

## RESEARCH ARTICLE

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# The COVID-19 pandemic disrupted the healthy fading of emotions in autobiographical memory mediated via in-person social disclosures

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## Abstract

We explore the impact of the COVID-19 pandemic in the United Kingdom upon the fading affect bias in autobiographical memory, which describes the greater fading of negative emotional intensity over time compared to positive. Across two studies we show that the magnitude of the FAB is smaller for pandemic-related events compared to pandemic-unrelated events. The FAB is thought to represent the result of healthy coping processes operating on autobiographical memory and our results indicate that these processes were disrupted, to a certain extent, by the pandemic. These effects were mediated by frequent in-person social disclosures of pleasant pandemic-unrelated events, which was, in turn, associated with less fading of positive affect. Further, the FAB for both pandemic-related and unrelated events was mediated by disclosures via social media. Together, these results highlight the potential effectiveness of using various modes of communication to facilitate emotional regulation processes in autobiographical memory.

## KEYWORDS

autobiographical memory, COVID-19 pandemic, emotion, fading affect bias, social disclosure

## 1 | INTRODUCTION

When we look back over the events that make up the patchwork of our lives, we tend to do so with a sense of positivity (Skowronski, 2011). Although we may have experienced just as many unpleasant as pleasant events, the unpleasant events tend to lose their emotional sting. In contrast, when we recall pleasant events, they usually retain more of the emotional warmth we experienced at the time. This differential fading of emotional intensity in autobiographical memory is known as the fading affect bias, or FAB (Walker & Skowronski, 2009).

The FAB is thought to be the result of healthy coping processes that operate on autobiographical memory, acting to maintain a sense of positivity which is important for mental health and wellbeing across our lifespan (Skowronski et al., 2014). For instance, Taylor's mobilisation-

minimization theory suggests that, after experiencing an unpleasant event, healthy coping processes act to minimise the associated negative emotions and allow normal functioning to reoccur (Taylor, 1991). These processes are proposed to be a self-protective function of our autobiographical memory system (Sedikides, 2012). If every unpleasant event we experienced still had the power to cripple us emotionally when we recalled it, we would be unable to use these experiences for growth and to grasp new opportunities as they arise. Instead, the broaden and build model of positive emotions theorises that retaining positive emotions whilst allowing negative emotions to fade is vital for human functioning in a social world (Fredrickson, 2004).

The FAB has been the subject of substantial research interest and its reliability and robustness has been extensively established (Gibbons et al., 2011; Landau & Gunter, 2009; Lindeman et al., 2017;

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Ritchie et al., 2009; Skowronski et al., 2014; Walker & Skowronski, 2009). It has been found across a variety of time spans from a few months to a few years and is a cross cultural phenomenon (Ritchie et al., 2015). The FAB has been found in both adults and children (Rollins et al., 2018). The FAB is further not restricted to those events with extremely negative or extremely positive emotions, as it has been observed regardless of arousal level of the event's associated emotion (Ritchie et al., 2009). Thus, the FAB appears to be a universal phenomenon of human memory, lending credence to the idea that it emerges as a result of self-protective processes after the experience of both the pleasant and unpleasant aspects of human life (Walker & Skowronski, 2009).

However, the FAB has been found to be smaller and in some instances does not emerge at all for some types of recalled events. For instance, the FAB has been found in respect to a wide array of human experiences including dreams (Ritchie & Skowronski, 2008), events involving alcohol (Gibbons et al., 2013), and events involving religion (Gibbons et al., 2015). In contrast, whilst some research has found the FAB to emerge for memories of death (Gibbons et al., 2016), other research found no evidence of FAB for memories of death for people living in the Philippines (Bond et al., 2016). Similarly, although the FAB has emerged for memories of events associated with current relationships, it was not found for memories of past failed relationships (Zengel et al., 2019). A smaller FAB was also seen for memories of playing video games compared to non-video game memories (Gibbons & Bouldin, 2019), and for memories of the 2016 presidential election compared to non-political events (Gibbons et al., 2020). Thus, recent research into the FAB has shown that it is not necessarily universal across all types of events experienced, as it appears that characteristics of the event can moderate the extent to which usual healthy coping processes operate upon memories for those events.

## 2 | THE FAB AND THE COVID-19 PANDEMIC

The COVID-19 pandemic, which spread across the globe in 2020, has been the cause of hundreds of thousands of deaths, illness, loss, and anxiety, together with social isolation for many as the world struggled to contain the virus. How will our autobiographical memory system, so efficient at protecting us from persistent negative emotions, deal with such an event? Bond et al. (2021) examined the impact of a large scale negative event upon the FAB, by exploring how positive and negative emotions associated with memories of the super typhoon in the Philippines in 2013 faded over time. As would be predicted based on the FAB literature, negative emotions associated with memories of the super typhoon faded, whilst emotions associated with pleasant events not related to the typhoon were maintained. These results suggest that large scale events are just as subject to the FAB as every day, personally experienced events. In the current study, we intend to explore if the FAB still emerges for memories associated with the COVID-19 pandemic.

The impact of the pandemic upon mental health has already been acknowledged as an important issue (Xiang et al., 2020). Shah et al.

(2020) evaluated the impact of previous epidemics upon mental health, to extrapolate what this might mean for mental health during and after the COVID-19 pandemic. They concluded that behavioural interventions to address the pandemic (including isolation, quarantine, social distancing and avoiding close contact with other people) are necessary but have negative implications for both individual and societal level mental health (Rubin & Wessely, 2020; Shah et al., 2020). For instance, when examining the impact of previous epidemics, such as SARS and MERS, survivors of these outbreaks reported high levels of depression and emotional distress (Lee et al., 2018; Mak et al., 2009). The FAB is proposed to be a result of healthy coping processes operating on autobiographical memory. If such healthy coping processes have been disrupted by the pandemic, as suggested by this prior research into the effects of epidemics on mental health, it is possible that the COVID-19 pandemic would be associated with a disrupted fading affect bias. In this case, we might expect to see reduced fading of unpleasant affect and/or increased fading of pleasant affect for events that were caused or related to the pandemic ( $H_1$ ). We explore this possibility in the current study by examining if the relationship between event valence and affect change (i.e., the FAB) is moderated by the type of event experienced, in terms of being related to the COVID-19 pandemic or not.

## 3 | PANDEMIC EFFECTS ON THE FAB MEDIATED BY FREQUENCY OF IN-PERSON OR OTHER FORMS OF SOCIAL DISCLOSURE

We also propose that social disclosure, the act of discussing personal experiences with other people, could be an important factor that could mediate the relationship between the pandemic and the FAB. Due to social distancing measures introduced to control the spread of the COVID-19 virus, opportunities to socially disclose personally experienced events has potentially been reduced, with important implications for the FAB.

Eklund et al. (2022) asked participants to report daily uplifts experienced during restrictions due to the COVID-19 pandemic in Sweden in July and August 2020. Daily uplifts are defined as small everyday positive events and are, thus, conceptually similar to the small, everyday pleasant events that are collected in FAB research. These descriptions were content analysed, and the results revealed that daily uplifts during the pandemic were related to being with and interacting with friends and family, along with exercise routines, leisure time and hobbies. These results suggest that social interaction was an important source of feelings of wellbeing during the pandemic. The finding that social interaction was an important daily uplift is in line with the prior research into the importance of social disclosure in the emergence and maintenance of the FAB in autobiographical memory (Muir et al., 2015; Skowronski et al., 2014).

Talking to other people about experienced events (i.e., social disclosure) increases FAB (Skowronski & Walker, 2004). The frequency that events are disclosed to other people is related to large negative fading affect and small positive fading affect (Rollins et al., 2018; Skowronski et al., 2004; Walker et al., 2009). Further, the greater the breadth of disclosure, in terms of the number of different people the

event is disclosed to, the greater the FAB (Skowronski et al., 2004). The effects of social disclosure are not attributable to increased rehearsal or mere verbalisation of the event memory, as the presence of a responsive listener is important (Muir et al., 2015). Finally, recent research further suggests that the nature of the interaction between speaker and listener during discussion of experienced events predicts whether the FAB is enhanced or not. Having meaningful 'person centred' interactions with others in which ideas are exchanged and emotional reactions validated was associated with a large FAB (Muir et al., 2019). So, discussing events and their consequences with a listener can play a pivotal role in encouraging emotional regulation within the autobiographical memory system (Skowronski & Walker, 2004).

Previous research into the effects of social disclosure in the FAB has focussed on in-person social interactions. However, attempts to restrict the spread of the COVID-19 virus led to social distancing measures, necessarily restricting in-person social interaction. Within the United Kingdom, the rapid spread of the virus in March 2020 led to the introduction of social distancing guidelines in which in-person social interaction was severely curtailed, culminating in full lockdown measures on the 23rd March 2020. During the Spring 2020 lockdown in the United Kingdom, schools and workplaces were closed, non-essential retail and hospitality were closed, and the UK population was advised only to leave their home for essential reasons (Gov.uk, 2020b). Thus, the UK population went from freely interacting and discussing events that they had experienced in-person, to a dramatic decline in opportunities for in-person social disclosure. The initial lockdown in the United Kingdom lasted until restrictions were gradually lifted beginning in June 2020, including groups of up to six people from different households permitted to meet outdoors. From July 2020, two households were permitted to mix and hospitality venues were permitted to re-open (Gov.uk, 2020a). Thus, there was an extended period in which the UK population had greatly reduced opportunities for in-person social disclosure of personally experienced events.

There is evidence that the frequency of in-person social interactions was influenced by the pandemic and related lockdowns. Giuntella et al. (2021) found self-reported socialising time in a sample of 682 US college students dropped to half of pre-pandemic rates. In a UK study, 19,914 18–59 year old participants reported reducing the amount of social contact with others during the pandemic lockdowns by an average of 75% (Gimma et al., 2022). It is, therefore, possible that any effects of the pandemic on the FAB are mediated by the frequency to which individuals socially disclosed events in-person.

