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RESEARCH ARTICLE OPEN ACCESS

# Depressive Symptoms and Cognitions of Foreseeability and Inevitability of Personal Events During the Covid-19 Pandemic

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## ABSTRACT

Cognitions, such as foreseeability (“I didn’t see it coming”) and inevitability (“It was bound to happen”) can regulate emotions regarding personal events. In previous research, hypothetical negative past events (i.e., with known outcomes) were rated as more foreseeable and more inevitable with higher levels of depressive symptoms. To investigate whether these findings extend to real-life autobiographical events and to imagined future personal events, we conducted an online survey during the initial wave of the Covid-19 pandemic. We assessed depressive symptoms and foreseeability and inevitability cognitions for pandemic-related events that participants had experienced (i.e., past events) and personal events that participants expected to experience (i.e., future events). For future events, depressive symptoms were associated with both affect-regulatory cognitions in alignment with theories of depression. For past events, there were no associations with depressive symptoms.

## 1 | Introduction

Affect-regulatory cognitions are one way to cope with stressful life events. Cognitions about autobiographical events show a positivity bias that is associated with mental well-being (Marsh et al. 2019; Sharot et al. 2007; Weinstein 1980). With heightened levels of depressive symptoms, affect regulation is often disturbed (Garnefski and Kraaij 2006; Teasdale 1988; Werner-Seidler et al. 2013). Two powerful cognitions supporting affect regulation are *foreseeability* and *inevitability*. Specifically, viewing negative events as being less foreseeable (“I did not see it coming, so I cannot be blamed.”) and more inevitable (“It was bound to happen, so there is nothing I could do about it.”) can help to regulate affect (Blank and Peters 2010; Pezzo and Pezzo 2007). Despite their importance, research investigating the relationship between these cognitions and mental well-being is scarce and limited to hypothetical past events (Groß et al. 2017). While cognitive theories of depression (e.g., Cognitive Triad; Beck 1967, 1987) propose that the association

between these affect-regulatory cognitions and depressive symptoms also exists in future thinking and for real-life events, direct empirical evidence is lacking. In the study reported here, we sought to close these gaps by assessing people’s foreseeability and inevitability cognitions about autobiographical past and expected future personal events during the initial wave of the Covid-19 pandemic and by investigating how these two cognitions were related to mental well-being.

### 1.1 | The Role of Cognitions in Affect Regulation

Cognitive theories of affect assume a close interplay between cognitions and affect. They postulate that cognitive processes such as changing the interpretation of an event (cognitive reappraisal, Lazarus and Folkman 1984) play a pivotal role in affect regulation. Cognitive strategies such as reappraisal have been shown to modulate emotional responses by reducing negative affect and increasing positive affect following stressful, negative

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events (Gross 1998; Keng et al. 2013; McRae et al. 2012). People generally lean toward a positivity bias in their cognitions when recalling personal experiences or imagining future events (Marsh et al. 2019; Mezulis et al. 2004; Sharot et al. 2007; Weinstein 1980). This positivity bias is thought to have an adaptive function, aiding in emotional well-being (Gower et al. 2023; Taylor and Brown 1988). For example, on the one hand, recalling positive events or envisioning positive future scenarios can effectively uplift one's mood and thus enhance mental well-being (Joormann and Siemer 2004; McFarland and Buehler 1998; Schweizer et al. 1999). On the other hand, negative cognitive styles are associated with a higher probability of encountering a depressive episode (Robinson and Alloy 2003). Thus, cognitions are important for mental health by supporting affect regulation.

## 1.2 | Foreseeability and Inevitability and Their Roles in Affect Regulation

Two specific cognitions, foreseeability and inevitability, directly influence affect regulation (Blank and Peters 2010; for a review, see Groß et al. 2017). Foreseeability pertains to the impression that one knows all along how an event will turn out (Blank et al. 2008). Thus, it includes beliefs about one's own knowledge and ability (Roese and Vohs 2012). Inevitability refers to the impression that the outcome of an event was predetermined (Blank et al. 2008). It includes beliefs about the objective state of the world (Roese and Vohs 2012). Both these cognitions can refer to events that already happened (hereafter referred to as *past events*) or to events predicted to happen in the future (hereafter referred to as *future events*). Typically, past events, with known outcomes, are rated as more foreseeable and more inevitable than future events, which have unknown outcomes (Fischhoff 1975, 1979; Nestler and von Collani 2008).

Importantly, foreseeability and inevitability cognitions depend on the valence of the event in question. Numerous studies found reduced foreseeability cognitions after negative outcomes, but not after positive outcomes (Blank and Nestler 2006; Groß et al. 2017; Louie 1999; Mark and Mellor 1991; Pezzo and Beckstead 2008). Denying that one was able to foresee a negative, self-relevant outcome, a strategy termed *defensive processing* (Pezzo and Pezzo 2007), is associated with reduced self-blame and is particularly functional in highly controllable situations, that is, when one's own decisions led to the event outcome (Blank and Peters 2010). By contrast, in uncontrollable situations, there is no personal responsibility, and a denial of foreseeability would, therefore, offer little functional value (Mark et al. 2003).

