mentioned most frequently in Study 1, while it was only on ranked third in frequency in Study 2.

The present study is arguably higher in external validity compared with Study 1. Participants thought about a project they actually had to complete, which was similar to real world projects in complexity and featured a number of sub-components that might allow for interruptions. Therefore, the pattern of effects in this study might generalize to a greater number of real world projects, compared to Study 1's hypothetical target project. Nonetheless, the project in Study 2 was a project specifically designed for the experiment and, given that their performance had little implication for grades, participants may have seen it as not important. Participants may have been less motivated to complete the project well or to complete the project at all because of its low importance.

There may be some concerns with internal validity. First, it is worth noting that the difference between the temporal distance conditions was small. A difference of two weeks might not have mattered enough for participants to drastically change their mental frame about the task and thus for the temporal distance manipulation to be stronger. Results might have been clearer if the temporal distance between the close and the distant condition had been greater. We chose a time difference of 14 days for practical purposes. Indeed, the high attrition rates in the distant condition might suggest that even a 14 day delay is too distant to ensure participants' cooperation in the project completion.

Study 2 used the closed-ended thought focus measure, rather than the open-ended thought listing, which was used in Study 1, as the mediating variable. Arguably, the closed-ended measure may be a more reliable measure than open-ended thought listing. It is worth noting that the open-ended thought listing in Study 2 differed marginally by temporal distance condition similarly to participants' thought focus measures, but did not correlate with participants' prediction. It is possible that this result is due to the overall smaller number of people mentioning concrete thoughts in Study 2 (26 participants) than in Study 1 (50 participants).

High attrition rates might raise another issue with internal validity: Did participants really intend to complete the project at the time of prediction? Specifically, did participants perceive the target project as a real project? Participants' responses to the email reminders seem to suggest that they did – all participants responded to the email reminder, even if they did not send any essays after their initial response.

A last concern may be that the present study was inconsistent with past research investigating the planning fallacy, because participants finished the target

project later than they usually completed projects. Past research (e.g., Buehler & Griffin, 1997) found that people's usual completion times are highly correlated with their actual completion time. Arguably, predicted completion time may vary across projects, but actual completion time should be consistent across projects. There are two possible explanations for the inconsistent result in Study 2: As they reported the usual completion time after their prediction, participants' predictions might have influenced their reported usual completion time. A second explanation might be that the target project was different from the set of projects participants recalled. For example, participants may have been less motivated to complete the target project than they were for their usual projects, and this lack of motivation might have influenced their behaviour so that they finished later than usual. Furthermore, the belated completion time, higher attrition rates and shorter essays in the distant condition may suggest that processes in the close condition (e.g., concrete plans) carried over to affect participants' behaviour, thus replicating earlier research (Armor & Taylor, 2003).

In sum, Study 2 showed evidence that temporal proximity prompts two thought processes, concreteness of thoughts and a focus on possible problems and interruptions that in turn affect project completion prediction. These two thought processes have opposite effects on prediction optimism, however, and thus no overall effect of temporal distance on prediction was observed.

General Discussion

The current research examined the effects of temporal distance on project completion predictions. Temporal distance to a target project was manipulated in two experiments, one involving a hypothetical academic assignment (Study 1) and the other an essay writing task that was actually to be completed (Study 2). Participants'

thoughts about the projects were assessed and appeared to mediate the relation between temporal distance and completion predictions. Both elements of Hypothesis 1 and Hypothesis 2 were in some ways supported by the present research. Specifically, temporal closeness led indirectly to an increase and to a decrease of prediction optimism.

Temporal closeness triggered both a more concrete representation of the task and more thoughts of possible problems. These two thought processes had opposite effects on prediction optimism: Concrete thoughts increased optimism whereas a focus on problems decreased optimism.

Hypothesis 1 was supported in Study 1 because participants' predictions were more optimistic when predicting the completion of a close than a distant hypothetical project. Participants thinking about a close project were more likely to think concretely about the target project, as predicted by Construal Level Theory (Lieberman & Trope, 1998) and made more optimistic predictions when focusing on a concrete plan of action (e.g., Buehler & Griffin, 2003).

In Study 2, we extended Hypothesis 1 to include concreteness of thoughts as a mediating process for the negative effect of temporal proximity. Hypothesis 1 (1b) was again supported in Study 2. Although temporal distance did not directly affect completion predictions, the mediation process involving concreteness of thoughts was associated with predictions about the essay task completion similarly to Study 1's pattern of results. Again, participants thought more concretely about the project in the close than in the distant future and made more optimistic predictions when thinking concretely. Study 2 also indirectly supported Hypothesis 2, however, by showing a mediation process, involving the consideration of possible problems and interruptions, which lead to an indirect effect of less optimism in the close future. Participants

thought more about possible problems and interruptions during their implementation of the project in the close than in the distant future. Considering possible problems and interruptions elicited less prediction optimism (e.g., Wilson et al., 2000).

Two Processes Mediating the Effects of Temporal Distance

Participants made more optimistic project completion predictions if they thought concretely about the project, i.e. spontaneously referred to a concrete plan of action (Study 1) or reported basing their prediction on a plan of action to a greater degree (Study 2). These findings support Buehler and Griffin's (2003) findings of the role of future focus in optimistic time predictions. Buehler and Griffin experimentally induced a future focus by asking participants to form a concrete plan of action about the target task (e.g., Christmas shopping). Participants who were thinking concretely about the task showed a greater optimistic bias. The present studies showed similar results; participants thinking concretely about the project were more optimistic about their completion predictions. Concreteness of thoughts was also shown to mediate the relationship between temporal distance and prediction optimism (Study 1 and Study 2). Specifically, increases in temporal proximity elicited more concrete thoughts, which in turn resulted in more optimistic predictions.

Participants gave less optimistic project completion predictions if they thought about possible problems and interruptions that might occur during the project implementation (Study 2). This finding appears to be consistent with the theory of focalism (Wilson et al., 2000). Focalism refers to the focus on a target event while failing to consider the consequences of other events. Wilson et al. developed the concept of focalism to explain the durability bias – namely, the tendency to overestimate the duration of one's emotions in affective forecasting. However, they also theorized that focalism may explain optimism in completion predictions; failing

to consider other events that may interrupt the project implementation may lead to overly optimistic completion predictions. The attempt to manipulate focalism in Study 2 failed, as participants were equally likely to consider possible interruptions by other projects in both the experimental and the control condition. Nonetheless, processes related to focalism appear to play a role in mediating the effects of temporal distance. Increased temporal proximity led to more thoughts about possible problems and interruptions. Furthermore, people considering possible problems and interruptions gave less optimistic completion predictions. Thus, thoughts about possible problems and interruptions could be shown to mediate the relation of temporal distance to prediction optimism (Study 2).

