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Investigating the Role of Time in Affective Forecasting: Temporal Influences on Forecasting Accuracy

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Investigating the Role of Time in Affective Forecasting: Temporal Influences on Forecasting Accuracy

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Using extensive diary data from people taking their driver's license exam, the authors investigated the role of time in affective forecasting accuracy. Replicating existing findings, participants grossly overestimated the intensity and duration of their negative affect after failure and only slightly overestimated the intensity and duration of their positive affect after success. Extending existing findings, participants accurately predicted a decrease of their affective reactions over time but underestimated the speed with which this decrease would occur. In addition, they showed greater forecasting accuracy for positive affect than negative affect when the exam was distant and greater forecasting accuracy for negative affect than positive affect when the exam was close. The motivational processes underlying these findings are being discussed.

Keywords: *affective experiences; affective forecasting; temporal biases*

Predicting how we will feel in response to future events is a central component of our self-knowledge. Small and big decisions—whether to drink another beer, whom to marry, whether to have children—often depend on our predictions about how pleasant or unpleasant these events would make us feel, specifically our *affective forecasts* (Wilson & Gilbert, 2003). The accuracy of these affective forecasts has recently sparked strong interest among social scientists (e.g., Gilbert, Gill, & Wilson, 2002; Gilbert, Lieberman, Morewedge, & Wilson, 2004; Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998; Loewenstein & Schkade, 1999). Overall, the research converges to suggest that people are inaccurate in predicting their affective reactions to future events (e.g., Buehler & McFarland, 2001; Sanna & Schwarz, 2004; Wilson & Gilbert, 2003). They grossly overestimate the intensity and duration of their affective reactions to the focal event (Wilson & Gilbert, 2003). Although extant research leaves little doubt that affective forecasts are inaccurate, we argue that forecasting accuracy will vary over time.

Two aspects of time appear especially important for forecasting accuracy. Both the *time course* of affective reactions and the amount of time between forecasts and the focal event, specifically *temporal distance* may affect

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forecasting accuracy. By providing participants with an opportunity to forecast their affective reactions on several days *before* the focal event and by following their affective experiences for several days *after* the event had happened, we compared people's affective forecasts and their affective experiences over time. This approach allows us to recognize time as an important determinant of forecasting accuracy through the investigation of both the time course of affective forecasts and experiences and the influence of temporal distance to the focal event on forecasting accuracy.

Temporal Influences on Forecasting Accuracy

Research on forecasting accuracy compares people's predictions about how they will feel in response to an event in the future with their actual affective experiences (Buehler & McFarland, 2001; Gilbert et al., 1998; Wilson, Wheatley, Meyers, Gilbert, & Axsom, 2000). Typically, this research takes what we would like to call a *time slice approach*. It computes the difference between an affective forecast made at one point in time before a focal event takes place and an assessment of the affective experience at one (e.g., Gilbert et al., 1998) or several points in time after the focal event has taken place (e.g., Wilson et al., 2000).

Two basic findings have emerged from this approach. First, people overestimate the intensity and duration of their affective reactions to a variety of focal events, committing the *impact bias* (Wilson & Gilbert, 2003). Second, the impact bias shows a positive-negative asymmetry, because it is much more pronounced for negative events than positive events (e.g., Buehler & McFarland, 2001; Gilbert et al., 1998).

Often the impact bias is taken as an indicator that people are poor predictors of their affective reaction and are subject to various errors (Wilson & Gilbert, 2003). To illustrate, people imagine the focal event in isolation and fail to consider mitigating circumstances that may change the course of their affective reaction after the event has taken place (Dunn, Wilson, & Gilbert, 2003; Wilson et al., 2000; for overviews see Loewenstein & Schkade, 1999; Wilson & Gilbert, 2003). Independent of the type of error people make, we suggest that the time slice approach tends to underline discrepancies between forecasts and experiences thereby overemphasizing bias and inaccuracies in affective forecasting.

Time course of the affective experience. The time slice approach mostly uses mean differences between the affective forecast and affective experiences. These mean differences capture, by definition, linear relationships or—where possible—linear trends (e.g., Sanna & Schwarz, 2004). It remains silent on the speed with which affect changes over time. Two models of speed of change can be conceived. A linear model of affective change implies that changes in affect start at a certain level of intensity and then increase or decrease at a relatively constant rate over the time period of interest. Recent models on affect progression and experience (e.g., Chow, Ram, Boker, Fujita, & Clore, 2005; Larsen, 2000) challenge such a linear conceptualization of affective change. To illustrate, affect may begin at a high level of intensity and may then decrease rapidly over several points of time before tapering off to an asymptote at later points of time. A quadratic model captures these nonlinear changes and considers that affect changes at different rates over the time period of interest. Hence, a quadratic model allows us to explicitly consider the speed of change in affective reactions.

How are quadratic models in affective experiences related to forecasting accuracy? People have naïve theories about how time influences their affective experiences (cf. Ross, 1989). The best illustration of such a theory is the proverb *time heals all wounds,* which indicates that affective experiences fade over time and that one eventually gets over physical and psychological injuries. When forecasting their affective reactions to an important event, people may invoke these theories to guide their predictions of change in affect intensity and duration over time (e.g., Igou, 2004). We propose that people's theories about affective changes over time reflect the assumption that affect changes at a constant rate over a particular period of time. This suggestion receives support from various studies showing that people fail to consider mitigating circumstances in their affective forecasts (see Gilbert, Gill, et al., 2002; Loewenstein & Schkade, 1999). They focus too much on the event and its outcome and not enough on the consequences this event might bring about (Wilson et al., 2000). By failing to consider these consequences and mitigating circumstances, people are likely to overestimate the duration of their affective experience (i.e., the linear trend) and to underestimate the speed with which their affective experience will decrease (i.e., the quadratic trend).

In contrast to the view that emphasizes inaccuracy of affective forecasts, then, we adopt a more optimistic view that acknowledges that under certain conditions affective forecasts may be accurate. Specifically, we argue that people's theories about affect progression are inaccurate, not because people are generally inaccurate, but because people fail to consider quadratic changes in affective experiences when making affective forecasts. Thus, regarding temporal changes in affect progression, we predict that people make linear forecasts of their affective reactions to a focal event. People's forecasts should fail to consider quadratic changes in affect progression that should render their forecasts inaccurate. Such a suggestion cannot be tested with the time slice approach (for an exception see Wilson et al., 2000) but requires multiple assessments of affective experiences *after* the event has taken place.

Temporal distance to the focal event. Dynamic changes in affect occur not only after an event has taken place but also prior to it. Existing research shows that preceding an event, people are motivated to activate psychological strategies that may help to soften the blow if necessary (e.g., Shepperd, Findley-Klein, Kwavnick, Walker, & Perez, 2000). The time slice approach does not allow us to consider how forecasts vary as a function of temporal proximity to the focal event because it typically assesses forecasts only once before the focal event takes place (for an exception see Van Boven, Loewenstein, & Dunning, 2005).

