Check for updates

Received: 20 July 2021 | Revised: 11 September 2022 | Accepted: 18 October 2022

DOI: 10.1111/jopy.12787

ORIGINAL ARTICLE

WILEY

Ready for the worst? Negative affect in anticipation of a stressor does not protect against affective reactivity

Elise K. Kalokerinos[1] | **Ella K. Moeck**[1] | **Koen Rummens**[2] | **Kristof Meers**[3] | **Merijn Mestdagh**[3]

[1]Melbourne School of Psychological Sciences, University of Melbourne, Melbourne, Victoria, Australia

[2]Institute for Psychology, University of Bern, Bern, Switzerland

[3]Faculty of Psychology and Educational Sciences, KU Leuven, Leuven, Belgium

Correspondence
Elise K. Kalokerinos, Melbourne School of Psychological Sciences, University of Melbourne, Parkville 3010, Melbourne, VIC, Australia.
Email: elise.kalokerinos@unimelb.edu.au

Merijn Mestdagh, Faculty of Psychology and Educational Sciences, KU Leuven, Leuven, Belgium.
Email: merijn.mestdagh@kuleuven.be

Abstract

Introduction: Lay wisdom suggests feeling negative while awaiting an upcoming stressor—anticipatory negative affect—shields against the blow of the subsequent stressor. However, evidence is mixed, with different lines of research and theory indirectly suggesting that anticipatory negative affect is helpful, harmful, or has no effect on emotional outcomes. In two studies, we aimed to reconcile these competing views by examining the affective trajectory across hours, days, and months, separating affective reactivity and recovery.

Methods: In Study 1, first-year students ($N = 101$) completed 9 days of experience sampling (10 surveys/day) as they received their first-semester exam grades, and a follow-up survey 5 months later. In Study 2, participants ($N = 73$) completed 2 days of experience sampling (60 surveys/day) before and after a Trier Social Stress Test. We investigated the association between anticipatory negative affect and the subsequent affective trajectory, investigating (1) reactivity immediately after the stressor, (2) recovery across hours (Study 2) and days (Study 1), and (3) recovery after 5 months (Study 1).

Results: Across the two studies, feeling more negative in anticipation of a stressor was either associated with increased negative affective reactivity, or unassociated with affective outcomes.

Conclusion: These results run counter to the idea that being affectively ready for the worst has psychological benefits, suggesting that instead, anticipatory negative affect can come with affective costs.

KEYWORDS

affect, anticipation, emotion, expectations, experience sampling

This research was not formally preregistered.

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.
© 2022 The Authors. *Journal of Personality* published by Wiley Periodicals LLC.

1 | INTRODUCTION

"Expect the worst, and you won't be disappointed" is common folk wisdom. This wisdom is reflected in behavior: as outcomes draw near, people become more pessimistic (Sweeny & Krizan, 2013). But does feeling negative in advance shield against the blow of a stressful event? In two studies, we tested whether *anticipatory affect*—that is, affect experienced in the present related to an upcoming stressor (Barsics et al., 2016)—was associated with subsequent affective trajectory. In Study 1, we followed students receiving grades, examining a personally meaningful and impactful real-world stressor. In Study 2, we followed participants anticipating an upcoming stressful lab task, examining a controlled stressor. In both studies, we investigated how anticipatory affect predicted the subsequent affective trajectory in terms of both reactivity to the stressor (i.e., affect directly after the stressor), and recovery from the stressor (i.e., affect in the hours, days, and months after the stressor). We measured both negative and positive affect, but primarily focus on negative affect, given it is more central to existing theory and research.

We review three lines of theory and research—on expectations, worry, and affect. Expectations and worry have received considerable empirical attention, where research on anticipatory affect is scarce. Both expectations and worry influence anticipatory affect (Newman et al., 2019; Sweeny et al., 2016), providing important indirect evidence to inform our understanding of this phenomenon. The theory and research we review provides contradictory evidence for whether anticipatory negative affect is likely to be beneficial. Therefore, we make competing hypotheses regarding the association between anticipatory affect and the subsequent affective trajectory.

1.1 | Expectations

Expectations refer to peoples' beliefs about what will happen in the future. Two theories on expectations deal directly with affective outcomes: the uncertainty navigation model (Sweeny et al., 2016; Sweeny & Cavanaugh, 2012), and the affective expectations model (Wilson et al., 1989).

The uncertainty navigation model grew from research on "bracing for the worst," which is a phenomenon where, as outcomes draw near, people hold more pessimistic expectations about those outcomes (Carroll et al., 2006). Bracing may serve an affect-regulatory function: disappointment occurs when expectations do not match outcomes, so one way to preemptively regulate disappointment is through lowered expectations (van Dijk et al., 2003). Indeed, people self-report bracing for this reason (Sweeny & Falkenstein, 2015).

The uncertainty navigation model discusses how expectation management strategies—like bracing—can influence affect at two time-points: (1) during the waiting period or (2) once the outcome is known. Bracing consistently worsens affect during the waiting period (Golub et al., 2009; Sweeny et al., 2016), but little research examines whether this worsened affect helps to provide a buffer when outcomes are known, and existing findings are contradictory. Golub et al. (2009) found there was no difference in affect between participants who expected a negative vs. positive outcome, suggesting negative expectations do not buffer against disappointment. In contrast, Sweeny and Shepperd (2010) found those who expected and received a negative outcome felt better after receiving the outcome than those who expected a positive outcome and received a negative outcome. The two studies differed in when they assessed post-outcome affect: a day after (Golub et al., 2009), or immediately after (Sweeny & Shepperd, 2010) the outcome. Accordingly, Sweeny and Shepperd (2010) suggested bracing may only have short-lived benefits for affect.

Contradicting the idea that expecting the worst might be helpful, the affective expectations model (Wilson et al., 1989) suggests that affective outcomes that are in line with expectations heighten emotional responses. In other words, expecting a negative outcome will heighten negativity when the expected outcome occurs, a finding that is supported by empirical evidence (Wilson et al., 1989). However, work on trigger warnings, which are alerts that upcoming content may be distressing, counters this theory. Trigger warnings increase anticipatory negative affect about upcoming content but have little to no effect on emotion after viewing the content (Bridgland et al., 2019; Sanson et al., 2019), suggesting negative expectations do not amplify short-term affective responses. Taken together, the work on expectations is mixed, with evidence that expecting negative outcomes—which heightens anticipatory negative affect (Sweeny et al., 2016)—can be helpful, harmful, or have no effect on affective outcomes.

1.2 | Worry

Worry is characterized by generalized negative thoughts about the future, and causes increased negative affect (Llera & Newman, 2010; McLaughlin et al., 2007), and so may also speak to the effects of anticipatory negative affect. One of the most common reasons people report worrying is to avoid disappointment (Freeston et al., 1994), providing indirect evidence that people may also find anticipatory negative affect helpful. Indeed, the contrast avoidance model suggests the purpose of worry is to avoid any sudden increases in negative affect, relative

14676494, 2023, 5, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jopy.12787 by Ku Leuven, Wiley Online Library on [11/09/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

to current emotional state (Newman & Llera, 2011). By sustaining negative affect, worry makes it easier for any non-negative experience to be perceived positively, improving the likelihood of experiencing positive affect in the future (Newman et al., 2019). Therefore, to the extent that broader negative thoughts about the future generalize to event-related affect, anticipatory negative affect may be both harmful *and* helpful.

1.3 | Affect

Theory on emotion regulation and dynamics suggests that anticipatory negative affect may be harmful, although to our knowledge, this possibility has not been empirically examined. Turning first to emotion regulation, the process model posits that emotions develop over cycles (Gross, 1998, 2015). Emotion regulation is often more effective earlier in these cycles, as changing an emotion becomes more difficult when an emotional response is fully formed (Gross, 1998, 2015). This theory suggests that once negative anticipatory affect has been generated, it will not be easy to change. Indeed, theory and research on emotion dynamics suggest that once developed, emotions tend to persist over time. Frijda (2017) argues that the default state of emotions is persistence, and a large body of research has demonstrated that people can become "stuck" in negative affect, a concept termed emotional inertia (e.g., Kuppens et al., 2010). In sum, the body of work on affect would suggest that affective anticipation would be linked with stronger affective responses.

1.4 | Bringing together the mixed findings

Theory surrounding constructs closely related to anticipatory negative affect paints a complex picture of how anticipatory negative affect might influence the subsequent affective trajectory: the theory and research reviewed suggest anticipatory affect might be helpful (e.g., Newman et al., 2019; Sweeny et al., 2016; Sweeny & Shepperd, 2010), harmful (e.g., Golub et al., 2009; Kuppens et al., 2010), or have no effect (e.g., Bridgland et al., 2019; Sanson et al., 2019). However, much of this research is indirect, investigating expectations (i.e., how someone thinks an outcome will go) or general cognitive styles (i.e., worry). It is important to directly test how anticipatory negative affect influences the subsequent affective trajectory, because anticipating a stressor is associated with increased negative affect (Neubauer et al., 2018), and negative affective responses to stressors have health costs (Piazza et al., 2013).