In sum, the effect of temporal distance on completion prediction optimism was mediated by concreteness of thoughts (Study 1 and Study 2) and by thoughts about possible problems and interruptions (Study 2). Interestingly, Study 1 did not show a mediation of thoughts about possible problems and interruptions. There might be moderating factors that attenuate the strength of one mediation versus the other.

Possible Moderators of Mediating Processes

As noted above, the present studies revealed two mediators, one leading to more prediction optimism in the close future and one leading to less prediction optimism in the close future. When both mediators were operating, the direct effect of temporal distance on prediction optimism appears to have been cancelled out (Study 2). When only one mediator was operating, temporal distance did show a direct effect on prediction optimism (Study 1). Study 1 might have involved factors that prevented the second mediator, thoughts about problems and interruptions, from operating. Factors that distinguish Study 1 from Study 2, and might moderate the effects of temporal distance, include the hypotheticality of the target project, and the difference

in time span between the temporal distance conditions. Each of these potential moderators is discussed further below.

Hypothetical versus real target project. A hypothetical project might be considered separately from one's other, real, projects. Thoughts about possible interruptions by real events might therefore be rare when considering a hypothetical event in both the near and the distant future. Study 2 did indeed show a greater proportion of participants who spontaneously mentioned possible interruptions than Study 1, independent of condition [16]. The effects of concreteness of thoughts, on the other hand, might not depend on the reality of the target project. A temporally close hypothetical event might still induce participants to think about a concrete plan of action, although perhaps not as strongly as a temporally close and real project would.

Time difference between prediction and project start. The time difference between the prediction and the start of the project might also moderate the proposed two-mediation-model. Thoughts about problems and interruptions may be more likely to play a role in the relatively close future (e.g., the time span that was defined as "distant" in Study 2 was two weeks) than in a more distant future (e.g., the time span that was defined as "distant" in Study 1 was four months). People might indeed perceive the increased time slack due to a lack of planned activities in the very distant future (Zauberman & Lynch, 2005), but two weeks into the future might not be enough time to trigger this effect. People might still be aware of their schedules in two weeks time, but not of their schedules in four months' time. Thus, awareness of time competing activities would decrease with increasing time distance and would reduce the impact of the second mediator, thoughts about problems and interruptions.

In addition, the relationship between temporal distance and time competing activities might be linear or parabolic. It may be possible that at a certain temporal

distance, past experiences have a stronger impact. If absolutely no time competing activities come to mind or if the point in time is so distant that no mental schedule is available, people might fall back unto their past experiences. Thus, in the very distant future, people might not consider specific possible interruptions, or concrete plans, but rather base accounts of their future level of activity on past activity. For the focalism (Wilson et al., 2003) and perceived time slack (Zauberman & Lynch, 2005) theories to apply to project completion prediction, a balance between accounting for some activities (distant future), but not accounting for all activities (close future) and not for none at all (very distant future) might be necessary.

Lastly, a greater time difference between prediction and project initiation might change people's mental temporal frame in which they place the project. When imagining a project in two weeks, people might construe the distance to this project in relation to another point in time, for example the end of the semester. If the project is more distant than this reference point, people might adopt a new reference point to place the project in an adequate mental frame, for example the end of the school year. Subjective distance to the project may be altered by the particular reference point that comes to mind, independent from the actual time distance. Indeed, Wilson and Ross (2001) used the reference point on a timeline as a way to successfully manipulate the perceived subjective temporal distance to an event.

Such a different mental construal would explain the independence of participants' subjective distance ratings from the actual distance manipulation in Study 1. Participants may have used a different reference point for the target project in four months (e.g., end of school year) than for the target project in two weeks (e.g., end of the semester), thus arriving at ratings of subjective distance that were inconsistent with objective temporal distance. In Study 2, in contrast, the time

difference between the close and the distant project was not as large, so that participants may have been inclined to choose a similar reference point for both the close and the distant project, thus arriving at subjective distance ratings consistent with the actual temporal distance.

The mental frame in which the target project is placed might be important for other components of mental construal, for example the level of concreteness of thoughts. Thinking about a larger mental frame with a more distant reference point might induce more abstract thinking, which in turn would influence participants' prediction optimism.

Future Directions

Future studies may strive to clarify three points raised above: The role of degree of time distance in moderating the two-mediator-model, the impact of hypotheticality versus reality of a project on completion predictions, and a clearer understanding of the two mediators in the model by means of manipulating these mediators.

Degree of temporal distance. Further research is needed to disentangle the role that the degree of temporal distance plays for project completion predictions. One way to go about this may be varying not only close and distant temporal distance but several degrees of distant temporal distance. For example, one might include 4 temporal distance conditions varying the target project from starting tomorrow, starting in two weeks, starting in two months, to starting in 6 months.

People may able to list continually less time competing activities and be less likely to include such thoughts into their prediction as temporal distance increases. Concreteness of thoughts should be weighted less strongly with increasing distance. These two hypothesized trends propose a two-mediator-model similar to the one

found in Study 2 with no direct effect on completion predictions, because both negative and positive effects of increasing temporal distance might cancel each other out. Nonetheless, there might be a decrease of prediction optimism in the very distant condition, as people may rely more heavily on past experiences when the target project is very distant. Past experiences may be used to a greater extent because the mental construal of a very distant project might be abstract to such a degree that it resembles an outside view of the project. Furthermore, people may not think concretely about a very distant target project nor are there salient time competing activities in the very distant future. Thus, they might resort to past experiences when they have nothing else that is highly accessible to base their prediction on.

Subjective temporal distance may be assessed as a means to assess mental framing. For example, participants could be asked to identify another significant event close to the endpoint of a time line stretching to "*feels very far*", to receive an idea about participants' reference points in each of the temporal distance conditions. Reference points would be expected to be continuously more distant with increasing actual distance of the target project.

Hypotheticality. In the present research, participants' cognition about distant projects appeared to be similar to their cognition about hypothetical projects. For example, participants' high focus on thoughts about past experiences for the hypothetical project may be mirrored in the higher weight people gave to thoughts about past experiences in the distant condition in Study 2. Further research might be able to pin down the differences and similarities of these two constructs. For example, participants may be asked to rate their subjective temporal distance to tasks of varying degrees of reality (e.g., participants know whether they will complete the task, they are not sure whether they will complete the task and they know that they will not

complete the task). Such a measure might show a correlation between temporal distance and hypotheticality. Past research may back up the presumed link between hypotheticality and temporal distance, as people were found to be more optimistic about the outcome of hypothetical (Armor & Sackett, 2006) as well as distant (Gilovitch et al., 2003; Savitsky et al., 1998) events. Along the same lines, hypothetical projects may simply be perceived as more abstract than real projects. This hypothetical link has yet to be tested empirically but has already been proposed theoretically by Trope and Liberman (2006).

