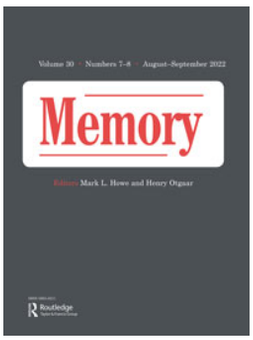

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The moderating effects of nostalgia on mood and optimism during the COVID-19 pandemic

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ABSTRACT

The initial waves of the coronavirus pandemic amplified feelings of depression, psychological fatigue and pessimism for the future. Past research suggests that nostalgia helps to repair negative moods by boosting current and future-oriented positive affect, thereby strengthening psychological resilience. Accordingly, the present study investigated whether nostalgia moderated the relationship between pandemic experience and individual differences in mood and optimism. Across two studies we assessed psychosocial self-report data from a total of 293 online participants (22–72 years old; mean age 38; 109 females, 184 males) during the first two waves of the pandemic. Participants completed comprehensive questionnaires that probed state and trait characteristics related to mood and memory, such as the Profile of Mood States, Nostalgia Inventory and State Optimism Measure. Our findings indicate that during the initial wave of coronavirus cases, higher levels of nostalgia buffered against deteriorating mood states associated with concern over the pandemic. Nostalgia also boosted optimism for participants experiencing negative mood, and optimism predicted subjective mood improvement one week later. This shielding effect of nostalgia on optimism was replicated during the second wave of coronavirus cases. The present findings support the role of nostalgia in promoting emotional homeostasis and resilience during periods of psychological distress.

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Nostalgia; mood; optimism; COVID-19

In March 2020, the World Health Organisation declared the coronavirus disease (COVID-19) a global pandemic (WHO, 2020). Soon thereafter, the United States adopted strict social distancing measures to help curb the spread of COVID-19, while many people also struggled with reduced income and food shortages. As a result, the deleterious effects of COVID-19 contributed to a mental health crisis in the midst of concurrent healthcare and economic instability. Almost half of adults surveyed in late March 2020 reported that worrying about the coronavirus pandemic was having a negative impact on their mental health (Kirzinger et al., 2020). In April 2020, a third of Americans surveyed by the Centers for Disease Control and Prevention reported symptoms of anxiety or depression, compared to only 11% who reported symptoms at the beginning of 2019 (CDC, 2020). As such, documenting the psychological well-being of individuals during this time and examining factors that moderated the effects of pandemic-induced stress and mood disturbance can provide crucial information to help mitigate ongoing mental health deterioration and prepare for future pandemic responses.

The initial waves of coronavirus cases led to widespread lockdowns throughout the world, and primary COVID-19 stressors included hearing and reading about the severity of the pandemic, financial uncertainty and changes to daily social routines (Park et al., 2020). These disruptions had many people yearning to return to the comfort and normalcy of their lives before the pandemic, although it was unclear when, or if, that would happen. These feelings of nostalgia are not surprising – reflecting on and romanticising pre-pandemic events became commonplace within media and political rhetoric, perhaps as a coping mechanism to help people psychologically distance from their distress (Gammon & Ramshaw, 2020). Recollecting a personal, nostalgic past likely provided a source of stability by reminding individuals of their social support networks and simpler times from before the pandemic.

To uncover why nostalgia can have such influential power, a rapidly growing body of research has emerged over the past two decades to study the content, triggers and functions of feeling nostalgic. This research has led to an empirical characterisation of nostalgia as a bittersweet and sentimental longing for the past, commonly

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for affectionate, idealised and personally meaningful memories (Hepper et al., 2012). Nostalgia thus constitutes a mixed-valenced experience of both positive and negative emotions, although this balanced characterisation contrasts starkly with original accounts of nostalgia. First proposed by Johannes Hofer in 1688, nostalgia was used to explain the physical and mental symptoms of Swiss mercenaries suffering from severe homesickness (Hofer, 1688/1934). Considered a psychiatric disorder resembling depression, nostalgia diagnoses gained even greater prominence during America's Civil War as soldiers experienced a debilitating longing to return home (Griesinger, 1867/1965). Eventually, however, scholars realised that many people experience nostalgia without the debilitating consequences that were observed on the battlefield. Indeed, with the cognitive revolution of the twentieth century and the emergence of affective science research, nostalgia transitioned into a more general psychological construct at the intersection of emotion and memory. Yet, despite losing classification as a psychiatric disorder, nostalgia was still often grouped with homesickness and thought to facilitate depressed mood as one desires to return to the past (McCann, 1941).

The positive, adaptive functions of nostalgia gained more widespread appreciation in the late twentieth century, with greater focus placed upon the heartwarming feelings of joy and reminiscence that accompany nostalgic memories (Kaplan, 1987). Since then, accumulating evidence has suggested that past scholars assumed a flawed causal interpretation of nostalgia and mood. That is, instead of inducing negative affect, nostalgia arises *because* of negative affect, which it subsequently acts to repair by simulating contrasting positive emotions (Batcho, 2013; De Brigard, 2018; Sedikides & Wildschut, 2018). In other words, nostalgia is an important factor in the relation between current negative mood and future mood improvement. This significant change to interpreting nostalgia was largely led by a series of studies from Wildschut and colleagues, who demonstrated that although descriptions of nostalgic experiences often involve negative components such as disappointment, loss, or a longing for what was, they are also filled with positive elements related to growth, self-esteem and the appreciation of past and current social bonds (Wildschut et al., 2006). Moreover, while negative moods induce a greater tendency to feel nostalgic, reminiscing on the nostalgic past promotes higher ratings of positive affect compared to simply recalling an ordinary autobiographical event. Thus, while negative moods may initially trigger nostalgic thoughts, nostalgia counteracts this negative mood by bolstering positive emotions involving social connectedness and self-esteem (Wildschut et al., 2006). Several studies have supported these claims (for a review, see Sedikides & Wildschut, 2018), emphasising that the personal significance of nostalgia and accompanying social elements maintain a sense of meaning in life (Routledge et al., 2011) and boost optimism (Cheung et al., 2013). The mood-repairing effects of nostalgia can be both immediate and long-lasting, given that higher levels of optimism are predictive of mood improvement weeks or even months into the future (Carver et al., 2010). These findings suggest an intricate relationship of nostalgia with past, present and future moods. Specifically, feeling nostalgic helps to cope with depressed mood by promoting emotional equilibrium between current positive and negative affect, as well as encouraging optimistic future thinking. Regarding the COVID-19 pandemic, nostalgia might therefore serve as an effective resilience factor in the presence of high distress and uncertainty. The availability of social support networks and higher optimism, for instance, have been shown to promote more stable mental health trajectories (Chen & Bonanno, 2020; Killgore et al., 2020). Evaluating the link between nostalgia, mood and optimism in relation to resilience throughout the pandemic can help validate the proposed triggers and functions of nostalgia outside of the lab-setting context in which they are commonly examined, thereby adding to an ongoing empirical effort to characterise this mixed-valenced emotional experience.

Importantly, when analyzing the effects of nostalgia, researchers must appreciate its unique positioning between negative and positive affect. Higher levels of nostalgia often contribute to a complex shift in statistical relations among other affect-related variables. For instance, Zhou et al. (2008) found that nostalgia was positively associated with both loneliness and perceived social support, even though loneliness was negatively associated with perceived social support. Upon further examination, subsequent analyses revealed that increased loneliness directly reduced feelings of social connectedness, but also indirectly *strengthened* social connectedness via nostalgia. That is, more loneliness predicted more nostalgia, which in turn predicted higher ratings of perceived social support. This pattern of effects indicates statistical suppression, whereby controlling for an intervening variable (nostalgia) strengthens the relationship between a predictor (loneliness) and dependent variable (social support). The authors also showed that resiliency moderated the relationship between loneliness and nostalgia, such that increased loneliness only associated with increased nostalgia among highly resilient individuals. Because a moderation by resiliency was not observed between nostalgia and perceived social support, these findings suggest that nostalgia is generally beneficial, but primarily recruited during periods of loneliness by resilient individuals (Zhou et al., 2008). In a similar vein, Abeyta et al. (2020) also evaluated whether nostalgia moderated the relationship of loneliness with social confidence and approach-related social intentions (i.e., willingness to participate in social interactions). Greater loneliness predicted less social confidence and approach-related intentions, but the strength of these relations weakened with higher levels of nostalgia. The authors interpreted these findings as suggesting that nostalgia regulates the negative motivational

tendencies that are typically associated with loneliness (Abeyta et al., 2020).

Recent work has also assessed the relations among nostalgia, loneliness and happiness during the COVID-19 pandemic. Across several studies conducted in China, the United States and the United Kingdom, Zhou et al. (2021) again observed a statistical suppression effect of nostalgia. The data indicated that loneliness was associated with feeling less happy but also more nostalgic. Nostalgia, in turn, was associated with feeling happier, thereby counteracting reductions in happiness associated with loneliness. To test the assumed directionality of nostalgia on boosting positive affect, Zhou et al. (2021) also conducted three separate studies showing that induced nostalgia (by asking participants to reflect on nostalgic memories) associated with increased reports of happiness compared to a control condition. Presumably, this mood-repairing effect of nostalgia may also transfer to an improved outlook for the future, although to our knowledge the relationship between nostalgia and optimism has not been tested during the pandemic. Moreover, it remains unclear whether feelings of nostalgia are directly linked to personal impact from the pandemic, or whether they arise from general changes in negative affect, as well as if nostalgia moderates the relationship among other indicators of positive and negative affect beyond just loneliness and happiness. Indeed, the moderating influence of nostalgia has been shown to be quite broad, such as buffering the relationships between mortality salience and death-related thoughts (Routledge et al., 2008), low meaning in life and subjective vitality (Routledge et al., 2011), low interactional justice and intrinsic motivation (van Dijke et al., 2019), and limited time horizons and psychological well-being (Hepper et al., 2021). In all these instances, higher levels of nostalgia shield against the secondary consequences of negative affect.