Thus, we set out to test whether the established adverse consequences of persistent negative affect (e.g., Kuppens et al., 2010) occur in the context of receiving the outcomes of an anticipated stressor. In doing so, we aimed to reconcile the mixed findings to date by examining anticipatory affect *and* affective responses at multiple time-points and across two stressor contexts. We investigated affective responses directly after the stressor outcome (i.e., reactivity), and over the subsequent hours, days, and months (i.e., recovery). Previous work has suggested that differences in findings may be because of differences in measurement periods (Sweeny & Shepperd, 2010), and so multiple measurements are key to disentangling these contradictory results.

1.5 | The current study

In two studies, we tested three competing hypotheses: that anticipatory negative affect is associated with (1) *increased* negative affect, (2) *decreased* negative affect, or (3) has *no association* with affect. Although we focused on negative affect, being affectively "ready for the worst" may also be reflected in reduced positive affect, and so we also examined positive affect. In Study 1, we investigated a real-world, impactful stressor—students receiving their exam results—across 9 days, with a 5-month follow-up. In Study 2, we investigated a more controlled stressor—participants completing the Trier Social Stress Test—over 2 days.

We use the term affect, rather than emotion. Affect is a broader term, referring to valenced states (positive, negative) in general, which include emotion (Gross, 1998). Emotions occur more specifically in response to particular stimuli or situations, and tend to fluctuate more rapidly than affect (Gross, 1998). In Study 1, we focus all measurement on one particular situation (exam results), but in Study 2, we ask about affect more generally. As a result, we use superordinate term affect throughout to encompass both studies.

We controlled for two sets of variables. First, to determine whether effects held when accounting for the fact that those higher in trait negativity are likely to report more negative affect at all time-points (Kalokerinos et al., 2020), we controlled for trait affect and neuroticism. We also centered both anticipatory affect and outcomes around each person's affective baseline, which meant analyses investigate change relative to baseline affect levels. These two decision mean that we are more confident in our results being about anticipatory negative affect in particular, rather than feeling negative more generally. Second, because those who see the stressor outcome as important might have stronger reactions

14676494, 2023, 5, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jopy.12787 by Ku Leuven, Wiley Online Library on [11/09/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

(Smith & Ellsworth, 1987), we controlled for importance. Materials, data, and code for both studies are available on the Open Science Framework (https://osf.io/bgt8d/).

2 | STUDY 1

We followed students receiving exam grades. Using experience-sampling, we measured affect the day before grades were released (*anticipatory affect*) and investigated how this predicted affect immediately after grades were received (a*ffective reactivity*), and recovery a week after grades were received (*new affective baseline*), and 5 months later (*follow-up affect*). In addition to the controls outlined above, we controlled for the number of exams taken and passed to separate anticipatory affect from the stressor outcome.

2.1 | Method

These data came from a larger study (e.g., see Dejonckheere et al., 2019; Kalokerinos et al., 2019) approved by the KU Leuven Ethics Committee. We discuss only measures analyzed for the current research question.

2.1.1 | Participants

Participants were 101 Belgian first-year psychology students receiving first-semester grades (87 women, 14 men; M_{age} = 18.64; SD_{age} = 1.45). Belgium allows almost all high-school graduates into university, regardless of their grades. As a result, for many, first-semester exams indicate whether they will be able to remain in university. Exam failure rates are high (79% of our sample failed at least one exam), making this an intense stressor for students.

We aimed to recruit at least 100 of approximately 400 first-year psychology students, allowing power to detect medium effects at the person-level ($r = 0.30$, $\alpha = 0.05$). We recruited through a research participation program and social media groups. Participants received 50 euros for completing at least 80% of the experience sampling method (ESM) surveys, and 5 euros less for every 10% below that target. Participants could take up to 5 subjects, each with an exam, and most (91.1%) took all five. Approximately 5 months later, 95 participants (94.1%) completed an online follow-up survey and were paid 5 euros.

2.1.2 | Procedure

Lab session

The procedure is outlined in Figure 1. Three days before receiving grades, participants were briefed and completed baseline questionnaires.

Experience sampling method (ESM) protocol

The next day, participants began ESM surveys using the Android app mobileQ (Meers et al., 2020). Participants received 90 surveys: 10 per day for 9 consecutive days. Surveys were sent using a stratified random-interval scheme: we divided waking hours (10 a.m.–10 p.m.) into ten equal intervals and sent a survey at a random point within each interval. On average, participants received a survey every 72 min (SD = 30 min) and completed 91% of the surveys (SD = 7.3%).

Of the 9-day period, the first 2 days (Day −2, Day −1) were before grades release. On Day 0, participants received their grades. Participants knew in advance that they would receive their grades that day and were sent a university email when grades were available. We encouraged participants to check as soon as possible, but there was some variability in when grades were received (between surveys

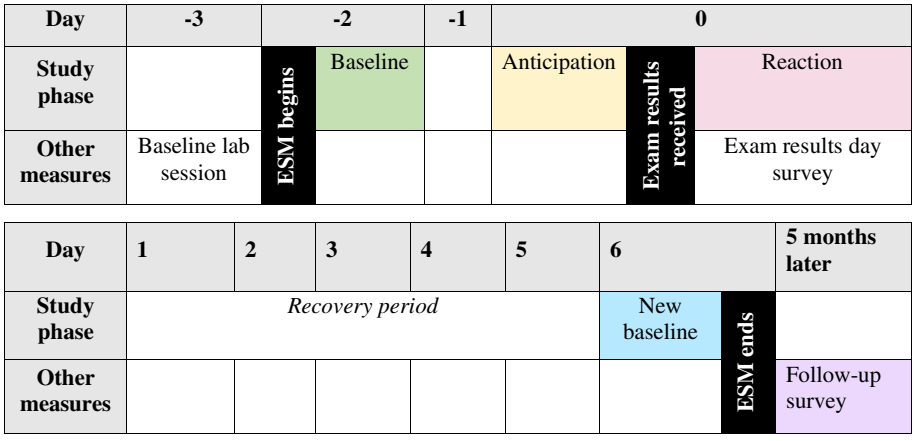

FIGURE 1 Outline of the Study 1 design.

14676494, 2023, 5, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jopy.12787 by Ku Leuven, Wiley Online Library on [11/09/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

21 and 28). ESM surveys consisted of 25 items, which were identical pre- and post-grades. Participants were instructed to answer the items pre-grades about anticipated grades, and post-grades about actual grades.

Exam results day survey
On grade release day, participants reported grades for each class in an online survey.

Follow-up survey
Five months after the lab session, participants were emailed an online follow-up survey.

2.1.3 | Measures

Affect
ESM. Six items assessed negative affect (sad, angry, disappointed, ashamed, anxious, stressed) and four items assessed positive affect (proud, happy, contented, relieved) on a 101-point slider (0 = *not at all*, 100 = *very much*). The item stem was "When you think about your grades right now, how [*affect term*] are you feeling?". Items covered low and high arousal affect (Russell, 1980), and were targeted to be relevant to the context of this study: receiving learning outcomes (Pekrun, 2006). We averaged together items for momentary negative ($\omega_{between} = 0.96$, $\omega_{within} = 0.86$) and positive affect ($\omega_{between} = 0.98$, $\omega_{within} = 0.91$).

Follow-up. Participants completed the same affect items a single time (negative: $\alpha = 0.92$, positive: $\alpha = 0.96$), with the question stem: "When you think of your exam results from the first semester, to what extent do you feel the following emotions?"

Importance of exam results
In each ESM survey, we asked participants "When you think about your grades right now, how important are your grades for you?" on a 101-point slider scale (0 = *not at all important*, 100 = *very important*). We took the mean of the importance ratings at the time-points prior to receiving exam results.

Expected and actual exam performance
We used three pieces of information about exams. First, in the lab session, we asked participants the number of subjects they took that semester (out of 5), and their expected scores for each subject (out of 20). In the exam results day survey, we asked participants their actual scores for each subject (out of 20). If a subject is failed, the exam must be retaken, and in the case of many fails, enrolment may be terminated. Thus, there was a consequential line at failing, and so we pass-fail dichotomized the score on each subject (1–9 was a fail, 10–20 was a pass), and made a variable representing the number of exams passed. This variable was highly correlated with mean score across exams ($r = 0.90$), and there were no differences in the reported results when using mean score instead of number passed. Moreover, number passed explained more variance in participants' affect right after they received their grades (negative $R^2 = 0.49$, positive $R^2 = 0.67$) than absolute score (negative $R^2 = 0.37$, positive $R^2 = 0.51$).

Trait affect
In the lab session, participants reported the extent to which they *usually* felt 6 positive affect terms (contented, happy, amused, proud, grateful, hopeful; $\alpha = 0.89$) and 9 negative affect terms (sad, depressed, nervous, angry, fearful, guilty, ashamed, irritated, stressed; $\alpha = 0.79$). These items were selected to cover the affective circumplex (Russell, 1980). Participants responded on a 7-point scale (1 = *not at all*, 7 = *very much*).