However, in response to restrictions on in-person social interaction, many people in the United Kingdom during the Spring 2020 lockdown turned to alternative forms of conducting social interactions. Statistics released by Ofcom in 2020 (Ofcom, 2020) revealed that the frequency of video calls rose by 35% with the advent of social distancing measures compared to before the pandemic (Ofcom, 2020). In May 2020, approximately 71% of adults with access to the internet reported using online video calling services at least weekly, whilst 38% of adults reported using them daily (Ofcom, 2020). Thus, although opportunities for direct in-person social disclosure may

have been drastically reduced, social disclosure may still have taken place via video calls to friends and family during the lockdown period. Further, there is evidence that disclosure of personal experiences also takes place via social media, in the form of status updates or wall posts on Facebook (Green et al., 2016; Nosko et al., 2010). Young people also report posting personal unpleasant experiences online, such as daily hassles and negative experiences occurring at work (Michikyan, 2020). Thus, although overall frequency of social disclosure may not necessarily have been affected by social distancing and isolation requirements forced by the pandemic, the mode in which social disclosure was achieved may have shifted.

It is possible that the effects of reduced in-person social disclosure upon the FAB caused by the pandemic lockdowns in the United Kingdom were ameliorated by a corresponding increase in social disclosure via computer-mediated forms of communication, such as video calls or social media posts. To our knowledge, researchers have yet to explore whether social disclosure via methods other than in-person (i.e., by using communication technology or social media platforms) have the same, or differing effects upon the FAB. Some researchers have explored a related topic, in terms of the magnitude of the FAB in relation to experiences using social media. Gibbons et al. (2017) and Gibbons et al. (2022) defined a *social media event* as any event that involved social media sites on a phone, computer, or tablet. Examples given of social media events provided by participants were 'funny snapchat story; Halloween pictures' (Gibbons et al., 2022). In this research, social media events were associated with a smaller FAB than non-social media events (Gibbons et al., 2017; Gibbons et al., 2022). However, the types of events investigated in these studies concerned experiences reading or watching content on social media, rather than using social media as a communication tool for the social disclosure of personally experienced real-world events. Therefore, for the first time in the FAB literature, we explore the frequency to which pleasant and unpleasant events were socially disclosed via different communication mediums, and if the nature of the event recalled (whether related to the pandemic or not) influenced the frequency of social disclosure. Finally, we examine if the magnitude of the FAB was mediated through the frequency of in-person, computer-mediated, or social media forms of social disclosure ( $H_2$ ).

## 4 | STUDY 1

We investigated the impact of the pandemic upon the FAB in terms of the fading of affect for events that were directly related or caused by the pandemic during the Spring 2020 lockdown period in the United Kingdom, compared to events that were not caused by or related to the pandemic during the same time period. We also examined any potential mediation by the frequency to which pandemic-related and pandemic-unrelated events had been socially disclosed via in-person, computer-mediated, and social media forms of communication.

Participants recalled memories of pleasant and unpleasant events that had occurred during the initial stages of the pandemic and first

lockdown period in the United Kingdom and rated each event for whether it was caused by or related to the pandemic or not. Participants also rated each event memory for emotional intensity upon event occurrence and recall, as in the standard retrospective recall FAB paradigm (i.e., Ritchie et al., 2006; Ritchie et al., 2009). For each event, participants completed a series of ratings examining the extent to which they had socially disclosed the event in each of the following ways: in-person; using computer technology (e.g., instant messaging and video calls); and using social media. Data were collected in June 2020. The order of event memory retrieval was counterbalanced, with half the participants ( $n = 218$ ) recalling pleasant event memories before unpleasant, and vice versa ( $n = 218$ ). All measures were completed using an online questionnaire for which there was no time limit for completion.

## 4.1 | Method

### 4.1.1 | Participants

Four hundred and forty-seven participants took part in the study. Data from 11 participants were removed for not following instructions (e.g., reporting events outside of the specified time period), leaving data from 436 participants available for analysis (328 female, 105 male, 1 transgender, 2 non-binary). Participant age ranged from 18 to 83 years ( $M = 31.51$ ,  $SD = 12.51$ ). Most participants were recruited from the general UK population through use of an online participant panel ( $n = 332$ ), or through online advertisements (e.g., on Twitter;  $n = 91$ ), with the rest of participants being undergraduate university students who received course credit for completion of the study ( $n = 13$ ). Ethical approval was granted for the study from the University in which the research took place.

Most participants reported that they were working from home ( $n = 114$ ) or engaged in higher education level study ( $n = 112$ ) during the Spring 2020 lockdown period in the United Kingdom. Other participants reported being employed as key workers outside of the home ( $n = 53$ ), employed but on furlough ( $n = 54$ ), self-employed ( $n = 21$ ), or not employed ( $n = 63$ ), or other circumstances, such as being retired ( $n = 8$ ).<sup>1</sup>

Participants reported living in households of various sizes during the lockdown periods. Most participants lived with one other person ( $n = 129$ ), followed by three other people ( $n = 118$ ), two other people ( $n = 78$ ), four other people ( $n = 44$ ), or alone ( $n = 37$ ), and few participants lived in households with five other people ( $n = 13$ ), six other people ( $n = 8$ ), or more than six people ( $n = 6$ ).<sup>2</sup>

### 4.1.2 | Event memory retrieval

Participants were instructed to recall at least one pleasant and one unpleasant event, up to three pleasant and three unpleasant events that they had experienced between 1st March 2020 and 9th June 2020. 1st March 2020 was the date the first coronavirus cases were

reported in the United Kingdom and approximately 3 weeks before the first lockdown in the United Kingdom on 23rd March 2020 (Gov.uk, 2020b). 9th June 2020 was when lockdown measures began to be eased in the United Kingdom (Gov.uk, 2020a).

For each event, participants were asked to provide a title, and to write a brief description of the event. Participants indicated if the event was caused by or related to the pandemic by responding 'yes: this event was directly caused or related to the pandemic or lockdown' or 'no: this event was not directly caused or related to the pandemic or lockdown'. Participants also provided an estimate of event age (i.e., how long ago the event occurred) in months and days to ensure that the FAB cannot be attributed to the age of events recalled within our sample, as is standard practice in this FAB paradigm (e.g., Ritchie et al., 2006; Ritchie et al., 2009; Ritchie & Skowronski, 2008).

### 4.1.3 | Affect intensity ratings and calculation of affect change

Participants then completed the following measures for each event. Participants rated the event for its emotional intensity upon event occurrence and recall. Participants were asked to rate 'How intense were the emotions you felt when this event originally happened?' and 'How intense are the emotions you feel when remembering this event now?', both on a bipolar scale from +3 (*extremely pleasant*) through 0 (*neutral*) to -3 (*extremely unpleasant*).

A measure of *affect change* was computed for each event. We removed events that changed valence from occurrence to recall (e.g., from negative to positive or vice versa). We then computed the absolute value of the negative ratings to ensure each event's ratings of affect intensity at occurrence and recall ranged from a positive value (max of 3) to zero. Next, we subtracted emotional intensity at recall from emotional intensity at occurrence. As in other FAB studies, positive values indicate the intensity of emotion decreased from event occurrence to recall (i.e., fading affect), whereas negative values indicate emotion increased in intensity from event occurrence to recall. The size of the value indicates the extent of change, with greater values indicating greater change in emotional intensity between event occurrence and recall.

### 4.1.4 | Social disclosure ratings

Finally, participants completed a series of ratings of the frequency to which they had discussed each event with other people, using the following methods: (a) in-person; (b) using technology (including video calls, phone calls, text messages, instant messaging and online chat services, but not including social media); (c) using social media (including websites and applications designed to allow users to interact with other users by posting text, video and images, such as Facebook, Twitter, or Instagram). Each method of discussing events was rated on a scale from 1 (*not at all*) to 6 (*very frequently*).

## 5 | RESULTS

A total of 927 events were retrieved by participants (462 pleasant events, and 465 unpleasant), of which 586 events were rated as being related to or caused by the pandemic in the United Kingdom (242 pleasant events, and 344 unpleasant events). Sixteen events showed a change in valence from occurrence to recall, such as from negative to positive (nine initially pleasant events, and seven initially unpleasant events). As in previous FAB studies, due to their small number, we removed events which changed valence between occurrence and recall (e.g., Muir et al., 2017; Ritchie et al., 2009), leaving 911 events for analysis (453 pleasant and 458 unpleasant, of which 238 pleasant events were related to the pandemic and 340 unpleasant events were related to the pandemic).

### 5.1 | Statistical analysis

Our dataset is clustered in nature; as some participants recalled multiple events each (up to three pleasant and three unpleasant events each), events are nested within individuals. Thus, in all the following analyses, a nominal level person variable was also included to control for possible between-subjects effects.

The event age variable, which participants reported in months, weeks and days, was translated into the number of days since the event occurred. Pleasant events ( $n = 453$ ) were on average 39.53 days old ( $SD = 26.64$ ) and unpleasant events ( $n = 458$ ) were an average of 43.82 days old ( $SD = 30.13$ ), which is not a significant difference,  $F(1, 907) = 1.42, p = .22, n^2 = 0.002$ . Similarly, events that were reported to be related to or caused by the pandemic ( $n = 578$ ) were an average of 42.96 days old ( $SD = 29.44$ ) and events rated as unrelated to the pandemic ( $n = 333$ ) were an average of 39.98 days old ( $SD = 28.09$ ), which is not a significant difference,  $F(1, 907) = 1.58, p = .21, n^2 = 0.002$ . The event age variable was entered as a covariate in all analyses, so any effects of valence or pandemic causality could not be attributed to the age of the event.

We imagined that household size (in terms of the number of people participants were living with at the time of the lockdown) might have influenced frequency of in-person social disclosure, as this directly impacted on the number of people available to discuss events with in-person during the lockdown period. Participants living in larger households at the time of the lockdown would naturally have a greater number of individuals with which to converse, and, therefore, might have socially disclosed experienced events in-person more frequently. Thus, we additionally entered household size as a covariate in all analyses to control for the effects of household size on the frequency of in-person, computer mediated social disclosure, and disclosure via social media.