A primary mechanism by which nostalgia achieves this shielding effect is by boosting optimism. Specifically, nostalgia draws upon heartwarming and idealised memories from the past, which subsequently foster current feelings of social connectedness and self-worth to brighten one's outlook for the future (Cheung et al., 2013, 2016). In addition to boosting optimism, nostalgia has also been shown to boost prosocial behaviour, inspiration and creativity, supporting recent calls to consider nostalgia as a future-oriented emotion that exerts a positive, motivational force on behaviour (Sedikides & Wildschut, 2016, 2019). Regarding psychological resilience, a positive view of the future supports approach-focused coping strategies such as support seeking and cognitive restructuring to manage a stressor more directly and with self-agency (Mak et al., 2011; Solberg Nes & Segerstrom, 2006). Indeed, optimism has already been shown to be beneficial for mental health during COVID-19. Specifically, optimistic thinking styles during initial lockdown following the COVID-19 outbreak were negatively associated with psychological distress and post-traumatic symptoms, in contrast to "all-or-nothing" (extreme) thinking styles that were positively associated with poor mental health trajectories (Giusti et al., 2020). Whether these relations among future thinking and emotional well-being can be traced to individual differences in feeling nostalgic remains to be tested.

We note that this view of nostalgia as a predominantly positive influence on affect may seem somewhat surprising, provided that nostalgia requires mentally simulating an episodic past we wish we could revisit, akin to rumination and counterfactual thinking (De Brigard & Parikh, 2019). Indeed, dispositional nostalgia is often correlated with ruminative tendencies (Cheung et al., 2018; Garrido, 2018), likely due to a shared reliance on recalling the past to inform the present. Recent work, however, suggests that the autobiographical memory functions of nostalgia are distinct from that of rumination and counterfactual thinking. Specifically, compared to these other modes of mental simulation, nostalgia proneness is uniquely associates with the tendency to reminisce on the past to maintain intimacy with others in lieu of their physical presence, to teach/inform about life, and to understand one's identity, while it is less closely affiliated with functions such as bitterness revival (Cheung et al., 2018). These findings suggest that nostalgia contains a more positive functional signature, and hence why individuals who are more prone to feeling nostalgic may be more likely to utilise nostalgia as a coping mechanism.

In sum, empirical evidence supports a role for nostalgia in coping with negative affect and promoting a more positive outlook for the future. Assuming the causal mechanisms outlined above, nostalgia correlates with negative affect (e.g., loneliness, distress) because it is triggered by declining mood. Highly nostalgic individuals are then better able to maintain emotional homeostasis by utilising nostalgia as a buffer against parallel declines in present and future-oriented positive affect. Accordingly, here we examined whether nostalgia specifically associates with psychological resilience in response to the COVID-19 pandemic. We operationalised resilience as the ability to maintain positive affect and optimism *despite* heightened levels of negative mood involving fatigue, frustration, loneliness and pandemic-related anxiety. Due to the observational nature of our data, as well as previous work demonstrating the moderating effects of nostalgia, we assessed whether nostalgia interacts with indices of negative affect to protect against declining positive affect. We expected more pandemic-related distress to associate with worsening mood, and worsening mood to associate with less optimism for the future, but that higher nostalgia would significantly buffer against both of these effects. Therefore, we tested if (1) nostalgia moderates the association of pandemic distress and indices of negative affect with retrospective and concurrent reports of mood state, and (2) nostalgia moderates the relationship between negative affect and optimism. We hypothesised that nostalgia shields from the negative effects of the pandemic by

maintaining both present and future-oriented positive affect, thereby supporting emotional equilibrium in the face of adversity. Moreover, we expected that optimism predicts long-term mood improvement, which we evaluated by measuring change in mood a week following the initial assessment. To test these predictions and the replicability of the observed effects, we collected data from two different samples of U.S. participants – one during the initial wave of coronavirus cases in April 2020 and another during the second wave of coronavirus cases in August 2020. At both timepoints, we collected a comprehensive assessment of individual differences in psychosocial variables encompassing mood, rumination, nostalgia, optimism and experience with the COVID-19 pandemic. Taken together, the studies reported here provide a novel evaluation of nostalgia's relationship with multiple indicators of emotional resilience during a globally distressing event.

Study 1

Materials and methods

Participants

On April 27th, 2020, we collected data from 150 online participants via Amazon's Mechanical Turk (power analysis provided in Supplemental Material). Recruitment was restricted to individuals in the United States who had successfully completed more than 100 HITs and had an approval rating greater than 95%. Participants were compensated with monetary payment. The final sample consisted of 134 individuals ($M_{age} = 38$ years, SD = 11, 49 F, 85 M; see Supplemental Material for full details of data exclusion). The study was approved by the Duke University Campus Institutional Review Board.

Materials and procedure

After consenting to participate in the study, participants were asked to complete six questionnaires (ordered randomly for each participant), indexing individual differences in mood, loneliness, nostalgia, rumination, state optimism and trait optimism.

The abbreviated Profile of Mood States, POMS (Grove & Prapavessis, 1992), is a 40-item questionnaire that asks participants to rate how well various adjectives describe their feelings on a scale of 0 ("*Not at all*") to 4 ("*Extremely*"). For the present study, participants were instructed to rate how well the words describe how they have generally felt in the past few days. The POMS questionnaire consists of seven subscales that measure tension, anger, fatigue, depression, esteem-related affect, vigour and confusion, which was measured as the average rating across their respective items. For a more comprehensive evaluation of positive mood, we added several positive adjectives to this questionnaire, which together comprised an additional positive affect subscale: "*content*", "*hopeful*", "*happy*", "*clear-headed*" and "*relaxed*" (Study 1: Cronbach's $\alpha = .91$; Study 2: Cronbach's $\alpha = .88$). Negative mood scores were calculated as the average score across the tension, anger, fatigue, depression and confusion subscales, while positive mood scores were calculated as the average score across the esteem-related affect, vigour and positive affect subscales. After completing the POMS, participants were also asked to assess on scales from 1 ("*Much more negative*") to 7 ("*Much more positive*") how their general mood in the past 24–48 h compares to their mood a week ago and a month ago. To measure levels of loneliness in addition to general negative mood, we also administered the 20-item UCLA Loneliness Scale (Russell et al., 1978). Participants indicated how often a series of statements (e.g., "*I have nobody to talk to*" and "*I feel isolated from others*") describes them on a scale of 0 ("*I never feel this way*") to 3 ("*I often feel this way*"), with a total score consisting of the average response across these items.

The Nostalgia Inventory (Batcho, 1995) is a 20-item questionnaire that asks participants to rate how much they miss certain aspects of the past when they were younger on a scale of 1 ("*Not at all*") to 7 ("*Very much*"), such as "*family*", "*friends*", "*not having to worry*" and "*the way society was*". A total nostalgia score was calculated as the average response across all 20 items. Although the Nostalgia Inventory measures a more dispositional level of nostalgia (i.e., nostalgia proneness), ratings on this inventory are influenced by current negative affect following a mood induction (Wildschut et al., 2006). As such, we expected this inventory would be sensitive to individual differences in reported mood within the present study. Nevertheless, we also administered the Personal Inventory of Nostalgic Experiences questionnaire which directly asks participants to rate the degree to which they feel nostalgic in the moment (Newman et al., 2020). Ratings on these items matched very closely with the Nostalgia Inventory ($r = .77$, $p < .001$) and produced similar results in moderation analyses (see Supplemental Material for more details).

The Ruminative Responses Scale consists of 22 items concerning what people think or do when they feel depressed (Treynor et al., 2003), including items such as "*Think about how sad you feel" and "Analyze recent events to try to understand why you are depressed"*. Items are rated on a scale of 1 ("*Almost never*") to 4 ("*Almost always*"). An attention check was added as a 23rd item that asked participants to "*Choose almost always if you are paying attention*". A total rumination score was calculated as the average response across all items.

The State Optimism Measure (Millstein et al., 2019) asks participants to rate on a scale of 1 ("*Strongly disagree*") to 7 ("*Strongly agree*") how they feel "*right now*" about 7 items related to optimism and the future, such as "*I am feeling optimistic about life's challenges*" and "*I am expecting things to turn out well*". An average score across all items was used for analyses. Finally, to index trait optimism, we administered the Revised Life Orientation Test (Scheier et al., 1994). This questionnaire consists of 10 items where participants rate the extent to which they

agree with statements such as "*In uncertain times, I usually expect the best*" and "*If something can go wrong for me, it will*" on a scale of 0 ("*I disagree a lot*") to 4 ("*I agree a lot*"). Four of the items are removed from scoring as they are only filler questions (e.g., "*It's important for me to keep busy*"). An average score was calculated after reverse coding the appropriate items.

Upon completing these psychological questionnaires, participants then provided common demographic information and completed a COVID-19 Experience Survey regarding health status, social distancing and perceptions of the COVID-19 pandemic (Anet et al., 2020). We also added a checklist where participants could select any number of events they had experienced since the start of the pandemic (e.g., "*worked from home for a majority of the time*", "*had your income reduced*", "*applied for unemployment*", etc.). To gauge the extent of social distancing, we focused on responses to the question "*How much have you been social distancing?*", which ranged from 1 ("*Not at all, I have been living my life as usual*") to 7 ("*The only face-to-face contact I have is with people I live with, if you live with someone*"). We were also particularly interested in two questions measuring the personal impact of the pandemic – "*How worried are you about the novel coronavirus (COVID-19) outbreak?*" on a scale of 1 ("*Not at all worried*") to 7 ("*Very worried*"), and "*How do you think you will be affected by the global effects of the virus (for example economic recession, reduced health capacity)*" on a scale of 1 ("*Not at all*") to 7 ("*Substantially*"). Responses to these two questions were combined into an average score as a general indicator of overall pandemic impact.