Neuroticism
Participants completed the neuroticism subscale of the Big Five Inventory (John et al., 1991), either at recruitment ($N = 64$), or in the lab session ($N = 37$). The subscale included 8 items assessed on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*; $\alpha = 0.87$).

2.1.4 | Data analysis

Computing the affective trajectory variables
Defining the variables. We first defined four key affect variables from the ESM surveys. As shown in Figure 2, these variables characterized the participant's affect at a certain time-point *t*. First, we defined the affective *baseline* before receiving exam grades as the participant's affect around the beginning of the study, where $t = -20$. Next, we defined *anticipatory* affect and affective *reaction* as the affect of the participant immediately before ($t = -1$) and after ($t = 0$) they received their grades. Finally, we defined the *new baseline* affect after receiving exam grades as the participant's affect at the end of the ESM ($t = 60$),[1] indicating how well a participant had recovered. We estimated these constructs separately for negative and positive affect.

Fitting a time-dependent function. We did not compute these variables by simply taking a participant's affect at the corresponding time-point (for example, by setting Baseline to the value of negative affect at time-point −20). There would be two problems with this approach. First, if the participant did not complete the survey at that time-point, it is impossible to estimate the variable. Second, because the

14676494, 2023, 5, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jopy.12787 by Ku Leuven, Wiley Online Library on [11/09/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

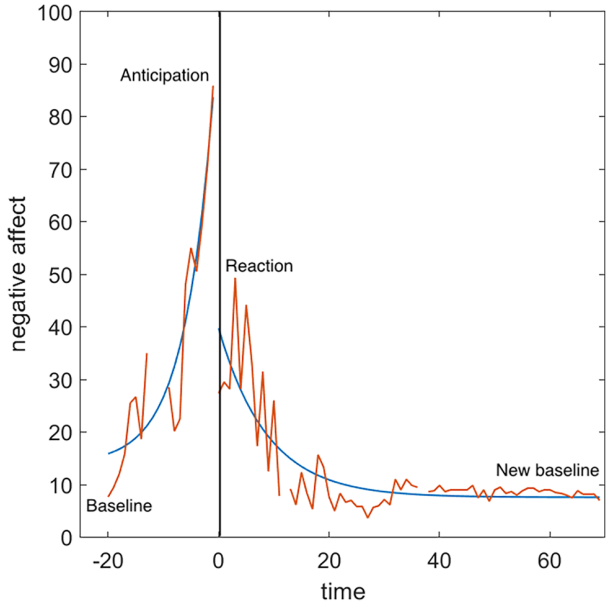

FIGURE 2 Negative affect of an example participant drawn from our dataset. The time-points(t) are on the x-axis. The black vertical line shows the time where the participant received their exam grades. The blue lines are the fitted exponential functions of Equation (1).

variable depends on a single measurement, the estimate may be unstable. One way to address both these problems would be averaging across multiple time-points. However, this is not an ideal approach in our data, because the statistical properties change over time (for example, see Figure 2, where affect is peaking and falling across time-points). In other words, the data are non-stationary.

Instead, to deal with these issues, we fitted a time-dependent function to the data. To estimate each construct, we computed the expected value of this function at a certain time-point. This function used multiple time-points, meaning that no single time-point or missing datapoint had an outsized influence on results. Our approach also accounted for the non-stationarity of the data by fitting two exponential functions,[2] one before and one after the exam grades were received. We combined these in a piecewise exponential function, separately for negative and positive affect (Equation 1):

$$\begin{aligned}&\text{Pregrades}(t<0): Y_t \sim I_1 + a_1 e^{c_1 * t} + \varepsilon_{1t}\\&\text{With} c_1 \geq 0 \text{and} 0 \leq I_1 \leq 100 \text{and} \varepsilon_{1t} \sim N\left(0, \sigma_1\right)\\&\\&\text{Post grades}(t \geq 0): Y_t \sim I_2 + a_2 e^{-c_2 * t} + \varepsilon_{2t}\\&\text{With} c_2 \geq 0 \text{and} 0 \leq I_2 \leq 100 \text{and} \varepsilon_{2t} \sim N\left(0, \sigma_2\right).\end{aligned} \quad (1)$$

A piecewise exponential function for an example participant is shown in Figure 2 (the blue lines). The piecewise function can handle the discontinuity of the data at the point where participants receive their grades. We used exponential functions because the autoregressive model often used to fit affective time-series (Loossens et al., 2021) expects an exponential decay following a change, but the pattern of recovery in our data was slower than this expected delay. Moreover, exponential functions naturally converge back toward baseline, best fitting the recovery trajectory. Because our measurement scale was 0–100, we limited the intercept I to be between 0 and 100: that meant that the values computed by our function could not exceed the range of the scale. Finally, we estimated the parameters for each participant using a least squares optimization function, which we minimized using a simplex algorithm starting from 20 different initial values.

Finally, we added the follow-up time-point, which was the affect measurement from the follow-up questionnaire. As the follow-up was a single time-point, distant from the other time-points, we could not implement a statistical solution to improve the follow-up measurement, and so follow-up is not calculated as part of the exponential function. Instead, we use the follow-up scores directly from the data.

Centering. We were interested in change across time, rather than absolute affect, and wanted to decouple the participants' trait affect from their affective response to receiving their grades. Therefore, we centered all subsequent affect variables after grade release around affect at the beginning of the study (i.e., baseline).

Running the analyses

We investigated relationships between these affective trajectory variables using linear regression. We simultaneously controlled for six control variables: Baseline affect, trait affect (both using positive for positive affect models, and negative for negative affect models), neuroticism, number of exams passed, number of exams completed, and importance of exam grades. For each regression where we related two constructs to each other, we used the latest construct (in time) as the outcome variable (e.g., anticipatory affect predicting reaction affect).

2.2 | Results

Descriptive statistics are presented in Table 1.

As a preliminary analysis, we visualized positive and negative affect for participants with high and low anticipatory affect (median split) in Figure 3. These figures suggest participants who have high anticipatory affect tend to stay high across time. The variables used in this figure are centered around baseline (so are showing

14676494, 2023, 5, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jopy.12787 by Ku Leuven, Wiley Online Library on [11/09/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

TABLE 1 Descriptive statistics for Study 1 and Study 2.

	Study 1				Study 2			
Variable	***M***		**SD**		***M***		**SD**	
Percentage of exams passed [0–100]	55.79		34.73		–		–	
Average exam score [0–20]	9.88		3.00		–		–	
Expected exam score [0–20]	9.94		1.90		–		–	
Expected task performance [1–7]	–		–		4.02		0.91	
Importance [S1: 0–100, S2: 1–7]	76.87		20.20		4.52		1.43	
Trait positive affect [S1: 1–7, S2: 1–5]	5.20		0.78		3.28		0.67	
Trait negative affect [S1: 1–7, S2: 1–5]	3.74		1.15		1.73		0.48	
Neuroticism [1–5]	3.32		0.76		3.38		1.35	
Affective trajectory	**NA**	**PA**	**NA**	**PA**	**NA**	**PA**	**NA**	**PA**
Experience sampling								
Baseline	37.91	30.01	16.99	14.16	21.88	61.21	12.53	12.31
Anticipation	8.91	−7.98	17.61	12.30	1.55	−7.66	9.68	16.42
Reaction	−5.99	20.68	28.70	33.57	2.97	−14.95	15.04	19.56
New baseline	−15.42	17.55	20.97	29.38	−3.89	2.00	12.38	14.33
Follow-up	−5.92	19.36	27.19	30.70	–	–	–	–
Lab sessions								
Time 1: Baseline	–	–	–	–	2.21	4.58	1.04	1.19
Time 2: Anticipation 1	–	–	–	–	0.43	−0.26	1.02	1.16
Time 3: Anticipation 2	–	–	–	–	0.75	−0.65	1.10	1.16
Time 4: Reaction	–	–	–	–	0.56	−1.22	1.25	1.36

Note: Measurement scales for all variables except the affective trajectory are indicated in square brackets. The affective trajectory is computed from variables measured on 101-point slider scales where 0 = not at all and 100 = very much for experience sampling, and on 7-point scale where 1 = not at all and 7 = very much for lab sessions. All affective trajectory variables except baseline are centered around baseline (meaning that negative values indicate a drop below initial baseline levels).

Abbreviations: NA, negative affect; PA, positive affect; S1, Study 1; S2, Study.

change from baseline), but this figure does not include the control variables, which we add in our primary analyses.

2.2.1 | Primary analyses

Regression results are in Figure 4. For negative affect (Panel A), anticipatory affect was associated with higher reactivity on receiving grades, and higher negative affect at follow-up 5 months later, but not with the new affective baseline at the conclusion of the study. This finding holds when controlling for trait negative affect and neuroticism, and is centered around baseline affect, suggesting that it does not reflect people with negative affective styles feeling more negative at every time-point. For positive affect (Panel B), we find no associations with anticipatory affect. Overall, these findings suggest that anticipatory negative affect may be associated with more negative affective outcomes.

2.2.2 | Supplemental analyses

We briefly outline the outcomes of these analyses here: see Supporting Information for full details.