Concerning inevitability, studies have shown increased inevitability cognitions after negative events only (Blank and Nestler 2006; Blank and Peters 2010; Tykocinski 2001). Depending on the situation, this may reflect a dysfunctional or functional cognitive style: for past events, in which individuals had relatively high control over the outcome, increased inevitability may be considered dysfunctional as it impedes learning from mistakes. In this case, individuals fail to recognize the role of their own (suboptimal) choices in producing the negative outcome (Tykocinski and Steinberg 2005). However, when individuals had little control over a negative outcome of a past event,

viewing that event as predetermined, a strategy termed *retroactive pessimism* (Tykocinski 2001) helps mitigate disappointment (Blank et al. 2008; Blank and Peters 2010). Thus, in this case, increased inevitability may be considered functional.

Thus, depending on the event's controllability, altering perceptions of foreseeability and inevitability can help reduce self-blame and disappointment when facing a past negative event thereby mitigating the intensity of the negative emotional experience. Thus, both cognitions play a pivotal role in affect regulation. Whereas healthy individuals commonly employ these cognitions in a functional way, very little is known about these two cognitions in individuals who face difficulties in affect regulation. Such difficulties occur, for instance, in internalizing disorders such as depression (Garnefski and Kraaij 2006; Teasdale 1988; Werner-Seidler et al. 2013).

## 1.3 | Affect Regulation and Cognition in Depression

Theories of depression and empirical findings support the notion that individuals displaying depressive symptoms show dysfunctional patterns in cognitions needed for affect regulation. According to cognitive theories of depression, key characteristics of the condition are helplessness (e.g., learned helplessness theory, Abramson et al. 1978) and negative beliefs about oneself, the world, and the future (Cognitive Triad, Beck 1987). More so, these theories postulate that negative cognitive biases are the mechanism underlying the problems with affect regulation commonly found in individuals with depressive symptoms (Joormann and Siemer 2011).

Empirical findings corroborate these theories by demonstrating a negativity bias in cognitions related to both past and future events in individuals experiencing depression. For example, they estimated the likelihood of future negative events to be higher compared to non-depressed controls (Andersen 1990; Andersen et al. 1992; MacLeod and Byrne 1996; MacLeod and Cropley 1995). They were also more certain about the non-occurrence of positive events in the future than were non-depressed controls (Miranda and Mennin 2007). Regarding past events, a similar valence-dependent pattern was observed. Individuals with elevated levels of depressive symptoms recalled more negative and fewer positive autobiographical events (Anderson and Evans 2015; Clark and Teasdale 1982). Moreover, the fading affect bias, wherein the emotional impact of negative events tends to diminish over time, is less pronounced in individuals with depressive symptoms (Walker et al. 2003).

Thus, theories of depression and these empirical findings suggest an interplay of the important affect-regulatory cognitions of foreseeability and inevitability with depressive symptoms. Such interplay, however, remains largely unexplored.

## 1.4 | Foreseeability and Inevitability Cognitions in Depression

Groß et al. (2017) conducted the first published study of the interplay between foreseeability and inevitability and

depressive symptoms. In their study, participants listened to descriptions of somewhat controllable hypothetical events (i.e., they had been rated as neither absolutely controllable nor absolutely uncontrollable), with either a positive outcome (e.g., a hotel room turned out to be better than expected) or a negative outcome (e.g., the hotel room turned out to be worse than expected). Subsequently, participants rated the foreseeability and the inevitability of the outcome. For negative events, there was a positive association between both types of cognitions and depressive symptoms. Specifically, with increasing levels of depressive symptoms, participants rated negative past events as more foreseeable, suggesting reduced defensive processing. Further, they also rated these events as more inevitable. Whereas rating a negative event outcome as inevitable is a suitable approach for uncontrollable events, it is rather dysfunctional for (somewhat) controllable negative event outcomes. Groß et al. (2017), therefore, interpreted their findings in terms of heightened helplessness. Thus, participants with higher levels of depressive symptoms exhibited cognitive patterns that may reflect dysfunctional processing of negative past events. Notably, there was no such association for positive events. Groß et al.'s (2017) study marked the pioneering attempt to determine the relationship of foreseeability and inevitability cognitions with depressive symptoms. However, this study had limitations. Firstly, Groß et al. (2017) exclusively investigated the associations for past events, and not for future events. Theoretical accounts of depression clearly suggest that, due to their affect-regulatory functions, both foreseeability and inevitability of imagined future events should be related to levels of depressive symptoms. However, empirical evidence of this connection is currently lacking. A second limitation of Groß et al.'s study is one of ecological validity: Participants were presented with hypothetical scenarios constructed by the researchers and not drawn from the participants' autobiographical experiences. Given the pivotal roles that foreseeability and inevitability are thought to play in affect regulation in real life and the difficulties of people with depressive symptoms in affect regulation, it is imperative to extend this research to future events and to genuine autobiographical experiences.

### 1.5 | The Current Study

The primary aim of this study was to investigate the relationship between depressive symptoms and the cognitions of foreseeability and inevitability when recalling past autobiographical events and imagining future personal events. Based on the study by Groß et al. (2017), we predicted dysfunctional patterns in foreseeability and inevitability cognitions in individuals with heightened depressive symptoms. Specifically, they should regard negative events as more foreseeable (indicating less defensive processing). With respect to inevitability, the picture may be more complex: while increased impressions of inevitability were associated with depressive symptoms (Groß et al. 2017) for controllable negative events (indicating greater helplessness), deviations from this pattern may be possible for real-life events, which vary in controllability. As cognitive theories of depression predict dysfunctional cognitions when recalling the past and when imagining the future (e.g., Cognitive Triad, Beck 1987), we expected to find similar patterns for past and future events.