The survey concluded with a final attention check asking participants if they were "*paying attention, avoided distractions, and took this survey seriously*" (Stanley et al., 2019), for which we only included in analyses those who selected the "*Yes*" response and excluded those who selected "*No, I was distracted*", "*No, I had trouble paying attention*", "*No, I did not take the survey seriously*", or "*No, something else affected my participation negatively*". We ensured participants that this response would not affect their payment or eligibility for future studies. The median time for survey completion was 11.1 min (mean = 13 min; SD = 9 min).

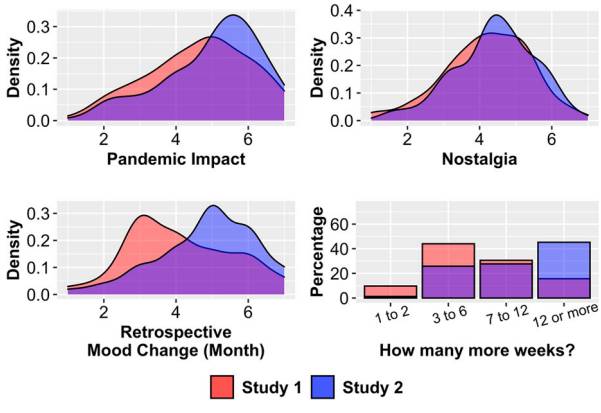

Figure 1. Distributions of pandemic impact, nostalgia, retrospective mood change and expected duration of pandemic-related safety measures. While both studies reported similar distributions of pandemic impact and nostalgia, participants in Study 2 were more likely to report improved mood over the past month and also expected that social distancing and other safety measures would last for longer than Study 1 participants.

Follow-up mood assessment

Exactly one week later, we posted a follow-up survey for those who successfully completed the first one. We collected follow-up responses on the POMS questionnaire, retrospective mood assessments, and included the final attention check from the survey administered the week prior. As with the first survey, participants were monetarily compensated for their time. 102 participants returned to complete the follow-up, of which 2 were excluded from analyses for failing the final attention check and one outlier who reported a change in both negative and positive mood more than 4 SD from the mean, resulting in a final sample of 99 participants (M_{age} = 38 years, SD = 12, 39 F, 60 M; median completion time 2.8 min).

Statistical analyses

All statistical analyses were performed in R. Relative importance metrics were computed with the "relaimpo" package (Grömping, 2006). Here we included all the POMS subscales and used the LMG method, which computes an average of the sequential sum of squares from all possible orderings of the predictors. Each predictor is assigned a metric representing the relative importance based on its contribution to the total proportion of variance explained in the multiple regression model. This approach was used to discern the most relevant predictors of nostalgia levels in the data.

Our primary analyses used a hierarchical regression approach to evaluate the moderating influences of nostalgia on mood and optimism. Hierarchical regression analyses first examined the relationship of multiple predictor variables with mood or optimism levels, and then tested the moderation (interaction) with nostalgia in a second step. These analyses were performed using the "stats" package (R Core Team, 2021) and all data were standardised prior to regression. Simple slopes of interaction effects were examined and visualised with the "interactions" package (Long, 2019).

Results

Responses on the COVID-19 Experience Survey indicated that participants were personally impacted by the pandemic (M = 4.64, SD = 1.41) and maintaining thorough social distancing measures (M = 6.04, SD = 1.11). Most participants (66%) indicated they were working from home since the start of the pandemic, and 32% of participants indicated that their income had been reduced. When asked how long lockdown and social distancing measures would last, most participants (44%) expected about 3–6 more weeks (Figure 1).

POMS ratings revealed mild levels of negative mood (M = .97, SD = .89) and moderate levels of positive mood (M = 2.15, SD = .84), with most participants reporting overall worsening mood over the course of the past month (Figure 1). Participants generally rated moderate to high levels of nostalgia (M = 4.21, SD = 1.19) and state optimism (M = 5.11, SD = 1.37). Zero-order correlations revealed that increased pandemic impact significantly correlated with more loneliness, negative mood, nostalgia and rumination, and less positive mood, state optimism and trait optimism. Additionally, nostalgia positively correlated with loneliness, negative mood and rumination, and negatively correlated with trait optimism (Table 1).

To further investigate the relationship between nostalgia and mood, we determined the relative importance of pandemic impact and each mood measure in predicting nostalgia (Figure 2). Pandemic impact contributed the most to predicting nostalgia levels (27%), followed by the confusion (18%) and anger (15%) POMS subscales. Thus, although nostalgia was significantly correlated with all indices of negative affect, impact by the pandemic, confusion (e.g., *unable to concentrate, uncertain about things*) and anger (e.g., *grouchy, annoyed*) were the most important predictors.

The moderating influence of nostalgia on past mood

We first assessed the moderating effects of nostalgia on the relationship between pandemic impact and retrospective mood reports, while accounting for the effect of trait rumination due to its documented influence on sustaining negative mood (Treynor et al., 2003) and evidence suggesting that nostalgia and rumination are often correlated (Cheung et al., 2018; Garrido, 2018). Using hierarchical regression analyses, we initially tested the contribution of pandemic impact, rumination and nostalgia to retrospective mood reports, followed by the interaction of nostalgia and pandemic impact (Table 2).

When evaluating perceived mood change over the past month (lower values indicate worsening mood), none of the main effects were significant in the first step, while the second step showed that pandemic experience significantly interacted with nostalgia to predict mood change, $\beta = .223$, SE = .079, $t_{129} = 2.833$, $p = .005$, 95% CI [.067, .379]. Evaluation of simple slopes revealed a negative relationship between pandemic concern and mood change with lower levels of nostalgia, which became non-significant for higher levels of nostalgia (Table 2A). Thus, more concern over the pandemic was associated with a perceived worsening mood only in those experiencing low nostalgia. The same interaction effect was observed for reported change in mood over the course of the prior week (instead of the prior month), $\beta = .181$, SE = .080, $t_{129} = 2.261$, $p = .025$, 95% CI [.023, .339], although this model was not further explored since the overall fit was poor ($R^2 = .017$, $F_{4,\ 129} = 1.581$, $p = .183$).

Moreover, we note that the same moderation effect of nostalgia on mood change over the past month was observed when pandemic concern was substituted with individual differences in negative mood ($\beta = .352$, SE = .083, $t_{129} = 4.254$, $p < .001$, 95% CI [.188, .516]) or loneliness ($\beta = .290$, SE = .089, $t_{129} = 3.266$, $p = .001$, 95% CI [.114, .465]). As before, at low levels of nostalgia (SD = −1) negative mood and loneliness were associated with retrospective reports of worsening mood (negative mood: $\beta = -.680$, $p < .001$; loneliness: $\beta = -.609$, $p < .001$), which shifted to a non-significant effect at high levels of nostalgia (SD = +1; negative mood: $\beta = .024$, $p = .864$; loneliness: $\beta = -.030$, $p = .818$). In other words, highly nostalgic individuals reported relatively low mood change over the course of the past month, regardless of current levels of concern about the pandemic, loneliness, or general negative mood.

The moderating influence of nostalgia on present mood

Nostalgia also moderated the relationship between pandemic impact and current mood state. Specifically, we observed a significant interaction between pandemic impact and nostalgia in predicting positive mood ratings (encompassing feelings of self-esteem, vigour, hope, contentment, happiness, etc.), $\beta = .317$, SE = .072, $t_{129} = 4.394$, $p < .001$, 95% CI [.174, .459], such that lower and average levels of nostalgia exhibited a negative relationship between pandemic impact and positive mood, whereas higher levels of nostalgia shifted to a non-significant positive effect (Table 2B). Thus, highly nostalgic individuals were less likely to report worsening positive mood associated with pandemic impact. A significant interaction of pandemic impact and nostalgia was not observed for predicting negative mood, $\beta = .054$, SE = .049, $t_{129} = 1.105$, p = .271, 95% CI [−.043, .151]. Instead, we observed a strengthening effect from rumination. Specifically, high ruminators exhibited a stronger relationship between pandemic impact and negative mood (see Supplemental Material for further details).

Again, a similar moderating influence of nostalgia on the relationship between pandemic impact and current positive mood was observed when substituting pandemic impact with current negative mood ($\beta = .389$, SE = .076, $t_{129} = 5.127$, $p < .001$, 95% CI [.239, .538]) or loneliness (β = .312, SE = .082, $t_{129} = 3.793$, $p < .001$, 95% CI [.149, .475]). At low levels of nostalgia (SD = −1) negative mood and loneliness were associated with less positive mood (negative mood: $\beta = -.962$, $p < .001$; loneliness: β = −.782, $p < .001$), which shifted to non-significant effects at high levels of nostalgia (SD = +1; negative mood: β = −.185, $p = .149$; loneliness: $\beta = -.158$, $p = .199$). Thus, highly nostalgic individuals were more likely to report ambivalent mood states with similar levels of both positive and negative affect.

The moderating influence of nostalgia on optimism

The moderating effects of nostalgia on past and present mood suggest that individuals reporting higher levels of

Table 1. Summary of all correlations among the variables of interest in Study 1.

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. COVID-19 impact	–								
2. Mood change (M)	−.07	–							
3. Mood change (W)	.03	.71***	–						
4. Loneliness	.30***	−.08	−.17	–					
5. Negative mood	.41***	−.01	−.08	.78***	–				
6. Positive mood	−.25**	.33***	.40***	−.38***	−.35***	–			
7. Nostalgia	.42***	−.03	−.03	.40***	.45***	−.11	–		
8. Rumination	.35***	.06	.07	.69***	.78***	−.27**	.45***	–	
9. Optimism (State)	−.18*	.33***	.44***	−.40***	−.32***	.73***	−.07	−.25**	–
10. Optimism (Trait)	−.28**	.05	.18*	−.64***	−.58***	.57***	−.26**	−.53***	.73***

Note. *p<.05; **p<.01; ***p<.001 (uncorrected for multiple comparisons); perceived mood change over the past month (M) and week (W) are both presented.

nostalgia generally show a diminished relationship between COVID-19 impact and mood. Importantly, these effects were observed for retrospective reports of mood change and current positive mood levels, despite a significant relationship that was also present between nostalgia and negative mood. Thus, in line with extant perspectives on the function of nostalgia, these findings suggest that nostalgia might act as a coping mechanism to regain emotional homeostasis in the presence of distress.