Relaxation

We hypothesized the positive relationships between anticipatory affect and subsequent affect were driven by higher initial anticipatory negative affect (e.g., a participant feeling very negative about their upcoming results). But an alternative explanation is that these effects were due to less relaxation after negative anticipation (e.g., by negative affect being slower to drop following grade release). Thus, to get a more complete picture of the affective process, we also examined relaxation. Relaxation was defined as the difference between anticipation and either reaction, new baseline, or follow-up, and so explicitly investigated the size of the change between time-points. We found the same effects for negative and positive affect: the higher the anticipatory affect,

14676494, 2023, 5, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jopy.12787 by Ku Leuven, Wiley Online Library on [11/09/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

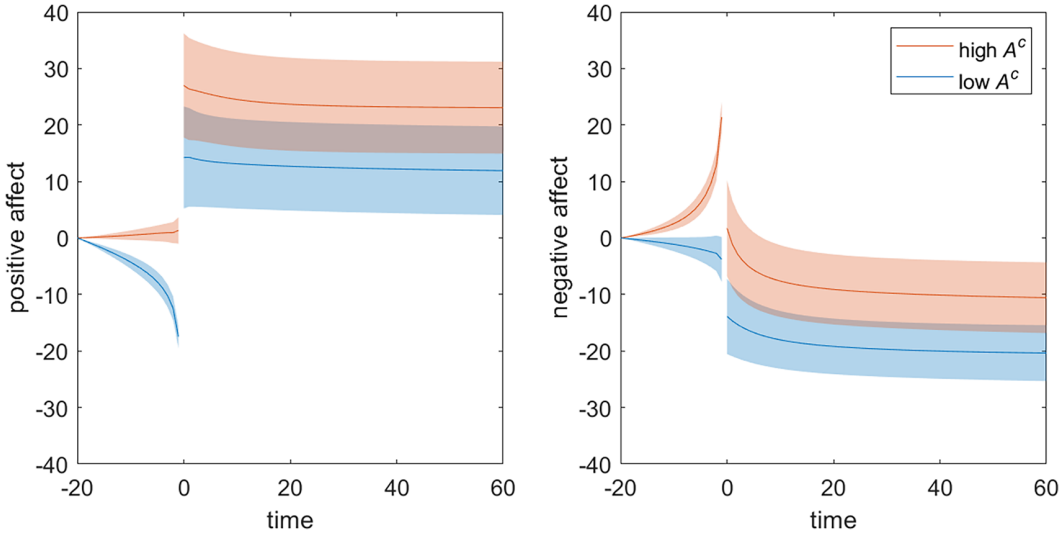

FIGURE 3 The average expected time-course of positive (left) and negative (right) affect among participants with low (blue lines) and high (red lines) anticipatory affect. Affect is centered around baseline, meaning that negative values indicate a drop below baseline affect, and positive indicate an increase beyond baseline affect. These analyses do not include control variables, which are introduced in the primary analyses. The red lines are from participants with a higher than median anticipatory affect (A^c on the graph), and the blue lines are from participants with a lower than median anticipatory affect. The shading around the lines shows the 95% confidence intervals (CIs) of these average time-courses. As all time-courses are centered around baseline, each course will have an affect score of 0 at time-point $t = -20$, which means that the CI is of width 0 at that time-point.

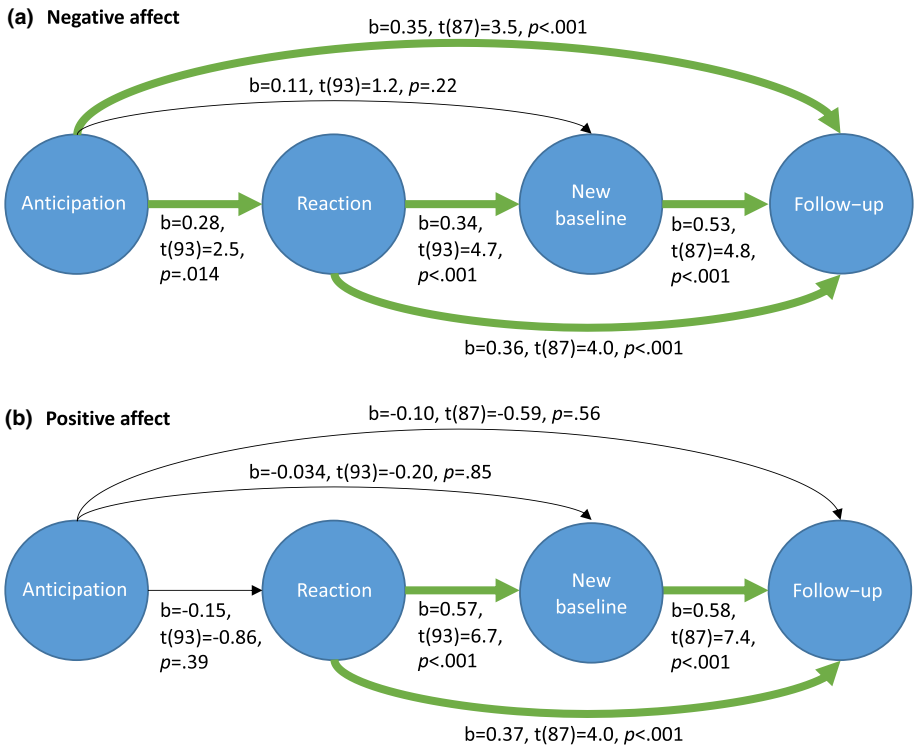

FIGURE 4 The relationship between anticipatory negative affect and the subsequent affective trajectory for negative affect (panel a) and positive affect (panel b) using linear regression in Study 1. A green line denotes a significant positive association. For our analyses, we use the latest construct (in time) as the outcome variable, as indicated by the direction of the arrows.

14676494, 2023, 5, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jopy.12787 by Ku Leuven, Wiley Online Library on [11/09/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

the larger the relaxation of affect back toward baseline (Figure S1).

The combination of these results with the primary results may seem counterintuitive: For negative affect, anticipation was associated with greater reaction and follow-up affect, while also being associated with greater relaxation in negative affect. This pattern occurs because relaxation analyses index the degree to which affective experience is moving back toward baseline. Those with a higher anticipatory negative affect were starting from a higher point, and thus had further to fall, resulting in more relaxation. However, this greater relaxation could not entirely offset the effects of the initial anticipation, meaning that anticipatory negative affect still had significant associations with higher reactivity and follow-up affect in the primary results. That is, the natural process of affect falling back toward baseline levels did not outweigh the negative consequences of anticipatory affect.

Multiverse

To investigate the robustness of our results to our analytic decisions, we used multiverse analyses (see Steegen et al., 2016). We tested four sets of alternative specifications. First, we investigated items used to construct negative and positive affect (see Figure S2). Negative affect composition did change the results in some models: the positive association between anticipatory affect and reaction was significant in 62% of affect compositions, and the positive association between anticipatory affect and follow-up was significant in 92% of affect compositions. Second, we investigated whether the time-points used to define the affective trajectory variables mattered (see Figure S3). We found the reported results become stronger the earlier we draw the baseline measurement from, suggesting the importance of having a baseline measured well before the outcome begins to loom. Third, we investigated the inclusion of control variables. The combination of control variables did not affect the relationships between anticipatory affect and reaction or follow-up, but the multiverse showed the relationship between anticipatory affect and new baseline (non-significant in the main analyses) was positive and significant in all analyses except for those including both baseline affect, and number of exams passed. Those with higher anticipatory negative affect also has higher negative affect at new baseline, suggesting slower recovery. Fourth, we investigated the exclusion of possible outliers, and found no changes. In sum, our results were generally robust.

Interaction between anticipatory affect and exam outcomes

We ran exploratory analyses to investigate whether associations were stronger among those who failed more exams. Given that the study was not designed to test this interaction, results should be interpreted with caution. We found one significant interaction between anticipatory affect and number of exams passed in predicting negative affect reactions: the positive association between anticipatory affect and reaction was stronger when fewer exams were passed (see Table S1).

Controlling for expectations

We ran analyses including adding a control for the *expected* number of exams passed, investigating whether anticipatory affect had an effect beyond cognitive expectations. Results replicated the primary analyses (see Figure S4).

2.3 | Discussion

Anticipatory negative affect was associated with greater negative affect relative to baseline both upon receiving an outcome and at 5-month follow-up. We controlled for baseline and trait affect and neuroticism, suggesting findings were not driven by trait negativity. There were no associations with anticipatory positive affect. Supplementary analyses showed that anticipatory negative affect was associated with more relaxation toward baseline in the days after the outcome was received. This pattern likely occurred because those with higher anticipatory negative affect had a higher starting point, and thus their affect had further to fall. However, despite this relaxation process, we still found associations with anticipatory negative affect. In other words, anticipatory negative affect is so hard to shake that associations linger, despite natural recovery processes.

