

Variation in Bittersweet Nostalgic Feelings and Their Divergent Effects on Daily Well-Being

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Experimental manipulations of nostalgia that privilege positive aspects of the bittersweet emotion have led to the conclusion that nostalgia is a predominantly positive emotion, yet nostalgia covaries negatively with well-being in daily life. To reconcile this discrepancy, we developed and tested the bittersweet variation model of nostalgia that posits that (a) nostalgic feelings vary not only in intensity but also in valence (i.e., how bitter or sweet a nostalgic feeling is); (b) daily events influence the valence of nostalgic feelings; and (c) nostalgia's valence influences well-being. Across two daily diary studies ($N = 151$; 1,356 daily reports), we found that the valence of nostalgic feelings varied considerably within-persons. Daily positive events predicted more positively rated nostalgic feelings, whereas daily negative events predicted more negatively rated nostalgic feelings. Controlling for the effects of daily events on well-being, positive nostalgic feelings predicted greater well-being, whereas negative nostalgic feelings predicted lower well-being. To provide more robust causal evidence of the effect of nostalgia valence on well-being, we conducted two experiments ($N = 445$) in which we manipulated nostalgia valence by asking participants to write about positive nostalgic feelings (involving people they remain close to) or negative nostalgic feelings (involving people they no longer remain close to), mimicking typical nostalgic feelings in daily life. Positive nostalgic feelings improved well-being compared with negative nostalgic feelings. Thus, nostalgia is not inherently positive or negative. Rather, the effect of nostalgia on well-being depends on its valence, which is influenced by the eliciting event.

Keywords: nostalgia, well-being, diary method, ecological validity, affect

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Nostalgia refers to a sentimental longing and wistful affection for the past. It is a mixed emotion that entails a happy memory with a tinge of sadness (Vaccaro et al., 2020). This mixed emotion has featured prominently in many classic works of literature, such as *The Odyssey*, *The Great Gatsby*, as well as in contemporary films, such as “Midnight in Paris,” and TV reunion specials. Although nostalgic themes appear repeatedly throughout literature and films, it is striking that nostalgic feelings are often elicited by a wide array of experiences, such as interactions with friends, musical compositions, dissatisfaction with romantic relationships, and wartime experiences. Psychological research has confirmed that nostalgia is

elicited by a variety of experiences, such feelings of loneliness (Zhou et al., 2008) and meaninglessness (Routledge et al., 2011), social interactions (Wildschut et al., 2006), and adverse weather (van Tilburg et al., 2018).

If nostalgia can be elicited by different events or experiences, it suggests that nostalgic feelings may vary in their nature and subsequently how they affect feelings and behaviors in the future. This possibility has largely been ignored in prior research. Nearly all studies that have manipulated nostalgia have done so by asking participants to recall their most (or a very) nostalgic feeling (Leunissen et al., 2020; Sedikides et al., 2015). In these contexts, nostalgia is elicited because an experimenter instructs a participant to recall an experience, a situation that likely differs considerably from the array of experiences that elicit nostalgia naturally in daily life. The goal of the present set of studies was to provide a novel theoretical framework to explain when nostalgia may yield beneficial psychological outcomes and when it may lead to less desirable states. We first provide a brief review of the empirical research on nostalgia, followed by our proposed theory and finally by an overview of the present studies that test our theory.

Overview of Nostalgia Findings

Much of the research on nostalgia has documented and focused on the positive effects of nostalgia. For example, reflecting on

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nostalgic memories leads to greater levels of meaning in life, optimism, self-esteem, and positive affect (Baldwin & Landau, 2014; Cheung et al., 2013; Routledge et al., 2011; Sedikides et al., 2018; Wildschut et al., 2006). The positive effects of nostalgia have generally fallen into one of three different categories: self-oriented, existential, and social benefits (Frankenbach et al., 2021). Because nostalgia involves a personal memory, it can focus the individual's attention on self-relevant constructs. For instance, people reported higher levels of self-esteem after listening to a song that elicited nostalgia (Cheung et al., 2013). In other situations that evoke nostalgia, people have reported feeling more optimistic about their future (Cheung et al., 2013). Nostalgia may also alleviate the negative consequences of existential threat or uncertainty. For example, reflecting on a past nostalgic experience can lower the extent to which people report searching for meaning in their lives (Routledge et al., 2011). Moreover, nostalgic reflections can also increase the extent to which people find meaning and purpose in their lives (Routledge et al., 2011; van Tilburg et al., 2019). This likely stems from the fact that highly nostalgic recollections may involve highly personal and momentous events or occasions (Wildschut et al., 2006). Finally, certain nostalgic reflections can lead to various social benefits, such as feeling less attachment anxiety (Wildschut et al., 2006), increasing trust toward a stranger (Turner et al., 2012), fostering prosocial behaviors (Stephan et al., 2014; Zhou et al., 2012), and feeling a higher degree of social support (Zhou et al., 2008). In sum, these findings have led to the conclusion that "... nostalgia is considered an emotion, and a predominantly positive one at that" (Sedikides et al., 2015, p. 194).

This conclusion stands in contrast, however, to some recent findings about the nature of nostalgia in daily life (Muise et al., 2020; Newman et al., 2020; Newman & Sachs, 2020; Turner & Stanley, 2021). In several daily diary studies, participants reported feeling lower levels of well-being on days when they felt higher levels of nostalgia (Newman et al., 2020; Newman & Sachs, 2020). The negative effects of nostalgia on well-being remained significant after controlling for the effects of daily negative events (Newman et al., 2020). Lagged analyses from one day to the next indicated that nostalgia increased negative affect and rumination and decreased positive deactivated (e.g., calm relaxed) affect (Newman et al., 2020; Newman & Sachs, 2020). In a separate daily diary study about sexual nostalgia (defined as reflections of positive sexual experiences with former romantic partners), participants felt dissatisfied with their romantic relationship on days when they engaged in sexual nostalgic thoughts (Muise et al., 2020). Moreover, people who felt higher levels of sexual nostalgia on average reported lower satisfaction with their sex lives and relationships three months later than those who felt lower levels of sexual nostalgia. In a recent experience sampling study of adults across the life span, nostalgic feelings were positively associated with positive activated (e.g., interested, excited, enthusiastic) and negative activated (e.g., distressed, irritable, jittery) emotions (Turner & Stanley, 2021). Other experience sampling studies have found somewhat mixed results, as one study found that momentary nostalgic feelings were not significantly associated with positive affect (van Dijke et al., 2019). Newman et al. (2020, Study 4) found that momentary nostalgic feelings were positively related to momentary states of sadness and depression, but lagged analyses of three hours in duration indicated that nostalgia led to increased

states of positive activated affect but decreased states of positive deactivated affect. In sum, the results from daily diary and experience sampling studies have shown that nostalgia tends to be negatively related to well-being, or at least not as uniformly positively related to well-being in comparison with prior research from experimental methods.