One of the proposed mechanisms by which nostalgia is thought to facilitate mood repair is by maintaining a positive outlook for the future. Subsequently, we examined whether nostalgia also moderates optimism in the context of current negative mood levels. Here we added trait optimism as a covariate to determine the moderating effect of nostalgia on state optimism above and beyond the dispositional tendency an individual might have to always expect the best (or worst). A significant interaction was observed, $\beta = .225$, SE = .056, $t_{128} = 4.006$, $p < .001$, 95% CI [.114, .337], which we further examined by focusing on a simple slopes analysis of negative mood at different levels of nostalgia. At lower levels of nostalgia (−1 SD), negative mood was negatively associated with optimism, which became non-significant and positive with higher levels of nostalgia (Table 2C; Figure 3). A nearly identical effect was observed with loneliness as the predictor instead of negative mood ($\beta = .227$, SE = .059, $t_{128} = 3.827$, $p < .001$, 95% CI [.110, .345]). Importantly, this interactive effect was specific to the interaction between nostalgia and negative affect, but not observed with the interaction between nostalgia and positive mood levels (see Supplemental Material for more details). Moreover, a similar (yet weaker) interaction was also observed between nostalgia and COVID-19 impact, $\beta = .164$, SE = .052, $t_{128} = 3.143$, $p = .002$, 95% CI [.061, .267], showing that nostalgia protected against the negative effects of both the pandemic and general negative mood on optimism.

Change in mood one week later

A follow-up survey was conducted on this same sample of participants one week later. On average, participants provided similar POMS ratings at the follow-up compared to the first session (negative POMS change: $M = -.073$, SD = .379; positive POMS change: $M = -.067$, .527). Ratings of overall perceived change in mood also suggested generally maintained or slightly improved mood at the follow-up ($M = 4.45$, SD = 1.09), with 17% reporting worsening moods (1–3), 33% reporting similar moods (4) and 49% reporting improved moods (5–7).

Interestingly, change in POMS ratings were only moderately correlated with the feeling of perceived mood change (negative POMS change: $r = -.309$, $p = .002$; positive POMS change: $r = .230$, $p = .022$), suggesting unexplained variance in the relation between the two. Likewise, state optimism ratings from the first session also correlated with perceived mood change ($r = .304$, $p = .002$), but not with the POMS subscales (negative: $r = .098$, $p = .333$; positive: $r = -.122$, $p = .229$). Thus, state optimism the week prior and change in POMS ratings were both predictive of a subjective feeling of overall improved mood, although these predictor variables were not correlated with one another. No significant effects of nostalgia on change in mood ratings were observed (all ps > .05).

We next evaluated whether state, but not trait, optimism significantly predicted change in perceived mood a week later even after accounting for change in POMS subscale scores, as well as other session 1 variables such as rumination style, nostalgia and COVID-19 impact. An effect of state optimism would confirm that positive future thinking specifically at the time of the initial assessment was most sensitive to predicting subjective mood trajectory (and hence validate the importance of the observed nostalgia moderation). This effect was confirmed with a multiple regression analysis, as state optimism at the first session was a significant predictor of perceived mood change at the follow-up, $\beta = .382$, SE = .145, $t_{91} = 2.634$, $p = .0099$, 95% CI [.094, .670], while trait optimism was not, $\beta = .103$, SE = .163, $t_{91} = .631$, $p = .529$, 95% CI [−.222, .428] (see Supplemental Material, Table S1, for an overview of all effects).

Interim discussion

Study 1 revealed that personal concern over the COVID-19 pandemic was significantly associated with indices of past,

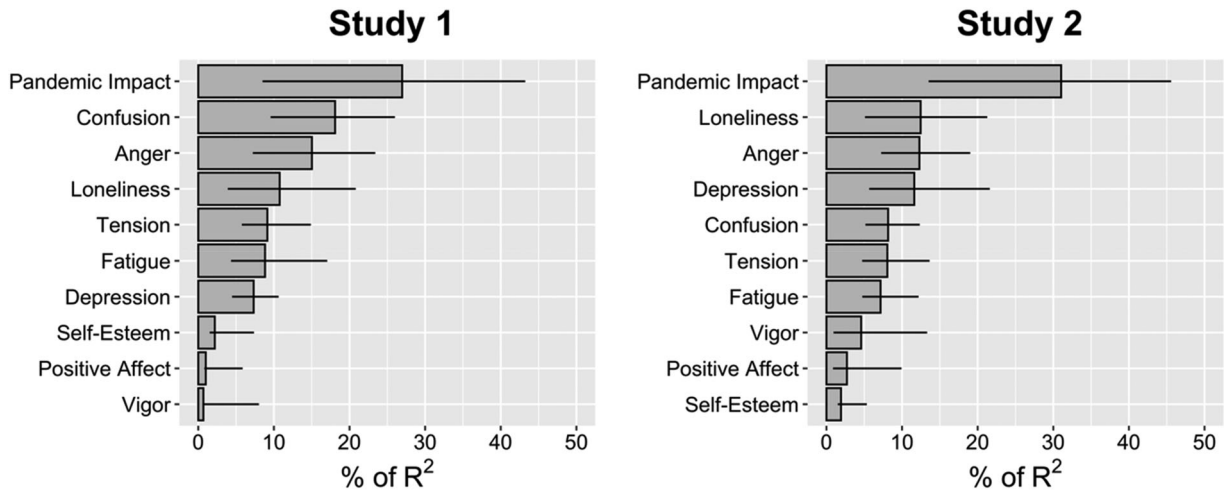

Figure 2. Relative importance for nostalgia with 95% bootstrap confidence intervals (after 5000 permutations). In both studies, the degree of pandemic impact was the most important predictor of nostalgia, followed by negative mood subscales and loneliness. Metrics are normalised to sum to 100%, representing a total R^2 of 36.56% in Study 1 and 39.65% in Study 2.

present and future-oriented affect. Importantly, nostalgia moderated all these effects. Our results confirm that nostalgia positively correlates with negative mood, but also shows that nostalgia buffers against the relationship between COVID-19 impact and positive mood, validating a role of nostalgia in maintaining emotional balance. In other words, although individuals reporting higher levels of nostalgia were experiencing more pandemic-related distress and negative mood (namely uncertainty and anxiety), they were also *less* likely to report concurrent changes in positive mood. This pattern of results, though correlational, is consistent with nostalgia's proposed role as a mood-repairing mechanism after initially being triggered by heightened negative affect (Sedikides & Wildschut, 2018). Furthermore, nostalgia interacted with negative, but not positive, mood levels to predict state optimism. Thus, nostalgia not only associated with present emotional homeostasis, but also uniquely interacted with negative mood to boost positive future thinking. In turn, higher state optimism at the initial assessment predicted subjective reports of improved mood a week later.

Study 2

The initial wave of coronavirus cases caused a great degree of uncertainty for the future and was accompanied by sudden changes in daily routine for most individuals, particularly due to social distancing and lockdown measures. Study 1 confirmed that pandemic-related concerns contributed to deteriorating mood states, although nostalgia buffered against these effects. To evaluate the replicability of the findings, we collected data from a second cohort of participants a few months later. Whereas the initial sample was collected during the first wave of coronavirus cases in the U.S. (April), this second sample was collected amid a second wave of increased cases (August) that prompted renewed calls for social distancing. We expected similar levels of pandemic-related worry to allow for a re-test of the moderating effects of nostalgia.

Materials and methods

Participants

On August 12th, 2020, we collected data from 200 online participants via Amazon's Mechanical Turk. Recruitment was restricted to individuals in the United States who had successfully completed more than 100 HITs, had an approval rating greater than 95%, and did not participate in Study 1. Participants were compensated with monetary payment. The final sample consisted of 159 individuals (M_{age} = 37 years, SD = 11, 60 F, 99 M; same exclusion criteria as Study 1; see Supplemental Material for full details). The study was approved by the Duke University Campus Institutional Review Board.

Materials and procedure

Participants completed the same survey that was administered in Study 1, as well as a follow-up mood assessment one week later (August 19th, 2020). 122 participants returned to complete the follow-up, of which three were excluded from analyses for failing the final attention check, and one outlier who reported change in negative mood more than 4 SD from the mean, resulting in a final sample of 118 participants (M_{age} = 37 years, SD = 11, 40 F, 78 M).

Statistical analysis

We followed the same statistical approach as in Study 1.

Results

Study 2 participants indicated similar levels of COVID-19 impact as Study 1 participants (M = 5.01, SD = 1.34) and

Table 2. Study 1 hierarchical regression models – Mood and state optimism.