Traditionally it is assumed that people are motivated to approach pleasure and success and to avoid pain and failure (e.g., Carver & Scheier, 1998; Gray, 1982). More recently, research draws attention to the fact, that under certain conditions, people may be inclined to approach negative feelings and avoid positive feelings (Erber & Erber, 2001; Gohm, 2003; Loewenstein, 2006; Västfjäll & Gärling, 2006). Rather than unconditionally pursuing pleasure, this research suggests that people are implicitly aware of the fact that emotions affect behavior and information processing. Accordingly, they regulate their affect to enhance their performance in a given situation (Gohm, 2003).

People have implicit theories about how emotions affect their behavior and everyday functioning. They attenuate both positive and negative emotions to avoid detrimental effects of emotions on social interaction (Erber, Wegner, & Therriault, 1996), motivation (Erber & Erber, 1994; Erber & Tesser, 1992), and performance (Therriault, Erber, & Oktela, 1996). To illustrate, in a study by Erber, Erber, and Poe (2004), participants who anticipated a high-stake task tried to attain negative feelings and reduce positive feelings to help them succeed in the important task. Participants who anticipated a low-stake task did not regulate their feelings. Erber et al. (2004) took these results to suggest that people believe that their feelings may influence their future performance. Consequently, people strategically regulate their feelings to ensure successful coping with demanding situations.

The attenuation of feelings may serve a variety of functions, including helping people to sustain motivation or promote realistic thinking, if it is believed to lead to benefits and gains in the long run (cf., Parrott, 2002). For example, people may up-regulate feelings of anxiety or fear prior to an important exam to motivate themselves to work harder or to resist distracting temptations. For similar reasons, people may down-regulate feelings of optimism or happiness. So, rather than being motivated by positive feelings, people seem to be motivated by positive outcomes (Martin & Davies, 1998) and they are willing to down-regulate positive feelings and up-regulate negative feelings to achieve these outcomes.

For forecasting accuracy, these findings give rise to an exciting but counterintuitive prediction. People should be more accurate at forecasting their positive affect than their negative affect before the event. Recall that forecasting accuracy indicates that people accurately predict not only that their affect will decrease (i.e., linear trend) but, more important, they accurately predict the speed with which their affect will decrease (i.e., quadratic trend). So, forecasting accuracy actually is an indicator that people are aware that their affect does not linger. Forecasting inaccuracy is an indicator that people accurately predict that their affect will decrease (i.e., linear trend) while they underestimate the speed with which this occurs thereby overestimating the intensity and duration of their affective reaction to the future event. Paralleling affect attenuation research, then, we expect that prior to an important event, people accurately predict the intensity and duration of their positive affect (i.e., forecasts show both linear and quadratic trends) but inaccurately predict the intensity of their negative affect (i.e., forecasts show the linear trend). Put differently, people should correctly predict the speed with which their positive affect fades and overestimate the duration of their negative affect.

This suggestion should be moderated by the temporal distance to the focal event. Dynamic shifts in affect occur as events or outcomes draw nearer (e.g., Shepperd et al., 2000). The literature on coping suggests that people are motivated to activate psychological strategies that may help to minimize the aversive impact of potential setbacks, failures, or tragedies (e.g., Shepperd & McNulty, 2002). These affect regulation processes vary as a function of temporal distance. To illustrate, people lower their expectations regarding the outcome of an event as the event draws nearer to brace for loss in case the event turns out to be negative (e.g., Shepperd et al., 2000; van Dijk, Zeelenberg, & van der Pligt, 2003). This pattern seems adaptive. As long as people believe that they can still influence the outcome of a future event, they may be motivated to try harder to pursue their goals and achieve a positive outcome. However, as the event draws nearer and as their influence on the outcome may decrease, people may be motivated to try to minimize the event's aversive impact. For example, before an important exam, people may try to ensure passing by working hard. When the exam is imminent, however, that is, when they cannot do anything to enhance their chances for success anymore, they should put strategies in motion to lessen the impact of a potential failure. These motivational changes across temporal distance to the event should be reflected in affective forecasts.

Specifically, people should more accurately predict the intensity and duration of their positive affect when the temporal distance to the focal event is great, whereas they should inaccurately predict (i.e., overestimate) their negative affect (see above). When the event is close, however, the pattern of forecasting accuracy should reverse such that people should more accurately predict their negative affect than their positive affect. Accuracy for negative affect, when the event is close, indicates that people accurately forecast that the negative affect will fade and—more important—that it will fade fast. Inaccuracy for positive affect when the event is close implies that people overestimate the intensity and duration of their positive affect. In short, we predict that forecasting accuracy for positive affect should decrease as the event draws nearer whereas forecasting accuracy for negative affect should increase.

Overview of the Study

The present study tested the following hypotheses. First, replicating findings based on the time slice paradigm, people should show the impact bias. The impact bias should be more pronounced for negative affect than for positive affect (e.g., Gilbert et al., 1998). Second, regarding the *time course* of their affective experiences, people's affective forecasts should accurately reflect linear changes in their affective experiences following the focal event. Their affective forecasts should be inaccurate in reflecting quadratic changes in affect experience following the focal event, however. Third, people's forecasting accuracy should vary as a function of temporal distance to the focal event. Specifically, accuracy for positive affect should be greater when the focal event is distant and should decrease as the event approaches. Accuracy for negative affect should be lower when the event is distant and increase as the focal event draws closer.

To investigate these hypotheses and circumvent shortcomings of the time slice paradigm, we conducted a longitudinal daily diary study among people taking their driving examination in the Netherlands. A Dutch driver's license is issued after passing a written test and a driving test at the Dutch Driving License Organisation (Centraal Bureau Rijvaardigheidsbewijzen or CBR). The average costs for the license amount to €1,710 or about 2,000 U.S. dollars (CBR, 2004; Consumentenbond, 2005) and is generally considered an important and self-relevant event.

Using an experience-sampling device, participants made affective forecasts regarding their driving exam outcome on each day for five consecutive days *before* their exam took place (–D5, –D4, –D3, –D2, –D1). They rated their affective experiences on the day of their exam after the exam had taken place (D-Day), and on five consecutive days following their exam (+D1, +D2, +D3, +D4, +D5). Given that participants could fail or pass the examination, we were able to investigate all hypotheses for both positive affect (i.e., happiness) and negative affect (i.e., disappointment).

Because our study combined both several assessments of affective forecasts before the focal event took place and several assessments of affective experiences after the event took place, it was uniquely positioned to address questions regarding the role of time in affective forecasting that have remained unanswered by studies using the time slice paradigm. Studies using between-subjects designs (e.g., Gilbert et al., 1998) compared affective forecasts and experiences but do not allow us to examine dynamic changes of affective forecasts and/or experiences over time. Within-subjects designs in which participants forecast their affective reaction once and rate their affective experience several times (e.g., Wilson et al., 2000) allow us to gain insights into the time course of affective experiences but remain silent on the influence of temporal distance on affective forecasting accuracy. Within-subjects designs in which participants forecast their affective reaction several times but do not report their affective experience (e.g., Shepperd, Ouellette, & Fernandez, 1996) allow us to investigate the influence of temporal distance on affective forecasts but remain silent on affective experiences. Finally, within-subject designs in which participants forecast their affective reactions twice and rate their affective experiences twice (Sanna & Schwarz, 2004) allow for the examination of linear temporal changes but do not allow us to examine quadratic changes in affective experiences. Therefore, our study is the first to explicitly consider the effect of time course and temporal distance on forecasting accuracy. Moreover, it is one of the first studies to recognize dynamic temporal changes in affective experiences and affective forecasting, and, we argue, will help to illuminate when and why forecasting accuracy will vary over time.