Bittersweet Variation Model of Nostalgia

One way of reconciling these differences between nostalgia induced via experimental manipulation and nostalgia measured in naturalistic contexts is to consider the experience or event that elicits nostalgia. Some events or experiences that elicit nostalgia are quite positive, such as interacting with a friend or listening to an enjoyable song (Barrett et al., 2010; Wildschut et al., 2006). Others tend to be much more negative, such as loneliness or feelings of meaninglessness (Routledge et al., 2011; Zhou et al., 2008). In daily life, nostalgia covaries with and is likely elicited by negative experiences, such as being rejected by peers and performing poorly on work (Newman et al., 2020). In contrast, experiments typically ask participants to bring to mind their most nostalgic feeling, an exercise that privileges atypical and highly positive memories. In fact, people's most nostalgic feelings were rated more positively and less negatively than daily or typical nostalgic feelings (Newman et al., 2020, Study 5).

In light of these considerations, we developed the bittersweet variation model of nostalgia, which depicts how daily events may influence different types of nostalgia and how these forms of nostalgia may differentially influence well-being. Here, we operationalize well-being as consisting of three components: evaluative (e.g., life satisfaction, self-esteem), eudaimonic (e.g., meaning and purpose in life), and experiential (e.g., positive and negative emotions; Kahneman, 1999; Schwarz & Strack, 1999; Steptoe et al., 2015). Standard questionnaires designed to capture these three components of well-being can be modified to refer to specific moments, days, or one's life more broadly (Newman et al., 2021). The bittersweet variation model is built on three components. First, we hypothesize that nostalgia varies not only in intensity but in valence, that is, how bitter or sweet the feeling is perceived to be. Some nostalgic feelings are much more sweet than bitter, whereas others may not be so positive. Within any given individual, the valence of nostalgic feelings may vary considerably from one day to the next. Second, we predict that the valence of the nostalgic experience (i.e., how positive or negative it is) depends on the valence of the event that elicits nostalgia. For example, a nostalgic feeling that occurs in response to a group of friends reminiscing about the good old days is likely more sweet than bitter. In contrast, a nostalgic feeling that occurs in response to feeling isolated and lonely is likely composed of more bitterness than sweetness. Third, we hypothesize that nostalgic feelings that are relatively more positively valenced should have positive effects on well-being, and nostalgic feelings that are relatively more negatively valenced should have negative effects on well-being.

Overview of Present Studies

We test the bittersweet variation model with daily diary and experimental methods, each of which have their own strengths and weaknesses that can complement each other (McGrath, 1982).

Daily diary methods excel at capturing dynamic variations in ecologically valid contexts (Bolger et al., 2003; Newman & Stone, 2019; Nezlek, 2012). They also allow for the measurement of daily events, nostalgia, and well-being, which enables us to test the full model with within-persons associations. Within-person relationships are mathematically orthogonal to and psychologically distinct from between-person relationships (Affleck et al., 1999; Nezlek, 2001). For example, previous work has shown that overall, people who search more for meaning in their life report *less* meaning in life than those who search less (a *negative* between-person relationship). However, when assessing within-person relationships, it was shown that people find *more* meaning on days when they search more for meaning in life than on days when they search less (a *positive* within-person relationship; Newman et al., 2018). While both levels of analysis address important questions, many psychological processes, particularly those in daily life, are ideally examined as within-person relationships. Therefore, across two daily diary studies, we examine the degree to which the valence of nostalgic experiences varies in daily life, whether the valence of nostalgia is predicted by typical positive and negative events, and how the valence of nostalgic feelings subsequently predicts well-being. Because daily diary methods are inherently correlational, we cannot make firm causal statements. Thus, we conduct two experiments that manipulate the valence of nostalgia by bringing to mind either negative or positive aspects of nostalgia to examine the causal effects of different types of nostalgic feelings. The goal of the experiments was to manipulate nostalgia in different ways, thus attempting to elicit nostalgic feelings that may be similar to the types of nostalgic feelings that are elicited naturally in daily life. We were careful to manipulate different types of nostalgia without explicitly instructing participants to focus on positive or negative aspects. This provided an unbiased examination of the causal effects of the valence of nostalgia on well-being.

To ensure the robustness of our findings, we conducted initial studies followed by preregistered, direct replications. Aggregated results across studies provide a more robust estimate of the effects than either single study (Fabrigar & Wegener, 2016). Therefore, we provide the aggregated results in the article to be concise, but we also report the results of each individual study in the [online supplemental materials](#) to be completely transparent. This approach was utilized first for two daily diary studies, and a similar process followed for two experiments.

Studies 1–2: Daily Diary Studies

Method

Transparency and Openness

All materials, data, and analyses are available at OSF (<https://osf.io/6j3sv/>). The data were analyzed with HLM Version 6 (Raudenbush et al., 2011). We report how we determined our sample sizes below and how we excluded data.

Overview

Study 1 was a reanalysis of the data collected from Newman et al. (2020). Whereas the analyses reported previously focused on

mean-level comparisons between people's most nostalgic experiences and aggregated daily nostalgic feelings, we now report within-person relationships between daily events, nostalgia ratings of positivity and negativity, and well-being. Study 2 was a preregistered, direct replication of Study 1 (<https://aspredicted.org/ef96v.pdf>). The only difference between the studies was that Study 2 increased the number of days reported from 7 to 14 to increase statistical power. Both studies were approved by the Institutional Review Board at the University of Southern California under the ID UP-18-00183.

Participants and Procedure

One-hundred and 51 undergraduate students (Study 1: $N = 81$; $M_{\text{age}} = 20.31$, $SD = 1.73$, 81.48% female; Study 2: $N = 70$; $M_{\text{age}} = 19.87$, $SD = 1.81$, 72.85% female) from a large private university in the United States received course credit for their participation. They completed end-of-day questionnaires for 7 days (Study 1) or 14 days (Study 2). Multiple entries completed on the same day, entries completed after 10:00 a.m. the following morning, and entries that did not have a correct answer to an instructed response item were dropped from final analyses. Participants who completed less than three entries (Study 1) or five entries (Study 2) were eliminated as well. In Study 1, 51 entries of the 535 entries were deleted (final $N = 484$; 90.47%). In Study 2, 46 of the 918 entries were deleted (final $N = 872$; 94.99%) Participants completed 5.98 daily questionnaires on average ($SD = 1.11$, median = 6) in Study 1, and they completed 12.46 daily questionnaires on average ($SD = 1.77$, median = 13) in Study 2. Overall, compliance was excellent.