The present research has shown the difficulty involved in obtaining real completion measures in the distant future. Likewise, past research (Armor & Sackett, 2006) suggests that hypotheticality introduces an independent effect. Future studies not explicitly investigating the differences between hypothetical and real events may use a cover story to make participants believe that they will complete the project without requiring them to do so. By using a cover story, the researcher is able to control the nature of the project and the point in time when the project occurs while not using a hypothetical event, thus making the target project more similar to real world projects.

Improved measures of mediators. Additional studies may manipulate either of the mediators found in the present research, in order to confirm predictive strength of the mediators. Concreteness of thoughts has been induced with a thought focus manipulation (Buehler & Griffin, 2003), but it might also be feasible to directly manipulate low level construal, which would result in increased concreteness of thoughts. Fujita and colleagues have recently suggested processes by which construal level may be manipulated directly (Fujita, Trope, Liberman, & Levin-Sagi, 2006). Participants may be asked to a) consider "why" they are doing certain activities

(abstract construal) versus "how" they are doing certain activities (concrete construal), b) generate category labels (abstract construal) versus exemplars (concrete construal) of certain descriptor nouns, and c) read scenarios that are written in abstract versus concrete terms. Concreteness of thoughts, independent of the target project might carry over to a concrete perception of the project, and thus increase the optimism of completion predictions.

The present research attempted to manipulate focalism, but failed to do so effectively. A more direct and explicit manipulation of thoughts about possible problems and interruptions might be more successful. First, participants could be reminded that they will have other things to do that might interrupt the project implementation and thus delay project completion time. Participants could be asked to list possible interruptions. Such manipulations would be similar to research on the planning fallacy that used worst case scenarios in an attempt to reduce the optimistic prediction bias (Newby-Clark et al., 2000). Second, participants could be reminded that simultaneous activities are competing for their time. Specifically, the present focalism manipulation might have failed because participants considered other activities but did not perceive them as competing for their time spent on the target project (Libermann & Trope, 1998).

Conclusions

As accurate completion prediction is part of successful project completion in people's personal and professional life, it is important to identify factors reducing the prevalent optimistic bias in completion predictions. Temporal distance might be one important determinant of the degree of optimism in predictions. As to the effect of temporal distance on prediction optimism, past research suggests that it can have both positive and a negative effects which was exactly what this research found. Temporal

closeness simultaneously increased the consideration of possible problems and interruptions, which reduced optimism, and increased concreteness of thoughts with which the project was regarded, which increased optimism.

The present research integrated seemingly contradicting past research that suggested both benefits and drawbacks of the effect of temporal closeness on predictions. It is theoretically interesting that two contradicting lines of research could both be supported under certain circumstances. Further, this finding may suggest that variables in other domains could also yield divergent effects. It also suggests that it is important to examine the specific thought processes leading to an effect, rather than just the end result.

The present research has also suggested possible moderators that may increase the benefits of long term planning. One plausible moderator may be the degree of temporal distance. Ironically, one might be better at forecasting the completion time for very distant projects than for close or moderately distant projects. However, several questions remain about the exact relationship between the degree of temporal distance and its impact on prediction. Do benefits of temporal distance increase linearly with increasing distance? Is there a tipping point of benefits outweighing drawbacks of temporal distance? And are there specific types of projects that are better planned in the distant future whereas other types of projects profit from temporal closeness? Further research is required to better understand how and when temporal distance displays its costs and benefits.

Table 1

Description of coding procedure for the thought listing measure (Study 1)

Category	Criterion Description	Example	Frequency
Past experiences	References to previous experiences, comparing the hypothetical assignment with past tasks	I arrived at my prediction based on previous experience. I have been given similar assignments, so I know approximately how long they will take.	50%
Personality traits	References to personality traits or habits in project completion	I think my predictions are very accurate because I am always very paranoid about school work and tend to start things right away. I tend to get very anxious if I get a new assignment.	32%
Time competing activities	References to activities other than the hypothetical assignment that would occur during the time of assignment completion	I also value other things (time spent with friends, important life stuff) above getting assignments down in significant advance before their due date.	19%
Concrete plan of action	References to specific characteristic of the task, planning the project in a step by step fashion or estimating the time subcomponents of the task will take	I know that in a chapter there are only something like 30 pages and in order to read that carefully and properly it will take no more than 1 hour.	39%

Table 2

Means of the dependent variables by temporal distance condition (Study 1)

	Temporal Distance		
	Close	Distant	Significance
Time slack for past project	3.52	3.85	ns
Negative feelings about past project	2.83	2.72	ns
Typicality of past project	2.58	2.42	ns
Importance of past project	3.69	3.38	ns
Recalled details	2.59	2.55	ns
Recalled delays	3.17	3.10	ns
Subjective distance to past project	63.15	70.44	ns
Subjective distance to deadline	46.47	36.51	*
Subjective distance to start	53.98	49.36	ns
Subjective temporal to completion	45.42	47.95	ns
Time slack for future project	3.61	4.03	*
Difficulty of future project	2.18	2.36	ns
Certainty of start prediction	6.76	6.52	ns
Certainty of duration prediction	6.35	5.84	ns
Certainty of completion prediction	7.45	7.35	ns

Note. * = $p < .05$; ** = $p < .0$

Table 3

Correlations of subsidiary measures with the optimism of prediction, by temporal distance condition (Study 1)

	Close			Distant		
	Start	Duration	Completion	Start	Duration	Completion
Subjective distance to past project	.09	.05	.04	.02	-.14	.14
Subjective distance to deadline	.16	.17	-.03	.25	.39*	.01
Subjective distance to start	.30*	.29*	.03	.16	.25	.00
Subjective distance to completion	.00	.05	-.04	-.04	.17	-.20
Negative feelings about past project	.10	.38**	-.21	.05	.07	-.03
Typicality of past project	.00	.25	-.06	.22	-.02	.07
Perceived importance of past project	-.11	-.07	-.15	.14	-.05	.10
Recalled details	-.02	.13	-.18	.05	.17	-.07
Recalled delays	.20	-.06	.13	.22	.03	.03
Past expected duration	-.03	.72**	-.18	-.07	.34*	-.21
Past real duration	-.12	.46**	-.11	-.04	.38**	-.12
Past expected completion	.22	-.21	.65**	.24	-.18	.71**
Past real completion	.21	-.20	.55**	.38**	-.19	.85**
Perceived time slack for past project	.10	-.11	.25*	-.10	-.17	-.18