To test these hypotheses, we conducted an online study during the first lockdown period of the Covid-19 pandemic in Germany. The Covid-19 pandemic had detrimental effects on mental well-being, leading to a surge in depressive symptoms among the populace (Hajek et al. 2022; Mazza et al. 2020; Santomauro et al. 2021). This unique backdrop allowed us to draw participants from the general population while capturing a wide variability in levels of depressive symptoms. The Covid-19 pandemic led to many emotionally intense events (e.g., disruptions in daily life due to social isolation policies), thereby creating a heightened need for affect regulation. Thus, we seized this unprecedented opportunity to investigate how individuals use affect-regulatory cognitions amidst real-world challenges.

In our study, participants were prompted to think of both positive and negative autobiographical events that had happened during the pandemic (e.g., losing a loved one to Covid-19). Also, participants were asked to think of both positive and negative future personal events that participants thought might occur to them because of the pandemic (e.g., starting a new hobby because of increased free time). Participants rated the foreseeability and inevitability of each event. We also assessed their level of depressive symptoms aiming to unravel the interplay between affect-regulatory cognitions and mental health in the context of the pandemic.

## 2 | Methods

### 2.1 | Participants

The study was approved by the local ethics committee. It was part of a larger online survey (Niziurski and Schaper 2023) for which participants were recruited via social media postings. To be included in the study, participants had to be at least 18 years old and live in Germany. Data collection took place between April 20th 2020 and May 4th 2020. We restricted the time frame for participation to ensure similar Covid-19 regulations for all participants during data collection (e.g., closed restaurants, no meetings of more than two people, work-from-home orders, distance learning). Overall, 682 participants met the inclusion criteria. One participant was excluded because they gave identical answers to all questions. Participants were between 18 and 70 years old ( $M = 29.59$ ,  $SD = 11.82$ ; 23 non-responders) and consisted of 499 women, 172 men, and 2 non-binary participants (8 non-responders). A sensitivity power analysis using G\*Power (Faul et al. 2007) showed that it is possible to detect a correlation of size  $\rho = 0.14$  (small effect; cf. Cohen 1988) given the sample size of  $N = 681$ ,  $\alpha = 0.05$ , and  $\beta = 0.05$ . As an incentive to participate, we donated 3€ per participant to the German Red Cross. Students of psychology from Heinrich Heine University Düsseldorf could choose to receive course credit instead.

### 2.2 | Design

With regards to the personal events to be generated by the participants, we used a 2 (valence: positive vs. negative)  $\times$  2 (time period: past vs. future) repeated-measures design. Level of depressive symptoms, foreseeability ratings, and inevitability ratings were measured continuous variables.

## 2.3 | Procedure and Measures

The online survey consisted of a series of questionnaires that all participants completed in fixed order at their own pace. Participants first selected the language of the survey (German or English) and indicated their country of residence before providing informed consent. A total of 655 participants completed the study in German and 26 completed the study in English. Questionnaires that were not available in both languages were translated and back-translated by two independent translators.

First, participants completed a personality questionnaire not relevant for the current purpose (the Mini-IPIP, Donnellan et al. 2006; German version by Streib and Wiedmaier 2001).

Next, participants completed the short-form version of the Depression Anxiety Stress Scale (DASS-21, Lovibond and Lovibond 1995; German version by Nilges and Essau 2015). The DASS-21 consists of a total of 21 items, 7 on each of three subscales assessing current levels of depression, anxiety, and stress. Participants rated how much each item (e.g., “I felt that life was meaningless”) applied to them over the past week on a 4-point Likert scale ranging from 0 (*did not apply to me at all—NEVER*) to 3 (*applied to me very much, or most of the time—ALMOST ALWAYS*). For the current purpose, we used the data from the depression subscale. We calculated the depression score by adding up the scores from the seven items of the depression subscale and multiplying the resulting value by two (cf., Lovibond and Lovibond 1995). Scores can range between 0 (normal) and 42 (extremely severe).

Thereafter, participants completed two other questionnaires that are not relevant for the current purpose: the World Assumptions Questionnaire (WAQ; Kaler 2009) and Changes in Everyday Life (Jakobsen and del Palacio-Gonzalez 2018).

Next, there was an attention check embedded in the questionnaire format. Participants viewed an additional item instructing them to click on the answer on the far right. Failing the attention check resulted in termination of the survey without recording of any data for this participant.