Data were collected from as many participants as possible within the constraints of the participant pool. The decision to increase the number of days in the diary study from 7 in Study 1 to 14 in Study 2 was to increase statistical power. Post hoc power analyses were calculated by running simulations with 5,000 iterations in Mplus based on the parameter estimates of the strongest and weakest effects (Bolger et al., 2012). These analyses showed that we achieved between .90 and 1.00 power to test the primary research questions. We recognize some of the inherent weaknesses of post hoc power analyses, such as the limited information they provide beyond inferential statistics. Alternative methods such as sensitivity analyses are also limited due to the complexities of power analyses in multilevel modeling, which require a greater number of estimates than power analyses with the general linear model (Bolger et al., 2012). For example, in addition to the fixed effects coefficients, multilevel power analyses require estimates of the random slope of the Level-1 predictor, the within-subjects residual variance, the covariance between the mean of the intercept and the Level-1 predictor, the variance of the intercept, and the variance of the Level-1 predictor's slope from the fixed effect. Sensitivity analyses would require estimates of each of these components and would therefore yield redundant information with the inferential statistics. These issues notwithstanding, we believe we were adequately powered to test the effects of interest in our studies. General recommendations of sample sizes in daily diary research confirmed our intuitions (Maas & Hox, 2005; Nezlek, 2012).

Measures

Positive and negative daily events were measured with 26 social (e.g., "Had especially good interactions with friend(s) or

acquaintances”; “Was excluded or left out by my group of friends”) and achievement (e.g., “Completed work on an interesting project or assignment”; “Fell behind in course work or duties”) events that are common in the lives of undergraduate students. These events were compiled from various daily event checklists (Butler et al., 1994; Gable et al., 2000; Seidnitz & Diener, 1993). Responses were recorded on a 5-point scale (0 = *did not occur*, 1 = *occurred and not important*, 2 = *occurred and somewhat important*, 3 = *occurred and pretty important*, 4 = *occurred and extremely important*). We calculated composite scores for positive events and negative events by averaging the ratings within each respective category (Nezlek & Plesko, 2001). Thus, scores could range from 0 to 4. This method has statistical advantages over frequency scores, but we note the results involving frequency scores mirrored those that used composite scores.

Nostalgia intensity was assessed with the daily version of the four-item Personal Inventory of Nostalgic Experience (PINE) scale (e.g., “How nostalgic did you feel today?”; Newman et al., 2020). Responses were reported on a 7-point scale (1 = *not at all*, 7 = *very much*). If the participant recorded a score greater than 1 (*not at all*) for any of the four nostalgia questions (53.88% of the days), they were asked to think about the experience that made them feel nostalgic that day. They wrote four keywords to describe the experience. Next, they were asked to describe their experience in a text box and how it made them feel. These instructions were adapted from the Event Reflection Task (Leunissen et al., 2020; Wildschut et al., 2006).¹ If the participant did not feel nostalgic at all, they were asked to think of an ordinary experience that happened that day (46.12% of the days). They were asked to write four keywords and then to describe the experience and how it made them feel. In each case, participants were separately asked, “How positive was this experience for you?” and “How negative was this experience for you?” with 7-point responses (1 = *not at all positive/negative*, 7 = *very positive/negative*, respectively).

Well-being was assessed with scales measuring affect, satisfaction with life, meaning in life, and self-esteem. Relying on an affective circumplex that distinguishes valence and arousal (Feldman Barrett & Russell, 1998), participants were asked how strongly they felt each of the following adjectives today: enthusiastic, delighted, happy, glad, and excited (positive activated); calm, peaceful, relaxed, contented, and at ease (positive deactivated); stressed, angry, annoyed, tense, and nervous (negative activated); and depressed, disappointed, miserable, gloomy, and sad (negative deactivated). Responses were recorded on a 7-point scale (1 = *did not feel this way at all*, 4 = *felt this way moderately*, 7 = *felt this way very strongly*).

Following the recommendation of Nezlek (2012), we created abbreviated daily measures that were adapted from trait measures. These measures have been used reliably in previous research (Kashdan & Nezlek, 2012; Newman et al., 2018; Nezlek, 2005). Daily satisfaction with life was measured with a single item on a 7-point scale: “How satisfied were you with your life today?” (1 = *not at all*, 7 = *very much*). Meaning in life was measured with two items: “How meaningful did you feel your life was today?” and “How much did you feel your life had purpose today?” (1 = *not at all*, 7 = *very much*). Self-esteem was measured with four items adapted from Rosenberg’s (1965) trait

measure. The items were “Today, I felt like a failure”; “Today, I felt that I had many good qualities”; “Today, I thought I was not good at all”; and “Today, on the whole, I was satisfied with myself.” Responses were recorded on a 7-point scale (1 = *very uncharacteristic of me today*, 7 = *very characteristic of me today*).

Data Analytic Strategy

Due to the nested data structure (i.e., days nested within persons), we used multilevel modeling to distinguish between- and within-person variation, and we used the program HLM (Raudenbush & Bryk, 2002). We begin with null or unconditional models which include a random intercept and no predictors at either level. These models provide estimates of the amount of within- and between-person variation of each variable. We also conducted reliability analyses of all multiitem scales by following a procedure described by Nezlek (2017). In short, we created three-level models in which items were nested within days which were nested within persons. The within-person reliability is calculated from the intercept of the null model, which provides an estimate of the true variation over the total variance. The within-person analyses of primary interest relied on two-level models in which days were nested within participants, and predictors were person-mean centered, which provide pure estimates of the within-person relationships.

Because Study 2 was a preregistered replication of Study 1, we present aggregated analyses across studies to be concise. Results from Study 2 replicated those from Study 1, and both are presented separately in [online supplemental materials](#).

Results

Within-Person Variation of Nostalgia Valence

The first premise of the bittersweet variation model is that nostalgic feelings vary in their valence. To test this, we examined the amount of within- and between-person variance of two items that measured the subjective ratings of positivity and negativity of nostalgic feelings in daily life. Unconditional models in which days were nested within persons showed that the amount of within-person variance of ratings of positivity and negativity of nostalgic feelings exceeded the amount of between-person variance (see [Table 1](#)). This means that the valence of nostalgic feelings varies considerably from one day to the next. Additional descriptive statistics for all daily variables are presented in [Table 1](#).