Certainty: Start	.11	.06	.15	-.02	.19	-.03
Certainty: Duration	-.09	-.17	.15	-.11	.04	-.13
Certainty:Completion	-.11	-.13	-.08	-.16	.09	-.16
Thoughts about past delays	.23	.06	.11	.02	.162	0
Procrastination	-.36**	.06	-.51**	-.47**	-.01	-.37**
Self esteem	.13	.03	-.07	.16	-.10	.03
Optimism	.06	.07	-.09	.19	-.05	.05
Dialectic thinking	-.06	-.16	-.11	.04	.06	.07
Perfectionism	-.07	.07	.20	-.01	.21	-.14
Judgement of past as relevant	.06	.18	.07	-.04	.07	-.03
Judgement of future as controllable	-.14	.05	-.17	.06	.05	-.07

Note. * = $p < .05$, ** = $p < .01$

Table 4

Descriptive statistics of the main dependent variables by temporal distance condition (Study 1)

	Temporal Distance		
	Close	Distant	Significance
Past duration (in hours)	3.95 (3.37)	3.61 (2.80)	ns
Past completion (days bf. deadline)	1.21 (1.97)	1.07 (1.57)	ns
Predicted start (days bf. deadline)	5.24 (.38)	4.86 (.41)	ns
Predicted duration (in hours)	4.47 (.39)	3.06 (.40)	*
Predicted completion (days bf. deadline)	1.77 (1.83)	1.10 (1.16)	*
Predicted completion (adjusted for ANCOVA)	1.73 (.15)	1.14 (.16)	*

Note. * = $p < .05$; ** = $p < .01$

Table 5

Frequencies of open-ended thought categories by temporal distance condition (Study1)

Category	Temporal Distance		Significance
	Close	Distant	
Past experiences	36 (54%)	27 (44%)	ns
Personality traits	21 (32%)	20 (33%)	ns
Time competing activities	12 (18%)	12 (20%)	ns
Concrete plan of action	31 (49%)	18 (30%)	*

Note. * = $p < .05$; ** = $p < .01$; % = percent of the entire sample that gave a reference to the coding category (may add up to > 100, because participants made references to more than one category)

Table 6

Rating of closed-ended thought focus measures by temporal distance condition (Study 1)

	Temporal Distance		
	Close	Distant	Significance
Past experiences	3.92 (.96)	3.78 (.89)	ns
Anticipated Problems	2.95 (1.03)	2.93 (1.14)	ns
Anticipated interruptions	3.35 (1.04)	3.44 (1.16)	ns
Concrete Steps of Action	3.00 (1.09)	3.08 (1.10)	ns
Hopes and Wishes	3.73 (.92)	3.53 (1.08)	ns
Other People's baseline	2.84 (1.03)	2.65 (1.19)	ns

Note. * = $p < .05$; ** = $p < .01$

Table 7

Correlations of closed-ended (CE) and open-ended (OE) measures of thought focus (Study 1)

	OE: Past Experiences	OE:Personality Traits	OE: Time Competing Activities	OE:Concrete Plans
CE: Plan of Action	.13	.22*	-.07	-.03
CE: Hopes and Wishes	.01	.14	-.07	-.12
CE: Anticipated Problems	.02	-.07	.21*	-.19*
CE: Anticipated Interruptions	.03	.07	-.05	-.16
CE: Past Experiences	.03	.20*	.08	0
CE: Other People's baseline	-.24**	.04	.09	.07

Note. * = $p < .05$; ** = $p < .01$

Table 8

Correlations of predicted start, duration, and completion times with closed-ended thought focus measures (Study 1)

	Start	Duration	Completion
Past experiences	.05	-.15	-.09
Anticipated Problems	.20*	.21	.02
Anticipated interruptions	.15	.02	.06
Concrete Steps of Action	.34**	.01	.19*
Hopes and Wishes	.34**	.02	.18
Other People's baseline	.14	.03	.08

Note. * = $p < .05$; ** = $p < .01$

Table 9

Correlations of dispositional measures with predicted completion times by temporal distance condition (Study2)

	Temporal Distance			
	Close		Distant	
	Final Essay	Mean Prediction	Final Essay	Mean Prediction
Procrastination	.60**	.55**	.32*	.20
Perfectionism	-.09	.50**	.02	.20
Tendency to abstract construal	-.01	.12	-.16	-.05
Future is determined	.12	.16	-.19	-.16
Future can be changed	.03	.08	-.12	-.18
Past is reliable	.12	.15	.17	.04
Past is irrelevant	-.17	-.02	.13	.03
Academic helplessness	0	.10	.22	.17
Academic distraction	.46**	.34**	.23	.08

Note. * = $p < .05$, ** = $p < .01$

Table 10

Manipulation checks and main dependent variables by focalism condition (Study 2)

	Focalism		
	Control	Defocused	Significance
% of people generating spontaneous thoughts about other activities	38	41	ns
Generated number of daily and weekly activities	6.74 (.28)	6.00 (.28)	ns
Expected hours to be spend with daily activities on a typical day	22.25 (.57)	21.29 (.58)	ns
Rating of likelihood of interruptions	6.94 (.32)	6.76 (.32)	ns
Predicted submission of last essay	5.29 (.18)	5.32 (.18)	ns
Mean prediction for all essays	3.74 (.15)	3.63 (.15)	ns
Actual submission of last essay	6.38 (.32)	5.93 (.33)	ns
Mean submission of all essays	5.04 (.34)	4.52 (.33)	ns

Table 11

Predicted essay completion times by temporal distance condition (Study 2)

	Temporal Distance		
	Close	Distant	Significance
1st essay	2.00 (.16)	2.16 (.16)	ns
2nd essay	3.65 (.16)	3.61 (.16)	ns
3rd (final) essay	5.23 (.18)	5.38 (.18)	ns
Mean prediction	3.66 (.15)	3.72 (.15)	ns

Table 12

Frequency distribution of open-ended thought listing by temporal distance condition (Study 2)

	Temporal Distance		
	Close	Distant	Significance
Past experiences	10 (20%)	16 (33%)	ns
Time competing activities	36 (72%)	28 (57%)	ns
Plan of action	18 (36%)	10 (20%)	†
Personality	9 (18%)	13 (27 %)	ns

Note. † = $p < .09$

Table 13

Means of closed-ended thought focus measure by temporal distance condition (Study 2)

	Temporal Distance		
	Close	Distant	Significance
Writing sample essay	4.62 (.34)	4.96 (.35)	ns
Past experiences	6.39 (.32)	7.31 (.32)	*
Problems and interruptions	6.27 (.27)	5.51 (.27)	*
Plan of action	6.21 (.33)	5.31 (.33)	*
Hopes	6.87 (.31)	6.45 (.31)	ns
How long people in general take	4.42 (.33)	4.25 (.34)	ns

Note. * = $p < .05$

Table 14

Correlation of closed-ended (CE) and open-ended (OE) thought focus measures with project completion predictions (Study 2)

	Final Essay	Mean Prediction
CE: Writing sample essay	-.06	-.05
CE: Past experiences	-.08	-.05
CE: Problems and Interruptions	.24*	.26**
CE: Plan of action	-.21*	-.23*
CE: Hopes	-.24*	-.26**
CE: People in general	-.02	.04
OE: Past	.05	.03
OE: Interruptions	-.09	-.04
OE: Plan of action	0	-.03
OE: Personality	-.23*	-.14

Note. * = $p < .05$; ** = $p < .01$

Figure Captions

Figure 1. Presence of concrete thoughts about a project as a mediator for the effect of temporal distance on optimism of prediction (Study 1).