Participants then completed a series of four questionnaires about past autobiographical and imagined future events related to the pandemic. There was one questionnaire for each cell of the 2 (valence) × 2 (time period) design. Participants completed the four questionnaires in the following fixed order: negative past event, negative future event, positive past event, positive future event. Thus, the questionnaires ended with a positive outlook to reduce the possibility of evoking negative mood toward the end of the study. At the beginning of each questionnaire, participants were informed about the type of event (e.g., past negative). For past events, participants received the following instruction: “Please think of the most [positive/negative] event that has happened in your life because of the Covid-19 pandemic.” For the future events, the instruction read: “Please think about your future. Think of a [positive/negative] event that may occur in your future because of the COVID-19 pandemic.” Participants were encouraged to write down a description of this event, but were not obliged to do so due to ethical reasons. They were asked to constantly think of this event

while completing the respective questionnaire. The next 17 questions were not relevant for the current purpose and consisted of the Autobiographical Memory Questionnaire (AMQ; Rubin et al. 2003; reported in Niziurski and Schaper 2023). After the AMQ, participants answered the three foreseeability items followed by the two inevitability items, in fixed order (as listed in Table 1; the German version is in the OSF <https://osf.io/8cwq2>; Supporting Information A—German Items). These items were adapted from previous studies of foreseeability and inevitability (Blank and Peters 2010; Groß and Bayen 2022; Groß et al. 2017). Participants rated their agreement with each statement on a 7-point Likert scale ranging from 1 (*do not agree at all*) to 7 (*totally agree*). After the last inevitability item, the questionnaire for the next event type started.

After completing the questionnaire for the final event type (i.e., positive future), participants answered a demographic questionnaire. Finally, participants were debriefed and chose their compensation (donation or course credit). On average, participants completed the study in 35–40 min.

**TABLE 1** | Items of foreseeability and inevitability.

Foreseeability	
Item 1	I knew all along that the event would happen. (past) I know if the event will happen. (future)
Item 2 (reverse coded)	It was difficult for me to predict that this event would happen. (past) It is difficult for me to predict if this event will happen. (future)
Item 3	I had a clear idea that the event would happen. (past) I have a clear idea of whether or not the event will happen. (future)
Inevitability	
Item 1	Under the given circumstances, it was completely determined that the event would happen. (past) Under the given circumstances, it is completely determined whether the event will happen or not. (future)
Item 2 (reverse coded)	Because of the many factors, that can influence the event, it was open that the event would happen. (past) Because of the many factors, that can influence the event, it is still open whether or not the event will happen. (future)

*Note:* English version of the foreseeability and inevitability items. Items were adapted from previous studies (Blank and Peters 2010; Groß and Bayen 2022; Groß et al. 2017). The German version is available in the Supporting Information A—German Items on OSF (<https://osf.io/8cwq2>). Participants rated their agreement with each statement on a Likert scale from 1 (*do not agree at all*) to 7 (*totally agree*).

### 3 | Results

The data, analysis code, and complete statistics for the multi-level analyses are available in the Open Science Framework (<https://osf.io/8cwq2>). We set  $\alpha=0.05$  for all analyses. We first present the results separately for the depressive symptoms, past and future events, and the foreseeability and inevitability cognitions. Subsequently, we analyze the interplay between depressive symptoms and foreseeability and inevitability cognitions.

#### 3.1 | Depressive Symptoms

Lovibond and Lovibond (1995) recommended the following cut-off scores for the severity of depressive symptoms as measured with the depression subscale of the DASS-21: 0–9 (normal), 10–13 (mild), 14–20 (moderate), 21–27 (severe), > 28 (extremely severe). In the current sample, scores covered the full possible range from 0 to 42. In our sample, 386 participants had normal levels of depressive symptoms, 87 mild depressive symptoms, 119 moderate depressive symptoms, 39 severe depressive symptoms, and 50 extremely severe symptoms. On average, participants had mild

depressive symptoms ( $M=10.20$ ,  $SD=9.05$ ,  $IQR=12.00$ ). We compared this mean depression score with the mean score from a pre-pandemic study by Bibi et al. (2020;  $M=5.39$ ,  $SD=5.10$ ) who also administered the DASS-21 to a German sample. An independent-sample  $t$ -test showed higher levels of depressive symptoms in our sample compared to the pre-pandemic sample,  $t(2002)=15.20$ ,  $p<0.001$ ,  $d=0.72$ . Note, though, that participants were not randomly assigned to these two studies and, thus, causal interpretations need to be made cautiously.

#### 3.2 | Past and Future Events

Overall, 473 participants provided at least one event description. Of these, 196 participants provided all four descriptions, 108 provided three, 88 provided two, and 81 provided one description. All event descriptions were coded based on their content. Two independent research assistants created 10 categories for each event valence (see Table 2). Two new independent research assistants coded all event descriptions based on these categories. The initial interrater agreement was Cohen's  $\kappa=0.88$ . Disagreements were solved by a third rater. The category frequencies are presented in

**TABLE 2** | Frequencies and contents of event descriptions.

Valence of event	Content of description	Time	
		Past	Future
Negative	Social isolation/loneliness (self or others)	114	27
	Sickness/death of others/self	75	171
	Canceled plans/events	49	24
	Economic loss/job loss	42	71
	Conflict in relationships	42	6
	Academic/education hardships	40	52
	Canceled activities	19	5
	Other daily life hassles	18	5
	Other negative event	11	17
	Event description was not negative	7	2
	Total	417 (61.20%)	380 (55.80%)
Positive	Improved relationships	133	45
	Improved work/life balance	84	40
	Positive changes for society	31	36
	Economic/job improvement	23	41
	Academic/education improvements	18	33
	Other positive event	17	14
	Event description was not positive	6	12
	Able to attend events/travel	3	13
	Positive changes for environment	3	10
	Cure/vaccine	0	6
	Total	318 (46.70%)	250 (36.71%)

Note: For ethical reasons, it was not mandatory for participants to provide a description of events. The maximum possible number of descriptions per event type is 681.