	ΔR^2	β	*SE*	*t*
A. Outcome: Perceived mood change (past month)				
Step 1	−.007			
Rumination		.115	.099	1.156
COVID-19 impact		−.096	.098	−.980
Nostalgia		−.041	.103	−.404
Step 2	.052**			
Rumination		.115	.097	1.195
COVID-19 impact		−.099	.095	−1.045
Nostalgia		.007	.101	.068
Nostalgia × COVID-19 impact		.223	.079	2.833**
Simple slopes (COVID-19 impact)				
Nostalgia = −1 SD		−.323	.124	−2.594*
Nostalgia = Mean		−.099	.095	−1.045
Nostalgia = +1 SD		.124	.123	1.009
B. Outcome: Positive mood				
Step 1	.088**			
Rumination		−.241	.094	−2.552*
COVID-19 impact		−.205	.093	−2.207*
Nostalgia		.083	.098	.851
Step 2	.113***			
Rumination		−.240	.088	−2.714**
COVID-19 impact		−.211	.087	−2.418*
Nostalgia		.152	.093	1.635
Nostalgia × COVID-19 impact		.317	.072	4.394***
Simple slopes (COVID-19 impact)				
Nostalgia = −1 SD		−.527	.114	−4.634***
Nostalgia = Mean		−.211	.087	−2.418*
Nostalgia = +1 SD		.106	.112	.947
C. Outcome: State optimism				
Step 1	.552***			
Trait optimism		.836	.072	11.622***
Rumination		.167	.096	1.750
Negative mood		−.006	.099	−0.057
Nostalgia		.075	.066	1.144
Step 2	.047***			
Trait optimism		.791	.069	11.473***
Rumination		.164	.091	1.816
Negative mood		−.141	.100	−1.410
Nostalgia		.167	.066	2.510*
Nostalgia × Negative mood		.225	.056	4.006***
Simple slopes (negative mood)				
Nostalgia = −1 SD		−.366	.130	−2.815**
Nostalgia = Mean		−.141	.100	−1.410
Nostalgia = +1 SD		.085	.097	.878

Note. *$p<.05$; **$p<.01$; ***$p<.001$. All variables were standardised prior to regression. ΔR^2 was calculated with adjusted R^2. Higher values on the outcome measures indicate more positive mood or optimism.

were still social distancing ($M = 5.88$, SD = 1.10). Similarly, 60% of participants reported working from home for a majority of the time since the start of the pandemic, with 28% also experiencing reduced income. Expectations for how long measures such as social distancing would last shifted from Study 1, with more participants in Study 2 expecting safety measures to last for 12 or more weeks (Figure 1). Current mood ratings again indicated mild levels of negative mood ($M = 1.29$, SD = 1.03) and moderate levels of positive mood ($M = 2.26$, SD = .82), as well as moderate to high levels of nostalgia ($M = 4.42$, SD = 1.12) and state optimism ($M = 5.18$, SD = 1.32). Reports of perceived mood change over the past month generally indicated improved moods (Figure 1).

Zero-order correlations again showed that increased pandemic impact correlated significantly with more loneliness, negative mood, nostalgia and rumination, as well as less trait optimism (Table 3). However, the impact of the pandemic did not associate with positive mood or state optimism, a departure from the findings in Study 1. Nostalgia was again positively correlated with both negative mood and rumination, and negatively correlated with trait optimism. In contrast to Study 1, Study 2 participants exhibited a significant positive correlation between nostalgia and subjective mood improvement over the past week and past month. In sum, compared to Study 1, which included participants during the first wave of cases, the sample of participants in Study 2 reported a similar experience with the pandemic, although expectations for how long social distancing measures would last were generally longer and perceived change in mood was generally more positive (and correlated with nostalgia), suggesting a habituated response to the pandemic. The association of pandemic impact with positive mood and state optimism was also no longer significant, indicating that the pandemic was having less influence on affective outcomes in this sample. This result, again, suggests a habituated response to the pandemic.

Finally, we determined the relative importance of each mood measure in predicting nostalgia, following the same procedures as in Study 1. Pandemic impact again contributed the most to predicting nostalgia levels (31%), followed by loneliness (12%), and then the anger (12%) and depression (12%) POMS subscales (Figure 2).

The moderating influence of nostalgia on past mood

Using the same approach as in Study 1, we first evaluated the moderating effect of nostalgia on retrospective mood reports using a hierarchical regression approach (Table 4A). Higher levels of nostalgia associated with perceptions of improved mood over the past month, $\beta = .306$, SE = .092, $t_{155} = 3.320$, $p = .001$, 95% CI [.124, .488], as well as the past week, $\beta = .340$, SE = .090, $t_{155} = 3.791$, $p < .001$, 95% CI [.163, .518]. However, unlike Study 1, nostalgia did not significantly interact with COVID-19 impact for either measure. Thus, those who reported feeling more nostalgic also reported experiencing improved mood levels over the course of the past week and month, although this effect was not influenced by degree of personal impact from the pandemic.

Although nostalgia did not moderate the relationship between pandemic impact and retrospective reports of mood change, we again tested whether nostalgia had a moderating effect if pandemic impact was substituted with general negative mood or loneliness. Results indicated a replication of Study 1, whereby both negative mood ($\beta = .242$, SE = .073, $t_{154} = 3.314$, $p = .001$, 95% CI [.098, .387]) and loneliness ($\beta = .176$, SE = .075, $t_{154} = 2.353$, $p = .02$, 95% CI [.028, .323]) interacted with nostalgia when predicting reports of mood change over the past month. Again, at low levels of nostalgia (SD = −1) current negative mood and loneliness were associated with reports of worsening mood (negative mood: $\beta = -.604$, p

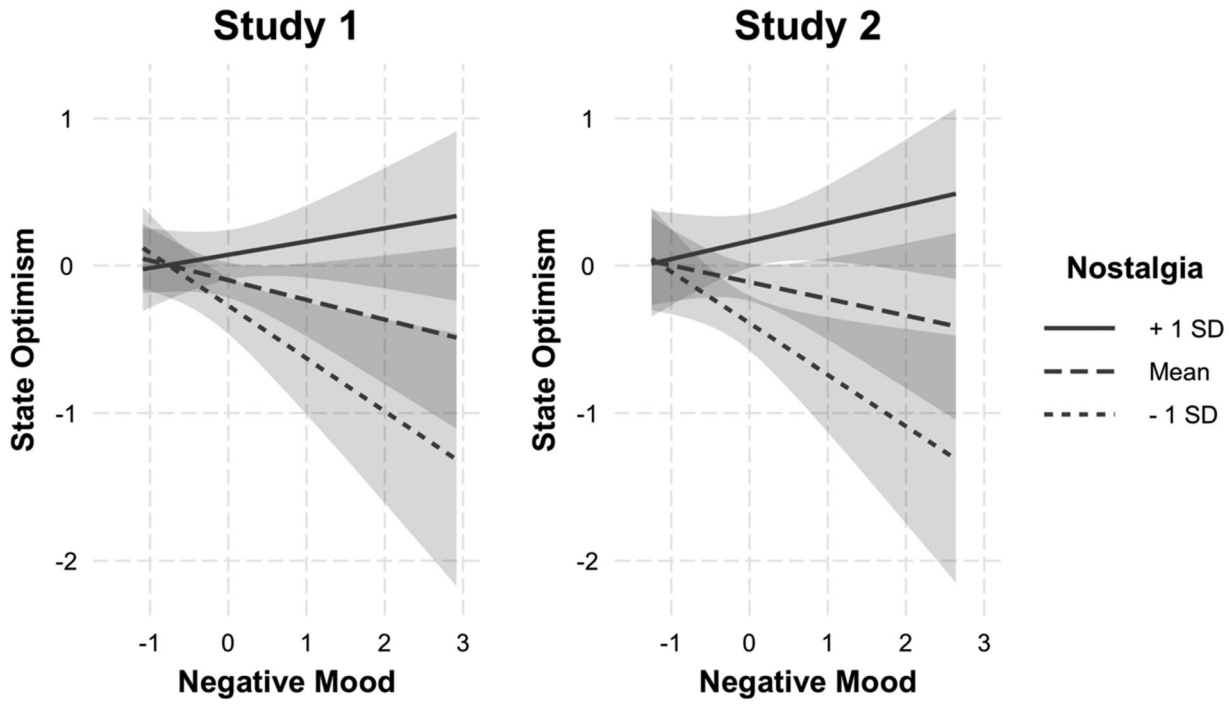

Figure 3. Nostalgia moderates the relationship between negative mood and optimism. At lower levels of nostalgia (−1 SD), negative mood was negatively associated with state optimism, which shifted to a more positive association with higher levels of nostalgia (+1 SD). This finding replicated across Study 1 and Study 2. All values are standardised. Shaded areas represent 95% confidence intervals. See Tables 2 and 4 for the complete statistical analysis.

= .001; loneliness: $\beta = -.368$, $p = .011$), which shifted to non-significant effects at high levels of nostalgia (SD = +1; negative mood: $\beta = -.119$, $p = .389$; loneliness: $\beta = -.016$, $p = .913$).

The moderating influence of nostalgia on present mood

We also observed a significant main effect of nostalgia on present mood, as measured by the POMS (Table 4B). Higher levels of nostalgia were positively associated with higher levels of current positive mood, $\beta = .207$, SE = .093, $t_{155} = 2.218$, $p = .028$, 95% CI [.023, .391]. Thus, while nostalgia and positive mood were initially uncorrelated, higher nostalgia did predict a more positive mood after accounting for trait rumination and COVID-19 impact. Unlike Study 1, the interaction of nostalgia with COVID-19 impact did not meet statistical significance. However, like in Study 1, nostalgia still interacted with current negative mood ($\beta = .378$, SE = .071, $t_{154} = 5.348$, $p < .001$, 95% CI [.238, .517]) and loneliness ($\beta = .324$, SE = .069, $t_{154} = 4.701$, $p < .001$, 95% CI [.188, .460]) to predict current positive mood. At low levels of nostalgia (SD = −1) negative mood and loneliness were associated with less positive mood (negative mood: $\beta = -.753$, $p < .001$; loneliness: $\beta = -.812$, $p < .001$), which shifted to non-significant effects at high levels of nostalgia (SD = +1; negative mood: $\beta = .003$, $p = .985$; loneliness: $\beta = -.165$, $p = .224$).

The moderating influence of nostalgia on optimism

Regarding optimism, regression analyses replicated the interaction of nostalgia and negative mood in predicting optimism, $\beta = .236$, SE = .060, $t_{153} = 3.950$, $p = .001$, 95% CI [118, .354] (Figure 3). That is, negative mood was

Table 3. Summary of all correlations among the variables of interest in Study 2.