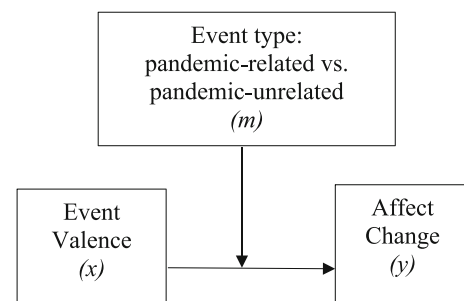
To test our moderation and mediation hypotheses we used the PROCESS macro for SPSS (Hayes, 2013) which has been widely used for analysis of datasets of a similar nature in previous FAB research (i.e., Gibbons et al., 2013; Ritchie et al., 2014). We tested our first hypothesis ( $H_1$ ) using Model #1 within Process. We tested if the magnitude of the fading affect bias was moderated by the type of event:

whether the magnitude of the FAB was smaller for events that were caused by or related to the pandemic, compared to events which were not caused by or related to the pandemic. We thus tested for a main effect of event type (pandemic-related vs. pandemic-unrelated) upon affect change scores, and an interaction between event valence (pleasant vs. unpleasant) and event type (pandemic-related vs. pandemic-unrelated) upon affect change scores. These effects are illustrated in Figure 1.

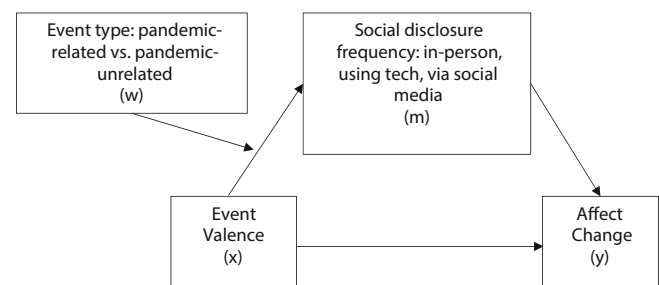
Next, we tested our second hypothesis around the FAB being mediated via the frequency of social disclosure in-person, using technology, or using social media ( $H_2$ ), using model #8 of PROCESS. We report our mediation analysis per the steps outlined in Baron and Kenny (1986). We first examined if event valence and event type predicted frequency of social disclosure (in-person, using technology, or via social media), before examining if frequency of social disclosure predicted affect change scores. Finally, we directly tested if the moderation of the FAB by event type was mediated via frequency of social disclosure. We tested each mode of social disclosure (in person, using technology, or via social media) in a separate model. These effects are illustrated in Figure 2.

### 5.2 | Moderation of the FAB by pandemic-related versus pandemic-unrelated events

There was a main effect of event valence (pleasant vs. unpleasant) on affect change scores,  $b = 0.36, t(911) = 5.16, p < .001, 95\% CI [0.22,$

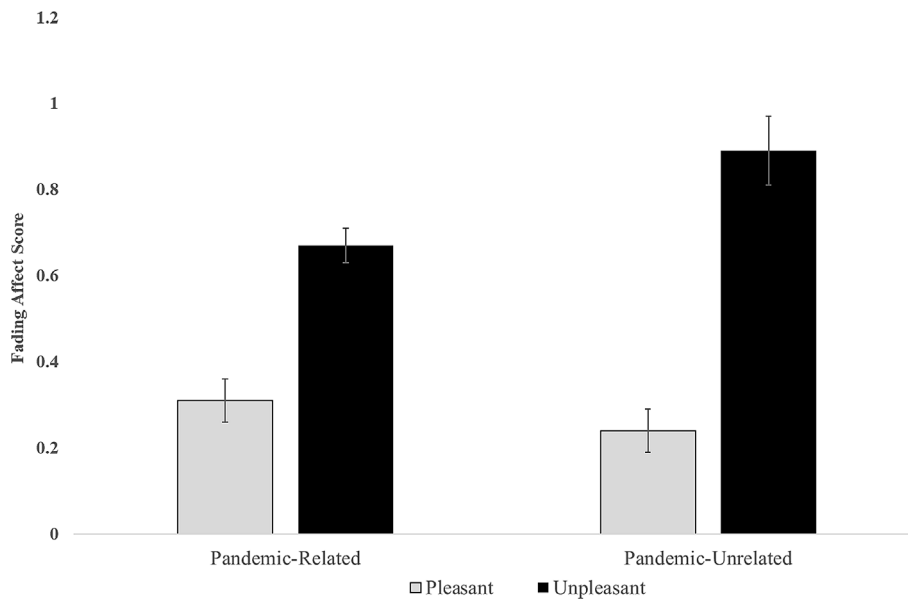


**FIGURE 1**  $H_1$ : Moderation of the fading affect bias by event type (pandemic-related vs. pandemic-unrelated).



**FIGURE 2**  $H_2$ : Mediation of the fading affect bias by social disclosure frequency, and moderation of social disclosure frequency by event type.





**FIGURE 3** Fading affect scores for pandemic-related and pandemic-unrelated pleasant and unpleasant events in Study 1.

0.29], showing the usual FAB: negative affect faded in intensity ( $M = 0.73$ ,  $SD = 0.88$ ) to a greater extent compared to positive affect ( $M = 0.27$ ,  $SD = 0.76$ ). No main effect of event type was evident (pandemic-related vs. pandemic-unrelated) upon affect change scores,  $b = -.06$ ,  $t(911) = -.86$ ,  $p = .38$ ,  $CI [-.22, 0.08]$ . However, we observed an interaction between event valence (unpleasant vs. pleasant) and event type (pandemic-related vs. pandemic-unrelated) in predicting affect change scores,  $b = 0.29$ ,  $t(911) = 2.50$ ,  $p = .01$ , 95%  $CI [0.06, 0.52]$ .

We explored this interaction by examining the main effect of event valence (pleasant vs. unpleasant) upon affect change scores (i.e., the FAB) for pandemic related and pandemic-unrelated events separately. The FAB was evident for both event types, in terms of greater fading of negative affect compared to positive. However, the magnitude of the FAB (in terms of the size of the difference between positive and negative affect change scores) was greater for pandemic unrelated events,  $b = 0.65$ ,  $t(911) = 6.93$ ,  $p < .001$ , 95%  $CI [0.47, 0.84]$ , compared to pandemic-related events,  $b = 0.36$ ,  $t(911) = 5.16$ ,  $p < .001$ , 95%  $CI [0.22, 0.50]$ . Figure 3, below, illustrates that the difference in positive and negative affect fading is smaller for pandemic-related compared to pandemic-unrelated events.

### 5.3 | Mediation via social disclosure frequency

#### 5.3.1 | Social disclosure in person

We first examined how frequently events were socially disclosed in person, and whether this variable was influenced by event valence (pleasant vs. unpleasant) and event type (pandemic-related vs. pandemic-unrelated).

Event valence did not predict the frequency of social disclosure in-person,  $b = 0.08$ ,  $t(910) = 0.65$ ,  $p = .51$ ,  $CI [-.16, 0.33]$ , and neither did event type,  $b = 0.10$ ,  $t(910) = 0.75$ ,  $p = .45$ ,  $CI [-.17, 0.38]$ .

However, an interaction between event valence (pleasant vs. unpleasant) and event type (pandemic-related vs. pandemic-unrelated) emerged in predicting frequency of social disclosure in person,  $b = -.53$ ,  $t(910) = -2.48$ ,  $p = .01$ , 95%  $CI [-.95, -.11]$ .

To explore this interaction, we first examined the effects of event valence (pleasant vs. unpleasant) upon frequency of social disclosure in-person for pandemic-related and pandemic-unrelated events separately. Table 1, below, shows that pleasant events which were unrelated to the pandemic were socially disclosed in person *more frequently* compared to unpleasant events which were unrelated to the pandemic,  $t(331) = 2.65$ ,  $p = .008$ . In contrast, there were no differences in frequency of social disclosure in person for pleasant and unpleasant events related to the pandemic,  $t(575) = -.66$ ,  $p = .51$ . Next, we examined the effects of event type (pandemic-related vs. pandemic-unrelated) upon frequency of social disclosure in-person for pleasant and unpleasant events separately. There were no differences in frequency of social disclosure in-person between pleasant pandemic-related and pandemic-unrelated events,  $t(450) = -.76$ ,  $p = .44$ , but unpleasant pandemic-related events were socially disclosed in-person to a greater frequency compared to pandemic-unrelated events,  $t(450) = 2.69$ ,  $p = .007$ .

We next explored if the frequency of social disclosure in-person predicted affect change. With increasing frequency of social disclosure in-person, affect faded less,  $b = -.05$ ,  $t(910) = -2.80$ ,  $p = .005$ , 95%  $CI [-.08, -.01]$ , but this effect did not interact with event valence,  $F(1, 902) = 0.66$ ,  $p = .42$ , suggesting that both positive and negative affect faded less with increasing frequency of social disclosure in-person.

Finally, we tested if the magnitude of the interaction involving FAB being moderated by event type was mediated via frequency of social disclosure in-person. For events that were *not related* to the pandemic, a mediation model fit the data,  $b = 0.02$ ,  $boot\ se = 0.01$ ,  $boot\ 95\%\ CI [0.003, 0.06]$ , suggesting that the effects of

**TABLE 1** Mean frequency of social disclosure (in-person, using technology, and via social media) for pleasant and unpleasant pandemic-related and pandemic unrelated events in Study 1.

| Event type                    | Social disclosure type |                  |                  |
|-------------------------------|------------------------|------------------|------------------|
|                               | In-person              | Using technology | Via social media |
| Pleasant pandemic-related     | 3.50 (1.44)            | 3.57 (1.41)      | 2.50 (1.51)      |
| Pleasant pandemic-unrelated   | 3.61 (1.52)            | 3.49 (1.59)      | 2.53 (1.62)      |
| Unpleasant pandemic-related   | 3.58 (1.52)            | 3.53 (1.56)      | 2.04 (1.45)      |
| Unpleasant pandemic-unrelated | 3.15 (1.49)            | 3.12 (1.56)      | 1.79 (1.35)      |

Note: Standard deviation in brackets. Each method of discussing events was rated on a scale from 1 (*not at all*) to 6 (*very frequently*).

event valence upon affect change (i.e., the FAB) were mediated via frequency of social disclosure in-person. Pleasant events that were *unrelated* to the pandemic were socially disclosed in-person more frequently compared to unpleasant events, and this effect, in turn, was associated with less fading of positive affect compared to negative affect. In contrast, the mediation model did not fit the data for pandemic-related events,  $b = -.004$ ,  $boot\ se = 0.007$ ,  $boot\ 95\%\ CI [-.02, 0.009]$ , suggesting the FAB for pandemic-related events was not mediated via the frequency of social disclosure in-person.