Table 2. Events with descriptions that did not comply with instructions (i.e., were not negative or positive according to instructions for the respective event type) were excluded from further analyses.

### 3.3 | Foreseeability and Inevitability Cognitions

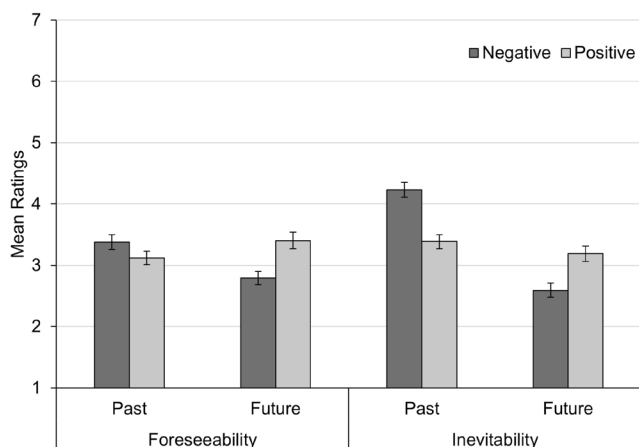
We calculated composite foreseeability and inevitability scores for each event type and each participant by averaging the ratings for the three items of foreseeability and the two items of inevitability, respectively. Mean Cronbach's  $\alpha$  was =0.77 for foreseeability and 0.64 for inevitability (averaged over all event types). Figure 1 shows descriptive statistics for these scores as a function of valence and time.

### 3.4 | Effects of Valence, Time and Depressive Symptoms on Foreseeability and Inevitability

To test the association between foreseeability and inevitability on the one hand and depressive symptoms on the other hand, we ran multilevel regression models using R (R Core Team 2021). Multilevel modeling is a suitable approach for the nested data structure of our research design, namely, multiple data points at the event level (i.e., two data points each for valence and time, barring missing values) nested within participants. This approach allowed us to test for cross-level interactions, namely, valence and time at the event level, and depressive symptoms assessed at the participant level (cf. Bryk and Raudenbush 1992). Further, the approach can account for missing data points (Snijders and Bosker 1999). We analyzed the data using the R packages *lme4* (Bates et al. 2015), *lmerTest* (Kuznetsova et al. 2017), and *MLMUsingR* (Huang 2024).

#### 3.4.1 | Foreseeability

We tested the relationship between foreseeability with event valence, time, and depressive symptoms. Previous research has established a link between elevated levels of depressive symptoms



**FIGURE 1** | Mean foreseeability and inevitability ratings as a function of valence and time. Mean ratings of foreseeability and inevitability for negative and positive past and future events. Error bars represent 95% confidence intervals. Number of observations: 674 past negative, 665 past positive, 677 future negative, 665 future positive.

and dysfunctional cognitive patterns that indicate difficulties in emotion regulation. Therefore, we expected to find a parallel pattern in foreseeability cognition. Specifically, we hypothesized that with increasing depressive symptoms, participants would show reduced defensive processing, reflected in higher ratings of negative events as more foreseeable. Building on earlier findings involving past hypothetical events (Groß et al. 2017), we aimed to extend these results to real-life autobiographical events. Based on cognitive theories of depression (Cognitive Triad by Beck 1987), we predicted that these relationships would be evident not only in past events but also in future-oriented thinking.

To test these hypotheses, we conducted a regression model with foreseeability ratings as the dependent variable. We entered valence (dummy coded as negative = 0, positive = 1, and subsequently centered to the participant mean), time (dummy coded as past = 0, future = 1, and subsequently centered to the participant mean), level of depressive symptoms (centered to the grand mean), and all interactions as predictors. Centering valence and time at the event level to the participant mean is recommended when cross-level interactions (e.g., the interaction between valence at the event level and depressive symptoms at the participant level) are of substantial interest and to prevent issues arising due to multicollinearity (Enders and Tofghi 2007).<sup>1</sup> Fixed effects included all main effects and interactions. To account for individual differences, we included a random intercept for each participant, allowing the baseline levels of foreseeability to vary across individuals.<sup>2</sup> The unstandardized regression weights for the full model are presented in Table 3 (for complete inference statistics, see Supporting Information B—Complete Statistics; Table S1; <https://osf.io/8cwq2>). The intercept indicates the expected rating of foreseeability when all predictors are equal to zero. A positive slope for valence indicates that positive events are rated as more foreseeable, whereas a negative slope indicates that positive events are rated as less foreseeable. A positive slope for time indicates that future events are rated as more foreseeable, whereas a negative slope indicates that future events are rated as less foreseeable.

In the full model, we found significant main effects of valence and time. However, these main effects were qualified by significant two-way interactions of time  $\times$  valence and of depressive symptoms  $\times$  valence. To determine how patterns of results differed for past versus future events, we performed separate analyses for past and future events. In both models, we entered valence, level of depressive symptoms, and their interaction as predictors. Results are also displayed in Table 3 (for complete inference statistics, see Supporting Information B—Complete Statistics; Table S2; <https://osf.io/8cwq2>).