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. COVID-19 impact	–								
2. Mood change (M)	.09	–							
3. Mood change (W)	.17*	.66***	–						
4. Loneliness	.18*	.05	.09	–					
5. Negative mood	.36***	.06	.17*	.81***	–				
6. Positive mood	−.06	.41***	.41***	−.32***	−.19*	–			
7. Nostalgia	.45***	.29***	.36***	.43***	.48***	.06	–		
8. Rumination	.36***	.13	.20*	.79***	.82***	−.18*	.46***	–	
9. Optimism (State)	−.07	.42***	.33***	−.24**	−.13	.72***	.15	−.06	–
10. Optimism (Trait)	−.24**	.05	−.07	−.61***	−.56***	.46***	−.27**	−.49***	.56***

Note. *p<.05; **p<.01; ***p<.001 (uncorrected for multiple comparisons); perceived mood change over the past month (M) and week (W) are both presented.

Table 4. Study 2 hierarchical regression models – Mood and state optimism.

	ΔR^2	β	*SE*	*t*
A. Outcome: Perceived mood change (past month)				
Step 1	.066**			
Rumination		.002	.088	.025
COVID-19 impact		−.045	.088	−.511
Nostalgia		.306	.092	3.320**
Step 2	−.004			
Rumination		.001	.089	.012
COVID-19 impact		−.036	.090	−.397
Nostalgia		.308	.093	3.332**
Nostalgia × COVID-19 impact		.039	.076	.509
B. Outcome: Positive mood				
Step 1	.045*			
Rumination		−.255	.089	−2.860**
COVID-19 impact		−.062	.089	−.699
Nostalgia		.207	.093	2.218*
Step 2	.014			
Rumination		−.260	.089	−2.928**
COVID-19 impact		−.029	.090	−.322
Nostalgia		.215	.093	2.316*
Nostalgia × COVID-19 impact		.138	.076	1.823
C. Outcome: State optimism				
Step 1	.410***			
Trait optimism		.712	.074	9.659***
Rumination		.136	.108	1.253
Negative mood		.029	.115	.248
Nostalgia		.268	.070	3.811***
Step 2	.051***			
Trait optimism		.642	.073	8.852***
Rumination		.239	.107	2.238*
Negative mood		−.114	.116	−.982
Nostalgia		.279	.067	4.148***
Nostalgia × Negative mood		.236	.060	3.950***
Simple slopes (negative mood)				
Nostalgia = −1 SD		−.349	.146	−2.396*
Nostalgia = Mean		−.114	.116	−.982
Nostalgia = +1 SD		.122	.113	1.085

Note. *p<.05; **p<.01; ***p<.001. All variables were standardised prior to regression. ΔR^2 was calculated with adjusted R^2. Higher values on the outcome measures indicate more positive mood or optimism.

negatively associated with optimism for those experiencing low levels of nostalgia, but this effect shifted to a non-significant, positive effect for higher levels of nostalgia (Table 4C). This interaction was specific to negative mood and not found with positive mood (see Supplemental Material), further replicating our set of findings from Study 1. However, we did not replicate the interaction of COVID-19 impact and nostalgia in predicting optimism, $\beta = .032$, SE = .061, $t_{153} = .527$, $p = .599$, 95% CI [−.089, .153].

Change in mood one week later

The follow-up survey conducted one week later revealed generally consistent ratings of both negative ($M = .011$, SD = .511) and positive ($M = .017$, SD = .536) mood. Participants again reported mostly maintained or improved mood over the previous week ($M = 4.76$, SD = 1.27). Interestingly, unlike Study 1, this perception of mood change was uncorrelated with the observed change in negative ($r = -.156$, $p = .091$) or positive ($r = .079$, $p = .396$) mood obtained from POMS ratings, although it was still correlated with state optimism from the first session ($r = .425$, $p < .001$).

Furthermore, the unique relationship between state optimism at the first session and perceived mood change at the second session remained evident in Study 2. That is, in a model with POMS negative and positive subscale change scores, rumination, nostalgia, COVID-19 impact, trait optimism and state optimism, only state optimism was predictive of retrospective mood reports at the second session, $\beta = .495$, SE = .108, $t_{110} = 4.598$, $p < .001$, 95% CI [.281, .708] (see Supplemental Material, Table S2).

Discussion

Our replication attempt of Study 1 was largely successful, with our findings again demonstrating a relationship of nostalgia with measures of both negative and positive mood and, importantly, an interaction with negative mood in predicting state optimism levels. Moreover, we again found that state optimism at the initial assessment was the primary variable associated with subjective mood reports a week later, suggesting a general relationship between optimism and future positivity bias. Primary differences from Study 1 were the reduced effects of pandemic impact on mood and the lack of an interaction of pandemic impact with nostalgia, which may be explained by participants having better adapted to the pandemic by this time. Indeed, highly nostalgic individuals were most likely to report that their mood had already improved over the course of the past month and were also experiencing higher levels of positive affect (after correcting for pandemic impact and trait rumination). Importantly, nostalgia still moderated the relationship of negative affect with past, present and future-oriented positive affect, even if interactions with pandemic impact were not significant. Study 2 thus confirmed a general role for nostalgia in regulating mood and boosting optimism, despite participants demonstrating habituation to the influence of COVID-19 on their well-being.

General discussion

The present studies evaluated nostalgia during a global, distressing event. Our findings suggest that the initial waves of the COVID-19 pandemic had a significant impact on the emotional lives of the participants we surveyed, shown by associations with more negative mood states and higher levels of nostalgia. In fact, both studies showed that personal impact by the pandemic was the most important predictor of reported nostalgia above all other mood variables. Our hypotheses on the function of nostalgia were also largely supported, as we expected that more nostalgic individuals would be shielded against parallel declines in positive affect that accompany pandemic-related distress and negative mood. To test this proposal, we conducted a series of moderation analyses to ascertain how the relationship among affect variables shift

at different levels of nostalgia. Study 1 showed that nostalgia buffered against the effects of the pandemic on mood by moderating its relationship with perceived mood change over the past month and current levels of positive mood. Importantly, nostalgia did not moderate the relationship between pandemic impact and negative mood, and we instead observed a boosting effect of rumination on this relationship (see Supplemental Material). Higher levels of nostalgia also protected against declining optimism, and higher optimism was associated with subjective reports of mood improvement a week later. Study 2 replicated the moderating influence of nostalgia on negative mood and optimism, even though the overall impact of the pandemic on mood was reduced. Together, these studies illustrate that nostalgia may help to maintain psychological homeostasis by conserving positive affect despite the presence of distress (Sedikides & Wildschut, 2018). This function of nostalgia was particularly evident during the initial wave of coronavirus cases in the U.S., although our second study still demonstrated similar effects even when participants showed a more habituated emotional response to the pandemic.

Regarding past and present mood levels, our findings from Study 1 showed that nostalgia protected from mood deterioration associated with pandemic-related concern, as indexed by retrospective reports of mood change and current levels of positive mood. While this interaction did not replicate in Study 2, we still observed associations of nostalgia with both negative and positive affect during the second wave of coronavirus cases. That is, although higher nostalgia was associated with a more negative mood, it was also predictive of retrospective mood improvement and current levels of positive mood. These seemingly contradictory effects are in line with the proposal that nostalgia is triggered by negative mood, which it counteracts by simulating contrasting positive emotions (De Brigard, 2018; Sedikides & Wildschut, 2018). For example, previous studies have shown that loneliness induces nostalgia, which consequently boosts perceived social support (Zhou et al., 2008), thus explaining the positive relationship of nostalgia with both loneliness and social support. Accordingly, across both studies, we observed a moderating role for nostalgia on the relationship between negative and positive affect, such that the relationship between the two became non-significant at higher levels of nostalgia. Considering the context in which our data was collected, the findings reported here suggest that nostalgia-prone individuals are able to maintain emotional homeostasis despite high levels of distress resulting from the COVID-19 pandemic. That is, even when experiencing feelings of confusion, anger, tension, depression and/or loneliness, highly nostalgic individuals still report generally sustained levels of positive affect. This state of emotional ambivalence (Larsen et al., 2001; Rees et al., 2013) is a direct reflection of the bittersweet nature that characterises nostalgic experiences (Wildschut et al., 2006). Indeed, others have shown that feeling nostalgic can even help to maintain physiological comfort by stimulating physical warmth (Zhou et al., 2012). Regarding retrospective mood reports, though, both studies indicated that highly nostalgic individuals were less likely to indicate that their mood had worsened over the prior month, even if they were currently experiencing negative affect. Thus, this effect may indicate that highly nostalgic individuals are experiencing a more trait level of depression that never fully resolves. Alternatively, highly nostalgic individuals may exhibit retrospective biases in which the present is not necessarily perceived as much better or worse than the past, even if there are uncertainties. More research is needed to pinpoint how trait levels of negative affect may uniquely interact with nostalgic tendencies.

Across both samples of participants, we also observed a moderating influence of nostalgia on the relationship between mood and future-oriented affect. At low levels of nostalgia, negative mood was associated with reduced optimism, although this effect was abolished and even shifted to a non-significant positive relationship with higher levels of nostalgia. In other words, individuals experiencing negative mood were more likely to maintain a positive outlook for the future if they were also feeling nostalgic, consistent with past findings that also demonstrated heightened optimism resulting from induced nostalgia (Cheung et al., 2013, 2016). Study 1 also showed a similar moderating influence on the relationship between COVID-19 impact and optimism, although this effect did not replicate in Study 2. Theoretical perspectives suggest that nostalgia primarily buffers against declining optimism when individuals are experiencing an imbalance in positive and negative affect, which may not always be the case if someone is concerned about the pandemic. Indeed, Study 2 participants exhibited a habituated emotional response to the pandemic, where the pandemic impact variable was no longer correlated with positive mood or optimism and showed a weaker relationship with negative affect. Hence, the nostalgia moderation effect on optimism only replicated when negative mood was added as a predictor variable.