Figure 2. Presence of concrete thoughts about the project as a mediator for the effect of temporal distance on optimism of prediction (i.e., prediction completion of final essay) (Study 2).

Figure 3. Presence of thoughts about problems and interruptions as a mediator for the effect of temporal distance on optimism of prediction (prediction completion of final essay) (Study 2).

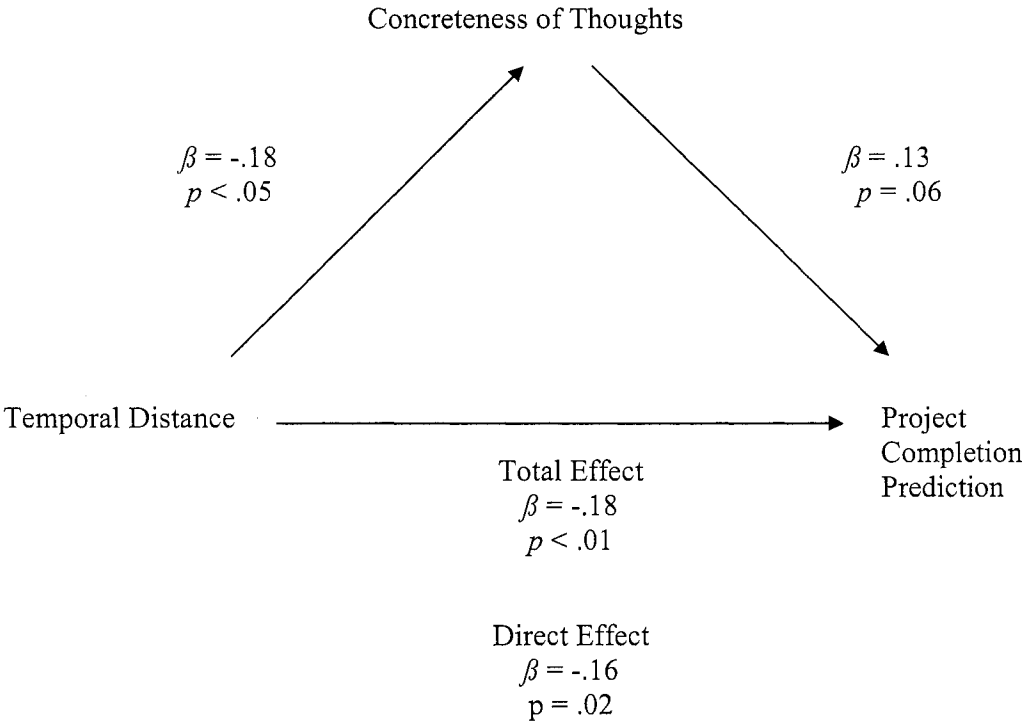

Figure 1. Presence of concrete thoughts about a project as a mediator for the effect of temporal distance on optimism of prediction (Study 1).

Note. Paths show standardized coefficients. Project completion predictions are measured in days before deadline (higher numbers = predicted to complete project earlier).

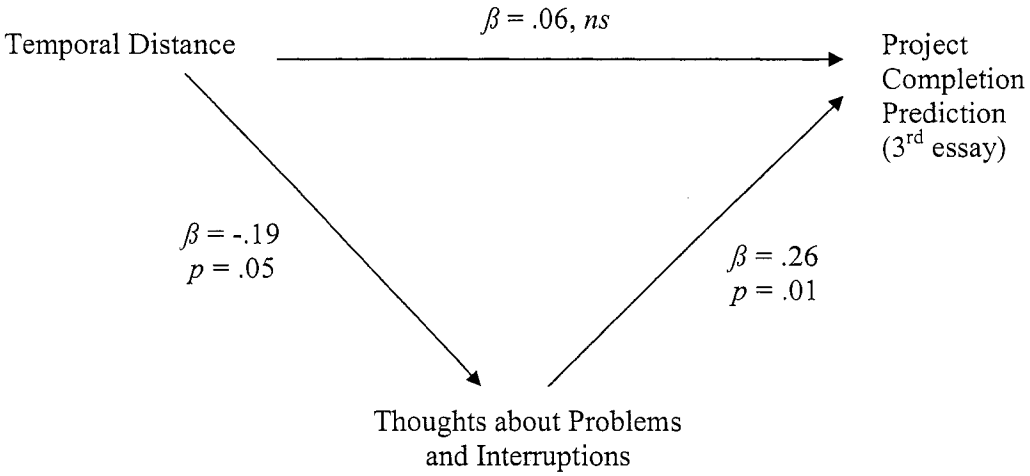

Figure 2. Presence of thoughts about problems and interruptions as a mediator for the effect of temporal distance on optimism of prediction (prediction completion of final essay) (Study 2).

Note. Paths show standardized coefficients. Project completion predictions are measured in days after start of the project (higher numbers = predicted to complete project later).

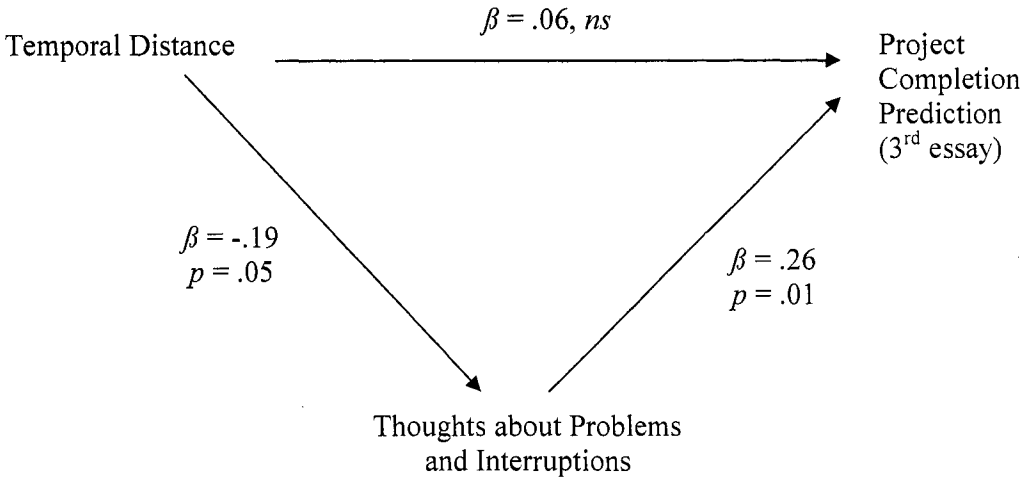

Figure 3. Presence of thoughts about problems and interruptions as a mediator for the effect of temporal distance on optimism of prediction (prediction completion of final essay) (Study 2).