**3.4.1.1 | Past Events.** Regarding past events, there was a significant main effect of valence. As indicated by the negative regression weight for valence (see Table 3), negative events received higher foreseeability ratings compared to positive events. Contrary to our hypotheses, there was no main effect of depressive symptoms and no interaction. Thus, depressive symptoms were not associated with foreseeability cognitions related to past events. Hence, the positive association between foreseeability and depressive symptoms found by Groß et al. (2017) for hypothetical negative events did not generalize to real-life experiences.

**3.4.1.2 | Future Events.** For future events, there was also a main effect of valence, and no main effect of depressive symptoms. Critically, we found a significant valence  $\times$  depressive symptoms interaction indicating that the effect of depressive symptoms depended on the valence of the event. To follow up on this interaction, we conducted separate simple regression analyses for negative and positive future events, using depressive symptoms as predictor (see Table 4). For negative future events, there was a marginally non-significant trend toward higher foreseeability ratings with increasing levels of depressive symptoms. For positive events, the association was significant—participants with higher levels of depressive symptoms rated positive future events as less foreseeable. Thus, participants with elevated depressive symptoms exhibited a less optimistic outlook toward the future, in alignment with Beck's Cognitive Triad (1987).

### 3.4.2 | Inevitability

We also conducted the analyses with inevitability scores as the criterion. Similar to the foreseeability cognition, we expected to observe dysfunctional patterns in the inevitability cognition for negative events (indicative of greater helplessness) with rising levels of depressive symptoms, encompassing both past and future events. That is, negative events were expected to be rated as more inevitable with heightened depressive symptoms. We ran a regression model with inevitability ratings as the dependent variable, utilizing the same predictor setup as in the analyses of foreseeability. Results are presented in Table 3. Again, main effects were qualified by interactions. Most notably, we found a significant three-way interaction of valence  $\times$  time  $\times$  depressive symptoms. Therefore, we again ran separate analyses for

**TABLE 3** | Effects of valence, time, and depressive symptoms on foreseeability and inevitability.

Criterion	Predictor	Full model	Time	
			Past	Future
Foreseeability	Intercept	3.17*	3.25*	3.09*
	Valence	0.18*	-0.25*	0.62*
	Time	-0.16*		
	Depressive symptoms	-0.00	0.00	-0.00
	Valence $\times$ Time	0.87*		
	Depressive symptoms $\times$ Time	-0.00		
	Depressive symptoms $\times$ Valence	-0.02*	-0.01	-0.03*
	Depressive symptoms $\times$ Valence $\times$ Time	-0.02		
Inevitability	Intercept	3.35*	3.81*	2.89*
	Valence	-0.12*	-0.84*	0.60*
	Time	-0.92*		
	Depressive symptoms	-0.00	-0.00	-0.00
	Valence $\times$ Time	1.43*		
	Depressive symptoms $\times$ Time	0.00		
	Depressive symptoms $\times$ Valence	-0.02*	0.00	-0.03*
	Depressive symptoms $\times$ Valence $\times$ Time	-0.03*		

Note: Estimates are the unstandardized regression weights of the multilevel analyses. Depressive symptoms were measured with the DASS-21 (Lovibond and Lovibond 1995). Depressive symptoms were centered to the grand mean. Valence (0 = negative, 1 = positive) and time (0 = past, 1 = future) were centered to the participant mean. Full statistics are available in the Supporting Information B—Complete Statistics; <https://osf.io/8cwq2>.  
\* $p < 0.05$ .

**TABLE 4** | Results in follow-up simple regression analyses with depressive symptoms as predictor.

Criterion	Event type	$\beta$	$R^2$	df	$t$	$p$
Foreseeability	Future negative	0.01	0.01	1, 675	1.94	0.052
	Future positive	-0.02	0.01	1, 663	2.38	0.017*
Inevitability	Future negative	0.01	0.01	1, 675	2.29	0.022*
	Future positive	-0.02	0.01	1, 663	2.56	0.011*

Note: Follow-up analyses were conducted for future events only as multilevel modeling found significant interactions of valence  $\times$  depressive symptoms for future events only.  
\* $p < 0.05$ .

past and future events (for complete inference statistics, see [Supporting Information B—Complete Statistics, Tables S1 and S2; https://osf.io/8cwq2](#)).

**3.4.2.1 | Past Events.** In the analyses of inevitability cognitions regarding past events, a parallel pattern of results emerged as observed in the foreseeability cognitions. Negative events garnered higher inevitability ratings than positive events. There were no main effects of depressive symptoms and no interaction. Hence, depressive symptoms were not associated with inevitability cognitions regarding past events. Thus, the findings reported by Groß et al. (2017) regarding inevitability cognitions about hypothetical past events did not generalize to real-life past events.

**3.4.2.2 | Future Events.** Turning to future events, there was a main effect of valence, but no main effect of depressive symptoms. Importantly, there was an interaction of valence  $\times$  depressive symptoms. To follow up on this interaction, we conducted separate regression analyses for negative and positive future events with depressive symptoms as predictor (refer to Table 4 for statistics). With increasing levels of depressive symptoms, negative future events were rated as more inevitable, whereas positive future events were rated as less inevitable. Thus, with increasing levels of depressive symptoms, participants demonstrated greater levels of helplessness toward possible future negative personal events.