METHOD

Participants

A total of 37 participants participated in a study on "Subjective Reactions Surrounding Driving Exams."

Participants were recruited in classes and with advertisements. Their mean age was 19.65 years (*SD* = 2.35). A total of 8 men (21.6%) and 29 women participated and all participants, except 1, had the Dutch nationality (97.1%). Participants who completed the study received €20 for their participation (about 23 U.S. dollars). The group was further divided on the basis of actual exam performance, resulting in success (*n* = 20) and failure conditions (*n* = 17).

Procedure

In recruiting our sample, we placed advertisements in the classified section of the university newspaper and on university bulletin boards. We further announced the study in first-year student courses of different faculties of the university. Interested people contacted the research assistant and were scheduled for an introductory session at our laboratory. Participants completed large batteries of questionnaires. At the introductory session, questionnaires contained measures of dispositional traits (e.g., state-action orientation, achievement motivation). During the diary periods before and after the exam, questionnaires included measures of affective forecasts and experiences, psychosocial well-being, attributional tendencies, and appraisals of the exam and the examiner. We describe only those measures relevant to the aims of the current hypotheses below.

At the introductory session, about 6 days before their exam, participants completed a background questionnaire, tapping demographics and information surrounding the driving exam (i.e., number of lessons, earlier exams). The assistant then introduced the experience sampling device, the so-called beeper (Palm Pilot CE M105), which we programmed with the Experience Sampling Program (ESP version 4.0) by Feldman-Barrett and Barrett (2001). She familiarized participants with its use and instructed participants to start completing the daily questionnaires the following day (or provided participants with a date when the interval was greater than one day), complete the daily measures in the evening, preferably at the same time each day, and return their beepers the day after their exam. Participants also received a questionnaire for the day their exam took place and a printed version of all daily questionnaires (as a fallback in case the beeper failed). The research assistant then answered all questions that participants had and set up the following appointment.

One day after their exam, participants returned to the laboratory. They returned the beeper and the completed printed questionnaires of the day of their exam. They received a follow-up beeper that assessed their affective experiences *following* the exam and scheduled the final session.

At the final session, participants returned the follow-up beeper. The research assistant described the purpose of the study to participants, paid them, and thanked them for their participation.

Questionnaires

Background information. The initial questionnaire asked participants for basic demographic information (i.e., age, gender, ethnicity) and information relevant to the driving exam. Specifically, participants reported how many driving lessons they had had (1 = *5 lessons,* 2 = *10 lessons,* 3 = *15 lessons,* 4 = *20 lessons,* 5 = *25 lessons,* 6 = *30 lessons,* 7 = *more than 30*). In addition, participants reported how often they had tried to pass the driving exam previously (*0 to more than 4 times*) and had taken practice exams (*0 to more than 4 times*).

Affective forecasts and experiences for success and failure. To assess *affective forecasts,* all participants estimated on 7-point scales each day for 5 consecutive days before their exam[1] (–D5, –D4, –D3, –D2, –D1) how happy and how disappointed they would feel immediately after their exam (T0) and the 5 subsequent days (T1 = *1 day after*, T2 = *2 days after*, T3 = *3 days after*, T4 = *4 days after*, and T5 = *5 days after*) if they were to pass or fail the exam (1 = *not at all*, 7 = *very much*). To assess *affective experiences*, participants in the success condition estimated on 7-point scales each day, including the day of the exam (D-Day) and 5 subsequent days (+D1, +D2, +D3, +D4, +D5), how happy they felt (1 = *not at all*, 7 = *very much*). Participants in the failure condition estimated on 7-point scales each day, including the day of the exam (D-Day) and 5 subsequent days (+D1, +D2, +D3, +D4, +D5), how disappointed they felt (1 = *not at all*, 7 = *very much*).[2]

RESULTS

Descriptive Analyses

On average participants took more than 30 driving lessons (*M* = 6.67, *SD* = 0.67), which corresponds to the national average (Consumentenbond, 2005). They had once previously tried passing the exam (*M* = 1.18, *SD* = 1.01) and had one practice exam (*M* = 1.30, *SD* = 0.46). Participants who succeeded and those who failed did not differ on these variables (all *F*s < 1). No gender differences were observed for these variables (all *F*s < 1).

Overall Models

The wealth of information in the 72 measures involved in the study allows us to test the hypotheses

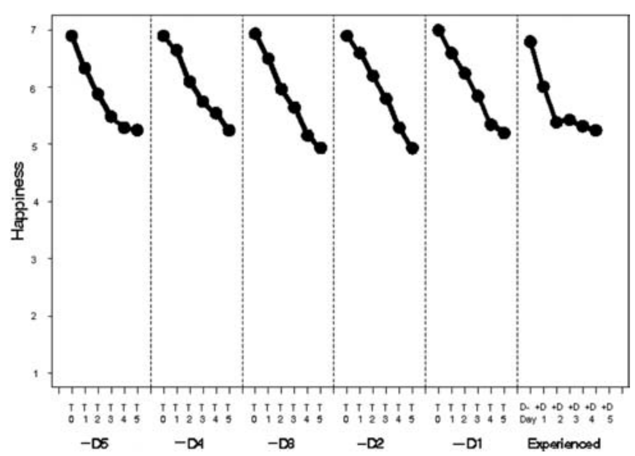

Figure 1 Overall pattern of means for forecasts and experiences of happiness.

NOTE: –D5 = forecast 5 days before the exam, –D4 = forecast 4 days before the exam, –D3 = forecast 3 days before the exam, –D2 = forecast 2 days before the exam, –D1 = forecast 1 day before the exam; Experienced = experienced affective reaction; T0 = immediately after the exam, T1 = 1 day after, T2 = 2 days after, T3 = 3 days after, T4 = 4 days after, and T5 = 5 days after the exam.

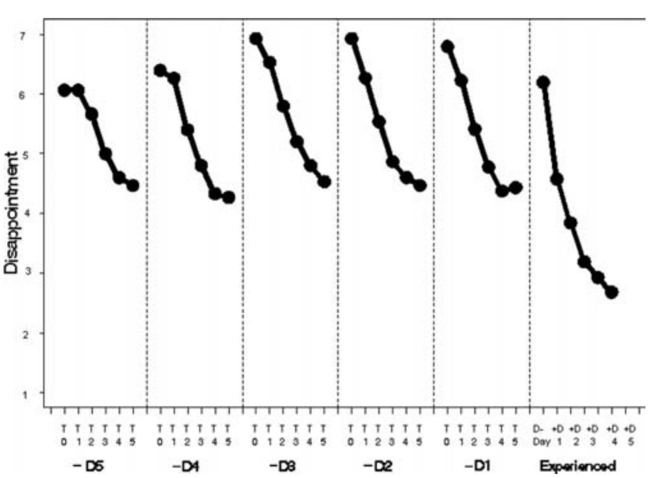

Figure 2 Overall pattern of means for forecasts and experiences of disappointment.