We interpret these results as suggesting that when nostalgic individuals experience deteriorated mood they are able to draw on the personally meaningful past to mentally simulate a positive future and, in doing so, motivate positive future behaviour such as self-care (Kersten et al., 2016). For this reason, nostalgia is often considered to be a predominantly future-oriented experience (FioRito & Routledge, 2020). Importantly, both of our studies validated the contribution of optimism to longer-term mood repair, as state optimism levels were predictive of subjective mood improvement a week later. However, given that we did not observe any direct relationships between nostalgia and future change in mood, further work is needed to clarify the role of nostalgia in this effect. Nostalgia may be linked to future mood improvement via multiple pathways that we did not measure, such as by

enhancing meaning in life and social connectedness (Sedikides & Wildschut, 2018), which could also be influenced by how often individuals feel nostalgic (Cheung et al., 2016). Thus, while our findings suggest that nostalgia may indirectly promote longer-term mood repair by boosting optimism, a more focused longitudinal assessment is needed to confirm this proposal. In the present studies, we only evaluated longer-term mood trajectories by assessing change in mood at a follow-up session with two distinct measures – one derived from change in scores on the POMS, and another from subjective assessment (introspection) by the participant. These measures were, surprisingly, only moderately correlated (Study 1) or uncorrelated (Study 2), perhaps due to low variance in POMS change scores. We focused our analyses on how participants subjectively compared their current mood to the previous week, although we acknowledge this may not accurately reflect an actual change in mood. Nonetheless, a retrospective positivity bias is beneficial to mental well-being and emotional resilience (Colombo et al., 2020; Marsh et al., 2019), and thus our findings still demonstrate a longer-term association of feeling optimistic and, as a result, emphasises the importance of nostalgia in boosting optimism.

In sum, the effects of nostalgia we observed were predominantly positive and shown by Study 1 to have been particularly relevant during the early stages of the coronavirus pandemic, although nostalgic individuals continued to demonstrate resilience against the effects of negative mood on optimism in Study 2. These findings compliment recent assessments that indicate a suppressing effect of nostalgia on the negative relationship between loneliness and happiness during the pandemic (Zhou et al., 2021). Importantly, here we compliment and extend those findings by relating nostalgia directly to the pandemic experience, while also demonstrating a moderating role for nostalgia on multiple forms of affective experience, including optimism. Coupled with Zhou et al. (2021), our findings add further empirical evidence that nostalgic individuals report a more balanced and resilient emotional profile. However, we note that the present findings diverge from recent daily diary studies that instead suggest a more negative interpretation of nostalgia (Newman et al., 2020; Newman & Sachs, 2020). In these assessments, state nostalgia was associated with reduced well-being the following day and seemed to exaggerate the negative effects of loneliness. We speculate that the influence of nostalgia likely depends on the context in which it is activated. Higher levels of distress resulting from the pandemic and a significant change to daily routines perhaps allowed for nostalgia to play a greater role in emotional resilience. The severity of the COVID-19 pandemic created lengthy periods of social isolation and uncertainty, thus placing greater reliance on using nostalgia to reminisce on fond memories, maintain social bonds, and facilitate a positive outlook for a future where the pandemic no longer exists. Indeed, our data indicates a strong association between pandemic impact and nostalgia levels in both studies, and viewing nostalgic media content became a common coping mechanism used to psychologically distance from pandemic distress during the initial rise in cases (Gammon & Ramshaw, 2020). Also suggesting that nostalgia effects are configured by the context in which they are activated, a recent longitudinal analysis showed that dispositional nostalgia predicts reduced distress over a one month period specifically for bereaved individuals, emphasising the role of nostalgia as a beneficial psychological resource when responding to strong negative affect (Reid et al., 2021). Importantly, the studies of Newman and Sachs (2020) and Newman et al. (2020) were unable to examine the effects of nostalgia during a common source of psychological distress, as data were aggregated across multiple groups of undergraduate participants sampled from different semesters. Moreover, in these studies, the authors primarily observed a negative effect of nostalgia on well-being via retrospective reports completed by participants at the end of the day, whereas momentary assessments of nostalgia throughout the day produced less clear findings (Newman et al., 2020). As discussed by Batcho (2020), studying the effects of nostalgia depends on how and when nostalgia is experienced relative to the past and the future, which could lead to different interpretations given the complex relationship of nostalgia with both negative and positive affect. Researchers should continue to evaluate and define contextual influences that might configure the adaptive or maladaptive effects of nostalgia. When measured as an individual difference during the pandemic, however, higher nostalgia levels seem to be consistently associate with indicators of improved mental well-being.

The present study has several limitations that will need to be addressed in future work. First, our primary measure of nostalgia was based on ratings of how much participants missed certain aspects of their past. While commonly used to index nostalgia (Sedikides & Wildschut, 2018; Wildschut et al., 2006), this inventory is specific to measuring one's longing for the past and does not capture the emotional signature of specific nostalgic memories. Second, most ratings were only collected at a single timepoint, and thus we were unable to evaluate day-to-day fluctuations in nostalgia, mood and optimism. Such an evaluation is needed to properly compare to the findings of Newman et al. (2020) and Newman and Sachs (2020). Our analyses are correlational and therefore causal interpretations remain speculative, although nonetheless informed by the literature in this area. Third, while sufficient to achieve statistical power, our samples were only moderately sized, and the pandemic may have uniquely impacted online study participants compared to other members of the population. Finally, we accounted for trait characteristics such as rumination and trait optimism in our analyses to demonstrate that the relations of nostalgia with state affect variables cannot be explained

by these trait variables alone. However, other dispositional factors may further influence the observed effects, such as underlying negative affective biases potentially stemming from pre-existing psychological disorders (Duyser et al., 2020).

Nevertheless, here we have shown that the relations of nostalgia with mood and optimism often observed in laboratory settings translate to real-life distressing events such as the COVID-19 pandemic, emphasising the utility of nostalgia as a coping mechanism that maintains emotional homeostasis. Our findings suggest a predominantly positive interpretation of nostalgia's functions, indicating that nostalgic individuals display a more resilient psychological profile even in the midst of a worldwide pandemic. Importantly, the present analyses contribute to a broader literature on how individual differences in retrieval tendencies (i.e., rumination, counterfactual thinking, future thinking and now nostalgia) influence psychological well-being. By appreciating these associations between autobiographical memory and mood, researchers gain a richer understanding for the variety of coping styles (both adaptive and maladaptive) that are employed during periods of high uncertainty and distress.

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No potential conflict of interest was reported by the author(s).

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Data availability statement

All data used in the regression analyses are available at https://osf.io/47dbq/.

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References

Abeyta, A. A., Routledge, C., & Kaslon, S. (2020). Combating loneliness with nostalgia: Nostalgic feelings attenuate negative thoughts and motivations associated With loneliness. *Frontiers in Psychology*, *11*, 1219. https://doi.org/10.3389/fpsyg.2020.01219

Anet, A., Pike, A., & Robinson, O. J. (2020). *COVID-19 resources: COVID_questions_Anet_Pike_Robinson Version: 1*. https://osf.io/wz9hv/.

Batcho, K. I. (1995). Nostalgia: A psychological perspective. *Perceptual and Motor Skills*, *80*(1), 131–143. https://doi.org/10.2466/pms.1995.80.1.131

Batcho, K. I. (2013). NOSTALGIA: The bittersweet history of a psychological concept. *History of Psychology*, *16*(3), 165–176. https://doi.org/10.1037/a0032427

Batcho, K. I. (2020). When nostalgia tilts to sad: Anticipatory and personal nostalgia. *Frontiers in Psychology*, *11*, 1186. https://doi.org/10.3389/fpsyg.2020.01186

Carver, C. S., Scheier, M. F., & Segerstrom, S. C. (2010). Optimism. *Clinical Psychology Review*, *30*(7), 879–889. https://doi.org/10.1016/j.cpr.2010.01.006

CDC. (2020). *Mental health – Household pulse survey – COVID-19*. https://www.cdc.gov/nchs/covid19/pulse/mental-health.htm.

Chen, S., & Bonanno, G. A. (2020). Psychological adjustment during the global outbreak of COVID-19: A resilience perspective. *Psychological Trauma: Theory, Research, Practice, and Policy*, *12* (S1), S51–S54. https://doi.org/10.1037/tra0000685

Cheung, W. Y., Sedikides, C., & Wildschut, T. (2016). Induced nostalgia increases optimism (via social-connectedness and self-esteem) among individuals high, but not low, in trait nostalgia. *Personality and Individual Differences*, *90*, 283–288. https://doi.org/10.1016/j.paid.2015.11.028

Cheung, W. Y., Wildschut, T., & Sedikides, C. (2018). Autobiographical memory functions of nostalgia in comparison to rumination and counterfactual thinking: Similarity and uniqueness. *Memory (Hove, England)*, *26*(2), 229–237. https://doi.org/10.1080/09658211.2017.1346129

Cheung, W. Y., Wildschut, T., Sedikides, C., Hepper, E. G., Arndt, J., & Vingerhoets, A. J. J. M. (2013). Back to the future: Nostalgia increases optimism. *Personality and Social Psychology Bulletin*, *39* (11), 1484–1496. https://doi.org/10.1177/0146167213499187

Colombo, D., Suso-Ribera, C., Fernández-Álvarez, J., Cipresso, P., Garcia-Palacios, A., Riva, G., & Botella, C. (2020). Affect recall bias: Being resilient by distorting reality. *Cognitive Therapy and Research*, *44*(5), 906–918. https://doi.org/10.1007/s10608-020-10122-3

De Brigard, F. (2018). Nostalgia and mental simulation. In A. Gotlib (Ed.), *The moral psychology of sadness* (pp. 155–181). Rowman & Littlefield.