Daily Events Influence Nostalgia Valence

The second premise of the bittersweet variation model is that the valence of nostalgic feelings is influenced by the daily events and experiences that elicit the nostalgic feelings. To test this, we examined the within-person relationships between different types of positive and negative events that are typical in daily life and ratings of positivity and negativity of nostalgic feelings. In separate models, positivity and negativity ratings of nostalgia

¹ If the participant reported feeling nostalgic but wrote that they did not feel nostalgic, we treated their positivity and negativity ratings as missing ($N_s = 6$ and 24, Studies 1 and 2, respectively).

Table 1
Descriptive Statistics From Daily Diary Studies (Studies 1–2)

Variable	N (days)	Intercept	Variance		Reliability
			Within	Between	
Positive events	1,356	.89	.19	.19	
Negative events	1,356	.39	.11	.08	
Nostalgia intensity	1,356	2.29	1.85	.90	.92
Nostalgia positivity	681	4.86	2.19	1.33	
Nostalgia negativity	681	2.70	2.00	1.09	
Ordinary positivity	583	4.90	3.39	.77	
Ordinary negativity	583	2.46	2.88	.51	
Positive activated affect	1,356	3.84	1.14	1.17	.83
Positive deactivated affect	1,356	3.83	1.00	1.14	.83
Negative activated affect	1,356	2.96	1.15	.85	.67
Negative deactivated affect	1,356	2.30	1.01	.94	.80
Satisfaction with life	1,354	4.67	1.30	1.31	
Meaning in life	1,354	4.32	1.17	1.81	.87
Self-esteem	1,356	5.12	1.06	.95	.55

Note. Intercepts and variances were obtained from unconditional models, and reliabilities were calculated using a procedure outlined by Nezelek (2017). Single-items measures do not provide reliability estimates and daily event reliabilities are not recommended (Stone et al., 1991).

were outcome measures, and positive and negative events were entered as person-mean centered predictors at Level 1 (Enders & Tofighi, 2007). Error terms were trimmed if their p-values exceeded .15 as recommended by Nezelek (2012).

Day level:

$$y_{ij}(\text{nostalgia positivity/negativity}) = \beta_{0j} + \beta_{1j}(\text{positive events}) + \beta_{2j}(\text{negative events}) + r_{ij}$$

Person level:

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + u_{1j}$$

$$\beta_{2j} = \gamma_{20} + u_{2j}$$

The results of these models showed that positive events predicted higher nostalgia positivity ratings, $b = .58, t = 3.65, p = .001$, and lower nostalgia negativity ratings, $b = -.82, t = 4.22, p < .001$. Negative events predicted lower nostalgia positivity ratings, $b = -.65, t = 4.16, p < .001$, and higher nostalgia negativity ratings, $b = .87, t = 5.76, p < .001$. HLM provides unstandardized coefficients, which means that for every one unit increase in average daily positive events on the raw scale, for instance, nostalgia positivity ratings increased by .58 for the average participant. In sum, on days when people felt nostalgic to some degree, their nostalgic feelings were relatively positive when the day was going well and were relatively negative when the day was not going well.

Nostalgia Valence Influences Well-Being

Testing the final portion of the bittersweet variation model, we examined how the valence of the nostalgic feeling influenced well-being states. Several well-being variables were the outcome

measures in separate models, and nostalgia positivity and nostalgia negativity ratings were entered as predictors individually and separately.² No predictors were included at Level 2.

Day level:

$$y_{ij}(\text{well – being}) = \beta_{0j} + \beta_{1j}(\text{nostalgia positivity/negativity}) + r_{ij}$$

Because social- and achievement-related events are some of the key predictors of well-being in daily life (e.g., Machell et al., 2015), we ran additional models in which we controlled for the effect of daily events on well-being in these models.

Day level:

$$y_{ij}(\text{well – being}) = \beta_{0j} + \beta_{1j}(\text{nostalgia positivity/negativity}) + \beta_{2j}(\text{positive events}) + \beta_{3j}(\text{negative events}) + r_{ij}$$

As before, the predictors were entered person-mean centered, and well-being measures were the outcome measures in separate models. A general pattern emerged, namely that positive nostalgic feelings predicted greater well-being, and these relationships remained significant albeit attenuated after controlling for daily events (see Table 2). Conversely, negative nostalgic feelings predicted lower well-being, both with and without controlling for the effect of daily events on well-being.

Independence of Nostalgia Intensity and Valence

Finally, it is worth emphasizing that the valence of nostalgia is distinct from the intensity of nostalgia. Daily nostalgia intensity

² Nostalgia valence could also be conceptualized as the difference between nostalgia positivity and nostalgia negativity. Therefore, we ran the same set of analyses with a difference score (nostalgia positivity—nostalgia negativity), and these findings mirrored those reported here. See Supplemental Table 3 for details.

Table 2*Within-Person Relationships Between Nostalgia Valence and Well-Being (Studies 1–2)*

DV	Nostalgia positivity								Nostalgia negativity							
	Without daily event controls				With daily event controls				Without daily event controls				With daily event controls			
	<i>b</i>	<i>t</i>	<i>p</i>	$r_w^{(fiv)}$	<i>b</i>	<i>t</i>	<i>p</i>		<i>b</i>	<i>t</i>	<i>p</i>	$r_w^{(fiv)}$	<i>b</i>	<i>t</i>	<i>p</i>	
PA	.15	5.07	<.001	.19	.10	3.28	.002		-.15	4.74	<.001	.19	-.07	2.14	.034	
PD	.12	3.88	<.001	.26	.09	2.72	.008		-.13	4.48	<.001	.19	-.08	2.64	.010	
NA	-.11	3.25	.002	.22	-.07	2.27	.024		.16	4.72	<.001	.23	.10	2.92	.005	
ND	-.18	5.63	<.001	.31	-.14	4.92	<.001		.21	6.37	<.001	.37	.15	4.73	<.001	
SWL	.24	6.29	<.001	.36	.21	6.15	<.001		-.23	6.24	<.001	.33	-.16	4.31	<.001	
ML	.19	6.30	<.001	.28	.15	4.46	<.001		-.16	4.37	<.001	.28	-.10	2.87	.005	
SE	.20	6.20	<.001	.33	.17	4.82	<.001		-.23	6.79	<.001	.37	-.17	4.88	<.001	