There are two key limitations of Study 1. First, the stressor was uncontrolled: some participants passed many exams, and some few. We statistically controlled for this in our analyses, but it would be ideal to complement these results with anticipatory affect around a controlled stressor. Second, participants were aware at study commencement that they would receive their exam results on Day 3. Consequently, baseline affect (which was corrected for in all models) may have already been somewhat colored by anticipation. A baseline where participants are unaware of the upcoming stressor may provide a clearer view of effects.

3 | STUDY 2

Study 2 was a secondary analysis of an existing dataset selected to address the key limitations of Study 1. In an intensive 2-day study, participants completed both lab and ESM affect measures. On Day 1, participants were unaware of

14676494, 2023, 5, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jopy.12787 by Ku Leuven, Wiley Online Library on [11/09/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

the upcoming stressor, providing a baseline measure uncolored by anticipation. On the morning of Day 2, participants were told of the upcoming stressor, which occurred that afternoon. All participants completed the same controlled stressor task, removing some of the variability in event outcomes in Study 1. Thus, this study provides an excellent complement to Study 1.

3.1 | Method

These data were from a larger study (Koval & Kuppens, 2012) approved by the University of Melbourne Ethics Committee. We discuss only measures analyzed for the current research question.

3.1.1 | Participants

Seventy-three participants were recruited via university website advertisements (42 women, 31 men; $M_{age} = 21.21$; $SD_{age} = 4.18$) in return for AU$40: 79 participants were initially recruited, but 6 withdrew before completing any ESM surveys, so were not included in analysis.

3.1.2 | Procedure

The study ran over 2 consecutive days and involved three lab sessions and the ESM protocol. There were 4 affect measurements across the lab sessions, and up to 120 affect measurements across the ESM protocol. Figure 5 outlines the procedure.

Lab session 1

On the morning of Day 1, participants were briefed and completed questionnaires, including the Time 1 lab affect measure. ESM began after this session.

Lab session 2

On the morning of Day 2, participants were told they would complete the Trier Social Stress Test (Kirschbaum et al., 1993) in Lab Session 3 later that day. They were given instructions describing the public speaking and mental arithmetic tasks they would complete (adapted from Kudielka et al., 2007). The task was described as demanding, and participants were told they would be judged by an expert committee and video recorded. They then completed the Time 2 lab affect measure.

Lab session 3

On the afternoon of Day 2, participants completed the Time 3 lab affect measure, followed by the Trier Social Stress Test, then the Time 4 lab affect measure.

Experience sampling protocol

There were 60 eight-item surveys per day (total $t = 120$) for a period of 12 h (10 a.m.–10 p.m.), although participants received fewer surveys depending on when their lab sessions occurred (M surveys received = 105.6). Surveys were sent using a stratified random-interval scheme: the day was divided into 60 equal intervals, and a survey was sent randomly within each interval. On average, participants received a survey every 13.82 min (SD = 9.37) and completed 87.44% of the surveys (SD = 8.72%).

Day	Day 1	
Time	9:00-10:00	10:00-22:00
Study phase	Baseline	
ESM		ESM
Lab session	Session 1: Time 1	

Day	Day 2				
Time	9:00-10:00	10:00-15:00	15:00-17:00		17:00-22:00
Study phase	Told about upcoming stressor	Anticipation	Completed stressor task	Reaction	New baseline
ESM		ESM		ESM	ESM
Lab session		Session 2: Time 2	Session 3: Time 3	Session 3: Time 4	

FIGURE 5 Outline of the Study 2 design.

14676494, 2023, 5, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jopy.12787 by Ku Leuven, Wiley Online Library on [11/09/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

3.1.3 | Measures

Affect

All items were assessed in general, rather than with specific reference to the stressor, but given the intensive nature of this study, changes relative to baseline affect are likely to strongly reflect the influence of the stressor.

ESM. We measured 4 negative (sad, stressed, anxious, angry) and 2 positive affect terms (happy, relaxed) on a 101-point slider (0 = *not at all*, 100 = *very much*). The item stem was "At the moment, how [affect term] are you feeling?". We averaged items for momentary negative ($\omega_{between} = 0.94$, $\omega_{within} = 0.72$) and positive affect ($\omega_{between} = 0.61$, $\omega_{within} = 0.87$).

Lab sessions. We measured 9 negative affect terms ($\omega_{between} = 0.97$, $\omega_{within} = 0.88$; worried, anxious, nervous, under pressure, stressed, tense, irritated, angry, and pissed off) and 6 positive affect terms ($\omega_{between} = 0.95$, $\omega_{within} = 0.97$; at ease, cheerful, peaceful, happy, serene, in good spirits). Items were assessed on a 7-point scale (1 = *not at all*, 7 = *very much*), and selected for this study to encompass experiences most relevant to the stressor task.

3.1.4 | Control variables

Expected performance and task importance

After the stressor was revealed (Lab sessions times 2–4), participants completed these items on a 7-point Likert scale (1 = *not at all*, 7 = *very much*). There were two expected performance items: "do you think your performance on these tasks will turn out how you want?" and "do you think you can perform these tasks successfully?": we took the mean ($r = 0.68$). The importance item was: "is it important for you to perform well on these tasks?". We took the mean of expected performance and of importance at the two time-points prior to the stress task as person-level control variables.

Trait affect

In Lab Session 1, participants completed the PANAS (Watson et al., 1988), which consisted of 10 positive ($\alpha = 0.86$) and 10 negative affect ($\alpha = 0.74$) items on a 5-point scale (1 = *very slightly*, 5 = *extremely*).

Neuroticism

In Lab session 1, participants completed the neuroticism subscale of the TIPI (Gosling et al., 2012). The scale consisted of 2 items assessed on a 7-point scale (1 = *disagree strongly*, 7 = *agree strongly*; $\alpha = 0.54$[3]).

3.1.5 | Data analysis

Computing the ESM affective trajectory variables

We followed the same general procedure as Study 1. The primary exception was the difference in calculating baseline. Because participants did not know about the upcoming stressor for the entirety of Day 1 of Study 1, we used the mean of ESM affect across Day 1 as *baseline*. This meant that we did not need use the pre-stresor exponential function to compute the baseline as in Study 1: this was necessary in Study 1 only because participants were aware of the date of the outcome upon beginning the Study. *Anticipatory* affect and *reaction* were defined as in Study 1: affect before and after completing the stressor task, respectively. *New baseline* was defined as the participant's affect at the end of the ESM period (end of Day 2). We fit the same time-dependent exponential function[4] used in Study 1 to calculate each of these post-stressor-task constructs, for the same reasons we detail in depth in Study 1.

Centering

In the ESM data, we centered anticipatory affect, reaction, and new baseline around baseline (Day 1) affect. In the lab data, we centered Time 2 (initial anticipation), Time 3 (pre-stressor anticipation), and Time 4 (reaction) affect around Time 1 (baseline) lab affect. Thus, both sets of analyses look at change relative to their respective baseline levels.

Running the analyses

We assessed the relationships between these affective trajectory variables using linear regression. We ran one set of analyses with the ESM data, and one set of analyses with the lab session data, keeping them separate because they used different measures and time-scales. In both sets of analyses, we simultaneously controlled for four variables: baseline affect, trait affect (positive for positive affect models, and negative for negative affect models), self-reported task importance, and neuroticism.[5] For each regression, we used the latest construct (in time) as the outcome variable.

3.2 | Results

3.2.1 | Primary analyses

Descriptive statistics for Study 2 are in Table 1. Results for both ESM and Lab data are in Figure 6. For negative affect, in the ESM data, anticipation was not significantly associated with either reaction or new baseline. In the Lab sessions,[6] pre-stressor anticipation (Time 3) was significantly

14676494, 2023, 5, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jopy.12787 by Ku Leuven, Wiley Online Library on [11/09/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

