

**The Effect of a Multi-Week Nostalgia Intervention on Well-Being:
Mechanisms and Moderation**

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Abstract

Nostalgia is a sentimental longing for one's past. We examined the effect of a 6-week, weekly nostalgia intervention on well-being (positive and negative affect, life satisfaction, subjective vitality, and eudaimonic well-being) over time. After three weeks, participants who engaged in nostalgic reflection had higher well-being than those who engaged in ordinary reflection. After six weeks, and at a one-month follow-up, the positive effect of nostalgic reflection was reserved for those who were high on dispositional nostalgia (i.e., well-suited to the nostalgia intervention). However, at these time points, nostalgic reflection was associated with lower well-being among those particularly low on dispositional nostalgia. Across time points, nostalgic reflection was beneficial to the degree that it fostered social connectedness, meaning in life, and self-continuity, pointing to mechanisms that drive nostalgia's positive influence on well-being. In summary, weekly nostalgic reflection has temporary well-being benefits for most (out to three weeks) and, beyond that, is a matter of fit—beneficial or adverse to those especially high or low on dispositional nostalgia, respectively.

Keywords: nostalgia, nostalgia intervention, well-being, positive psychology intervention, happiness intervention

The Effect of a Multi-Week Nostalgia Intervention on Well-Being: Mechanisms and Moderation

Dictionaries define nostalgia as a “sentimental yearning for the happiness of a former place or time” (Random House Dictionary, 2014), “a yearning for the return of past circumstances, events, etc.” (Collins English Dictionary—Complete & Unabridged 10th edition, 2009), or “pleasure and sadness that is caused by remembering something from the past and wishing that you could experience it again” (Merriam-Webster Dictionary, 2014). These definitions highlight the bittersweet character of nostalgia—reflecting sentimentally on the past can kindle contentment and joy, but can also engender a longing to return to a place or time. Corroborating the formal definitions, laypersons also think of nostalgia as comprising mostly positive (e.g., personal meaning, social relationships, happiness), but also negative (e.g., missing, reliving, dwelling), features (Hepper et al., 2012).

Although nostalgizing is bittersweet, integrative evidence from short-term experiments indicates that, overall, nostalgia inductions (1) evoke positive affect (PA), but have no effect on negative affect (NA), and (2) produce more PA than NA (Leunissen et al., 2020). Also, although nostalgia often co-occurs with discomfoting states such as loneliness and existential threat, it is frequently used as a source of strength to overcome these states and restore well-being, rather than as an instigator of further sadness and anxiety (Sedikides et al., 2015b). Thus, at least in the short-term, nostalgia promotes well-being—it boosts PA and helps people overcome stressful times.

Importantly, the long-term effects of nostalgia on PA and NA are an open question. In the current study, we build upon past findings by investigating the effect of a weekly nostalgia practice on PA and NA over time. We also theorized that weekly nostalgic reflection may boost other aspects of well-being—namely, life satisfaction and eudaimonia. Additionally, we examine mechanisms by which nostalgia may promote well-being, as well as whether nostalgia is more beneficial for some than others.

Nostalgia and Short-Term Well-Being

Evidence demonstrates that nostalgizing promotes PA in the short-term. In an integrative data analysis of 41 experiments, participants in nostalgia conditions reported higher average PA than controls and, in analyses of discrete emotions, reported higher scores on 24 out of the 30 discrete positive emotions included (Leunissen et al., 2020). Thus, nostalgia inductions have a consistent and robust effect on PA composites, as well as on discrete positive emotions. The findings for negative affect were more nuanced. Overall, participants in the nostalgia and control conditions reported similar levels of average NA, but discrete emotion analyses revealed that those in the nostalgia conditions reported lower NA than controls on some emotions (i.e., bored, irritable, sluggish, tired), higher on others (i.e., homesick, regretful), and equivalent on most (see also Newman et al., 2020). However, in the subset of experiments that induced nostalgia with the Event Reflection Task (Sedikides et al., 2015b)—the task we implemented in the current study—participants in nostalgia conditions reported higher sadness than controls (as well as higher happiness). Thus, nostalgia’s effect on NA may depend on the type of nostalgic activity, as well as the specific negative emotions in question, whereas nostalgia’s effect on PA is more general.