### 5.3.2 | Social disclosure using technology

We first examined how frequently events were socially disclosed using technology, and whether this variable was influenced by event valence (pleasant vs. unpleasant) and event type (pandemic-related vs. pandemic-unrelated). We observed no main effect of event valence in predicting frequency of social disclosure using technology,  $b = -.03$ ,  $t(910) = -.27$ ,  $p = .78$ ,  $95\%\ CI [-.29, 0.22]$ , and no main effect of event type,  $b = -.07$ ,  $t(910) = -.50$ ,  $p = .61$ ,  $95\%\ CI [-.35, 0.21]$ , and no interaction between the two,  $b = -.31$ ,  $t(910) = -1.42$ ,  $p = .15$ ,  $95\%\ CI [-.74, 0.11]$ .

We next explored if the frequency of social disclosure using technology in-person predicted affect change. With increasing frequency of social disclosure using technology, affect faded less,  $b = -.06$ ,  $t(910) = -3.88$ ,  $p = .0001$ ,  $95\%\ CI [-.10, -.03]$ , and this effect did not interact with event valence,  $F(1, 904) = 0.80$ ,  $p = .36$ , suggesting that both positive and negative affect faded less with increasing frequency of social disclosure using technology. We then tested if moderation of the FAB by event type was mediated via frequency of social disclosure using technology. However, the mediation model did not significantly fit the data for pandemic-related events,  $b = 0.002$ ,  $boot\ se = .008$ ,  $boot\ 95\%\ CI [-.01, 0.02]$ , or pandemic-unrelated events,  $b = 0.02$ ,  $boot\ se = 0.01$ ,  $boot\ 95\%\ CI [-.0007, 0.05]$ .

### 5.3.3 | Social disclosure via social media

We examined how frequently events were socially disclosed via social media, and whether this variable was influenced by event

valence (pleasant vs. unpleasant) and event type (pandemic related vs. pandemic-unrelated). Event valence predicted the frequency of social disclosure via social media,  $b = -.46$ ,  $t(906) = -3.62$ ,  $p = .003$ ,  $95\%\ CI [-.71, -.21]$ , but event type did not,  $b = 0.02$ ,  $t(906) = 0.21$ ,  $p = .83$ ,  $95\%\ CI [-.24, 0.30]$ , nor did the interaction between the two variables,  $b = -.27$ ,  $t(906) = -1.27$ ,  $p = .20$ ,  $95\%\ CI [-.69, 0.14]$ . Table 1 shows greater frequency of social disclosure via social media for pleasant events compared to unpleasant events, across events that were related to the pandemic, and unrelated to the pandemic.

Frequency of social disclosure via social media was associated with less fading of affect,  $b = -.08$ ,  $t(906) = -4.64$ ,  $p < .001$ ,  $95\%\ CI [-.11, -.04]$ , but this effect did not interact with event valence,  $F(1, 898) = 0.21$ ,  $p = 0.65$ , suggesting that both positive and negative affect faded less with increasing frequency of social disclosure via social media. Finally, we examined if moderation of the FAB by event type was mediated via frequency of social disclosure via social media. The mediation model fit the data for both pandemic-related events,  $b = 0.03$ ,  $boot\ se = 0.01$ ,  $boot\ 95\%\ CI [0.01, 0.06]$ , and pandemic-unrelated events,  $b = 0.06$ ,  $boot\ se = 0.01$ ,  $boot\ 95\%\ CI [0.02, 0.10]$ . Thus, the FAB was mediated by frequency of social disclosure via social media, regardless of whether the event was related to the pandemic or not. Pleasant events were socially disclosed via social media more frequently compared to unpleasant events, and this effect was then associated with less fading of positive affect compared to negative affect.

## 5.4 | Discussion of Study 1

Our first finding of note is that participants reported *both pleasant and unpleasant events* as being caused by, or related to, the COVID-19 pandemic in the United Kingdom. It might be surprising to find that pleasant events can be related to the pandemic. Exploring event titles provided by participants, the kinds of pleasant events which were reportedly caused by the pandemic related to more time at home due to pandemic lockdowns (e.g., some titles provided by participants were 'spending time with family'; 'learning to paint'). Across our participant sample, 238 pleasant events were reported as being caused by, or related to, the COVID-19 pandemic. This finding is somewhat heartening to see, given evidence that the pandemic has resulted in negative experiences and decreases in wellbeing (e.g., Giuntella et al., 2021; Williams et al., 2020).

Further, we found that the FAB emerged, which is notable as there was only a relatively short timescale between event occurrence and recall of events in this study ( $M = 41.87$  days,  $SD = 28.94$  days). Our findings are, thus, in line with previous work indicating that the FAB can emerge over short timescales. Gibbons et al. (2011) found that a difference between positive and negative affect fading in autobiographical memory can be seen within 12 h of an event's occurrence. Our results thus lend credence to the proposition that the FAB emerges as a result of mobilization of cognitive and social resources to deal with unpleasant events and/or maximise the benefits of pleasant events. Such effects can be rapid and evident in our autobiographical memory system quite soon after such events occur. Interestingly, we are the first study in the FAB literature to find that the FAB can be mediated via the frequency of social disclosure using social media (regardless of event type): we found that pleasant events were socially disclosed more often via social media than unpleasant events, and this in turn was associated with less fading of positive affect compared to negative affect. As this study is the first to explore and find a relation between disclosure using social media and the FAB, this finding bears further replication and exploration.

Importantly, we found the nature of the event moderated the magnitude of the FAB, in a larger FAB for events that were *not* caused by or related to the pandemic. In contrast, the magnitude of the FAB was smaller for events that were related or caused by the pandemic. Thus, the pandemic has impacted emotional regulation in the autobiographical system, in terms of the magnitude of the fading affect bias. Further, the moderation effect was mediated via social disclosure in-person. Pleasant events that were not related to the pandemic were socially disclosed in person more often than unpleasant events which were not related to the pandemic, leading to less fading of positive affect compared to negative affect (and, thus, increased the FAB). However, the same effects were not present for pleasant and unpleasant events that were *related* to the pandemic, which were socially disclosed in-person to an equal level, leading to less fading of *both* positive and negative affect (and therefore, a smaller FAB). These same effects were not replicated for the frequency of social disclosure via technology, or for the frequency of social disclosure via social media. Therefore, we not only add to the FAB literature about the importance of social disclosure in facilitating the FAB (Muir et al., 2015; Skowronski et al., 2004), we add the novel finding that there seems to be something unique about *in-person* social disclosure. The frequency to which individuals share their life experiences in the personal presence of their conversational partner has special consequences for affect fading, which are not seen in other methods of disclosure.

Our next study aimed to examine if these effects, seen for the first time, replicated. Further, previous research indicates that the size of the FAB increases with retention interval (Ritchie et al., 2006), in that there can be a larger difference in affective fading between positive and negative affect with longer periods of time between event occurrence and recall. Thus, there is the possibility that the difference in the magnitude of the FAB for pandemic-related compared to pandemic-unrelated events may disappear over a longer retention interval. The cognitive and social work involved in creating the FAB in

autobiographical memory may potentially take longer with events that are unusual, such as events related to the pandemic. Thus, in our next study, we examined if the results we observed in Study 1 are apparent with a longer retention interval.

## 6 | STUDY 2

The aim of Study 2 was to explore if the effects of the nature of the event (pandemic-related vs. pandemic-unrelated) upon the magnitude of the FAB would still be apparent when there was a longer time between the occurrence of the event and recall in the present day. As in Study 1, participants recalled events from the first lockdown in the United Kingdom, but, rather than only 2 to 3 months between event occurrence and recall, there was up to 10 months between event occurrence and recall.

We believed that the social distancing measures put in place during the first lockdown in the United Kingdom could have impacted upon the frequency of social disclosure. In Study 2, we therefore included the frequency of social disclosure in various forms (in-person, using technology, and via social media) as a mediator of the effects of the type of event (pandemic-related vs. pandemic-unrelated) on the magnitude of the FAB. However, private rehearsal, defined as privately thinking about an event without talking about it to other people (Ritchie et al., 2006), has been consistently implicated as a mediator or moderator of the FAB. Greater frequency of private rehearsal has been associated with less fading of both positive and negative affect (Ritchie et al., 2006; Walker et al., 2009). Thus, it is possible that differing private rehearsal frequencies of pandemic-related vs. non-pandemic related events could also mediate the effects of the pandemic upon the magnitude of the FAB, alongside the effects of social disclosure frequency. In Study 2, we therefore included a measure of overall private rehearsal of each event, alongside the measures of social disclosure frequency from Study 1, to capture any effects of private rehearsal frequency. Data were collected in January 2021. The order of event memory retrieval was counterbalanced, with half the participants ( $n = 250$ ) recalling pleasant event memories before unpleasant, and vice versa ( $n = 249$ ). All measures were completed using an online questionnaire for which there was no time limit for completion.

### 6.1 | Method

#### 6.1.1 | Participants

Four hundred and ninety-nine participants took part in the study (333 female, 161 male, 1 transgender, 1 non-binary, 3 preferred not to say). Participant age ranged from 18 to 74 years ( $M = 33.14$ ,  $SD = 11.54$ ). Participants were recruited from the general UK population through use of an online participant panel. Ethical approval was granted for the study from the university in which the research took place. No participant who contributed to Study 1 also contributed to Study 2.