De Brigard, F., & Parikh, N. (2019). Episodic counterfactual thinking. *Current Directions in Psychological Science*, *28*(1), 59–66. https://doi.org/10.1177/0963721418806512

Duyser, F. A., van Eijndhoven, P. F. P., Bergman, M. A., Collard, R. M., Schene, A. H., Tendolkar, I., & Vrijsen, J. N. (2020). Negative memory bias as a transdiagnostic cognitive marker for depression symptom severity. *Journal of Affective Disorders*, *274*, 1165–1172. https://doi.org/10.1016/j.jad.2020.05.156

FioRito, T. A., & Routledge, C. (2020). Is nostalgia a past or future-oriented experience? Affective, behavioral, social cognitive, and neuroscientific evidence. *Frontiers in Psychology*, *11*, 1133. https://doi.org/10.3389/fpsyg.2020.01133

Gammon, S., & Ramshaw, G. (2020). Distancing from the present: Nostalgia and leisure in lockdown. *Leisure Sciences*, *43*(1-2), 131–137. https://doi.org/10.1080/01490400.2020.1773993

Garrido, S. (2018). The influence of personality and coping style on the affective outcomes of nostalgia: Is nostalgia a healthy coping mechanism or rumination? *Personality and Individual Differences*, *120*, 259–264. https://doi.org/10.1016/j.paid.2016.07.021

Giusti, L., Salza, A., Mammarella, S., Bianco, D., Ussorio, D., Casacchia, M., & Roncone, R. (2020). #Everything will be fine. Duration of home confinement and "all-or-nothing" cognitive thinking style as predictors of traumatic distress in young University students on a digital platform during the COVID-19 Italian lockdown. *Frontiers in Psychiatry*, *11*, 574812. https://doi.org/10.3389/fpsyt.2020.574812

Griesinger, W. (1867/1965). *Mental pathology and therapeutics*. Hafner Publishing Company.

Grömping, U. (2006). Relative importance for linear regression in R: The package relaimpo. *Journal of Statistical Software*, *17*(1), 1–27. https://doi.org/10.18637/jss.v017.i01

Grove, J. R., & Prapavessis, H. (1992). Preliminary evidence for the reliability and validity of an abbreviated profile of mood states. *International Journal of Sport Psychology*, *23*(2), 93–109.

Hepper, E. G., Ritchie, T. D., Sedikides, C., & Wildschut, T. (2012). Odyssey's end: Lay conceptions of nostalgia reflect its original homeric meaning. *Emotion*, *12*(1), 102–119. https://doi.org/10.1037/a0025167

Hepper, E. G., Wildschut, T., Sedikides, C., Robertson, S., & Routledge, C. D. (2021). Time capsule: Nostalgia shields psychological well-being from limited time horizons. *Emotion*, *21*(3), 644–664. https://doi.org/10.1037/emo0000728

Hofer, J. (1934). Medical dissertation on nostalgia. In *Bulletin of the history of medicine* (Vol. 2).

Kaplan, H. A. (1987). The psychopathology of nostalgia. *Psychoanalytic Review*, *74*(4), 465–486.

Kersten, M., Cox, C. R., & Van Enkevort, E. A. (2016). An exercise in nostalgia: Nostalgia promotes health optimism and physical activity. *Psychology and Health*, *31*(10), 1166–1181. https://doi.org/10.1080/08870446.2016.1185524

Killgore, W. D. S., Taylor, E. C., Cloonan, S. A., & Dailey, N. S. (2020). Psychological resilience during the COVID-19 lockdown. *Psychiatry Research*, *291*, 113216. https://doi.org/10.1016/j.psychres.2020.113216

Kirzinger, A., Kearney, A., Hamel, L., & Brodie, M. (2020). *KFF health tracking poll – Early April 2020: The impact of coronavirus on life in America*. The Henry J. Kaiser Family Foundation. https://www.kff.org/coronavirus-covid-19/report/kff-health-tracking-poll-early-april-2020/

Larsen, J. T., McGraw, A. P., & Cacioppo, J. T. (2001). Can people feel happy and sad at the same time? *Journal of Personality and Social Psychology*, *81*(4), 684–696. https://doi.org/10.1037//0022-3514.81.4.684

Long, J. A. (2019). *Interactions: Comprehensive, user-friendly toolkit for probing interactions*. http://www.cran.r-project.org.

Mak, W. W. S., Ng, I. S. W., & Wong, C. C. Y. (2011). Resilience: Enhancing well-being through the positive cognitive triad. *Journal of Counseling Psychology*, *58*(4), 610–617. https://doi.org/10.1037/a0025195

Marsh, L., Edginton, T., Conway, M. A., & Loveday, C. (2019). Positivity bias in past and future episodic thinking: Relationship with anxiety, depression, and retrieval-induced forgetting. *Quarterly Journal of Experimental Psychology*, *72*(3), 508–522. https://doi.org/10.1177/1747021818758620

McCann, W. H. (1941). Nostalgia: A review of the literature. *Psychological Bulletin*, *38*(3), 165–182. https://doi.org/10.1037/h0057354

Millstein, R. A., Chung, W. J., Hoeppner, B. B., Boehm, J. K., Legler, S. R., Mastromauro, C. A., & Huffman, J. C. (2019). Development of the state optimism measure. *General Hospital Psychiatry*, *58*, 83–93. https://doi.org/10.1016/j.genhosppsych.2019.04.002

Newman, D. B., & Sachs, M. E. (2020). The negative interactive effects of nostalgia and loneliness on affect in daily life. *Frontiers in Psychology*, *11*, 2185. https://doi.org/10.3389/fpsyg.2020.02185

Newman, D. B., Sachs, M. E., Stone, A. A., & Schwarz, N. (2020). Nostalgia and well-being in daily life: An ecological validity perspective. *Journal of Personality and Social Psychology*, *118*(2), 325–347. https://doi.org/10.1037/pspp0000236

Park, C. L., Russell, B. S., Fendrich, M., Finkelstein-Fox, L., Hutchison, M., & Becker, J. (2020). Americans' COVID-19 stress, coping, and adherence to CDC guidelines. *Journal of General Internal Medicine*, *35*(8), 2296–2303. https://doi.org/10.1007/s11606-020-05898-9

R Core Team. (2021). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. https://www.r-project.org/

Rees, L., Rothman, N. B., Lehavy, R., & Sanchez-Burks, J. (2013). The ambivalent mind can be a wise mind: Emotional ambivalence increases judgment accuracy. *Journal of Experimental Social Psychology*, *49*(3), 360–367. https://doi.org/10.1016/j.jesp.2012.12.017

Reid, C. A., Green, J. D., Short, S. D., Willis, K. D., Moloney, J. M., Collison, E. A., Wildschut, T., Sedikides, C., & Gramling, S. (2021). The past as a resource for the bereaved: Nostalgia predicts declines in distress. *Cognition and Emotion*, *35*(2), 256–268. https://doi.org/10.1080/02699931.2020.1825339

Routledge, C., Arndt, J., Sedikides, C., & Wildschut, T. (2008). A blast from the past: The terror management function of nostalgia. *Journal of Experimental Social Psychology*, *44*(1), 132–140. https://doi.org/10.1016/j.jesp.2006.11.001

Routledge, C., Arndt, J., Wildschut, T., Sedikides, C., Hart, C. M., Juhl, J., Vingerhoets, A. J. J. M., & Schlotz, W. (2011). The past makes the present meaningful: Nostalgia as an existential resource. *Journal of Personality and Social Psychology*, *101*(3), 638–652. https://doi.org/10.1037/a0024292

Russell, D., Peplau, L. A., & Ferguson, M. L. (1978). Developing a measure of loneliness. *Journal of Personality Assessment*, *42*(3), 290–294. https://doi.org/10.1207/s15327752jpa4203_11

Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety. Self-mastery, and self-esteem): A reevaluation of the life orientation test. *Journal of Personality and Social Psychology*, *67*(6), 1063–1078. https://doi.org/10.1037/0022-3514.67.6.1063

Sedikides, C., & Wildschut, T. (2016). Past forward: Nostalgia as a motivational force. *Trends in Cognitive Sciences*, *20*(5), 319–321. https://doi.org/10.1016/j.tics.2016.01.008

Sedikides, C., & Wildschut, T. (2018). Finding meaning in nostalgia. *Review of General Psychology*, *22*(1), 48–61. https://doi.org/10.1037/gpr0000109

Sedikides, C., & Wildschut, T. (2019). *The motivational potency of nostalgia: The future is called yesterday*. https://doi.org/10.1016/bs.adms.2019.05.001

Solberg Nes, L., & Segerstrom, S. C. (2006). Dispositional optimism and coping: A meta-analytic review. *Personality and Social Psychology Review*, *10*(3), 235–251. https://doi.org/10.1207/s15327957pspr1003_3

Stanley, M. L., Yin, S., & Sinnott-Armstrong, W. (2019). A reason-based explanation for moral dumbfounding. *Judgment and Decision Making*, *14*(2), 120–129.

Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination reconsidered: A psychometric analysis. *Cognitive Therapy and Research*, *27*(3), 247–259. https://doi.org/10.1023/A:1023910315561

van Dijke, M., Leunissen, J. M., Wildschut, T., & Sedikides, C. (2019). Nostalgia promotes intrinsic motivation and effort in the presence of low interactional justice. *Organizational Behavior and Human Decision Processes*, *150*, 46–61. https://doi.org/10.1016/j.obhdp.2018.12.003

WHO. (2020). *Rolling updates on coronavirus disease (COVID-19)*. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen.

Wildschut, T., Sedikides, C., Arndt, J., & Routledge, C. (2006). Nostalgia: Content, triggers, functions. *Journal of Personality and Social Psychology*, *91*(5), 975–993. https://doi.org/10.1037/0022-3514.91.5.975

Zhou, X., Sedikides, C., Mo, T., Li, W., Hong, E. K., & Wildschut, T. (2021). The restorative power of nostalgia: Thwarting loneliness by raising happiness during the COVID-19 pandemic. *Social Psychological and Personality Science*, *13*(4), 803–815. https://doi.org/10.1177/19485506211041830

Zhou, X., Sedikides, C., Wildschut, T., & Gao, D. G. (2008). Counteracting loneliness: On the restorative function of nostalgia. *Psychological Science*, *19*(10), 1023–1029. https://doi.org/10.1111/j.1467-9280.2008.02194.x

Zhou, X., Wildschut, T., Sedikides, C., Chen, X., & Vingerhoets, A. J. J. M. (2012). Heartwarming memories: Nostalgia maintains physiological comfort. *Emotion*, *12*(4), 678–684. https://doi.org/10.1037/a0027236