Note. Paths show standardized coefficients. Project completion predictions are measured in days after start of the project (higher numbers = predicted to complete project later).

Footnotes

[1] Initially the study included an additional condition in which the measures were presented in a different sequence. However, preliminary analyses indicated that the two conditions of the questionnaire order manipulation did not differ significantly from each other in the main analyses. Therefore, we collapsed across this order manipulation for all reported analyses.

[2] Participants were asked to indicate how far away the deadline felt on a time line with the anchors *feels very close* and *feels very far*. The distance from the left anchor to the mark in cm provided a measure of the subjective temporal distance of the project. This measure was included because earlier research has shown that subjective temporal distance is not equivalent to objective temporal distance (Wilson & Ross, 2001, 2003).

In the current study, the objective temporal distance manipulation had a significant main effect on the subjective temporal distance to the deadline of the project, $F(1, 125) = 4.27$, $p = .04$. Subjects induced to think about a distant project reported feeling subjectively closer to the project's deadline ($M = 36.51$, $SD = 3.34$) than subjects thinking about a temporally close project ($M = 46.47$, $SD = 3.34$). This counter-intuitive finding might be explained by the psychological function of temporal distancing. Feeling close to a deadline might be threatening and create an unpleasant feeling of urgency. On the other hand, feeling far away from a deadline might reduce these negative feelings. Subjective distancing might serve the psychological function of coping with negative feelings about an event (Sanna, Chang, & Carter, 2004, Wilson & Ross, 2003), which would be necessary for close events that induce an uncomfortable feeling of urgency, but not for distant events that do not create negative feelings in the first place.

Curiously, participants also felt closer to the deadline of the project (M = 41.69, SD = 27.50) than to the start of the project (M = 51.76, SD = 27.58). This difference was statistically significant, as tested with a paired sample t-test, $t(126) = -4.33$, $p < .001$, by paired sample t-test.

Subjective temporal distance to the deadline of the target assignment moderated the effect of temporal distance on completion prediction optimism, when separate ANOVAs were conducted for the lower and upper half of the subjective distance continuum. Temporal distance predicted optimism of completion prediction for participants feeling close to the target assignment deadline, $F(1, 63) = 6.94$, $p = .01$, but not for participants feeling far from the target assignment, $F(1, 64) = 1.77$, *ns*. However, this difference for the upper and lower half of feeling of subjective distance was not significant when an interaction term with subjective distance to the deadline and temporal distance was submitted to a regression analysis, $F(3, 123) = 1.82$, *ns*.

[3] Further exploratory analyses were conducted. As a discussion of all variables would be beyond the scope of this proposal, refer to Table 2 for the mean differences of all variables and Table 3 for an overview of the correlations with the predictions.

[4] All reported Means for ANOVA computations are estimated marginal Means, unless indicated otherwise.

[5] The closed and the open-ended thought focus measures of prediction generation correlated significantly only for the anticipation of future problems that might delay project completion and the anticipation of time competing activities, $r(125) = .21$, $p = .02$. For all correlations of open-ended and closed-ended thoughts, see Table 7.

[6] Concreteness of thoughts did not correlate with project completion predictions when past project completion time was not controlled for, $r(125) = .11$, *ns*.

There appears to be a relation between concreteness of thoughts and relative optimism of completion prediction but not between concreteness of thoughts and optimism of completion prediction.

[7] A different test of mediation (Baron & Kenny, 1986) failed to reach significance, *Sobel* $z = -1.49$, $p = .14$. The difference in relative optimism of project completion prediction across the temporal distance conditions could not be fully explained by a mediation of concreteness of thoughts. The effect of temporal distance on completion prediction, $\beta = -.18$, $p < .01$ was not reduced significantly when controlling for concreteness of thoughts, $\beta = -.16$, $p = .02$. The shown mediation is therefore not very strong or might be suppressed by additional factors.

[8] Participants who reported having based their predictions on past experiences really did show a significantly higher correlation of past project completion time and predicted future completion time, $r(61) = .76$, $p < .001$, than participants who did not report basing their prediction on past experiences, $r(62) = .47$, $p < .001$, $z = 2.67$, $p < .01$. Although not significant ($z = 1.15$, *ns*) the closed-ended measure revealed a similar pattern, such that participants agreeing with the statement that they had based their prediction on past experiences (median split at 3 to 4 on a 5 point scale) showed a higher correlation between the past project completion time and the future project completion time, $r(81) = .68$, $p < .001$ than participants who did not agree with this statement, $r(40) = .54$, $p < .001$. Participants' self-reported thoughts about their prediction may therefore be judged as accurate.

[9] Exploratory analyses revealed that in the close condition, participants high on behavioural trait procrastination predicted to complete the essays on average later than participants low on procrastination, $r(49) = .44$, $p < .001$. However, in line with previous research (Buehler et al., 2002, Buehler & Griffin, 2003), procrastinators also

completed the essay later than non-procrastinators, $r(37) = .50$, $p = .001$. Thus, there was no difference in participants' bias of prediction, $r(37) = .20$, *ns*. Interestingly, procrastinators did not differ from non-procrastinators in prediction $r(49) = 20$, *ns* or submission time, $r(23) = .20$, *ns* in the distant condition. Independent of temporal distance, procrastination was furthermore negatively correlated with the extent to which participants based their prediction on concrete thoughts, $r(101) = -.29$, $p < .01$ as well as with the general tendency to construe events concretely (BIF), $r(100) = -.25$, $p = 01$.

The measure of the tendency to construe events concretely (BIF) was, as expected, correlated positively with the extent to which people reported basing their thoughts on a concrete plan of action while generating their prediction, $r(101) = .20$, $p = .04$ (See Table 9 for correlations of the main personality scales with predictions). This finding suggests that state (extent to which participants based their prediction on a plan of action) and trait (BIF) measures of concrete construal were related.