Most participants reported they were working from home ( $n = 151$ ) or employed outside of the home ( $n = 110$ ), during the first lockdown period in the United Kingdom in 2020. Other participants reported being employed but on furlough ( $n = 62$ ), engaged in higher education level study ( $n = 67$ ), self-employed ( $n = 38$ ), or not employed ( $n = 59$ ), or other circumstances, such as being retired ( $n = 12$ ). Participants reported living in households of various sizes during the lockdown period with most participants living with one other person ( $n = 153$ ), followed by two other people ( $n = 140$ ), three other people ( $n = 107$ ), four other people ( $n = 50$ ), or alone ( $n = 22$ ), with few participants reporting living in households with five other people ( $n = 20$ ), six other people ( $n = 4$ ), or more than six people ( $n = 2$ ).

## 6.1.2 | Event memory retrieval and rating

Participants were instructed to recall at least one pleasant and one unpleasant event, up to three pleasant and three unpleasant events that they had experienced between 1st March 2020 and 1st September 2020, which was when the first lockdown in the United Kingdom fully eased with schools re-opening and leisure and hospitality temporarily re-opened.

Participants completed the same measures for each event as per Study 1, with the addition that participants were also asked to rate the frequency of private rehearsal for each event. Private rehearsal was defined as ‘any time you have privately thought about the event without talking about it to other people’. This measure was rated on the same 1 (*not at all*) to 6 (*very frequently*) scale as the social disclosure frequency ratings. Study 2 was the same as Study 1 in all other respects.

## 7 | RESULTS

Although participants were asked to retrieve at least one pleasant and one unpleasant event, some participants declined to retrieve all requested events. Thus, a total of 920 events were retrieved by participants (456 pleasant events, and 464 unpleasant), of which 627 events were rated as being related to or caused by the COVID-19 pandemic in the United Kingdom (265 pleasant events, and 362 unpleasant events).

Six initially pleasant events changed valence from occurrence to recall. Due to their small number, we removed these events (e.g., Muir et al., 2017; Ritchie et al., 2009), leaving 941 events for analysis (450 pleasant and 464 unpleasant, of which 259 pleasant events were related to the pandemic and 362 unpleasant events were related to the pandemic).

### 7.1 | Statistical analysis

Data analysis proceeded in the same manner as in Study 1. The event age variable, which participants reported in months, weeks, and days,

was translated into the number of days since the event occurred. Pleasant events ( $n = 450$ ) were on average 247.18 days old ( $SD = 37.58$ ) and unpleasant events ( $n = 464$ ) were on average of 252.04 days old ( $SD = 42.28$ ) which were not significantly different,  $F(1, 908) = 1.67$ ,  $p = .19$ ,  $n^2 = 0.002$ . Similarly, events that were reported to be related to or caused by the pandemic ( $n = 621$ ) were an average of 250.02 days old ( $SD = 40.84$ ) and events rated as not being related to the pandemic ( $n = 293$ ) were an average of 248.86 days old ( $SD = 38.51$ ) which is not a significant difference,  $F(1, 908) = 0.01$ ,  $p = .92$ ,  $n^2 = 0.001$ . As in Study 1, the event age variable was entered as a covariate in all analyses, so any effects of event valence or event type cannot be attributed to the age of the event, along with a nominal variable representing each participant to control for clustering in the data, and household size was also entered as a covariate.

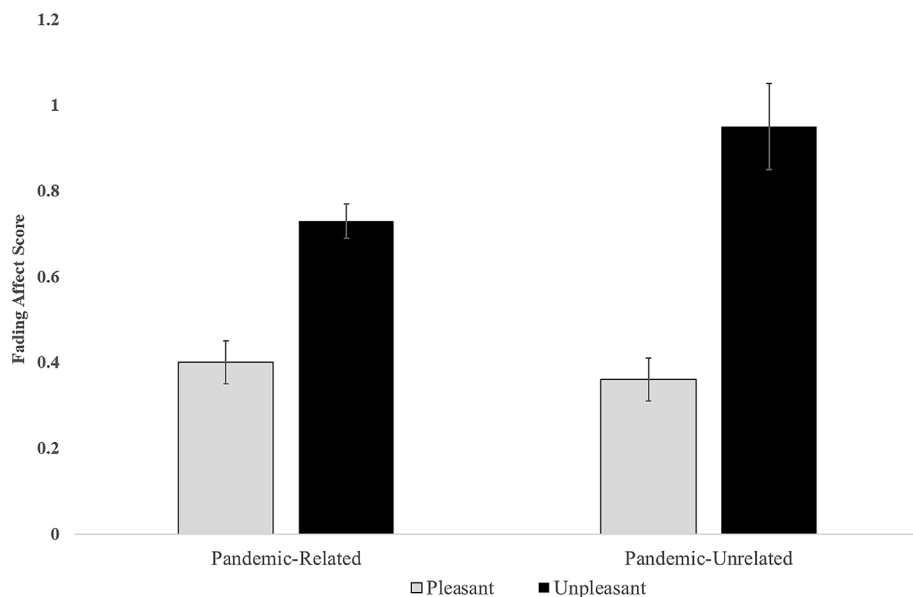
### 7.2 | Moderation of the FAB by pandemic-related versus pandemic-unrelated events

There was a main effect of event valence,  $b = 0.33$ ,  $t(914) = 4.63$ ,  $p < .001$ , 95% CI [0.19, 0.48] showing the usual FAB: negative affect faded in intensity ( $M = 0.78$ ,  $SD = 0.92$ ) to a greater extent compared to positive affect ( $M = 0.38$ ,  $SD = 0.83$ ). No main effect of event type (pandemic-related vs pandemic-unrelated) upon affect change scores was evident,  $b = -.30$ ,  $t(914) = -1.55$ ,  $p = .12$ , CI [-.69, 0.08]. As in Study 1, there was an interaction between event valence (pleasant vs. unpleasant) and event type (pandemic-related vs. pandemic-unrelated) in predicting affect change,  $b = 0.26$ ,  $t(914) = 2.00$ ,  $p = .05$ , 95% CI [0.01, 0.52]. Although the FAB was evident for both types of events, the magnitude of the FAB was larger for pandemic-unrelated events,  $b = 0.59$ ,  $t(914) = 5.48$ ,  $p < .001$ , 95% CI [0.38, 0.81], than pandemic-related events,  $b = 0.33$ ,  $t(914) = 4.63$ ,  $p < .001$ , 95% CI [0.19, 0.48]. Figure 4 shows that the magnitude of the FAB is smaller for pandemic-related compared to pandemic-unrelated events.

### 7.3 | Mediation via social disclosure frequency

#### 7.3.1 | Social disclosure in person

Event valence did not predict the frequency of social disclosure in-person,  $b = -.06$ ,  $t(901) = -.62$ ,  $p = .53$ , CI [-.27, 0.14], but collapsing across unpleasant and pleasant events, pandemic-related events were socially disclosed in-person more frequently ( $M = 3.88$ ,  $SD = 1.51$ ) compared to pandemic-unrelated events ( $M = 3.60$ ,  $SD = 1.57$ ),  $b = -.32$ ,  $t(901) = -2.86$ ,  $p = .004$ , CI [-.54, -.10]. Event valence (pleasant vs. unpleasant) and event type (pandemic-related vs. pandemic-unrelated) interacted to predict the frequency of social disclosure in-person,  $b = -.50$ ,  $t(914) = -2.25$ ,  $p = .02$ , 95% CI [-.93, -.06]. To explore this interaction, we first examined the effects of event valence (pleasant vs. unpleasant) upon frequency of social disclosure in-person for pandemic-related and pandemic-unrelated events separately.



**FIGURE 4** Fading affect scores for pandemic-related and pandemic-unrelated pleasant and unpleasant events in Study 2.

**TABLE 2** Mean frequency of social disclosure (in-person, using technology, and via social media) and private rehearsal for pleasant and unpleasant pandemic-related and pandemic-unrelated events in Study 2.

| Event type                    | Disclosure type |                  |                  |                   |
|-------------------------------|-----------------|------------------|------------------|-------------------|
|                               | In-person       | Using technology | Via social media | Private rehearsal |
| Pleasant pandemic-related     | 3.85 (1.51)     | 3.49 (1.65)      | 2.72 (1.68)      | 4.30 (1.31)       |
| Pleasant pandemic-unrelated   | 3.86 (1.44)     | 3.26 (1.73)      | 2.50 (1.63)      | 4.11 (1.43)       |
| Unpleasant pandemic-related   | 3.88 (1.49)     | 3.46 (1.65)      | 2.06 (1.47)      | 4.48 (1.43)       |
| Unpleasant pandemic-unrelated | 3.40 (1.60)     | 3.06 (1.64)      | 1.91 (1.35)      | 4.22 (1.54)       |

Note: Standard deviation in brackets.

Table 2 shows that pleasant pandemic-unrelated events were socially disclosed in person more frequently compared to unpleasant pandemic-unrelated events,  $t(189.03)^3 = 2.43$ ,  $p = .01$ . In contrast, there were no differences in frequency of social disclosure in-person for pleasant and unpleasant pandemic-related events,  $t(619) = -.29$ ,  $p = .77$ . Next, we examined the effects of event type (pandemic-related vs. pandemic-unrelated) upon frequency of social disclosure in-person for pleasant and unpleasant events separately. As in Study 1, there were no differences in frequency of social disclosure in-person between pleasant pandemic-related and pandemic-unrelated events,  $t(447) = 1.49$ ,  $p = .13$ , but unpleasant pandemic-related events were socially disclosed in-person to a greater frequency compared to pandemic-unrelated events,  $t(462) = 2.49$ ,  $p = .01$ .

Each method of discussing events or private rehearsal was rated on a scale from 1 (*not at all*) to 6 (*very frequently*).