## 4 | Discussion

Viewing negative events as being less foreseeable (defensive processing; Blank and Peters 2010; Mark et al. 2003) and more inevitable (retroactive pessimism; Tykocinski 2001) are potentially powerful tools in helping to regulate emotions. In people with depressive symptoms, however, emotion regulation is impaired (Liu and Thompson 2017). Little is known about the interplay of the foreseeability and inevitability cognitions with depressive symptoms. A previous study by Groß et al. (2017) reported associations between these cognitions and depressive symptoms for past hypothetical events. In the present study, we investigated whether these associations also exist for real-life personal events and imagined future personal events. To this end, we had participants rate the foreseeability and inevitability of events they had experienced during the initial phase of the Covid-19 pandemic and of anticipated future personal events.

### 4.1 | Foreseeability

For past events, we only found an effect of valence but neither a main effect of depressive symptoms nor an interaction. The main effect of valence showed that negative past events were rated as more foreseeable than positive past events, indicating a negativity bias. This is surprising, as research typically found positivity biases in cognitions relating to past events (Walker et al. 2003). One possible explanation for this reversed pattern may lie in the perceived controllability of the events. Giroux et al. (2022) reported that participants rated the Covid-19 pandemic as unforeseeable, suggesting that events related to the

pandemic might have been perceived as uncontrollable in the current study (e.g., not meeting friends for a birthday party may have been due to governmental restrictions rather than personal choice). When events are perceived as uncontrollable, defensive processing is an obsolete strategy as an individual neither can be blamed nor blame themselves for the negative event outcome. Thus, reduced controllability may have diminished the typical defensive processing that usually follows negative events (Groß et al. 2017; Louie 1999; Pezzo and Beckstead 2008), resulting in higher foreseeability ratings for negative past events in the current study.

Further, depressive symptoms did not play a role in the foreseeability cognitions regarding past autobiographical events as indicated by the absence of a significant interaction. Thus, the findings that Groß et al. (2017) obtained with hypothetical events did not generalize to real-life events. This is somewhat surprising as Zautra et al. (1985) found no difference in cognitive styles between hypothetical and real-life personal events. This, too, might be explained by the controllability of the events that participants generated in our study. Recall that we explicitly asked participants about personal events related to the Covid-19 pandemic. Again, the events that our participants generated may have been perceived as rather uncontrollable, whereas the events selected for the study by Groß et al. (2017) were rated as somewhat controllable (i.e., neither absolutely controllable nor absolutely uncontrollable). Thus, differences in perceived controllability may have contributed to the differences in the current findings compared to previous ones.

For imagined future events, we found a main effect of valence with positive events rated as more foreseeable than negative events, that is, a positivity bias. In other cognitions, such a bias is commonly observed (review by Walker et al. 2003) and was also found during the Covid-19 crisis (Aizpurua et al. 2021; Gower et al. 2023). Moreover, we found the expected interaction of valence and depressive symptoms. In line with cognitive theories of depression (Cognitive Triad of Depression; Beck 1967), with increasing levels of depressive symptoms, positive events were rated as less foreseeable (i.e., a less optimistic outlook towards the future). For negative events, there was a statistical trend toward a positive association between depressive symptoms and foreseeability, suggesting a trend toward less defensive processing as depressive symptoms increased. Thus, for future events, we found cognitive patterns that are typical for depressive symptoms.

### 4.2 | Inevitability

For past events, there was only a main effect of valence with negative events rated as more inevitable than positive events. This may indicate that participants used the retroactive pessimism strategy by rating negative events as unavoidable (Blank and Peters 2010; Tykocinski 2001). As retroactive pessimism is an effective affect-regulatory strategy mainly in low-controllability situations (Tykocinski and Steinberg 2005), it is a suitable approach for events related to the uncontrollable Covid-19 pandemic. As with the foreseeability cognition, we did not find any effects of depressive symptoms for past events. Participants with increased depressive symptoms showed similar levels of

inevitability as participants without depressive symptoms, indicating similar retroactive pessimism and helplessness regarding negative past events. This finding does not align with previous studies that found increased helplessness for past negative events in participants with higher levels of depressive symptoms (Groß et al. 2017). Again, the perceived controllability of events may be a key factor here, resulting in the different outcomes. As the events in Groß et al. (2017) were at least somewhat controllable, this may have allowed tendencies of learned helplessness (i.e., increased inevitability) to emerge. In our study, participants may have recalled events from the Covid-19 pandemic that were perceived as largely uncontrollable, leaving less room for such tendencies to manifest, contributing to the null effects.

For future events, there was a main effect of valence. As predicted, we also found a significant interaction of valence  $\times$  depressive symptoms. With increasing levels of depressive symptoms, participants rated negative future events as more inevitable and thus unavoidable. Contrary, with increasing levels of depressive symptoms, participants rated positive future events as less inevitable, which may reflect a less positive outlook toward the future. Viewing future negative events as inevitable might contribute to the maintenance or exacerbation of depressive symptoms by reinforcing feelings of helplessness, rather than serving a functional role in affect regulation. Thus, these findings can also be interpreted as a dysfunctional cognitive bias, consistent with theories of depression, such as learned helplessness theory (Abramson et al. 1978) and the Cognitive Triad (Beck 1967). Further, our results align with empirical findings underpinning the negative view of the personal future in depression (Andersen et al. 1992).