Note. PA = positive activated affect; PD = positive deactivated affect; NA = negative activated affect; ND = negative deactivated affect; SWL = satisfaction with life; ML = meaning in life; SE = self-esteem. HLM provides unstandardized coefficients. Effect sizes, $r_w^{(fiv)}$, were calculated following recommendations by Rights and Sterba (2019). The $r_w^{(fiv)}$ statistic is defined as the square root of the proportion of variance explained by within-person predictors via fixed slopes and random slope variation/covariation. This is similar to a measure of the square root of the proportion reduction in variance, akin to a correlation (Hox, 2002; Kreft & de Leeuw, 1998; Raudenbush & Bryk, 2002). Due to space constraints, 95% confidence intervals are presented in Supplemental Table 2.

was not related to nostalgia positivity, $b = .01$, $t = .22$, $p = .825$, or nostalgia negativity, $b = .05$, $t = 1.41$, $p = .256$. That is, how intensely people felt nostalgic on a particular day did not predict how positive or negative that nostalgic feeling was. Moreover, the within-person relationships between nostalgia intensity and daily events and well-being were distinct from those relationships involving nostalgia valence. Similar to Newman et al. (2020, Study 3), nostalgia intensity was more strongly related to negative events, $b = .93$, $t = 5.43$, $p < .001$, than positive events, $b = .44$, $t = 5.64$, $p < .001$, $\chi^2(1) = 8.10$, $p = .005$, and was negatively or not significantly related to well-being (see Supplemental Table 4). Thus, nostalgia intensity was predicted by negative events and related negatively to well-being, whereas nostalgia valence was predicted by corresponding positive and negative events, and nostalgia valence predicted well-being in divergent ways.³

Discussion

Studies 1–2 utilized the strengths of daily diary methods by capturing within-person processes of the complete model. The results supported the bittersweet variation model. Departing from prior research which has measured or manipulated the intensity of nostalgic feelings (Newman et al., 2020; Sedikides et al., 2015), the present studies demonstrate that certain nostalgic feelings are relatively more bitter or sweet than others. Positive events predict more positively valenced nostalgic feelings, and positively valenced nostalgic feelings subsequently predict higher well-being. The inverse was also found, such that negative events predict negatively valenced nostalgia, which predicts lower well-being.

Studies 3–4: Experimental Studies

The assumption from Studies 1–2 was that the valence of nostalgic feelings had a causal effect on well-being later that day. Although we statistically controlled for the effect of daily events on well-being, we do not know the temporal sequence of events and experiences that occurred during the day. Moreover, there may have been additional unmeasured third variable confounds that we

could not control for, which weaken causal claims. To address these limitations, we conducted two experiments with between-subjects designs by asking participants to write about experiences that would either elicit positive nostalgic feelings or negative nostalgic feelings to determine the causal effect of nostalgia valence on well-being (measured with affect ratings). To ensure the wording of the instructions did not drive the effects, we explicitly did not instruct participants to focus on positive or negative aspects of the nostalgic feeling. Study 4 was a preregistered, direct replication of Study 3. We present the aggregated results to be concise. Study 4 replicated the effects of Study 3 and separate analyses for each individual study are presented in the online supplemental materials.

Method

Transparency and Openness

All materials, data, and analyses are available at OSF (<https://osf.io/6j3sv/>). The data were analyzed with SPSS Version 27. We report how we determined our sample sizes below and how we excluded data. The studies were approved by the Human Research Protection Office at Columbia University under the ID IRB-AAAT3955. Study 4 was preregistered at [aspredicted.org](https://aspredicted.org/x7cu8.pdf) (<https://aspredicted.org/x7cu8.pdf>).

Participants

Participants were 445 (Study 3: $N = 180$, $M_{\text{age}} = 20.15$, $SD = 2.47$; 61.11% female; Study 4: $N = 265$, $M_{\text{age}} = 20.05$, $SD = 2.71$, 50.19% female) undergraduate students at two private universities in the United States who received course research credit for their participation. We collected data from as many participants as we could within the constraints of the participant pool. A power analysis conducted with GPower (Faul et al., 2007) after Study 3 based

³ We preregistered two additional analyses that were not central to our model. Nostalgia negativity ratings were not more strongly related to well-being than nostalgia positivity ratings. The within-person relationships between nostalgia valence and well-being were not moderated by daily events. Details are provided in online supplemental materials.

on the average effect size of the four dependent variables of $\eta_p^2 = .028$ indicated that we needed 339 participants to achieve 80% power.⁴ Our full sample exceeded this amount. For complete transparency, we additionally ran a sensitivity analysis which indicated we had 80% power to detect effects as small as $f = .148$. Thus, we were adequately powered to examine the effects of interest.

Procedure

In a between-subjects design, participants were randomly assigned to one of three conditions: positive nostalgia, negative nostalgia, and a control. The goal of the positive and negative nostalgia conditions was to mimic the types of nostalgic feelings that occur in response to positive and negative events in daily life, respectively. We noticed that the highly positively valenced nostalgic experiences in Studies 1–2 were often about experiences with close social connections who have remained involved in their lives (e.g., family members, current romantic partners). Nostalgic experiences that were highly negative often involved experiences with people who were no longer involved in their lives (e.g., former romantic partners).

Following the procedure of the event reflection task, the most commonly used manipulation of nostalgia that elicits people's most nostalgic feelings (Leunissen et al., 2020), we first provided a definition of nostalgia from the Oxford Dictionary ("nostalgia is defined as a sentimental longing for the past") to participants in both nostalgia conditions. Following the procedure of Juhl et al. (2021), we then told participants in both conditions that, "People are often nostalgic about times with other people, such as family, friends, a partner, or close others." In the positive [negative] nostalgia condition, participants read the following:

Please think of a nostalgic event in your life that involves people who you are close with and with whom you remain in close contact [were once close with but with whom you now no longer contact]. Specifically, try to think of a past event (involving others that you have kept in touch with) [(involving people you no longer keep in touch with)] that makes you feel most nostalgic. Bring this nostalgic experience to mind. Immerse yourself in the nostalgic experience. How does it make you feel?

Please spend a couple of minutes thinking about how it makes you feel. Please write down four keywords relevant to this nostalgic event that involves close others (i.e., words that describe the experience).