[10] Temporal distance to the project appears to have been more important for people's cognition about time competing activities than the defocus manipulation: People in the close condition listed more activities ($M = 6.79$, $SD = .28$) than people in the distant condition ($M = 5.95$, $SD = .28$), $F(1, 100) = 4.55$, $p = .04$. This finding is in line with research by Zauberman and Lynch (2005) finding that people perceive more time slack in the future than they do at present. One may simply not have any plans for the future and thus not be aware of any time competing projects and activities. The number of listed activities did not correlate with predicted project completion time, $r(100) = -.01$, $p = .67$, or actual completion time, $r(55) = -.05$, $p = .69$.

[11] The subsequent Means and Standard Deviations are adjusted for a smaller sample size, as not all participants completed the essay task.

[12] Participants formulated three completion predictions, one for each essay. Participants might have perceived the three essays as separate, repetitive tasks rather than as one comprehensive task. To account for this possibility, we computed the mean prediction for all essay tasks as a second main dependent variable.

[13] Participants' open-ended responses were coded similarly to Study 1 (See Table 11 for a frequency distribution of all coding categories). Unlike Study 1, the most frequently occurring thought concerned activities that may interrupt or delay project completion (56%) with references to past experiences mentioned less frequently (30%). The two following thought categories, concreteness of thoughts and problems/ interruptions, were examined more closely, to investigate whether they mirror the closed-ended thought ratings.

Twenty-two participants (22%) in the close condition and 16 (16%) in the distant condition spontaneously referred to a concrete plan of action. Although the difference was in the same direction as Study 1's results and the closed-ended measure in Study 2, the difference was not significant, $F(1, 96) = .58$, *ns*.

Thirty-one participants (63%) in the close condition spontaneously referred to possible interruptions or problems that might occur during project completion. In the distant condition, non-significantly fewer participants (24 or 49%) did so, $F(1, 96) = 2.03$, *ns*.

[14] Participants who did not send any essays did differ from participants who sent at least one essay in their mean completion prediction, $F(1, 97) = 5.38$, $p = .02$. Participants who did not send any essays, predicted to send the last essay later, ($M =$ 4.01 days, $SD = .17$) than participants who sent at least one essay ($M = 3.50$ days, *SD*

= .13). This difference might reflect an initial difference in motivation to complete the project which then increased over time and led participants with low motivation to drop out. Participants who did not send any essays did not differ from participants who sent at least one essay in their final essay completion prediction.

[15] Kahneman and Lovallo (1993) suggest that thinking concretely about an event (inside view) and thinking about past experiences (outside view) are opposites. In accordance with this assumption, we expected thoughts about past experiences to be negatively related to concrete thoughts. First, we examined participants' open-ended thought listings. The thought listing categories for concrete thoughts and thoughts about past experiences correlated negatively, $r(97) = -.32$, $p = .001$, as was expected. Next, we examined the closed-ended thought focus measure. Contrary to expectations, the thought focus measure of concreteness of thoughts was slightly positively correlated with the thought focus measure of thoughts about past experiences, $r(101) = .20$, $p = .05$. However, this result might just be an indicator for response tendencies in participants. Some participants might display the enthusiastic tendency to agree with all thought focus statements to a greater degree, whereas other participants might be more timid in their responses. To control for response tendencies, we controlled for participants' grand mean of the closed-ended thought focus measure while correlating the closed-ended thought focus measures of concrete thoughts with thoughts about past experience. When thus controlling for participants' response tendencies, concreteness of thoughts and consideration of past experiences correlated negatively, $r(98) = -.28$, $p < .01$, as would be expected according to Kahneman and Lovallo's theory.

[16] A total of 24 (19%) participants spontaneously mentioned time competing activities or possible interruptions in Study 1. A total of 55 participants (53%) participants spontaneously mentioned possible interruptions in Study 2.

Appendix A Study 1: Temporal Distance Manipulation

Imagine now, that you **just received** (*will receive next term*) the formerly described assignment, in one of your courses.

> [One of your course instructors gives out an assignment for which completion you will have to read one chapter in your text book and write a summary about it, as well as answering 5 questions related to the chapter's content. You have two weeks time to complete this assignment.]

The assignment is due in two weeks from **today** (*the day you receive the instructions*).

Sometimes, points in time in the future feel very far away, while other times they feel very close, regardless of how far in time they actually are.
Please respond to the following two questions by placing a mark on the provided timeline

How far does this due date feel for you right now?
Very
close_____very
far

Appendix B Study 1: Predictions

Now, we would like to ask you several questions about the hypothetical assignment now, keep in mind that the assignment is due 14 days from **today** (*the day you received the instructions.*)

Now, please predict as honestly and accurate as possible:

1) How many days before the deadline will you start working on your assignment?
_____days
How far does this proposed start date feel for you?
Very close_____very far

2) How much time do you think the completion of the assignment will take you?
_____ actual working hours [regardless of number of days across which the event was spread out]

3) When will you be finished with the assignment? [Put 0 days if you expect to finish right on time]
_____days before the deadline
How far does this day when you will have completed the assignment feel for you?
Very close_____very far

Appendix C Study 1: Thought Focus Measures

The following questions refer to the prediction that you made on the previous page of when you are most likely to start and complete the project. Please consider how you arrived at these predictions (start, duration and completion date), and describe your thoughts in as much detail as possible in the space provided below. How did you arrive at your predictions? What are the predictions based on?

[textbox, that allows participants to write up to one page of text]

Now, please think back to the beginning of the experiment, when you were asked to recall and write down an experience of a previous school assignment. We are interested in how this recalled experience influenced your predictions.

1. When predicting the start time to work on the proposed assignment, how much did you take into account

When you started working on your previously recalled assignment (e.g. such as how far from the deadline you started)

1	2	3	4	5
Not at all				Very much

2. When predicting the total amount of time it would take you to work on the assignment, how much did you take into account

How much actual working time you spend on the assignment

1	2	3	4	5
Not at all				Very much

3. When predicting the completion date of the assignment, how much did you take into account

When you started working on your previously recalled assignment (such as how far from the deadline you started)

1	2	3	4	5
Not at all				Very much

The duration of your previously recalled experience

1	2	3	4	5
Not at all				Very much

When you completed the work on your previously recalled assignment (such as how far from the deadline you finished)

1	2	3	4	5
Not at all				Very much

When making all these predictions, how much were you thinking of distractions and delays that had come to mind when you recalled the previous assignment?

1	2	3	4	5
Not at all				Very much

Apart from the previously recalled experience, to what extent did you base your prediction on each of the following?