NOTE: –D5 = forecast 5 days before the exam, –D4 = forecast 4 days before the exam, –D3 = forecast 3 days before the exam, –D2 = forecast 2 days before the exam, –D1 = forecast 1 day before the exam; Experienced = experienced affective reaction; T0 = immediately after the exam, T1 = 1 day after, T2 = 2 days after, T3 = 3 days after, T4 = 4 days after, and T5 = 5 days after the exam.

advanced in the theoretical section. We tested these hypotheses by means of specific contrasts designed to reflect the expected pattern of means. Nonetheless, to "protect" the subsequent specific tests, we first describe the overall sources of variation in our data by means of two overall models. The overall pattern of means is pictured in Figures 1 and 2.

Modeling forecasts. The first model involves the entire set of 60 forecast measures in a 5 (*day of forecast:* –D5, –D4, –D3, –D2, –D1) × 6 (*target day:* T0, +T1, +T2, +T3, +T4, and +T5) × 2 (*affect:* Happiness, Disappointment) repeated measures ANOVA. This analysis showed the following effects: A significant main effect of *day of forecast*,[3] $F(4, 144) = 2.48$, $p = .046$, $p\eta^2 = .06$, indicating that participants' forecasts changed as the day of exam approached, averaging across affect and target day. A strong, significant main effect of *target day*, $F(5, 180) = 110.14$, $p < .001$, $p\eta^2 = .75$, indicated that across affect and day of forecast, participants forecasted a marked change in their affective reaction as days after the exam pass by. A strong, significant effect of *affect*, $F(1, 36) = 30.11$, $p < .001$, $p\eta^2 = .45$, indicated that on average, forecasts for happiness were more intense than forecasts for disappointment. Note that this overall effect of *affect* is not indicative of the hypothesized asymmetric impact bias, because the tested overall model does not consider experienced affect.

A significant interaction between *day of forecast* and *target day*, $F(20, 720) = 2.87$, $p < .001$, $p\eta^2 = .07$, indicated that participants' expectations of change in affect due to time differ as the exam approaches. A marginally significant interaction between *affect* and *target day*, $F(5, 180) = 6.41$, $p = .058$, $p\eta^2 = .15$, suggests that the forecasted change in affect after the exam differs for happiness and disappointment. Finally, a significant three-way interaction, $F(20, 720) = 2.57$, $p < .001$, $p\eta^2 = .06$, showed that the mentioned interaction between *day of forecast* and *target day* is moderated by *affect*. That is, participants' forecasts of change in affect are shaped differently for happiness and disappointment. The interaction between *target day* and *affect* was nonsignificant, $F(4, 144) = 1.96$, $p = .104$, $p\eta^2 = .05$.

Modeling forecasts and experiences for success and failure. The second model expands the first one by including the experienced affect reported after the exam. This model examines and compares participants' response trends over time and encompasses all contrasts concerning accuracy of participants' forecasts. As compared to the first model, then, in the second model the within-subject factor *day of forecast* not only includes participants' affective forecasts before the exam but also their affective experiences after the exam. Accordingly, we refer to this factor as *day of measurement*. In addition, *affect* in the second model represents a between-subjects factor because participants reported only the experienced affect that was congruent with their exam outcome (happiness for success and disappointment for failure).[4] The model features a 6 (*day of measurement:* –D5, –D4, –D3, –D2, –D1, Experienced) × 6 (*target*

TABLE 1: Comparison of Overall Forecasts on One Day With Overall Experienced Affect

	Positive Affect				*Negative Affect*			
Day of Prediction	*Mean Difference*	SD	*Effect Size (r)*	*F*	*Mean Difference*	SD	*Effect Size (r)*	*F*
–D5	0.16	1.12	.143	0.40	1.40	1.12	.789	23.21†
–D4	0.33	1.15	.284	1.67	1.33	1.26	.739	16.87†
–D3	0.16	0.93	.173	0.59	1.72	1.27	.814	27.61†
–D2	0.25	0.85	.292	1.79	1.53	1.12	.817	28.21†
–D1	0.34	0.78	.406	3.77*	1.42	1.19	.777	21.41†
Average	0.24	0.87		1.62	1.48	1.03		26.28†

* $p < .10$. † $p < .001$.

day: +T0, +T1, +T2, +T3, +T4, T5) × 2 (*Affect:* Happiness, Disappointment) mixed model ANOVA.

Replicating the first model results with the inclusion of the reports on experienced affect, we found a significant main effect of *day of measurement*, $F(5, 165) = 10.77$, $p < .001$, $p\eta^2 = .24$, a significant main effect of *target day*, $F(5, 165) = 104.26$, $p < .001$, $p\eta^2 = .75$, and a significant effect of *affect*, $F(1, 33) = 11.27$, $p = .002$, $p\eta^2 = .25$. Furthermore, the second model replicates all high-order effects found in the first model. Specifically, we found an interaction between *day of measurement* and *target day*, $F(25, 825) = 1.80$, $p = .009$, $p\eta^2 = .05$, a significant interaction between *day of measurement* and *affect*, $F(5, 165) = 10.77$, $p < .001$, $p\eta^2 = .24$, and a significant three-way interaction, $F(25, 825) = 1.50$, $p = .054$, $p\eta^2 = .04$. Extending the first model, we found a significant interaction between *affect* and *target day,* $F(5, 165) = 3.60$, $p = .004$, $p\eta^2 = .10$, indicating that by including the experienced affect, the differences between forecasted and experienced affect differ for happiness and disappointment.

To recap, the first model shows that affective forecasts vary as a function of the day on which they are made (i.e., *day of forecast*). Also, they depend on whether they concern affective experiences in the immediate aftermath of the focal event or experiences further in the future (i.e., *day of measurement*). Finally, affective forecasts vary across the type of affect involved in the affective experience (i.e., *affect*). The second model additionally shows that this dependency of the forecasts is maintained when we only consider forecasts congruent with the actual outcome of the event. That is, also when considering forecasts and experiences for success and failure separately, affective forecasts vary as a function of the day on which they are made, suggesting that they vary as a function of the temporal distance to the exam. Taken together, the results of these two overall models justify subsequent tests of the specific hypotheses advanced in the theoretical section.

The Positive-Negative Asymmetry of the Impact Bias

The *impact bias* implies that participants overestimate the intensity and duration of their affective reactions to the focal event. We should hence observe that the overall forecasted affect on each day before the focal event is more intense than the average experienced affect across the entire postexam period. This hypothesis corresponds to a contrast that aggregates all forecasts (i.e., mean of all forecasts) and compares them with the experienced affect after the focal event (i.e., mean of experienced affect on D-day, +D1, +D2, +D3, +D4, and +D5). If there is a negative-positive asymmetry, the contrast should be moderated by affect, implying an interaction between affect and the contrast because the contrast should be stronger for negative than for positive affect.

In line with our prediction, the results yielded a significant contrast, $F(1, 33) = 28.95$, $p < .001$, $p\eta^2 = .46$, and the expected significant interaction with *affect*, $F(1,33) = 14.72$, $p < .001$, $p\eta^2 = .30$. As can be seen in Table 1 (bottom), participants commit the impact bias, that is, their affective forecasts overestimate the intensity of their experienced affect. Moreover, replicating previous research, the impact bias is more pronounced for negative than for positive affect. For negative affect, simple effect analyses show that people grossly overestimated the intensity of their disappointment after having failed the exam, $F(1, 33) = 26.28$, $p < .001$, $p\eta^2 = .46$. For positive affect, on the contrary, although there are slight differences between forecasts of happiness after passing the exam, the difference does not reach significance, $F(1, 33) = 1.39$, $p = .24$, $p\eta^2 = .06$.