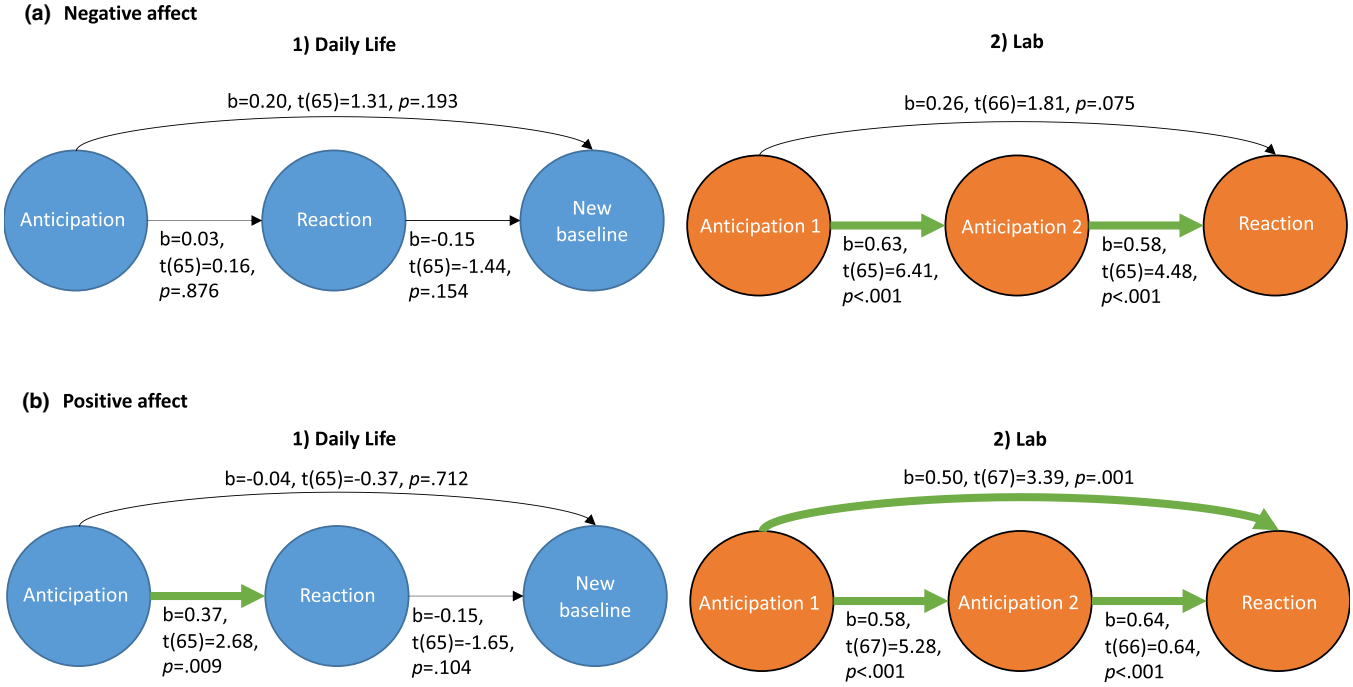

FIGURE 6 The relationship between anticipatory affect and the subsequent affective trajectory for negative affect (panel a) and positive affect (panel b) using linear regression in Study 2. The left panels labeled (1) are ESM data collected in daily life, and the right panels labeled (2) are lab session data. All constructs are centered around baseline affect. A green line denotes a significant positive association. For our analyses, we use the latest construct (in time) as the outcome variable, as indicated by the direction of the arrows.

associated with a greater affective reaction following the stressor, but initial anticipation (Time 2) was not associated with reaction. For positive affect, in the ESM data, anticipation was significantly positively associated with reaction, but not new baseline. In the Lab sessions, both anticipation time-points were significantly positively associated with reaction. Overall, these findings provide some support for the hypothesis that anticipatory affect may be associated with more intense affective outcomes, and some support for no relationship between anticipation and subsequent affect. There was no evidence for the idea that anticipatory affect was associated with blunted affective responses.

3.2.2 | Supplemental analyses

Stressor intensity

The effects of the stressor on affect were generally significant in the expected directions (see Table S3), but relatively small in size. This is also reflected in the descriptive statistics (Table 1). In the ESM data, the sample mean for negative affect fluctuated around baseline between 1.55 and 3.89 points on a 101-point scale. This is in contrast to the stressor in Study 1, which was stronger: negative affect fluctuated around baseline between 5.92 and 15.42 points on a 101-point scale. This may be one reason we do not see associations in the ESM negative affect data in Study 2 that we observed in Study 1.

The effect of the stressor on Study 2 positive affect was stronger than negative affect, with sample means for positive affect fluctuating between 2 and 14.95 points on a 101-point scale in the ESM data. This may be why we see stronger associations with positive than negative affect in the ESM data.

Relaxation

As in Study 1, we conducted relaxation analyses with the ESM data, investigating how affect fell back toward baseline (see Figure S5). Consistent with Study 1, the higher the affective starting point, the larger the subsequent drop in affect, suggesting any significant positive associations with anticipatory affect in our primary analyses are working against the natural emotional recovery process.

3.3 | Discussion

We found that anticipatory negative affect either had no association with outcomes or was associated with more negative affective outcomes. This suggests that being affectively prepared for the worst was never helpful, and sometimes harmful in this context. In the lab sessions, anticipatory negative affect was associated with a stronger

14676494, 2023, 5, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jopy.12787 by Ku Leuven, Wiley Online Library on [11/09/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

affective reaction when measured immediately prior to the stressor task, but not when measured earlier in the day when the stressor task was first introduced. Expectations tend to become more negative the closer the stressor becomes (Sweeny & Krizan, 2013), and this pattern may be why the measure closest in time to the outcome has the strongest influence. In the ESM data, there were no significant associations between negative anticipatory affect and reaction or new baseline.

For positive affect, in the lab sessions, both anticipation time-points were associated with a stronger reaction, and in the ESM data, anticipatory affect was associated with a stronger reaction, but not new baseline. These findings contrast the idea of being ready for the worst. Rather, in the context of a controlled social stressor, anticipating the best appears to be helpful. Alternatively, this pattern of results could be driven by people with *low* anticipatory positive affect also having low positive affect on reaction: that is, low anticipatory positive affect could be acting as another manifestation of anticipatory negative affect.

Overall, the results look somewhat stronger in the lab data than the ESM data, and there are some reasons to believe that the lab data may be a better measure. First, the pre-stressor anticipation time-point is the measure closest to the task: the ESM data were interrupted by the beginning of the lab session, and so the anticipation measure would not have been as close to the task commencement. Second, ratings made in lab sessions were likely to be more anchored to the stressor, which would have been salient when participants were in the lab where the stressor task would take place. This consideration is especially important in this study, where affect was assessed generally, rather than indexed to the stressor as in Study 1. Finally, the lab sessions had more affect items, which were more task-relevant than in the ESM protocol, likely providing a more comprehensive measure of affect.

There are some limitations that should be considered. First, although the Trier Social Stress Test reliably induces stress in the lab (Goodman et al., 2017), it had only a small to moderate effect on affect, and affect changes were not as large as in the more personally relevant stressor in Study 1. Second, the measurement of the new baseline may not have been far enough from the stressor to truly index recovery: the stressor was completed on the afternoon of Day 2, and new baseline was taken at the end of Day 2. Third, the affect items were assessed generally, in contrast to Study 1, where they were assessed with reference to the stressor. This meant affect measurement likely included more noise from other daily-life events, particularly in the ESM portion of the study.

4 | SUMMARY OF RESULTS

In Table 2, we provide an overview of the results across both studies.

5 | GENERAL DISCUSSION

In two studies, we investigated the association between anticipatory affect—that is, affect in advance of a known stressor—and the subsequent affective trajectory. Based on mixed theory and research, we tested competing hypotheses, positing that anticipatory negative affect could be helpful, harmful, or have no effect. We found that anticipating the worst was never helpful. Instead, we found that when there were effects, anticipatory negative affect was associated with more negative affective outcomes.

In Study 1, participants were first-year students awaiting and receiving their first semester exam results: an intense and significant, but relatively uncontrolled, stressor.

TABLE 2 Summary of results across Study 1 and Study 2

	Study 1		Study 2	
	NA	PA	NA	PA
ESM				
Anticipatory affect predicting reaction	+	*ns*	*ns*	+
Anticipatory affect predicting new baseline	*ns*	*ns*	*ns*	*ns*
Anticipatory affect predicting follow-up	+	*ns*		
Lab session				
Anticipation 1 (after being briefed on stressor task) predicting reaction			*ns*	+
Anticipation 2 (immediately before stressor task) predicting reaction			+	+

Note: Orange cells with a + indicate a positive relationship that is significant at $p < 0.05$, gray cells with *ns* indicate no significant relationship, blank cells indicate the relationship was not assessed in that study.

Abbreviations: NA, negative affect; PA, positive affect.

14676494, 2023, 5, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jopy.12787 by Ku Leuven, Wiley Online Library on [11/09/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

We found that higher levels of anticipatory negative affect in advance of receiving results were associated with more negative affect in reaction to the results, and more negative affect at a 5-month follow-up. We found no associations with anticipatory positive affect.

In Study 2, participants were anticipating and completing a lab stress task: a less intense and significant, but more experimentally controlled, stressor. We found that higher levels of anticipatory negative affect in advance of the stress task were associated with more negative affecti reactions, but only when using a lab measure taken directly before the task, and not in the ESM data. In contrast to Study 1, we also found associations with anticipatory positive affect, which was associated with increased positive affect reactions across both the lab and ESM data. This finding might reflect those who have low anticipatory positive affect also having low positive affect in reaction to the stressor: that is, it could be another manifestation of the potential costs of anticipating the worst. Taken together, our results suggest that being affectively ready for the worst is unlikely to be a beneficial strategy: in return for feeling worse in anticipation, those with high anticipatory negative affect see no benefit, and sometimes a cost, in their affective reactions.

Our findings linking anticipatory negative affect to increased reactivity fit best with theory and research on emotion regulation and affect dynamics. The process model of emotion regulation (Gross, 1998) suggests that fully formed emotions are more difficult to regulate. Our findings suggest that anticipatory negative affect may be one instance of this phenomenon: coming into a stressful situation with strong negative emotions may make down-regulation difficult. These findings also fit with emotion dynamics research, suggesting that emotions are strongly self-predictive (Koval et al., 2021). Some of our results also point to no relationship between anticipatory affect and outcomes, mirroring the work on trigger warnings (Sanson et al., 2019). These null findings were more common in Study 2, which was a less personally relevant stressor, suggesting that future research would benefit from systematically investigating personal relevance as a moderator of the consequences of anticipatory affect.