Importantly, even though nostalgizing may evoke sadness, it is still a predominantly positive emotional experience: nostalgizing produces more PA than NA (Leunissen et al., 2020; Sedikides & Wildschut, 2016; Wildschut et al., 2006). Similarly, analysis of participant-generated narratives reveals that nostalgic experiences include more expressions of PA than NA (Abeyta et al., 2015; Wildschut et al., 2006). Two things are often simultaneously true about nostalgic reflection in an experimental context: it evokes similar levels of NA as comparison conditions, but still evokes significantly more PA than NA (Stephan et al., 2012; Wildschut et al., 2006). Thus, Werman’s (1977, p. 393) definition of nostalgia as “a joy tinged with sadness” seems apt—nostalgia is both happy and sad, but more happy than sad. In all, we expected a weekly nostalgic reflection to increase PA over time, but to have no effect on NA.

Although not as robust as the evidence for nostalgia’s effects on PA and NA, nostalgizing also has had promising short-term effects on life satisfaction and eudaimonic well-being. In one

study, participants assigned to review a nostalgia-themed website about an old flame reported higher life satisfaction than those assigned to review a website about people's daily activities (Cox et al., 2015). In another study, participants who read song lyrics that they had previously deemed as personally nostalgic reported higher meaning in life than those who read the same song lyrics, but had not deemed them nostalgic (yoked design; Routledge et al., 2011). Lastly, participants who engaged in nostalgic (vs. ordinary) reflection reported higher eudaimonic well-being, operationalized as subjective vitality—a feeling of aliveness and energy (Sedikides et al., 2016). Given these short-term effects of nostalgic reverie, we expected that our weekly nostalgic reflection would promote life satisfaction and eudaimonic well-being over time.

Potential Mechanisms

In laboratory experiments, nostalgic reflection confers three key benefits: It fosters social connectedness (the subjective sense of belongingness and acceptance; Wildschut et al., 2006), meaning in life (the subjective sense that one's existence is significant, purposeful, and coherent; Routledge et al., 2011), and self-continuity (the subjective sense of connection between one's past and present; Sedikides et al., 2015a). We suspected that our multi-week nostalgia intervention would also boost these three mechanisms, which would in turn relate to higher well-being over time.

Humans have a need to belong, to feel close and connected with others (Baumeister & Leary, 1995), and the satisfaction of this need promotes well-being (Ryan & Deci, 2017). Nostalgic reflection often brings to mind important social relationships (Hepper et al., 2012, 2014), reminding people of the love and social support they have in their lives (Sedikides & Wildschut, 2019; Zhou et al., 2008). Indeed, participants who write about nostalgic experiences report feeling more connected to others than those who write about ordinary experiences (Wildschut et al., 2006, 2010). Thus, nostalgia prompts immediate social connectedness, which we expected to relate to higher well-being over time.

Nostalgizing involves the remembrance of events that are personally momentous (e.g., weddings, birth of children, graduations, family holidays; Madoglou et al., 2017; Wildschut et

al., 2006) and underscores the presence of meaning in people's lives. In fact, participants randomly assigned to nostalgic reflection (compared to controls) report greater meaning in their lives (Routledge et al., 2011; Sedikides & Wildschut, 2018). Given the strong, positive correlation between meaning and various well-being indicators (e.g., life satisfaction, PA; Steger, 2018), we anticipated that nostalgia would boost immediate meaning, which would in turn relate to higher well-being over time.

Additionally, nostalgic reflection may help individuals consider the ways in which their cherished values (e.g., education), close relationships (e.g., family), or interests (e.g., travel) have remained consistent over time. Individuals may hold onto certain memories, because these memories represent core and enduring aspects of the self. In accord with this reasoning, nostalgic reflection elevates self-continuity (Sedikides et al., 2015a; Van Tilburg et al., 2019b). Nostalgia-induced self-continuity, in turn, strengthens subjective vitality, an indicator of global well-being (Sedikides et al., 2016). Among Western samples, individuals who have relatively more consistent personalities across varying social roles also report higher global well-being (Donahue et al., 1993; Sheldon et al., 1997), pointing to self-continuity as a key antecedent of well-being.