To unfold the observed impact bias as it develops across forecasting days before the exam, we estimated, with appropriate contrasts, the differences between the average experienced affect after the exam and the average forecasted affect for each day before the exam (i.e., we compare the overall mean of experienced affect on

TABLE 2: Comparison of Average Forecasts for One Day With Experienced Affect on That Day

	Positive Affect				*Negative Affect*			
Day of Prediction	*Mean Difference*	*SD*	*Effect Size (r)*	*F*	*Mean Difference*	*SD*	*Effect Size (r)*	*F*
D-Day	0.13	0.54	.234	1.11	1.42	1.00	.656	3.72*
+D1	0.52	1.01	.470	5.39**	1.69	2.01	.750	10.63†
+D2	0.69	1.60	.404	3.72*	1.72	1.56	.727	18.09†
+D3	0.28	1.06	.257	1.35	1.73	1.69	.661	15.70†
+D4	0.01	1.51	.007	<.01	1.60	1.88	.682	10.88†
+D5	0.13	1.43	.234	.17	1.74	1.93	.656	12.24†

*$p < .10$. ** $p < .05$. † $p < .001$.

D-day, +D1, +D2, +D3, +D4, and +D5, with means computed for each forecast day –D5, –D4, –D3, –D2, and –D1). Given the moderating effect of affect (see above), we conducted the analyses for happiness and disappointment separately.

For happiness, a marginally significant bias emerged only for the day before the exam (i.e., –D1) when participants forecasted that they would be happier (M = 6.04) after passing the exam than they actually were (M = 5.70), $F(1, 19) = 3.77$, $p = .067$, $r = .46$. It should be noted, however, that all mean differences are in the positive direction (forecasts of happiness are more intense than experienced happiness) and they are accompanied by not trivial effect size indexes (r's from .14 to .46). Given our small sample, a small but coherent impact bias may be present in the positive affect forecasting, although the evidence is not strong enough to reject the statistical null hypothesis.

For disappointment, a significant and strong difference emerged between the average forecast and the experienced affect for each day before the exam (see Table 1). For each day, participants consistently expected a more intense disappointment after failing the exam than what they actually experienced in the days after they failed the exam. For each day, the size of the impact bias is slightly bigger than one standard deviation, corresponding to Cohen's d of around 1.30 and a correlation of .70. By inspecting the effect size indexes, furthermore, one can appreciate that the impact bias remains stable across all 5 days of forecast before the exam took place. This stability in the impact bias for disappointment (i.e., the lack of differences in the bias effects across days before the exam) is supported by an appropriate inferential test,[5] $F(4, 56) = 0.75$, $p = .561$, $p\eta^2 = .05$.

Thus, on each day of the forecasting period, participants overestimated the intensity of their experienced affect over the course of the 5 days following the exam. However, they were more accurate in predicting the overall intensity of their positive affect over the course of the five days following their exam than in predicting the intensity of negative affect, for which a strong impact bias was evident.

As mentioned in the introduction, the time slice approach evaluates forecasting accuracy by comparing forecasts at one particular point in time before the event takes place with the experiences at one point in time after the event has taken place (e.g., Gilbert et al., 1998). Our design allows us to evaluate forecasting accuracy for the affect experienced on the day of the exam and five consecutive days after the exam. For this comparison, we compared the average forecasted affect intensity for each day after the event across all forecasting days (i.e., average forecasted affect intensity on –D5, –D4, –D3, –D2, and –D1 for D-Day, for +D1, for +D2, for +D3, for +D4, and for +D5, respectively). This allowed us to compare the average forecasted affect intensity with the experienced affect intensity for each post-exam day, for happiness and disappointment separately (see Table 2). This set of analyses may therefore be considered a closer replication of existing studies on affective forecasting accuracy.

Consistent with these studies, the results of our second analysis show that people commit the impact bias and, again, confirm the positive-negative asymmetry (see Table 2). After having passed the exam, people tend to overestimate their happiness in the future, especially 1 and 2 days after the exam (i.e., +D1 and +D2). Overall, participants predict that their happiness will be more intense than it actually is. After having failed the exam, people show a consistent and stable impact bias, with the forecasted disappointment being more intense than the experienced one. People grossly (effect sizes r's from .65 to .75) overestimate the intensity of their disappointment after the exam, and they do so to a greater extent as more time after the exam has elapsed (see Table 2).

In sum, these findings closely replicate previous findings on the positive-negative asymmetry for the impact bias. In their forecasts, participants overestimate the intensity of their negative affect following the failure of an important exam much more than they overestimate their positive affect following the success of an important exam.

Next, we examined people's forecasting accuracy for the time course of their affective experience. That is, we examined the extent to which participants were able to

TABLE 3: Happiness: Comparison Between Linear and Quadratic Terms for Forecasts and Experienced Affects on Each Day of Forecast

Day of Measurement	*Linear Trend Effect Size*	*Difference With Experienced*	*Quadratic Trend Effect Size*	*Difference With Experienced*
–D5	.857†	.206	.533**	.226
–D4	.832†	.180	.237	.439**
–D3	.869†	.359	.302	.478**
–D2	.860†	.432*	.128	.581***
–D1	.821†	.277	.094	.456**
Experienced	.734†	—	.606***	—

NOTE: Effect sizes are expressed in terms of correlations. For linear and quadratic trends, a larger correlation indicates a stronger trend. For difference with experienced, a larger correlation indicates a larger difference between predicted and experienced trend, thus greater inaccuracy.
* $p < .10$. ** $p < .05$. *** $p < .01$. † $p < .001$.

forecast the change and the speed of change of their affective experience after the exam. Also, we examined whether their forecasting accuracy would be moderated by the temporal distance to the focal event. Specifically, we expected that when the exam is distant, people accurately forecast their positive affect and they inaccurately predict (i.e., overestimate) their positive affect when the event is close. Conversely, we expected that people inaccurately forecast (i.e., overestimate) their negative affect when the event is distant and accurately predict their negative affect when the event is close.

Time Course Accuracy as a Function of Temporal Distance

In discussing the first of our overall models, we noticed that forecasted intensity of affect changed across days after the exam took place, and that this change depended on the day on which the forecast was made. Furthermore, we found that the interaction between day of forecast and target day was different for positive and negative affect. In the following analyses, we examine how these changes in forecasted intensity correspond to the actual change of experienced affect after the exam took place. In light of the three-way interaction found for day of forecast, target day, and affect, we conducted the analyses for happiness and disappointment separately.