We next examined if frequency of social disclosure in-person predicted affect change scores. As in Study 1, there was less fading of affect with increased frequency of social disclosure in person,  $b = -.10$ ,  $t(914) = -5.10$ ,  $p < .001$ , 95% CI  $[-.14, -.06]$ . An interaction between event valence (pleasant vs. unpleasant) and frequency of social disclosure in-person emerged in predicting affect change,  $F(908) = 4.08$ ,  $p = .04$ . With increasing frequency of social disclosure in-person, affect faded less, but

this effect was greater for positive affect,  $b = -.12$ ,  $t(448) = -4.85$ ,  $p < .001$ , compared to negative affect,  $b = -.05$ ,  $t(462) = -1.93$ ,  $p = .05$ .

Finally, we examined if the moderating effects of the pandemic upon the FAB were mediated via frequency of social disclosure in-person. The mediation model fit the data for events that were *not related* to the pandemic,  $b = 0.05$ , *boot se* = 0.02, *boot 95% CI* [0.01, 0.09], indicating that the effects of event valence upon affect change (i.e., the FAB) were mediated through frequency of social disclosure in person. However, as in Study 1, the mediation model did not fit the data for events that were *related* to the pandemic,  $b = 0.001$ , *boot se* = 0.01, *boot 95% CI*  $[-.03, 0.02]$ .

### 7.3.2 | Social disclosure using technology

Event valence (pleasant vs. unpleasant) did not predict the frequency of social disclosure using technology,  $b = -.03$ ,  $t(914) = -.21$ ,  $p = .83$ , 95% CI  $[-.30, 0.24]$ , and neither did event type (pandemic-related vs. pandemic unrelated),  $b = -.06$ ,  $t(914) = -.17$ ,  $p = .87$ , 95% CI  $[-.79, 0.67]$ . There was no interaction between event valence and event type in predicting frequency of social disclosure using technology,  $b = -.17$ ,  $t(914) = -.69$ ,  $p = .49$ , 95% CI  $[-.66, 0.32]$ .

The frequency of social disclosure using technology predicted less fading of affect,  $b = -.05$ ,  $t(914) = -3.11$ ,  $p < .001$ , 95% CI  $[-.09, -.02]$ , but this effect did not interact with event valence,  $F(1, 906) = 0.15$ ,  $p = .70$ . Finally, the mediation model did not fit the data for either pandemic-related events,  $b = 0.001$ ,  $boot\ se = 0.01$ ,  $boot\ 95\% \text{ CI } [-.01, 0.02]$ , or pandemic-unrelated events,  $b = 0.01$ ,  $boot\ se = 0.01$ ,  $boot\ 95\% \text{ CI } [-.01, 0.04]$ .

### 7.3.3 | Social disclosure via social media

There was a main effect of event valence (pleasant vs. unpleasant) in predicting the frequency of social disclosure via social media,  $b = -.66$ ,  $t(903)^4 = -5.13$ ,  $p < .001$ , 95% CI  $[-.92, -.41]$ , but no main effect of event type (pandemic-related vs. pandemic-unrelated),  $b = -.29$ ,  $t(903) = -.84$ ,  $p = .40$ , 95% CI  $[-.98, 0.39]$ , and no interaction between the two variables,  $b = .07$ ,  $t(903) = 0.31$ ,  $p = .75$ , 95% CI  $[-.38, 0.53]$ . As in Study 1, Table 2 shows greater frequency of social disclosure via social media for pleasant events compared to unpleasant events, across events which were and were not related to, or caused by, the pandemic.

Frequency of social disclosure via social media predicted less fading of affect,  $b = -.04$ ,  $t(903) = -1.99$ ,  $p = .05$ , 95% CI  $[-.07, -.0004]$ , but this effect did not interact with event valence,  $F(1, 897) = 0.35$ ,  $p = .54$ , suggesting that both positive and negative affect faded less with increasing frequency of social disclosure via social media. Finally, we tested if the moderating effects of the pandemic upon the FAB were mediated via frequency of social disclosure using social media. The mediation model fit the data for both pandemic-related events,  $b = 0.02$ ,  $boot\ se = 0.01$ ,  $boot\ 95\% \text{ CI } [0.001, 0.05]$ , and pandemic-unrelated events,  $b = 0.02$ ,  $boot\ se = 0.01$ ,  $boot\ 95\% \text{ CI } [0.0008, 0.05]$ . Thus, FAB was mediated by frequency of social disclosure via social media, regardless of the type of event.

### 7.3.4 | Frequency of private rehearsal

Neither event valence,  $b = 0.18$ ,  $t(914) = 1.63$ ,  $p = .10$ , 95% CI  $[-.04, 0.40]$ , or event type,  $b = -.13$ ,  $t(914) = -.42$ ,  $p = .68$ , 95% CI  $[-.72, 0.47]$ , predicted frequency of overall private rehearsal, and there was no interaction,  $b = -.07$ ,  $t(914) = -.33$ ,  $p = .74$ , 95% CI  $[-.46, 0.33]$ . Frequency of private rehearsal predicted less fading of affect,  $b = -.14$ ,  $t(914) = -6.85$ ,  $p < .001$ , 95% CI  $[-.19, -.10]$ , but this effect did not interact with event valence, suggesting less fading of affect with increasing frequency of private rehearsal for both positive and negative events. The mediation model for private rehearsal frequency did not fit the data for events either related to the pandemic,  $b = -.03$ ,  $boot\ se = 0.03$ ,  $boot\ 95\% \text{ CI } [-.06, 0.001]$ , or unrelated to the pandemic,  $b = -.02$ ,  $boot\ se = 0.03$ ,  $boot\ 95\% \text{ CI } [-.07, 0.04]$ , indicating the FAB was not mediated via private rehearsal frequency.

## 7.4 | Exploratory analysis of the nature of events using event descriptions

We conducted an exploratory analysis using a linguistic tool to explore the characteristics of event descriptions across both studies, to yield insights into the nature of the events that were caused by or related to the pandemic.<sup>5</sup> The program Linguistic Inquiry and Word Count (LIWC: Pennebaker, Booth, et al., 2015; Pennebaker, Boyd, et al., 2015) is a popular tool used for linguistic analysis, which is used to explore the nature of written texts. The LIWC program has a validated dictionary of approximately 4500 words in 80 categories, ranging from words relating to social relationships (e.g., friends, family), personal concerns (e.g., work, leisure) along with other elements, such as function words (e.g., I, we, but, on), past, present and future tense terms (e.g., went, had, is, does, will) and psychological processes (words relating to cognition and emotion, such as think, insight, happy, sad). The LIWC program processes each text file word by word, comparing each word to the dictionary, and calculates how many words in the text fall into each of the categories, as a percentage of all the words in the text (Pennebaker, Booth, et al., 2015; Pennebaker, Boyd, et al., 2015).

There is precedence in the FAB literature in using LIWC to examine characteristics of events retrieved by participants. Muir et al. (2015) used LIWC to analyse descriptions of pleasant and unpleasant events provided by participants before and after the events had been socially disclosed to another participant. They found that event descriptions were described with a greater percentage of positive and negative emotion terms (e.g., happy, joyful; sad, angry) after being socially disclosed, compared to beforehand, and compared to events that were not socially disclosed. Thus, examining the words used to describe events can be an effective method of characterizing events retrieved by participants in FAB studies.

We processed the event descriptions written by participants in both studies using LIWC 2015 (Pennebaker, Booth, et al., 2015, Pennebaker, Boyd, et al., 2015), which yielded the percentage of words in each description that fell into a number of linguistic categories. We included word categories that would indicate the nature of the events: emotional content (*positive emotion*, such as love, nice, and *negative emotion*, such as hurt, nasty); *cognitive processes* (e.g., think, know, because, effect, should, would); *social processes* (daughter, dad, mate, neighbor); *achievement* (e.g., win, success); *leisure* (e.g., chat, movie); *home* (e.g., kitchen, house); *death* (e.g., bury, coffin); and *biological processes* (e.g., cheek, hands, pill, clinic).

We conducted a between subjects ANOVA with the linguistic categories as dependent variables, with event valence (pleasant vs. unpleasant) and event type (pandemic-related vs. pandemic-unrelated) as independent variables. We also included a nominal variable representing participants to account for clustering in our data resulting from participants recalling and describing multiple events. Table 3, below, presents the results of this analysis, including mean percentages of words in each category in event descriptions, combining descriptions from Studies 1 and 2.

**TABLE 3** Means and standard deviations of word categories (as a percentage of total words in the description) for event descriptions collapsed across Studies 1 and 2.