This research demonstrates the importance of using longer measurement windows to capture multiple points of the affective trajectory. Most studies have focused on short periods post affect induction in a lab setting, which means they are not able to examine both reactivity *and* recovery. In some instances, contrasting findings have been explained by differences in measurement times (e.g., directly after an outcome vs. the next day; Golub et al., 2009; Sweeny & Shepperd, 2010). We examined reactivity immediately after the outcome, and recovery across the day (Study 2) or week (Study 1), as well as at 5-month follow-up (Study 1). In general, we found that the negative consequences of anticipatory negative affect were observed most often and most strongly when examining associations with negative affective reaction directly after the stressor outcome. We found no associations with subsequent recovery to new baseline across the day or week, but we did find in Study 1 that anticipatory negative affect was associated with negative affect at 5-month follow-up, suggesting there may sometimes be a long tail to these relationships.

In these analyses, we used affect prior to the stressor to predict affect in reaction to the stressor, which raises two issues. First, this meant that it was important to demonstrate that our findings were not driven by trait affect: that people who tend to feel negative in general feel negative both before and after the stressor. We addressed this in two ways. We centered all variables around baseline affect, meaning that our analyses investigated changes from baseline, removing the effect of baseline affect levels. We also controlled for baseline affect, trait affect, and neuroticism, meaning that our results reflected associations over and above these trait variables.

Second, because we used pre-stressor affect to predict post-stressor affect, some may argue these results reflect the well-established finding that affect is self-predictive (e.g., Kuppens et al., 2010). However, stressors interrupt the natural flow of affect (see Figures 2 and 3), disrupting affective inertia (Koval & Kuppens, 2012). In other words, our findings are not another demonstration of the self-predictive nature of affect. Supporting this contention, our secondary relaxation analyses suggest that these findings run against the natural flow of affect in response to a stressor. In these analyses, people with higher anticipatory affect had a quicker relaxation of affect back toward baseline. The return to baseline from a peak is also a natural affective process, and one that works against finding any associations between anticipatory affect and subsequent affect. We find positive associations between anticipatory affect and outcomes *despite* this process, reflecting the potential negative impact of anticipatory affect.

5.1 | Limitations and future directions

First and foremost, we are not able to establish causal effects in these data. We focused on real-world intensive longitudinal data investigating both immediate reaction to—and longer-term recovery from unfolding stressors. Therefore, we were able to establish ecological validity and patterns of change across time. It will be important for future experimental work to establish causal effects in more controlled lab settings. Study 2 moves toward

14676494, 2023, 5, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jopy.12787 by Ku Leuven, Wiley Online Library on [11/09/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

this goal, as all participants completed an experimenter-controlled stressor in a within-persons design. However, Study 2 showed weaker affective responses, and more mixed results, suggesting that it will be important to continue to supplement more internally valid studies with externally valid real-world data following personally consequential events.

Second, we did not establish whether anticipatory affect was intentional. That means our data cannot speak to whether participants were actively aiming to be "ready for the worst," or whether these processes were occurring without awareness. Establishing intentionality and awareness, or a lack thereof, will be an important direction for future research. Previous research suggested that people self-report intentionally expecting the worst to buffer disappointment (Sweeny & Falkenstein, 2015), suggesting that there may be some element of goal-directed behavior. More broadly, we did not investigate mechanisms in these data, and establishing mechanism is an important next step. Our analyses controlled for the outcome, the importance of the event, and trait negativity, and supplemental analyses controlled for expectations about the event. Results did not differ with these variables included, suggesting that they are unlikely to be the primary mechanisms.

Third, we did not collect experience-sampling measurements of expectations. We ran supplemental analyses controlling for our lab measures of expectations in our models and found that this did not change results, but repeated measures of expectations could help us to understand whether expectations and anticipatory emotions exert different effects, or interact in meaningful ways. The lack of granular measurement of expectation means that we are unable to speak to whether there are benefits of bracing for the worst in terms of expectations, as in previous work (Sweeny et al., 2006): our findings only demonstrate that anticipatory negative *affect* is unlikely to be beneficial.

Finally, we did not examine the accuracy of anticipatory affect. Future research could investigate whether the costs of anticipatory negative affect depend on whether anticipatory affect accurately reflects experienced affect, bringing together this literature with work on affective forecasting—predictions about future feelings (e.g., Wilson & Gilbert, 2005).

6 | CONCLUSIONS

In two studies, we found that negative affect in anticipation of a stressor was either harmful for affective outcomes, or unassociated with affective outcomes: there was no evidence for affective benefits. Our findings suggest the folk wisdom that one should be ready for the worst may be bad advice, at least for one's affective health: anticipatory negative affect comes with the suffering of feeling worse in advance, without any affective benefits—and potential affective costs—upon receiving the outcome.

AUTHOR CONTRIBUTION

Elise K. Kalokerinos and Merijn Mestdagh conceptualized the project. Koen Rummens, Kristof Meers, and Elise K. Kalokerinos collected the data. Kristof Meers progammed and developed the software. Merijn Mestdagh analyzed the data. Elise K. Kalokerinos and Ella K. Moeck wrote the original draft, which was reviewed and edited by all authors.

ACKNOWLEDGEMENTS

The authors would like to thank Peter Koval for sharing the data used in Study 2. Open access publishing facilitated by The University of Melbourne, as part of the Wiley - The University of Melbourne agreement via the Council of Australian University Librarians.

ETHICS STATEMENT

Study 1 was approved by the KU Leuven Social and Societal Ethics Committee. Study 2 was approved by the University of Melbourne Ethics Committee.

ORCID

Elise K. Kalokerinos https://orcid.org/0000-0002-3282-6806
Kristof Meers https://orcid.org/0000-0002-9610-7712

ENDNOTES

[1] The choice to use time-points $t = -20$ and $t = 60$ to define the two baselines was driven mainly by length of the data collection, rather than by theory. We therefore discuss the robustness of our findings with regards to this choice in the Supporting Information.

[2] We also fitted a simple linear regression and a piecewise linear regression, but using cross-validation, we found that the exponential functions outperformed these linear functions.

[3] Reliability was low, but this is a known feature of the TIPI subscales, which are selected for domain coverage rather than internal consistency (Gosling et al., 2012). There were no substantive changes to results when neuroticism was not included as a control variable.

[4] Using cross-validation, we found that this exponential function outperformed a simple linear function.

[5] We also ran an additional set of analyses including expected task performance as a control variable and found no differences from the analyses reported.

[6] Using the median ±2.5 the median absolute deviation (Leys et al., 2013) we detected some outliers on centered affect in the

14676494, 2023, 5, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jopy.12787 by Ku Leuven, Wiley Online Library on [11/09/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

lab data. We re-ran our analyses without outliers and found no difference in conclusions.

REFERENCES

Barsics, C., Van der Linden, M., & D'Argembeau, A. (2016). Frequency, characteristics, and perceived functions of emotional future thinking in daily life. *Quarterly Journal of Experimental Psychology*, *69*(2), 217–233. https://doi.org/10.1080/17470218.2015.1051560

Bridgland, V. M. E., Green, D. M., Oulton, J. M., & Takarangi, M. K. T. (2019). Expecting the worst: Investigating the effects of trigger warnings on reactions to ambiguously themed photos. *Journal of Experimental Psychology: Applied*, *25*(4), 602–617. https://doi.org/10.1037/xap0000215

Carroll, P., Sweeny, K., & Shepperd, J. A. (2006). Forsaking optimism. *Review of General Psychology*, *10*(1), 56–73. https://doi.org/10.1037/1089-2680.10.1.56

Dejonckheere, E., Mestdagh, M., Verdonck, S., Lafit, G., Ceulemans, E., Bastian, B., & Kalokerinos, E. K. (2019). The relation between positive and negative affect becomes more negative in response to personally relevant events. *Emotion*, *21*, 326–336. https://doi.org/10.1037/emo0000697

Freeston, M. H., Rhéaume, J., Letarte, H., Dugas, M. J., & Ladouceur, R. (1994). Why do people worry? *Personality and Individual Differences*, *17*(6), 791–802. https://doi.org/10.1016/0191-8869(94)90048-5

Frijda, N. H. (2017). *The laws of emotion*. Psychology Press. https://doi.org/10.4324/9781315086071

Golub, S. A., Gilbert, D. T., & Wilson, T. D. (2009). Anticipating one's troubles: The costs and benefits of negative expectations. *Emotion*, *9*(2), 277–281. https://doi.org/10.1037/a0014716

Goodman, W. K., Janson, J., & Wolf, J. M. (2017). Meta-analytical assessment of the effects of protocol variations on cortisol responses to the Trier social stress test. *Psychoneuroendocrinology*, *80*, 26–35. https://doi.org/10.1016/j.psyneuen.2017.02.030