1	2	3	4	5	6	7	8	9	10
Not at all									A great deal

1. A specific plan of action for completing each of the steps needed to finish the project.
2. Your hopes or wishes for when you would most want the project to be finished.
3. Thoughts about possible problems that you might encounter in doing the project itself.
4. Thoughts about possible interruptions or distractions from other events (i.e., other events and activities that may be competing for your time).
5. Apart from the experience you recalled, thoughts about your own past experiences with projects in general (i.e., when you typically finish projects).
6. Thoughts about how long people in general take to complete similar projects like this.

Appendix D Study 2: Target Project

What you will do in this study

In this experiment you will be asked to write three essays [a short evaluation or review] of about half a page about three different articles in different editions of the newspaper "Toronto Star".

You have access to this newspaper at various WLU locations and can also access the newspaper online.

You are free to choose the section of "Toronto Star" from which you would like to pick an article, but you will have to indicate the title and the page number/ html address to specify your choice.

FOR EXAMPLE: **You write an essay for**

Monday Edition:	Wednesday Edition:	Thursday Edition:
TORONTO STAR www.thestar.com TORONTO STAR www.thestar.com	TORONTO STAR www.thestar.com	
Business Section	Sports Section	Sports Section
And submit it:		
Tuesday	Wednesday	Thursday

You will have **one week (7 days) time** to write three essays about three articles of three different editions (3 separate days). **You are only allowed to submit one essay per day.**

You will submit the articles by e-mail.

Just to give you an idea of what it will be like to write the essays, we would like you to complete a sample essay right now, choosing an article from the provided edition of "Toronto Star".

Appendix E Study 2: Temporal Distance Manipulation

Information about the experiment

You will have one week starting **from tomorrow** *(2 weeks from tomorrow)*, to complete the 3 essays.

Tomorrow *(Two weeks from tomorrow)* you will receive an email by the research assistant reminding you of the instructions of this experiment and providing you with her e-mail address and a description of the WLU locations where you can find the "Toronto Star".

Please respond to the following question by placing a mark on the provided timeline

Sometimes, points in time in the future feel very far away, while other times they feel very close, regardless of how far in time they actually are.

How far away does the start of the first essay task feel for you?

Very close_____Very far

How far does the deadline of the essay tasks feel for you?

Very close_____Very far

Appendix F Study 2: Predictions

Please keep in mind that you will start working on the three essays tomorrow (*two weeks from tomorrow*) and that you will have one week to complete the three assignments. You will need three different newspapers to complete the task. Please circle the day that you think you will start writing the first essay and write the approximate time of the day [e.g. 10 am or 7 pm] under it.

When will you start working on the essays?

Day	1st day	2nd day	3rd day	4th day	5th day	6th day	7th day
Time							
	10am: You receive the instructions						5pm: Deadline

When will you submit the first essay?

Day	1st day	2nd day	3rd day	4th day	5th day	6th day	7th day
Time							
	10 am: You receive the instructions (for all 3 essays)						5pm: Deadline

When will you submit the second essay?

Day	1st day	2nd day	3rd day	4th day	5th day	6th day	7th day
Time							
	10 am: You receive the instructions						5pm: Deadline

When will you submit the third essay?

Day	1st day	2nd day	3rd day	4th day	5th day	6th day	7th day
Time							
	10 am: You receive the instructions						5pm: Deadline

Appendix G Study 2: Thought Focus Measures

The following questions refer to the prediction that you made on the previous page of when you are most likely to start and complete the project. Please consider how you arrived at these predictions (start date and completion dates), and describe your thoughts in as much detail as possible in the space provided below. How did you arrive at your predictions? What are the predictions based on?

[textbox, that allows participants to write up to one page of text]

Please answer the following questions as honestly and accurately as possible When generating your predictions (when you will start and finish writing the essays), how much did you base your prediction on the following:

1	2	3	4	5	6	7	8	9	10
Not at all									A great deal

1. The experience of completing the same task earlier during this experiment
2. Apart from the experience earlier in this experiment, thoughts about your own past experiences with projects similar to this one (i.e. a short written assignment)
3. A specific plan of action for completing each of the steps needed to finish the project.
4. Your hopes or wishes for when you would most want the project to be finished.
5. Thoughts about possible problems that you might encounter in doing the project itself.
6. Thoughts about possible interruptions or distractions from other events (i.e., other events and activities that may be competing for your time).
7. Thoughts about how long people in general take to complete similar projects like this.

Appendix H Study 2: Reminder Email

Hello,
You participated in the first part of an experiment of the psychology department of Wilfrid Laurier University about completing multiple component tasks.

We ask you now to complete the second part of this experiment. This will require you to write three essays about three different articles of the newspaper "Toronto Star". You will receive one credit towards your psychology course grade upon completion of the essays.

PLEASE HIT THE "REPLY" BUTTON OF YOUR EMAIL MANAGER WHEN YOU READ THIS, SO THAT WE KNOW THAT YOU HAVE RECEIVED THIS NOTIFICATION.

WHAT I HAVE TO DO

- We ask you to write three essays (short reviews or critics) of three different articles of three different editions of the newspaper "Toronto Star".
- The essay should be about half a page long (300 – 400 words). The essays are confidential and will not be graded.
- You have one week's time (7days) from today to complete this task, you are only allowed to submit one essay per day.
- Please submit the essays by email to this email address (prep_study@hotmail.com).
- Please indicate the date of the newspaper edition, the pagenumber, and the title of the article on top of the essay.

WHERE TO GET THE PAPER
This newspaper can be found at various location at WLU:

- In the Concourse
- In front of the food course
- In the Science Building, opposite of Tim Hortons
- In the second floor of the Arts Building, where the Television Screen is
- At the Onecard office

You can also access the newspaper "Toronto star" online under the address www.thestar.com

WHAT TO WRITE
If you need more information and suggestions about what to write in the essays, please read the following information

Please indicate the date of the newspaper edition (date of the edition), the page number and the title of the article on top of the page.

The essay could contain:

- A brief summary of the topic and the arguments of the article
- Why you chose that specific article
- what you liked about it (content or style)
- what you didn't like about it (content or style)
- what it reminded you of (own experiences, other articles)
- why or why not you would recommend the article to a friend
- whether you learned something new by reading the article

REMINDER OF CONFIDENTIALITY

We will handle all essays completely confidential. That is, the essays will only be seen by the researchers (Johanna Peetz, Dr. Anne Wilson, Dr. Roger Buehler); they will not be available to your course instructors or any one else. You will not be graded on any of the essays.

However, the essays will not be anonymous when you initially submit them, because you submit the essays by email. All identifying information, such as your email address, will be removed as soon as it has been matched with the questionnaire of the experimental session.
Because you will be returning the take home assignment over the internet, confidentiality cannot be entirely guaranteed while the data is on the internet. All materials submitted via email will be deleted from the internet and stored as text files on a secure external data drive, as soon as they are received.

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