After writing four keywords, they were asked to write for a few minutes about the experience and how it makes them feel. In the control condition, participants were asked to bring an ordinary event to mind. They wrote four keywords describing that experience and then wrote for a few minutes about the experience and how it makes them feel. When selecting an appropriate control condition, we considered several options, each with their own strengths and weaknesses. Our goal was to select a neutral experience, but we also wanted our results to be comparable to prior research. In the vast majority of studies that have utilized the event reflection task, the control condition has been a reflection on an ordinary event. This may not be the optimal neutral condition as ordinary events privilege the boring, mundane aspects of daily life. Moreover, because our studies were conducted during the COVID-19 pandemic before vaccines were available, reflections

of ordinary daily experiences may have heightened levels of negative affect and lowered positive affect (Aknin et al., 2022; McGinty et al., 2020; VanderWeele et al., 2021). We nevertheless opted to use this control to be consistent with prior research. Moreover, this control condition allowed us to make sure both nostalgia conditions truly elicited nostalgia relative to ordinary experiences which do not elicit nostalgia.

As a manipulation check, participants were asked two questions that were adapted from the PINE scale: "How nostalgic do you feel right now?" and "Right now, to what extent do you feel sentimental for the past?" (1 = *not at all*, 7 = *very much*; $\alpha = .86$). Because the administration of questions can influence the participant (Schwarz, 1999), we limited the number of dependent variables to eight questions about participants' affect, using two items from each quadrant of the affective circumplex. The emotion adjectives were asked in the following order: sad, depressed (negative deactivated; $\alpha = .78$), happy, excited (positive activated; $\alpha = .74$), stressed, tense (negative activated; $\alpha = .88$), calm, relaxed (positive deactivated; $\alpha = .87$). The wording of the questions alternated between, "How [adjective] do you feel right now?" and "Right now, how [adjective] do you feel?" Responses were reported on a 7-point scale (1 = *not at all [adjective]*, 4 = *moderately [adjective]*, 7 = *very [adjective]*).

Results

Compared with the control condition ($M = 4.50$, $SD = 1.88$), in which participants wrote about an ordinary event, participants felt more nostalgic in both the positive nostalgic condition ($M = 5.61$, $SD = 1.13$), $t(297) = 6.14$, $p < .001$, and in the negative nostalgic condition ($M = 5.45$, $SD = 1.25$), $t(299) = 5.15$, $p < .001$. Levels of nostalgia did not differ across the two nostalgic conditions, $t(288) = 1.16$, $p = .257$. Thus, our manipulation was effective.

Mean levels of affect across each condition are presented in Table 3 and are depicted visually in Figure 1. We report omnibus tests for each affect variable as well as individual comparisons between each condition using Fisher's least significant difference (LSD) tests. The critical comparison is between positive nostalgia and negative nostalgia as our theory states that the more positive nostalgic feelings predict greater well-being compared with the more negative nostalgic feelings.

These analyses showed that positive activated affect (e.g., happy, excited) and positive deactivated affect (e.g., calm, relaxed) were significantly higher in the positive nostalgia condition than the negative nostalgia condition, which was roughly similar to the control condition. The difference between the positive nostalgia condition and the control condition, which emphasizes mundane, everyday experiences, mimics the results from experiments that induce nostalgia by asking participants to write about their most nostalgic feeling, a relatively positive one (Sedikides et al., 2015). Critical to our theory, however, writing about a positive nostalgic

⁴ Our preregistration indicated that we aimed to collect data from 288 participants, an estimate based on one of the effects from Study 3. As we prepared the manuscript, we decided it would be more appropriate to provide an estimate based on the average effect sizes instead of a single effect size. This point became moot as we were not able to recruit this many participants, but our final pooled sample nevertheless exceeded 339 participants.

Table 3
Affective Well-Being Levels as a Function of Positive and Negative Nostalgia (Studies 3–4)

DV	α	Conditions			Pairwise comparisons								
		Positive nostalgia (<i>N</i> = 144)	Negative nostalgia (<i>N</i> = 146)	Control (<i>N</i> = 155)	Omnibus test			Positive vs. negative		Positive vs. control		Negative vs. control	
		<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>F</i>	<i>p</i>	η_p^2	Difference [95% CI]	<i>p</i>	Difference [95% CI]	<i>p</i>	Difference [95% CI]	<i>p</i>
PA	.74	3.88 (1.28)	3.49 (1.29)	3.47 (1.33)	4.60	.011	.020	.39 [.09, .69]	.011	.41 [.11, .70]	.007	.02 [–.28, .31]	.901
PD	.87	4.49 (1.31)	3.95 (1.36)	4.14 (1.35)	6.01	.003	.026	.54 [.23, .85]	<.001	.35 [.04, .65]	.025	–.19 [–.49, .11]	.219
NA	.88	2.97 (1.61)	3.57 (1.74)	3.58 (1.65)	6.44	.002	.028	–.60 [–.99, –.22]	.002	–.61 [–.99, –.23]	.002	–.01 [–.39, .37]	.949
ND	.78	2.99 (1.45)	3.41 (1.50)	2.70 (1.44)	9.10	<.001	.040	–.43 [–.76, –.09]	.014	.29 [–.04, .63]	.085	.72 [.39, 1.05]	<.001

Note. PA = positive activated affect; PD = positive deactivated affect; NA = negative activated affect; ND = negative deactivated affect. Significance tests of difference scores were calculated with Fisher's least significant difference.

experience was much more beneficial than writing about a negative nostalgic experience.

Negative activated affect (e.g., stressed, tense) was lower in the positive nostalgia condition than the negative nostalgia condition, which was similar to the control condition. Negative deactivated affect (e.g., sad, depressed) was significantly lower in the positive nostalgia condition than the negative nostalgia condition. These findings lend support for the bittersweet variation model. Interestingly, negative deactivated affect was significantly higher in the negative nostalgia condition than the control condition and was marginally significantly higher in the positive nostalgia condition than the control condition. Thus, both nostalgia conditions increased negative deactivated affect in comparison to a control. Moreover, similar to prior research (Frankenbach et al., 2021), the effects of the positive nostalgic feeling (relative to a reflection on an ordinary experience) on negative affective states were mixed. The key takeaway from these analyses is that the negative nostalgia condition increased negative activated and negative deactivated states relative to the positive nostalgia condition.

Discussion

Extending the results beyond correlational methods, Studies 3–4 provide causal support for the bittersweet variation model. Writing about a positive nostalgic experience, similar to the types of nostalgic feelings elicited in response to positive events in daily life, improves affective well-being, whereas writing about a negative nostalgic experience, similar to the types of nostalgic feelings elicited by negative daily events, results in lower well-being. The results were most striking and robust when comparing the positive nostalgia condition to the negative nostalgia condition. Comparisons between either nostalgia condition and the control condition come with the caveat that “neutral” conditions are time-sensitive and shift depending on current circumstances.