| Word category        | Pleasant events  |                    | Unpleasant events |                    | Effects   |
|----------------------|------------------|--------------------|-------------------|--------------------|---|
|                      | Pandemic-related | Pandemic-unrelated | Pandemic-related  | Pandemic-unrelated |   |
| Positive emotions    | 4.49 (3.81)      | 5.19 (4.66)        | 1.28 (1.83)       | 1.08 (1.94)        | Valence $F(1, 884) = 240.56, p < .001, \eta^2p = 0.21$<br>Event Type $F(1, 884) = 1.95, p = .16, \eta^2p = 0.001$<br>Valence $\times$ Event Type $F(1, 884) = 3.66, p = .06, \eta^2p = 0.004$ |
| Negative emotions    | 0.79 (1.60)      | 0.46 (1.27)        | 4.62 (5.89)       | 4.17 (3.96)        | Valence $F(1, 884) = 170.13, p < .001, \eta^2p = 0.16$<br>Event Type $F(1, 884) = 0.12, p = .72, \eta^2p < .001$<br>Valence $\times$ Event Type $F(1, 884) = 0.42, p = .51, \eta^2p < .001$   |
| Social processes     | 12.53 (7.81)     | 13.93 (9.69)       | 10.16 (7.91)      | 9.48 (7.32)        | Valence $F(1, 884) = 32.60, p < .001, \eta^2p = 0.03$<br>Event Type $F(1, 884) = 0.38, p = .53, \eta^2p < .001$<br>Valence $\times$ Event Type $F(1, 884) = 2.97, p = .08, \eta^2p = 0.003$   |
| Cognitive processes  | 8.57 (5.41)      | 7.54 (6.00)        | 10.68 (6.57)      | 10.18 (6.84)       | Valence $F(1, 884) = 28.11, p < .001, \eta^2p = 0.03$<br>Event Type $F(1, 884) = 2.92, p = .08, \eta^2p = 0.003$<br>Valence $\times$ Event Type $F(1, 884) = .02, p = .88, \eta^2p < .001$    |
| Biological processes | 1.89 (2.44)      | 2.53 (3.69)        | 1.99 (2.86)       | 3.77 (5.55)        | Valence $F(1, 884) = 7.31, p = .007, \eta^2p = 0.008$<br>Event Type $F(1, 884) = 23.96, p < .001, \eta^2p = 0.03$<br>Valence $\times$ Event Type $F(1, 884) = 5.27, p = .02, \eta^2p = 0.006$ |
| Achievement          | 2.00 (2.57)      | 2.52 (4.83)        | 2.32 (3.47)       | 1.16 (1.97)        | Valence $F(1, 884) = 4.23, p = .04, \eta^2p = 0.005$<br>Event Type $F(1, 884) = 2.61, p = .11, \eta^2p = 0.001$<br>Valence $\times$ Event Type $F(1, 884) = 10.83, p = .001, \eta^2p = 0.01$  |
| Work                 | 2.17 (3.92)      | 1.89 (4.37)        | 2.58 (3.99)       | 2.68 (9.88)        | Valence $F(1, 884) = 2.53, p = .11, \eta^2p = 0.003$<br>Event Type $F(1, 884) = 0.13, p = .71, \eta^2p < .001$<br>Valence $\times$ Event Type $F(1, 884) = 0.17, p = .67, \eta^2p < .001$     |
| Home                 | 1.76 (2.29)      | 1.95 (3.56)        | 1.49 (3.01)       | 0.93 (2.08)        | Valence $F(1, 884) = 9.56, p = .002, \eta^2p = 0.01$<br>Event Type $F(1, 884) = 0.82, p = .33, \eta^2p = 0.001$<br>Valence $\times$ Event Type $F(1, 884) = 3.22, p = .07, \eta^2p = 0.004$   |
| Leisure              | 3.41 (4.20)      | 4.61 (7.37)        | 1.41 (3.06)       | 1.09 (2.58)        | Valence $F(1, 884) = 66.72, p < .001, \eta^2p = 0.07$<br>Event Type $F(1, 884) = 1.67, p = .19, \eta^2p = 0.002$<br>Valence $\times$ Event Type $F(1, 884) = 5.07, p = .02, \eta^2p = 0.006$  |
| Money                | 0.74 (2.21)      | 0.57 (1.58)        | 0.81 (2.24)       | 0.45 (1.84)        | Valence $F(1, 884) = 0.03, p = .86, \eta^2p < .001$<br>Event Type $F(1, 884) = 2.41, p = .12, \eta^2p = 0.001$<br>Valence $\times$ Event Type $F(1, 884) = 0.08, p = .77, \eta^2p < .001$     |
| Death                | 0.009 (.13)      | 0.003 (.04)        | 0.52 (2.99)       | 1.02 (2.70)        | Valence $F(1, 884) = 26.42, p < .001, \eta^2p = 0.03$<br>Event Type $F(1, 884) = 2.83, p = .09, \eta^2p = 0.003$<br>Valence $\times$ Event Type $F(1, 884) = 2.96, p = .08, \eta^2p = 0.003$  |

A main effect of event valence was evident for several of the word categories: words relating to positive emotions, negative emotions, social processes, cognitive processes, biological processes, leisure, achievements, home, and death.<sup>6</sup> We also observed a significant interaction between event valence and event type for words relating to biological processes, achievement, and leisure. For the linguistic category biological processes, there was a main effect

of event type<sup>7</sup> and a significant interaction between event type and event valence. Overall, pandemic-unrelated event descriptions contained more words relating to biological processes compared to pandemic-related event descriptions, but the magnitude of this difference was greater for unpleasant events,  $F(1, 443) = 19.21, p < .001, \eta^2p = 0.04$ , than pleasant events,  $F(1, 440) = 4.75, p = .03, \eta^2p = 0.01$ .

For words relating to achievement, a significant interaction between event type and event valence showed fewer words relating to achievement in unpleasant pandemic-unrelated, compared to pandemic-related, event descriptions,  $F(1, 443) = 11.29$ ,  $p < .001$ ,  $\eta^2p = 0.02$ . For pleasant events, no differences in references to achievement were observed for each event type,  $F(1, 440) = 1.97$ ,  $p = .16$ ,  $\eta^2p = 0.004$ .

For the category of leisure, a significant interaction between event type and event valence showed no differences in references to leisure between unpleasant pandemic-related and pandemic-unrelated event descriptions,  $F(1, 443) = 1.09$ ,  $p = .29$ ,  $\eta^2p = 0.002$ . In contrast, pleasant events showed fewer words relating to leisure in pandemic-related compared to pandemic-unrelated event descriptions,  $F(1, 440) = 4.49$ ,  $p = .03$ ,  $\eta^2p = 0.01$ .

## 7.5 | Discussion of Study 2

We found that many of the same effects in Study 1 replicated in Study 2. We again found the FAB, this time with approximately a 10 month retention interval between event occurrence and recall. We again found that using social media mediated the FAB, in that pleasant events were socially disclosed using social media more frequently than unpleasant events (across both pandemic-related and pandemic-unrelated events), which was then associated with less fading of positive affect. This result suggests that using social media can be a beneficial way of communicating with others about life events, such that the FAB is enhanced.

Further, the smaller FAB in relation to the pandemic was again observed, showing that the effects seen in Study 1 were reliable and extended across a longer retention interval. Social disclosure in-person is one factor that could explain the smaller FAB for pandemic-related events. The effects of the pandemic upon the FAB were again mediated by the frequency with which events were socially disclosed in person. As in Study 1, pleasant pandemic-unrelated events were socially disclosed in person more frequently compared to unpleasant pandemic-unrelated events, leading to less fading of positive affect in comparison to negative affect (and thus the FAB). However, the same effects were not present for pleasant and unpleasant events which were related to the pandemic, which were socially disclosed in-person to an equal level, leading to less fading of both positive and negative affect (and, therefore, a smaller FAB). As in Study 1, these same effects were not evident for the frequency of social disclosure via technology or social media, or via private rehearsal. Thus, we again highlight the unique role of social disclosure which takes place in-person, as this method of disclosure was the only one that mediated the effects of the pandemic upon the FAB.

We used a linguistic tool to explore the nature of events that were related and unrelated to the pandemic, combined across both studies. Interestingly, unpleasant events that were *not related* to the pandemic contained *more* words relating to biological processes (e.g., *eat, blood, pain*), and fewer words relating to achievement (e.g., *win, success*), compared to events related to the pandemic. This result

suggests that whilst some unpleasant aspects of life were reduced due to pandemic related lockdowns, such as stresses associated with work or commuting (Ipsen et al., 2021), the negative experiences of life around health and illness continued, and experiences of achievement were reduced. In addition, although participants did report experiencing some pleasant events associated with the pandemic, *pandemic-unrelated pleasant events* contained *more* leisure related words (e.g., *chat, movie*) compared to pleasant pandemic-related events. The pandemic apparently impacted on the nature of leisure activities experienced during the lockdown periods (see also Lee & Tipoe, 2021).

## 8 | GENERAL DISCUSSION

Across two studies we found events that were related to or caused by the COVID-19 pandemic in the United Kingdom showed a smaller FAB compared to events that were not related to the pandemic. In both studies, the FAB was mediated via frequency of social disclosures using social media. Further, the effects of the pandemic upon the FAB were mediated via the frequency of in-person social disclosure, but not via the frequency of other modes of social disclosure including using technology or social media, and or via frequency of private rehearsal (in Study 2).

Like most other studies within the FAB literature (Ritchie et al., 2006; Ritchie et al., 2009; Ritchie & Skowronski, 2008), our use of a retrospective paradigm did rely on participants' ability to recall and report personally experienced events from the past. We did not manipulate any variables in these studies, so we can only draw correlative conclusions about the effects of the pandemic and social disclosure on the FAB. Future research could focus on expanding the methodologies used to explore the FAB beyond self-report. These methods could include manipulating variables such as social disclosure frequencies via different communicative modes to draw stronger causal conclusions, and using methods such as daily diary studies to collect event memories from participants to ensure random sampling. Nevertheless, the results of two studies indicate that the COVID-19 pandemic influenced the fading affect bias in autobiographical memory, via the frequency to which events were socially disclosed in-person, and that disclosure via social media mediated the FAB for both pandemic-related and unrelated events. We found that these effects generalized across short retention intervals (an average of 2–3 months between event occurrence and recall) and longer retention intervals (an average of 10 months between event occurrence and recall).

### 8.1 | Modes of social disclosure and the FAB

We present the novel finding that the *mode* of social disclosure is important for the FAB. Interestingly, social disclosure using technology (video calls, by phone, or instant messaging) did not mediate the FAB, which is in line with other research showing that social



interaction which was mediated by technology during the COVID-19 pandemic did not necessarily have the same impact as in-person social interaction. For instance, Okabe-Miyamoto et al. (2021) found that video calling did not result in feelings of social connectedness, nor protect against feelings of loneliness during social distancing measures in the United States and United Kingdom. Thus, our results could show the impacts of social distancing measures in reducing opportunities for in-person social interaction may not necessarily be compensated by increases in communication using technology, such as video calling.

Our finding that the effects of the pandemic upon the FAB were only mediated via social disclosure *in-person*, suggests something special about this mode of communication. Indeed, some research suggests that in person communication can be associated with more positive feelings and positive implications for relationships, compared to other modes of communication. For example, perceived bonding between pairs of friends was greatest when the pairs chatted in-person, compared to video, audio or instant messaging chats (Sherman et al., 2013). Relevant to the FAB, research suggests that, after experiencing a stressor, in-person emotional support is more effective at raising levels of positive affect compared to text messages (Holtzman et al., 2017; Subrahmanyam et al., 2020). Social presence theory might explain this preference for in-person social interaction. Social presence refers to the ability for any communication medium to effectively convey the feeling that one's conversational partner is physically present (Biocca & Harms, 2002; IJsselstein et al., 2003). In-person, face to face communication is generally considered to be the richest form of communication in terms of the instantaneous transmission and exchange of verbal and non-verbal cues, and conveyance of affective information (Burke & Chidambaram, 1996; Daft & Lengel, 1986). Perhaps our innate drive for rich communication accounts for why only in-person social disclosure had an impact upon the fading of affect intensity for pandemic-unrelated events.