To sum up, we did not find the predicted associations in both cognitions with depressive symptoms for autobiographical past events, whereas we did so for imagined future events. For future events, our results align with cognitive theories of depression and previous studies. This may indicate that depressive symptoms primarily manifest when imagining events rather than when processing actual past events. In a clinical context, this may imply that reframing negative future expectations could be particularly beneficial for individuals with depressive symptoms.

### 4.3 | Limitations and Outlook

As mentioned, the perceived controllability of events may be a key factor in some of our findings. It should be noted, though, that we did not assess the perceived controllability of events in our study. Thus, we cannot investigate whether the lack of defensive processing and the missing associations for past events were due to events being perceived as uncontrollable. Future studies should address this possible explanation by including measures of perceived controllability or varying the perceived controllability systematically.

Another limitation is that, for ethical reasons, we do not have event descriptions available from all participants and for all event types. Thus, we cannot consider the exact nature of the events that participants rated in this study. We emphasized

to participants to constantly think about the particular event while answering all items, even if they did not provide an event description.

A further limitation of our study is the cross-sectional nature of its design. Foreseeability and inevitability were measured at one point in time only for each event (after the outcome was known for past events, and before the outcome was known for future events). This precludes the measurement of hindsight bias. Hindsight bias is the tendency to perceive events as more predictable or inevitable after they have occurred, compared to predictions beforehand (Blank et al. 2008; Fischhoff 1975). Foreseeability and inevitability are both core components of hindsight bias (Blank et al. 2008). The measurement of hindsight bias would, however, require a longitudinal design with one measurement point before event occurrence and one thereafter. Given that, with two measurement points, Groß et al. (2017) found increased hindsight bias for negative hypothetical events (with both foreseeability and inevitability) with increased levels of depressive symptoms, it seems plausible that this pattern may also emerge for hindsight bias for personal events.

With the current study, we were able to demonstrate an association between foreseeability and inevitability cognitions with depressive symptoms for future events. Future studies are needed to investigate the direction of the causal relationship. Cognitive theories of depression (e.g., Cognitive Triad by Beck 1967; helplessness theory by Abramson et al. 1978) propose that a negative cognitive style is a vulnerability factor for the onset of depression. Thus, it seems plausible that negative styles in foreseeability and inevitability cognitions are also risk factors for depression. Conversely, depressive symptoms may lead to dysfunctional foreseeability and inevitability cognitions in the future. Finally, a reciprocal relationship between depressive symptoms and the two cognitions could possibly form a vicious cycle (see Teasdale 1983). Given our cross-sectional design, we cannot rule out any of these possibilities. A more fine-grained understanding of these associations, however, is essential and could help to improve cognitive therapy of depression and thus help to mitigate the mental consequences of times of crises as a pandemic. As our study and many other studies found increased levels of depressive symptoms in the general population after the Covid-19 outbreak (for a review, see Robinson et al. 2022), this is of particular importance.

Finally, it should be noted that the generalizability to a clinical sample may be limited even though sub-clinically versus clinically depressed individuals show similar problems in psychosocial functioning (Gotlib et al. 1995).

## 5 | Conclusion

To conclude, previous research demonstrated that viewing negative events as being less foreseeable and more inevitable than positive events can be a powerful tool to regulate emotions (Blank and Peters 2010; Pezzo and Pezzo 2007). With our study, we were able to shed more light on the interplay of these two affect-regulatory cognitions with depressive symptoms by extending previous work to the real world and to future events.

While we found that these associations exist for future events, we were not able to replicate previous findings when asking participants about past real-life events. Future research addressing the question of whether the perceived controllability of events may play a key role is needed. Overall, a better understanding of this interplay is necessary and may help to improve cognitive intervention against depressive symptoms.

### Author Contributions

**Larissa Rothfeld:** formal analysis, data curation, visualization, writing – original draft, investigation, methodology, project administration. **Ute J. Bayen:** investigation, supervision, resources, methodology, writing – original draft, writing – review and editing, conceptualization, funding acquisition. **Marie Luisa Schaper:** investigation, writing – review and editing, validation, supervision, data curation, project administration, methodology, funding acquisition.

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### Ethics Statement

The study was approved by the local ethics committee and all participants provided informed consent.

### Conflicts of Interest

The authors declare no conflicts of interest.

### Data Availability Statement

Preliminary results were presented at the 61st Annual Meeting of the Psychonomic Society (virtual), in November of 2020. Materials, data, and analysis code are openly available via the Open Science Framework at <https://osf.io/8cwq2>.

### Endnotes

<sup>1</sup>To test for multicollinearity among the predictors (main effects and interactions), we ran the models using uncentered Level-1 predictors and calculated variance inflation factors (VIFs). Most VIFs exceeded the commonly used threshold of 4 (especially for the interaction terms), indicating substantial multicollinearity. Centering the predictors reduces this multicollinearity by orthogonalizing the main effects and interaction terms, thereby providing more stable estimates.

<sup>2</sup>We conducted further analyses by incorporating by-participant random slopes for time and by-participant random slopes for valence. Variance components for the random slopes of valence and time were near zero. A model including these slopes showed convergence issues, and its fixed-effect estimates were nearly identical to those of the reported model. For parsimony, we therefore excluded random slopes for valence and time in the model as it adequately captures the relationships between depressive symptoms, valence, time, and cognition.

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### Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Data S1:** Supplementary Information.