General Discussion

Four studies, including diverse methods and two preregistered replications, provided evidence that supports the bittersweet variation model, which clarifies when nostalgia can be beneficial or harmful for well-being. In daily life, when people felt nostalgic, they rated their nostalgic feelings relatively positively when the day was going well and relatively negatively when the day was

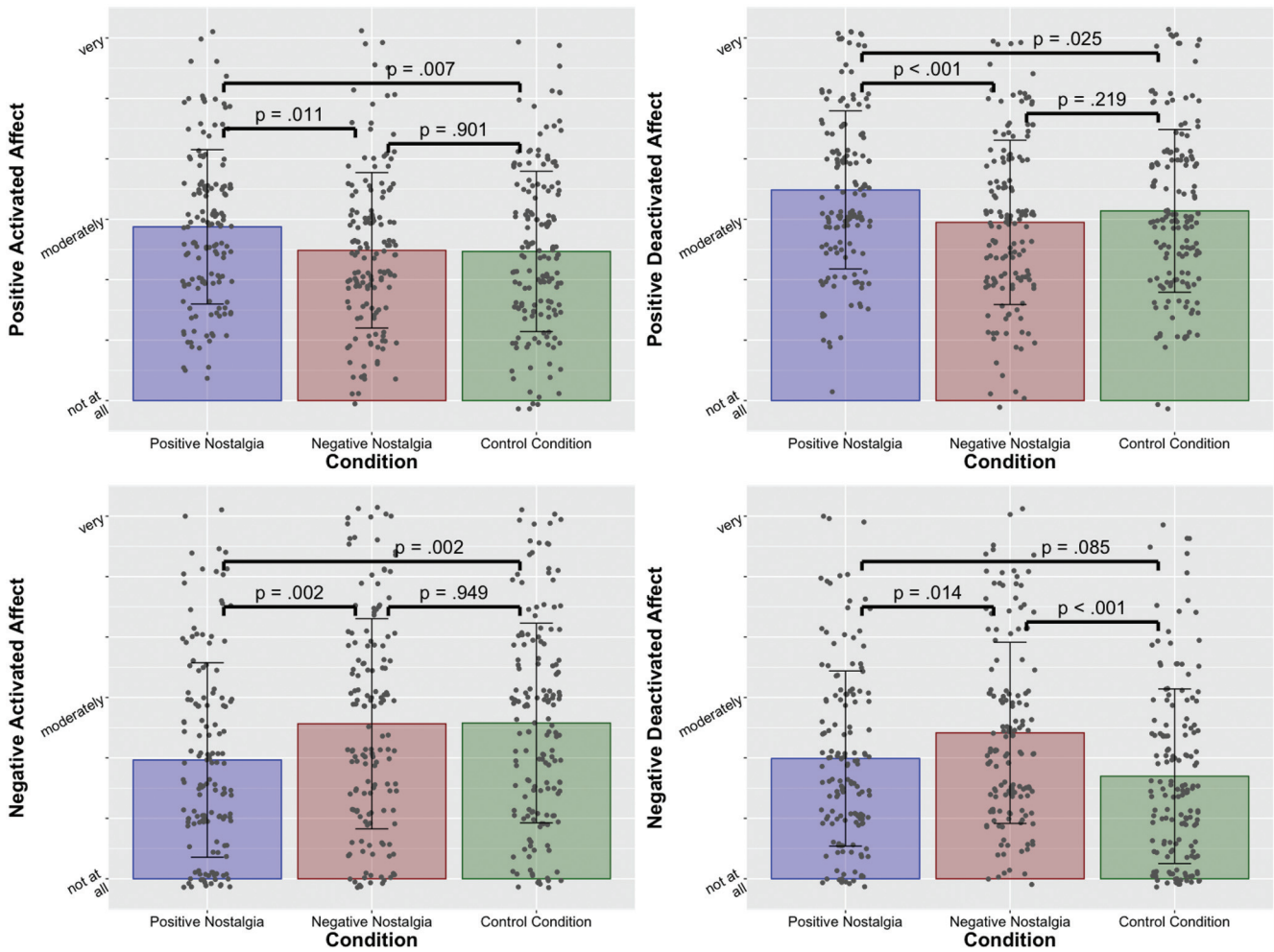
not going well. Subsequently, positive nostalgic feelings had a positive influence on well-being, whereas negative nostalgic feelings had a negative effect on well-being. These effects remained after statistically controlling for the effects of the daily events. A more robust causal test confirmed that positive nostalgic feelings had a more positive effect on well-being than negative nostalgic feelings. In short, the valence of nostalgic feelings varies quite a bit. How bittersweet they are depends on how they were elicited which can subsequently influence well-being.

It is worth emphasizing a few key strengths and novel aspects of the present studies. First, these studies are the first to measure not only the intensity of nostalgia but the valence of nostalgic feelings. Like all emotions, the intensity of nostalgia may vary considerably from one moment to the next (Muise et al., 2020; Newman et al., 2020; van Dijke et al., 2019; van Tilburg et al., 2018). Yet unlike other, more basic emotions, nostalgia is by definition a mixed emotion, and the degree of positive to negative, bitterness to sweetness, can vary considerably from one time to the next. This finding extends prior theoretical work on mixed emotions more broadly that has argued that mixed emotions can vary considerably within-individuals (Ong et al., 2017) and that the make-up or ratio of positive and negative affective components may vary depending on the context (Larsen et al., 2017). To our knowledge, this is the first empirical demonstration of these postulates within the field of nostalgia research. Second, we implemented a novel manipulation of nostalgia by inducing two different types of nostalgic feelings. Whereas prior research typically induces one type of nostalgic feeling (Frankenbach et al., 2021; Leunissen et al., 2020), we showed that different types of nostalgic feelings can have differential effects on well-being. Third, we relied on two separate methodologies that complemented each other with their unique strengths and weaknesses. Daily diary methods excel at measuring nostalgia in ecologically valid contexts but are limited in drawing causal claims, whereas experimental methods are limited in capturing ecologically valid situations but are excellent at testing causal relationships (McGrath, 1982).

Theoretical Implications

The novel aspects of our bittersweet variation model provide a useful theoretical framework that can help integrate and situate findings within the literature. As our model name suggests, nostalgia is a bittersweet emotion, a fact that has long been recognized

Figure 1
Differences in Affective Well-Being as a Function of Positive and Negative Nostalgia (Studies 3–4)



Note. Error bars represent one standard deviation above and below the mean. See the online article for the color version of this figure.

by lay audiences and researchers alike (Batcho, 2013). Yet the implications of this fact have not received the attention it has deserved. Although prior research has documented a variety of positive and negative antecedents to nostalgia (e.g., Newman et al., 2020; Wildschut et al., 2006), experimental methods that have explored the consequences of nostalgia have focused on nostalgia elicited under positive contexts. Empirically, nostalgia research has been dominated by a focus on the sweet quality by asking participants to deliberately engage in recalling their *most* nostalgic memory. When this is done, the consequences of nostalgia are largely quite positive, as demonstrated in the seminal work by Sedikides and colleagues (e.g., Sedikides et al., 2015) and as observed in the “sweet” or positive conditions of the present studies. That is, nostalgia elicited under positive situations can improve people’s sense of meaning in life, self-esteem, and positive affect.