Happiness

Time course of the experience. We first describe how the experienced happiness changed over the 5 days after the exam took place. After the exam, we observe a difference in average experienced affect happiness as days go by, $F(5, 95) = 8.09$, $p < .001$, $p\eta^2 = .30$, indicating that people's experienced happiness decreases over time (cf. Figure 1, far right). This decrease can be partitioned into a linear trend, $F(1, 19) = 22.27$, $p < .001$, $r = .73$, and a quadratic trend, $F(1, 19) = 11.07$, $p = .004$, $r = .60$. No other polynomial trend was significant. The observed linear trend indicates that people experienced changes in happiness that start at a high level of intensity and then decrease at a constant rate over the time period after the exam. The observed quadratic trend indicates that the intensity of happiness decreases rapidly over the first days following the exam before tapering off later on. These effects are captured in Figure 1: Happiness clearly decreases over time (linear trend). In addition, the speed of change is maximal from D-day to +D1, it slows down between +D2 and +D3, and finally stabilizes up to +D5 (quadratic trend).

To test whether participants are more accurate in forecasting the linear trend of their affective experience than the quadratic trend, we first conducted trend analyses for each day of the prediction. Except for –D5, where participants forecasted a quadratic trend for the time course of their happiness, $F(1, 19) = 7.92$, $p < .01$, $r = .53$, no significant quadratic trends emerged for the forecasted happiness after the exam on any other day. For each day of the forecasting, however, clear linear trends emerged (all Fs > 29 and all r's > .80, cf. Table 3). Thus, people in the success condition clearly seem to know that "time heals all wounds" (even the good ones). They forecast that their happiness will fade over time, and that it will do so at a constant, linear rate.

Time course of forecasting accuracy as a function of temporal distance. We then tested whether the linear trends and the quadratic trends predicted by participants on the 5 different days before the exam were different from each other (i.e., whether participants' representations of the change of their happiness changed over the days of forecast), and whether they differed from the trend observed for their experienced happiness. Thus, we estimated the interaction between the trends in forecasts by *day of forecast,* namely a Day × Linear-Trend and Day × Quadratic-Trend, and then estimated the differences between forecasted trends (linear and quadratic) for each day of forecasts and the experienced affects trends.

The 6 linear trends (one experienced and five forecasted) did not yield significant differences, $F(5, 95) = 1.33$, $p = .256$, $p\eta^2 = .06$, nor did any linear trend forecasted on any day before the exam differ from the experienced one (cf. Table 3). Thus, confirming that people's affective forecasts are accurate when one considers the linear part of change in affective experiences, participants' forecasts do not change as a function of temporal distance to the focal event, and they do not differ from the linear course of their experienced affect. Intensity of happiness decreases as time goes by, and people know that very well.

In contrast, the six quadratic terms (one experienced and five forecasted) showed a significant difference, $F(5, 95) = 3.74$, $p = .004$, $p\eta^2 = .16$, indicating that some quadratic trend in affective forecasts for happiness on a specific day of forecasts differs from the experienced one. We then tested these comparisons. Recall that the experienced happiness decreased quadratically, $F(1, 19) = 11.07$, $p = .004$, $r = .60$. At –D5, participants forecasted a quadratic trend (cf. Table 3), rendering the comparison between the experienced and the predicted quadratic trend nonsignificant, $F(1, 19) = 1.03$, $p = .323$, $r = .22$. On –D4, participants forecasted a small quadratic trend, revealing a significant comparison, $F(1, 19) = 4.54$, $p = .04$. $r = .43$. On days –D3, –D2, and –D1, participants did not forecast a quadratic trend, making the comparisons between forecasted and experienced trend significant, $F(1, 19) = 5.63$, $p = .032$, $r = .47$, $F(1, 19) = 9.70$, $p = .005$, $r = .58$, and $F(1, 19) = 5.00$, $p = .037$, $r = .45$, respectively. Thus, consistent with our hypothesis, as regards the quadratic part of the change in happiness, participants' forecasts do change over time and differ from the quadratic trend of their experienced happiness. In addition, these findings are moderated by temporal distance, because quadratic trends for happiness are accurately forecasted when the event is distant and become more inaccurate as the event draws closer. This change of quadratic accuracy across temporal distance was statistically supported, $F(4, 76) = 2.32$, $p = .064$, $p\eta^2 = .10$.

These results suggest that people forecast a linear decrease of the intensity of their happiness over time. Because happiness does decrease over time, participants' forecasts appear accurate. In addition, they are able to forecast the quadratic trend of their positive affect experience when the event was *distant*. This result supports our prediction that people are more accurate in predicting their positive affect following a focal event when the event is distant (i.e., on –D5 and –D4) than when it is closer (i.e., on –D3, –D2, and –D1). Forecasting accuracy for positive affect seems to *decrease* as the focal event draws nearer in time and people fail to consider the quadratic nature of the decrease of happiness, making their predictions more inaccurate when the event is close.

Disappointment

Time course of the experience. Paralleling the results found for happiness, we observe a difference in average experienced disappointment as days go by, $F(7, 70) = 17.36$, $p < .001$, $p\eta^2 = .55$, indicating that disappointment decreases over time. Again, the decrease can be partitioned into a linear trend, $F(1, 14) = 57.30$, p < .001, $r = .89$, and a quadratic trend, $F(1, 14) = 13.61$, $p < .001$, $r = .64$. The linear trend indicates that, paralleling the findings for happiness, experienced disappointment decreases at a constant rate over the time period after the exam. The quadratic trend indicates that the speed with which the intensity decreases is very rapid right after the exam before tapering off later on.

To investigate whether participants are more accurate in forecasting the linear trend of their affective experience than the quadratic trend, we first conducted trend analyses for each day of the prediction. Except for days –D1 and –D2, where participants forecasted quadratic trends for the time course of their disappointment, $F(1, 14) = 4.55$, $p = .05$, $r = .49$, and $F(1, 14) = 3.53$, $p = .08$, $r = .44$, no quadratic trends emerged for the forecasted disappointment on any other day. For each day of the forecasting, however, clear linear trends emerged (all Fs > 12, cf. Table 4).

Time course accuracy as a function of temporal distance. As for happiness, we then tested whether the linear and quadratic trends forecasted by participants differed across days of predictions before the exam and whether they differed from the trend of the experienced disappointment.

The six linear trends (one experienced and five forecasted) did not reveal a significant difference, $F(5, 70) = 1.69$, $p = .14$, $p\eta^2 = .10$, nor did any forecasted linear trend on any day before the exam differ from the experienced one (cf. Table 4). As for happiness, these findings support the hypothesis that regarding the linear part of the change in affective experiences, participants' forecasts do not change as a function of temporal distance and do not differ from the linear course of their experienced affect.