Further, certain types of events and emotions are more likely to be shared with some people than others. For instance, experiences of shame are socially shared less frequently and with fewer people, compared to experiences of sadness or fear (Singh-Manoux & Finkenauer, 2001). Our exploratory analysis revealed that unpleasant pandemic-unrelated events were described with words relating to biological processes, including sickness, medical and health concerns. This result suggested that these events were infrequently socially disclosed in person due to lower perceived social acceptability of sharing these types of experiences (Van Kleef, 2009). For instance, health-related experiences are often felt to be private in nature and less socially shared due to fear of shame or stigma (Bansal et al., 2010; Dolezal et al., 2021). In contrast, unpleasant pandemic-related events were described with words relating to achievement, such as experiences of failure or leaving employment/study as a consequence of the pandemic. These types of events may have been viewed as more appropriate or desirable to share socially (e.g., Shepherd et al., 2020; Whittle et al., 2020). Another aspect to consider is the nature of listener responses, because they are linked to an enhanced or reduced fading affect bias after social disclosure (Muir et al., 2015; Muir

et al., 2019). Listener responses that are high in *person centredness* (e.g., acknowledging and legitimizing emotions expressed by the discloser) have been linked to reductions in negative emotions in the discloser (Bodie et al., 2015; Burleson, 1982), and *enthusiastic support* given to pleasant event disclosures by listeners can be linked to boosts in positive emotions (Gable et al., 2004). It is reasonable to suggest the nature of the event shared, or characteristics of the discloser, could, in turn, influence listener responses (e.g., Forest et al., 2014). For instance, listeners may be unlikely to respond with *enthusiastic support* to a disclosure about a pleasant event caused by the pandemic, if the listener perceived that event to be socially unacceptable considering lockdown restrictions (Martínez et al., 2021). Thus, the nature of pandemic-related and pandemic-unrelated events could have influenced several elements of social disclosure including frequency and listener responses to the disclosure, depending on perceptions of event importance, salience, or social acceptability at the time of the pandemic.

The retrospective FAB paradigm that we used employs global positive and negative self-report affect intensity scales. We, therefore, did not capture the subtle differences in discrete emotions triggered by events experienced by individuals during the pandemic. For example, an unpleasant event that was *not caused by or related to the pandemic* could have triggered discrete emotions of shame and embarrassment, whereas an unpleasant event *caused by the pandemic* could have triggered fear and anger. These specific emotions might have been perceived as appropriate or inappropriate to share socially. Further, we observed that *both* positive and negative affect intensity faded *less* with increasing frequency of social disclosure in-person. In contrast, previous FAB research highlights that social disclosure can have different effects upon positive versus negative affect intensity, as frequent social disclosure can be associated with increased negative affective fading and decreased positive affective fading (e.g., Skowronski et al., 2004; Walker et al., 2009). This interesting contradiction of results for in-person social disclosure is for future research to pursue, by collecting the discrete emotion types associated with experienced events and the extent to which they are socially disclosed, along with other elements of the disclosure, such as listener responses and measuring consequent affect fading.

Our final result has important implications in situations where individuals are isolated from other people: we found that socially disclosing events via social media mediated the FAB. Participants disclosed pleasant events via social media more than unpleasant events, and this effect was associated with less fading of positive affect (and thus increased FAB) for both pandemic-related and pandemic-unrelated events. Our research suggests that using social media to disclose pleasant experiences to others may help to prevent their associated positive affect from fading. Therefore, using social media to discuss experienced events may be particularly useful in situations where in-person social interaction is restricted or limited. Indeed, some research shows that using social media during lockdown periods was helpful in building resilience to the stresses of the pandemic (Marzouki et al., 2021). Our findings could also point to the potential effectiveness of using various modes of communication including social media

to facilitate emotional regulation processes, particularly to help preserve positive emotions in autobiographical memory. We encourage future research to explore this interesting avenue further.

We are the first in the FAB literature to consider the impact of social disclosure using different modes, so our results must be considered as preliminary. We further acknowledge that we did not differentiate between forms of technology mediated social disclosure (e.g., using instant messaging vs. video calls), or varying social media platforms (e.g., Twitter vs. Instagram). Thus, we are unable at this point to make fine-grained distinctions about the impacts of these different modes of communication. Future research could further explore the relation between the FAB and different communicative mediums in more depth, along with interactions involving personality with respect to preferences for modes of social interaction. For example, some research indicates that social anxiety is related to concerns about privacy on Facebook, which, in turn, negatively correlates with self-disclosure using Facebook (Liu et al., 2013).

## 8.2 | Conclusions

We found the COVID-19 pandemic has disrupted the normal processes that act upon autobiographical memory and result in the FAB, leading to a reduced FAB for events which were caused by the pandemic. Further, we found that these effects were mediated by in-person social disclosure, and disclosure using social media mediated the FAB, for both pandemic-related and unrelated events. Our findings, therefore, point to a special function for social disclosure, which appears to be particularly important when it comes to the fate of emotions in autobiographical memory. We, thus, add to understanding the impact of social isolation due to pandemic lockdowns and highlight that talking about experiences with a communication partner is a vital part of emotional regulation in the autobiographical memory system.

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## CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to declare.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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## ENDNOTES

- <sup>1</sup> Note, 11 participants declined to answer the question about their employment conditions during the lockdown period.
- <sup>2</sup> Note, three participants declined to answer this question about number of individuals living in the household.
- <sup>3</sup> Equal variances not assumed.
- <sup>4</sup> Note, not all participants opted to provide estimates of social disclosure via social media for each event.
- <sup>5</sup> We also explored if pandemic-related events were different in nature from not-pandemic events by conducting a 2 (event valence)  $\times$  2 (event type) one-way ANOVA on occurrence ratings. In study 1, there were no differences in affect intensity at event occurrence between pleasant and unpleasant events,  $F(1, 905) = 0.007$ ,  $p = .93$ ,  $\eta^2p < .001$ , or between pandemic-related and pandemic-unrelated events,  $F(1, 905) = 0.002$ ,  $p = .96$ ,  $\eta^2p < .001$ . There was an interaction between event valence and event type on occurrence ratings,  $F(1, 905) = 4.27$ ,  $p = .04$ ,  $\eta^2p = 0.004$ . Pleasant pandemic-related events were rated as slightly higher in affect intensity at occurrence ( $M = 2.50$ ,  $SD = 0.64$ ) compared to unpleasant pandemic-related events ( $M = 2.40$ ,  $SD = 0.78$ ), but this difference only approached statistical significance,  $F(1, 574) = 3.28$ ,  $p = .07$ ,  $\eta^2p = 0.006$ . Unpleasant pandemic-unrelated events were slightly higher in affect intensity at occurrence ( $M = 2.50$ ,  $SD = 0.77$ ) compared to pleasant pandemic-unrelated events ( $M = 2.40$ ,  $SD = 0.70$ ), but this was again not a reliable difference,  $F(1, 329) = 1.66$ ,  $p = .19$ ,  $\eta^2p = 0.005$ . In study 2, there was a main effect of event valence upon ratings of affect intensity at event occurrence,  $F(1, 908) = 5.05$ ,  $p = .02$ ,  $\eta^2p = 0.006$ , suggesting that collapsing across event type, unpleasant events were rated as slightly higher in affect intensity at event occurrence ( $M = 2.49$ ,  $SD = 0.65$ ) compared to pleasant events ( $M = 2.38$ ,  $SD = 0.72$ ). This is not unheard of in the FAB literature (e.g., Gibbons et al., 2011; Muir et al., 2015; Ritchie et al., 2009). As in study 1, there were no differences in affect intensity at event occurrence between pandemic-related and pandemic-unrelated events,  $F(1, 908) = 0.09$ ,  $p = .75$ ,  $\eta^2p < .001$ , and there was no interaction between event valence and event type on occurrence ratings,  $F(1, 908) = 0.005$ ,  $p = .95$ ,  $\eta^2p < .001$ .
- <sup>6</sup> In comparison to unpleasant events, collapsing across event type pleasant events were described with a greater percentage of words relating to positive emotion ( $M = 4.68$ ,  $SD = 4.28$  vs.  $M = 1.18$ ,  $SD = 1.93$ ), social processes ( $M = 12.60$ ,  $SD = 8.86$  vs.  $M = 10.38$ ,  $SD = 8.14$ ), leisure ( $M = 3.13$ ,  $SD = 5.21$  vs.  $M = 2.19$ ,  $SD = 4.46$ ), achievements ( $M = 2.25$ ,  $SD = 3.83$  vs.  $M = 2.02$ ,  $SD = 3.19$ ), and home ( $M = 1.71$ ,  $SD = 2.96$  vs.  $M = 1.50$ ,  $SD = 2.83$ ). In contrast, in comparison to pleasant events, collapsing across event type unpleasant events contained more words relating to negative emotions ( $M = 4.45$ ,  $SD = 5.31$  vs.  $M = 0.62$ ,  $SD = 1.45$ ), cognitive processing ( $M = 10.09$ ,  $SD = 6.69$  vs.  $M = 7.91$ ,  $SD = 5.88$ ), biological processes ( $M = 2.44$ ,  $SD = 3.81$  vs.  $M = 2.19$ ,  $SD = 3.11$ ), and death ( $M = 0.65$ ,  $SD = 2.92$  vs.  $M = 0.006$ ,  $SD = 0.10$ ).
- <sup>7</sup> Collapsing across event valence, descriptions of pandemic-unrelated events contained more references to biological processes ( $M = 2.97$ ,  $SD = 4.47$ ) compared to pandemic-related events ( $M = 1.95$ ,  $SD = 2.69$ ).

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