However, this is only half of the story. Nostalgia elicited under negative contexts tends to have negative consequences on well-being. In daily life, negative antecedents to nostalgia are more common than positive antecedents (Newman et al., 2020),

and the bitter component of nostalgia in daily life is more prominent than nostalgia elicited in the classic experiments in which participants are asked to deliberately engage in their *most* nostalgic memory. Hence, in daily life, the consequences of nostalgia are often negative, an aspect that has been missing in the nostalgia literature.

It is important to reiterate that the findings from the daily diary studies demonstrate a process that typically or normally occurs under ecologically valid conditions. This does not rule out the possibility that nostalgia may be used to buffer the negative effects of certain negative experiences, as several experiments have shown (Stephan et al., 2014; Zhou et al., 2008). For instance, certain motivational processes could interact with negative events to lead nostalgia to beneficial outcomes. The present studies clarify that without intervening processes, nostalgic feelings that occur in response to negative events tend to be relatively negative in valence and have a negative influence on well-being in comparison to more positive instances of nostalgia.

This framework helps explain particular findings in the nostalgia literature. For example, daily nostalgic feelings were more

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negatively related to well-being on days in which people felt higher levels of loneliness than on days when they felt lower levels of loneliness (Newman & Sachs, 2020). Although the valence of the nostalgic feelings was not measured, nostalgic feelings elicited by loneliness were presumably more negative than the nostalgic feelings that were not elicited by loneliness. Subsequently, the more negatively valenced nostalgic feelings had more negative consequences on affective well-being states than the more positively valenced nostalgic feelings. A similar pattern of results was detected by Abeyta et al. (2019). Nostalgia was beneficial for people who scored low in attachment-related avoidance but was not beneficial for those who scored high in attachment-related avoidance. Arguably, people who score high in attachment-related avoidance likely experience nostalgia under more negative contexts. Likewise, Wildschut et al. (2010) found similar results in studies measuring perceptions of feeling connected to others.

Limitations and Future Directions

A few limitations and directions for future research are worth noting. First, given the correlational nature of the diary studies, we cannot firmly claim that daily events had a causal effect on the valence ratings of nostalgia. Although we think it is unlikely that nostalgia valence would influence daily events or that the association between the two is merely spurious, carefully planned experiments or longitudinal studies would have to be implemented to confirm the causal effects.

Second, when participants rated how positive and negative the nostalgic experience was, it is possible they were evaluating either the memory itself, the feeling, or some other aspect of the experience. Teasing apart these differences is difficult with a daily diary method. Regardless though, it is clear there is a fair amount of variance of these ratings, and they covaried with the valence of daily events and well-being, providing evidence for the bittersweet variation model. Future research could clarify the exact source of the variation (see Iyer & Jetten, 2011 and Osborn et al., 2022 for potential insights).

Third, although we captured a range of different types of nostalgic feelings in the daily diary studies by asking participants to reflect on one particular nostalgic event of the day, there may have been other nostalgic experiences they did not report. Thus, we may not have captured all nostalgic experiences and we were unable to examine the types of specific situations that may have elicited positively valenced or negatively valenced nostalgic feelings. Ecological momentary assessment methods that ask participants about their experiences multiple times throughout the day could examine such nuances, and they could offer promising insights for future research (Newman & Stone, 2019; Shiffman et al., 2008).

Fourth, as is the case for most nostalgia research, our studies were conducted with undergraduate students. Future research with diverse samples could help generalize our findings more broadly or point to important moderators of the effects. For example, older adults report greater levels of nostalgia (Turner & Stanley, 2021; cf. Newman, 2022) and mixed emotions more broadly (Carstensen et al., 2000; Schneider & Stone, 2015). These findings are consistent with theoretical accounts (differential emotions theory and socioemotional selectivity theory) that argue that older adults have a greater capacity for emotional complexity (Carstensen et al., 2003; Magai et al., 2006). However, it is unclear whether older adults'

nostalgic feelings are more bitter or sweet compared to younger adults. Moreover, understanding how the valence of nostalgic feelings may differentially influence well-being across the life span would require studies designed to examine such processes. Such studies are a crucial next step for extending the translational potential of nostalgic research and the ways in which complex emotions are linked to changes in mental and physical health in aging populations.

Our studies highlight the pitfalls of research traditions that rely heavily on a single manipulation. Most experimental inductions ask people to recall their most nostalgic feeling (Frankenbach et al., 2021; Leunissen et al., 2020). As our experiments demonstrated, inducing nostalgia with instructions that bring to mind different nostalgic feelings can yield divergent effects on well-being. Increasing the range of manipulations used to elicit nostalgia would be fruitful for future research.

Finally, future research could address more specific mechanisms that may explain why positive and negative nostalgic feelings have differential effects on well-being. One intriguing possibility is that people may consider positive nostalgic events to be experiences that they have an opportunity to revisit or repeat, whereas negative nostalgic events may not be repeatable. For example, a past vacation with a current romantic partner could theoretically be repeated to some degree, whereas a past vacation with a parent who has since died could not be repeated. A recent study found that recalled events that were not repeatable elicited higher levels of sadness and mixed emotions compared to recalled events that were repeatable (Larsen et al., 2021). This finding is consistent with the negative within-person relationships between daily relationship satisfaction and sexual nostalgic feelings, which are presumably triggered by sexual experiences that are nonrepeatable (Muise et al., 2020). The possibility that the repeatability of the event predicts its valence and subsequent effects on well-being would need to be examined in studies designed to test this mechanism.

Conclusion

Nostalgia is a mixed emotion that varies not only in intensity but also in valence, that is, how bitter or sweet the feeling is. Some nostalgic feelings are relatively more bitter than sweet, whereas others might be relatively more sweet than bitter. The valence of nostalgia is influenced by the events in daily life and different feelings of nostalgia can have divergent effects on well-being. Therefore, nostalgia is not inherently good or bad. Rather, how this mixed emotion influences well-being depends on the event or experience that elicits nostalgia.

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