In contrast, the six quadratic terms (one experienced and five forecasted) showed a significant difference, $F(5, 70) = 2.39$, $p = .046$. Some quadratic trends forecasted on a particular day were different from the experienced one. Recall that the actual disappointment decreases quadratically, $F(1, 14) = 13.61$, $p < .001$, $r = .64$. On –D5 and –D4, participants did not predict a quadratic trend (cf. Table 4), rendering the comparison

TABLE 4: Disappointment: Comparison Between Linear and Quadratic Terms for Forecasts and Experienced Affects on Each Day of Forecast

Day of Measurement	*Linear Trend Effect Size*	*Difference With Experienced*	*Quadratic Trend Effect Size*	*Difference With Experienced*
–D5	.675***	.426*	.053	.462*
–D4	.817†	.299	.293	.439*
–D3	.889†	.303	.306	.497**
–D2	.861†	.279	.495*	.338
–D1	.872†	.329	.448*	.287
Experienced	.896†	—	.702***	—

NOTE: Effect sizes are expressed in terms of correlations. For linear and quadratic trends, a larger correlation indicates a stronger trend. For difference with experienced, a larger correlation indicates a larger difference between predicted and experienced trend, thus greater inaccuracy.
* $p < .10$. ** $p < .05$. *** $p < .01$. † $p < .001$.

between the experienced and the forecasted quadratic trend marginally significant, $F(1, 14) = 3.80$, $p = .07$, $r = .46$ and $F(1, 14) = 3.66$, $p = .07$, $r = .43$, respectively. On –D3, participants did not predict a quadratic trend, making the comparison significant, $F(1, 14) = 4.61$, $p = .04$, $r = .49$. On –D2 and –D1, participants predicted a quadratic trend (cf. Table 4), making the comparison with the experienced trend nonsignificant, $F(1, 14) = 1.81$, $p = .19$, $r = .33$ and $F(1, 14) = 1.26$, $p = .28$, $r = .28$. Consistent with our predictions, regarding the quadratic part of the change in disappointment, participants' forecasts do change as a function of temporal distance to the exam and differ from the quadratic course of their experienced disappointment, especially when the exam is distant. Inspection of the effect size indexes (cf. Table 4) shows how accuracy regarding the speed of change of the negative affect increases as the focal event approaches. This change of quadratic accuracy across temporal distance was statistically supported, $F(4, 64) = 2.63$, $p = .042$, $p\eta^2 = .14$.

These results closely mirror the ones found for happiness. People seem to be able to accurately forecast a linear decrease of the intensity of their disappointment over time. In addition, they were able to forecast the quadratic trend of their experience when the event was *close*. This result supports our prediction that people are more accurate in predicting their negative affect following a focal event when the event is close (i.e., on –D2 and –D1) than when it is distant (i.e., on –D5, –D4, and –D3). Forecasting accuracy for negative affect seems to *increase* as the event draws nearer in time and people consider the quadratic nature of the decline of happiness, making their predictions more accurate when the event is close.

DISCUSSION

The present study is the first to investigate the role of time in affective forecasting. Using a longitudinal diary paradigm among people taking their driving exam, we replicate existing findings on the positive-negative asymmetry of the impact bias. Moreover, we extend previous findings by showing how both the time course of an affective experience and the temporal distance to the focal event influence forecasting accuracy.

Participants grossly overestimated both the intensity and the duration of their disappointment toward failing their driver's license exam, whereas they only slightly overestimated their happiness following success at the exam. Consistent with existing findings on affective forecasting (e.g., Dunn et al., 2003; see Wilson & Gilbert, 2003), they show an impact bias and this bias is more pronounced for negative affect than for positive affect.

Our study is the first to show how time affects forecasting accuracy, thereby extending previous research in important ways. First, the present results show that regarding the *time course* of an affective experience people's affective forecasts accurately reflect linear changes in their affective experiences. Their affective forecasts, however, do not accurately reflect quadratic changes in affective experiences. Our results therefore confirm the suggestion that people have naïve theories about how time influences their affective experiences (cf. Ross, 1989). They know that the intensity of their affective reactions to future events will diminish over time (cf. Igou, 2004). What they do not know is how fast both their positive and negative affective reactions diminish. Their theories about the progression of their affect are inaccurate, not because they are generally inaccurate, but because people fail to consider quadratic changes in affective experiences when making affective forecasts. Thus, our study is the first to show that people realize that time will tamper their affective reactions but that they underestimate the speed with which this process will take place. Second, our results show that the *temporal distance* to an event moderates people's accuracy about the time course of their affective experiences. Their forecasting accuracy for positive affect is greater the more distant an event is and decreases as an event approaches. Conversely, their forecasting accuracy for negative affect is smaller the more distant an event is and increases as an event draws closer. Thus, the present study adds to the extant literature by showing that people's forecasting accuracy varies as a function of the temporal distance to the focal event.

One explanation for the finding that people forecast linear changes in affect progression may be that before an event takes place, multiple outcomes are possible. For example, before an exam has taken place, both success and failure are still possible outcomes. Hsee and Zangh (2004) argue that before making choices, people compare multiple scenarios with each other, a comparative frame of mind that they termed a *joint evaluation mode*. People who are in such a comparative frame compare and weigh success and failure scenarios against each other. According to Hsee and Zangh such a comparison between scenarios is relatively easy, because it is easy to discern the differences between them and should lead to linear predictions. Confirming their suggestion, Hsee and Zangh found that the function that best described people's predictions and evaluations in the joint evaluation mode was relatively steep and smooth, that is, linear. Participants in our study may have been in such a comparative frame of mind when making their affective forecasts. They may have based their forecasts on the comparison of success versus failure scenarios. If participants were in such a joint evaluation mode before the exam, they should be able to predict relatively easily that they will be happier when succeeding the exam than when failing it (cf. Wilson et al., 2000) and these predictions tend to be linear (cf. Hsee & Zangh, 2004). It would be interesting to examine what people's affective forecasting functions were to look like in a *single evaluation mode,* in which they face only one scenario. In our study, participants were in such a single evaluation mode after the exam took place and they knew that they had either succeeded or failed the exam. If asked to forecast their affective reactions to their success or failure after the exam has taken place, according to Hsee and Zangh (2004), the forecasting function should be more quadratic than the forecasting function before the exam.

Another explanation for people's negligence in considering quadratic changes in affective forecasts is offered by the literature on biases in affective forecasting (e.g., Gilbert, Driver-Lynn, & Wilson, 2002; Gilbert, Gill, et al., 2002; Wilson & Gilbert 2003). People tend to misimagine the focal event and its consequences when making predictions about how it will make them feel. This misconstrual of the event may cause them to underestimate the speed with which their affective reactions will decrease (i.e., the quadratic trend of their predictions). Any intervention that enables people to realistically imagine how an event will unfold should increase people's forecasting accuracy for the speed with which the intensity of their affective reaction will return to baseline (Buehler & MacFarland, 2001; Wilson et al., 2000).

As predicted, people's forecasting accuracy varied as a function of the *temporal distance* to the focal event. The pattern of results found is consistent with our predictions derived from the literature on motivational principles (e.g., Erber et al., 2004; Gohm, 2003; Shepperd et al., 2000). When an important event is distant, people are motivated to pursue a positive outcome. Their intuitive theories on how affect influences performance may lead them to down-regulate positive affect and up-regulate negative affect to maintain their motivation and work hard to achieve their goal. For forecasting accuracy, the pattern we found is compatible with this reasoning. Specifically, when the event was distant, people accurately predicted the linear and quadratic trends for their positive affect, indicating that they expect that their positive affect after success will decrease (i.e., linear trend) and that it will decrease fast (i.e., quadratic trend). They inaccurately predicted their negative affect after failure, indicating that they overestimated the time with which negative affect would linger (i.e., failed to predict the quadratic trend). This combination of forecasts may lead people to overestimate the aversive impact of the event and may motivate them to work hard to prevent the aversive outcome from occurring.