Gosling, S. D., Rentfrow, P. J., & Swann, W. B. (2012). A very brief measure of the big-five personality domains. *Journal of Research in Personality*, *37*(6), 504–528. https://doi.org/10.1016/S0092-6566(03)00046-1

Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology*, *2*(3), 271–299. https://doi.org/10.1037/1089-2680.2.3.271

Gross, J. J. (2015). Emotion regulation: Current status and future prospects. *Psychological Inquiry*, *26*(1), 1–26. https://doi.org/10.1080/1047840X.2014.940781

John, O. P., Donahue, E. M., & Kentle, R. L. (1991). Big five inventory (BFI) [Database record]. *APA PsycTests*. https://doi.org/10.1037/t07550-000

Kalokerinos, E. K., Erbas, Y., Ceulemans, E., & Kuppens, P. (2019). Differentiate to regulate: Low negative emotion differentiation is associated with ineffective use but not selection of emotion-regulation strategies. *Psychological Science*, *30*(6), 863–879. https://doi.org/10.1177/0956797619838763

Kalokerinos, E. K., Murphy, S. C., Koval, P., Bailen, N. H., Crombez, G., Hollenstein, T., Gleeson, J., Thompson, R. J., Van Ryckeghem, D. M. L., Kuppens, P., & Bastian, B. (2020). Neuroticism may not reflect emotional variability. *Proceedings of the National Academy of Sciences*, *117*(17), 9270–9276. https://doi.org/10.1073/pnas.1919934117

Kirschbaum, C., Pirke, K.-M., & Hellhammer, D. H. (1993). The 'Trier social stress test'—A tool for investigating psychobiological stress responses in a laboratory setting. *Neuropsychobiology*, *28*(1–2), 76–81. https://doi.org/10.1159/000119004

Koval, P., Burnett, P. T., & Zheng, Y. (2021). Emotional inertia: On the conservation of emotional momentum. In C. E. Waugh & P. Kuppens (Eds.), *Affect dynamics* (pp. 63–94). Springer International Publishing. https://doi.org/10.1007/978-3-030-82965-0_4

Koval, P., & Kuppens, P. (2012). Changing emotion dynamics: Individual differences in the effect of anticipatory social stress on emotional inertia. *Emotion*, *12*(2), 256–267. https://doi.org/10.1037/a0024756

Kudielka, B. M., Hellhammer, D. H., & Kirschbaum, C. (2007). Ten years of research with the Trier social stress test—Revisited. In *Social neuroscience: Integrating biological and psychological explanations of social behavior* (pp. 56–83). The Guilford Press.

Kuppens, P., Allen, N. B., & Sheeber, L. B. (2010). Emotional inertia and psychological maladjustment. *Psychological Science*, *21*(7), 984–991. https://doi.org/10.1177/0956797610372634

Leys, C., Ley, C., Klein, O., Bernard, P., & Licata, L. (2013). Detecting outliers: Do not use standard deviation around the mean, use absolute deviation around the median. *Journal of Experimental Social Psychology*, *49*(4), 764–766. https://doi.org/10.1016/j.jesp.2013.03.013

Llera, S. J., & Newman, M. G. (2010). Effects of worry on physiological and subjective reactivity to emotional stimuli in generalized anxiety disorder and nonanxious control participants. *Emotion*, *10*, 640–650. https://doi.org/10.1037/a0019351

Loossens, T., Tuerlinckx, F., & Verdonck, S. (2021). A comparison of continuous and discrete time modeling of affective processes in terms of predictive accuracy. *Scientific Reports*, *11*(1), 6218. https://doi.org/10.1038/s41598-021-85320-4

McLaughlin, K. A., Borkovec, T. D., & Sibrava, N. J. (2007). The effects of worry and rumination on affect states and cognitive activity. *Behavior Therapy*, *38*(1), 23–38. https://doi.org/10.1016/j.beth.2006.03.003

Meers, K., Dejonckheere, E., Kalokerinos, E. K., Rummens, K., & Kuppens, P. (2020). MobileQ: A free user-friendly application for collecting experience sampling data. *Behavior Research Methods*, *52*, 1510–1515. https://doi.org/10.3758/s13428-019-01330-1

Neubauer, A. B., Smyth, J. M., & Sliwinski, M. J. (2018). When you see it coming: Stressor anticipation modulates stress effects on negative affect. *Emotion*, *18*(3), 342–354. https://doi.org/10.1037/emo0000381

Newman, M. G., Jacobson, N. C., Zainal, N. H., Shin, K. E., Szkodny, L. E., & Sliwinski, M. J. (2019). The effects of worry in daily life: An ecological momentary assessment study supporting the tenets of the contrast avoidance model. *Clinical Psychological Science*, *7*(4), 794–810. https://doi.org/10.1177/2167702619827019

Newman, M. G., & Llera, S. J. (2011). A novel theory of experiential avoidance in generalized anxiety disorder: A review and synthesis of research supporting a contrast avoidance model of worry. *Clinical Psychology Review*, *31*(3), 371–382. https://doi.org/10.1016/j.cpr.2011.01.008

14676494, 2023, 5, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jopy.12787 by Ku Leuven, Wiley Online Library on [11/09/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational Psychology Review*, *18*(4), 315–341. https://doi.org/10.1007/s10648-006-9029-9

Piazza, J. R., Charles, S. T., Sliwinski, M. J., Mogle, J., & Almeida, D. M. (2013). Affective reactivity to daily stressors and long-term risk of reporting a chronic physical health condition. *Annals of Behavioral Medicine*, *45*(1), 110–120. https://doi.org/10.1007/s12160-012-9423-0

Russell, J. A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology*, *39*(6), 1161–1178. https://doi.org/10.1037/h0077714

Sanson, M., Strange, D., & Garry, M. (2019). Trigger warnings are trivially helpful at reducing negative affect, intrusive thoughts, and avoidance. *Clinical Psychological Science*, *7*(4), 778–793. https://doi.org/10.1177/2167702619827018

Smith, C. A., & Ellsworth, P. C. (1987). Patterns of appraisal and emotion related to taking an exam. *Journal of Personality and Social Psychology*, *52*(3), 475–488. https://doi.org/10.1037/0022-3514.52.3.475

Steegen, S., Tuerlinckx, F., Gelman, A., & Vanpaemel, W. (2016). Increasing transparency through a multiverse analysis. *Perspectives on Psychological Science*, *11*(5), 702–712. https://doi.org/10.1177/1745691616658637

Sweeny, K., Carroll, P. J., & Shepperd, J. A. (2006). Is optimism always best? Future outlooks and preparedness. *Current Directions in Psychological Science*, *15*(6), 302–306. https://doi.org/10.1111/j.1467-8721.2006.00457.x

Sweeny, K., & Cavanaugh, A. G. (2012). Waiting is the hardest part: A model of uncertainty navigation in the context of health news. *Health Psychology Review*, *6*(2), 147–164. https://doi.org/10.1080/17437199.2010.520112

Sweeny, K., & Falkenstein, A. (2015). Is waiting the hardest part? Comparing the emotional experiences of awaiting and receiving bad news. *Personality and Social Psychology Bulletin*, *41*(11), 1551–1559. https://doi.org/10.1177/0146167215601407

Sweeny, K., & Krizan, Z. (2013). Sobering up: A quantitative review of temporal declines in expectations. *Psychological Bulletin*, *139*(3), 702–724. https://doi.org/10.1037/a0029951

Sweeny, K., Reynolds, C. A., Falkenstein, A., Andrews, S. E., & Dooley, M. D. (2016). Two definitions of waiting well. *Emotion*, *16*(1), 129–143. https://doi.org/10.1037/emo0000117

Sweeny, K., & Shepperd, J. A. (2010). The costs of optimism and the benefits of pessimism. *Emotion*, *10*(5), 750–753. https://doi.org/10.1037/a0019016

van Dijk, W. W., Zeelenberg, M., & van der Pligt, J. (2003). Blessed are those who expect nothing: Lowering expectations as a way of avoiding disappointment. *Journal of Economic Psychology*, *24*(4), 505–516. https://doi.org/10.1016/S0167-4870(02)00211-8

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*(6), 1063–1070. https://doi.org/10.1037/0022-3514.54.6.1063

Wilson, T. D., & Gilbert, D. T. (2005). Affective forecasting: Knowing what to want. *Current Directions in Psychological Science*, *14*(3), 131–134. https://doi.org/10.1111/j.0963-7214.2005.00355.x

Wilson, T. D., Lisle, D. J., Kraft, D., & Wetzel, C. G. (1989). Preferences as expectation-driven inferences: Effects of affective expectations on affective experience. *Journal of Personality and Social Psychology*, *56*(4), 519–530. https://doi.org/10.1037/0022-3514.56.4.519

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Kalokerinos, E. K., Moeck, E. K., Rummens, K., Meers, K., & Mestdagh, M. (2023). Ready for the worst? Negative affect in anticipation of a stressor does not protect against affective reactivity. *Journal of Personality*, *91*, 1123–1139. https://doi.org/10.1111/jopy.12787

14676494, 2023, 5, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jopy.12787 by Ku Leuven, Wiley Online Library on [11/09/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License