When the important event is close, however, people are motivated by softening the aversive impact of the event should it turn out to be negative. Their intuitive reaction when the event is so close that they cannot actively do anything to control the outcome anymore is to mobilize strategies that down-regulate negative affect and up-regulate positive affect. Again the pattern we found for forecasting accuracy when the event is close is compatible with this suggestion. Specifically, when the event was close, people accurately predicted the linear and quadratic trends for their negative affect, indicating that they expect that their negative affect following failure will decrease (i.e., linear trend) and that it will decrease fast (i.e., quadratic trend). They inaccurately predicted their positive affect, indicating that they overestimated the time with which positive affect after success would linger (i.e., failed to predict the quadratic trend). This combination of forecasts may lead people to realistically perceive the aversive impact of the event as temporary and may motivate them to minimize its eventual impact.

This pattern of results may give an indication of the mechanism underlying the influence time has on affective processing. People may be motivated to advance and achieve their goals when the event is distant, whereas they may be motivated to avoid risk and seek security when the event is close (e.g., Förster & Higgins, 2005; Pennington & Roese, 2003). When an event is distant, the overestimation of negative affect and the accurate forecast of positive affect may provide people with an extra drive to achieve their goal and invest all necessary resources (e.g., Gohm, 2003; Västfjäll & Gärling, 2006). When an event is close, on the contrary, the overestimation of positive affect and the accurate forecast of negative affect may provide people with information necessary to successfully cope with a potentially aversive outcome. In addition, it may help them to regulate and reduce arousal, stress, and anxiety that are often linked to the approach of important, relevant events (e.g., Derryberry & Reed, 2002). Reflecting such a motivational pattern, our results suggest that people are more attuned to achieving positive outcomes when the temporal distance is large, whereas they are more attuned to bracing for loss when the temporal distance to the event is small.

Future research should investigate the role of affect in the observed motivational pattern. People have difficulties predicting how they will feel and react in affective states that are different from their current states (e.g., Van Boven & Loewenstein, 2003). In this perspective, people may have felt more positive when the event was distant. This positive affect may have served as a cue for the predictions of happiness, rendering these forecasts more accurate. Conversely, people may have felt more negative when the event drew closer. This negative affect may have served as a cue for the predictions of disappointment, rendering these forecasts more accurate.

Forecasting accuracy may be influenced by lay theories that individuals hold about the progression of different emotions. In the present research, we focused on two specific emotions, that is, disappointment and happiness. These emotions represent in our research setting the most relevant negative and positive emotion that participants experience after failure and success, respectively. Future research could investigate whether our obtained results for disappointment and happiness generalize to other negative emotions like regret, anger, guilt, or shame and to other positive emotions like pride, relief, or hope.

The time course of affective forecasts and experiences represents a challenge for researchers. Previous research on affective forecasting has examined accuracy using almost exclusively one form of the time slice paradigm. In this research, accuracy was operationalized as the difference between a forecast at one point in time and an experience at one of several points in time. We are among the first who have looked at multiple assessments of affect before and after a focal event. Various challenges—statistical, experiential, or measurement among others (e.g., Hsee & Abelson, 1991; Larsen & Frederickson, 1999)—surround the repeated measure of affective forecasts and experiences. For example, one could argue that the repeated measurement of affective forecasts may distort people's actual experiences (cf., Wilson & Gilbert, 2003). Future studies should investigate the implications of repeated measurements on affective experiences more systematically. Until more empirical data is available, it remains impossible to exclude such influences in repeated measurements, and therefore they remain a reason for cautiousness. Despite this cautiousness, the consistency with which our findings replicate previous findings on the impact bias and its positive-negative asymmetry provide us with confidence in the validity of our findings and suggest that our findings are among the first to allow us exciting insights into the time course of affective forecasts and experiences.

CONCLUDING REMARKS

Our study investigated the role of time in affective forecasting. We began with the general observation that people make biased predictions about their affective reactions to future events and argued that the accuracy of these affective forecasts will be influenced by time—specifically the time course of the affective reactions and the temporal distance to the focal event. Our findings corroborate our hypotheses by indicating that people are more accurate in predicting their positive affect when an event is distant, whereas they are more accurate in predicting their negative affect when an event is close. Moreover, our findings indicate that although people are accurate in predicting the decrease of the intensity of their affective reactions, they are inaccurate in predicting the speed with which this decrease takes place. The present study is the first to shed new light on the influence of temporal factors on forecasting accuracy and may provide a more optimistic view on people's capacity to make predictions about factors that will guide their decisions and behavior regarding important future events.

NOTES

1. The capital letter "D" refers to the day on which the measurement took place, with a minus (e.g.,–D1,–D2, etc.) to indicate days before the exam, D-day is used for the day of the exam, and a plus (e.g., +D1, +D2, etc) to indicate days after the exam. In addition, the capital letter "T" indicates the target day; that is, the day the participant was forecasting about. Thus, participants' forecasts for their experiences 2 days after the exam made 3 days before the exam is referred to as –D3T2. Because measures of affect made after the exams are measures about the same day, we simply refer to them as +D1, +D2, and so on, instead of +D1T1, +D2T2, and so on.

2. One question that may arise is whether the types of scale used to assess affective forecasts may have favored linear over quadratic trends. Possibly, quadratic trends in affect progression are easier for participants to model when they are given a graph, rather than a 7-point scale. To address this concern, we conducted a study in which participants

were asked to imagine taking their driver's exam. In the scale condition, participants rated on a 7-point scale (1 = *not at all*, 7 = *very much*) how happy (disappointed) they would be if they passed (failed) the exam, immediately after the exam, 1 day after the exam, 2 days after the exam, 3 days after the exam, 4 days after the exam, and 5 days after the exam, respectively. In the graph condition, participants were presented with a graph depicting a grid of 7 cm high and 10.5 cm long. Gridlines were visible every 0.5 cm. On the y-axis, the intensity of the emotion was marked on a 7-point scale at every full centimeter (1 = *not at all happy* [disappointed], 7 = *very happy* [disappointed]). On the x-axis, forecasting distance was marked at every full centimeter (immediately, 1 day, 2 days, 3 days, 4 days, and 5 days). The order with which emotions were forecasted was counterbalanced. Results indicated that scale and graph forecasts yielded linear forecasts for both happiness and disappointment over time. The only difference that emerged was that participants in the scale condition forecasted slightly more intense happiness for 4 and 5 days after the exam. No other effects emerged. Importantly, no differences for linear or quadratic trends emerged, indicating that differences found between affective forecasts and experiences reflect actual differences that cannot be reduced to the type of measurement tool used to assess them.

3. Following common practice (Grissom & Kim, 2005), we report effect sizes for main effects and interactions expressed in terms of partial eta-squared ($p\eta^2$). For contrasts and trend analysis, we report the effect sizes as correlations (Rosenthal, Rosnow, & Rubin, 2000). Among the possible correlation effect size indexes available, we used the partial correlation effect size ($r_{contrast}$ in Rosenthal et al., 2000) because of its straightforward interpretation in repeated measure designs (the ratio between SS explained and error SS) and because of its direct relationship with the partial eta-squared (i.e., $r^2 = p\eta^2$).

4. As a consequence of the difference in the models, the estimates of the effects in the second model and the statistical tests may differ from the first model, even when involving the same measures.

5. This test is simply the effect of *day of forecast* (–D5, –D4, –D3, –D2, –D1) on the average forecasted disappointment.

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