The Efficacy of a Nostalgia Intervention May Depend on Dispositional Nostalgia

In their positive activity model, Lyubomirsky and Layous (2013) proposed that any given activity would only successfully increase well-being if it were well-suited to the person practicing it (i.e., if there was optimal person-activity fit; see also Schmader & Sedikides, 2018). In line with this proposal, people who indicate that an activity feels more natural and enjoyable to them are more likely to report increases in well-being over time (Dickerhoof, 2007), persist in the activity beyond the prescribed intervention period (Sheldon & Lyubomirsky, 2006a), and sustain their well-being benefits over time (Proyer et al., 2015).

In the case of a nostalgia intervention, the people who find nostalgia practice the most fitting may be the ones who already readily engage in nostalgic reflection in their daily lives. The Southampton Nostalgia Scale (Barrett et al., 2010; Routledge et al., 2008; Sedikides et al., 2015b) assesses dispositional nostalgia—the degree to which people value nostalgia and engage

in it frequently. Those who score highly on that scale may have found nostalgia a helpful resource in maintaining their well-being or are experts in using nostalgia in a way that sustains their well-being. Thus, the efficacy of a weekly nostalgia intervention likely depends on degree of dispositional nostalgia, with those who are high on it benefitting the most. Consistent with this possibility, Cheung et al. (2016) found that individuals higher (rather than lower) on dispositional nostalgia evinced greater social connectedness, self-esteem, and optimism immediately following a nostalgia induction. Accordingly, we expected that individuals high on dispositional nostalgia would report greater well-being over time after a weekly nostalgia practice.

Distinguishing Nostalgia from Reminiscence

Although a central feature of nostalgic reflection is reminiscence (Evans et al., 2020; Hepper et al., 2012), our nostalgia intervention is distinct from the reminiscence interventions that are most commonly employed among older adults in a therapeutic setting (Pinquart & Forstmeier, 2012; Westerhof et al., 2010; Westerhof & Slatman, 2019). Reminiscence interventions are varied in content and purpose, but three main types have emerged: (1) *simple reminiscence* that focuses on sharing memories from different phases of life (e.g., school days, births of children) to promote positive feelings and social bonds, (2) *life review* that focuses systematically on the entire lifespan to promote the (re-)evaluation and integration of positive and negative memories into a coherent life story, and (3) *life-review therapy* that focuses on reducing maladaptive reminiscence (e.g., bitterness and dissatisfaction) among older people with mental health problems (Pinquart & Forstmeier, 2012; Westerhof et al., 2010). Of these, simple reminiscence is most similar to the nostalgia induction we used in our current study, but still leaves much variation in the types of memories people may recall. Research suggests that, when people reminisce, the memories they bring to mind serve certain functions (e.g., to remember their positive achievements [self-regard], to understand the self better [identity], to remember loved ones [intimacy maintenance], or to rekindle bitter rivalries [bitterness revival]; Webster, 1993). In turn, these functions are related to more or less well-being over time (O'Rourke et al.,

2011). Thus, people could reminisce about positive memories that would enhance well-being (i.e., self-regard), but they could also reminisce about negative memories that would undermine their well-being (i.e., bitterness revival).

The partial focus on positive memories may help explain why some *guided* reminiscence interventions have reported well-being improvements among older adults (Pinquart & Forstmeier, 2011). Regardless, we contend that a specific focus on the emotion of nostalgia—a focus that does not need to be guided—could be even more effective, as it ensures that participants sentimentally bring to mind momentous, personally meaningful, and socially connected memories (Hepper et al., 2012, 2014) rather than thinking about often prosaic or even bitter memories. Indeed, Westerhof and Bohlmeijer (2014) suggest that reminiscence and life review interventions should harness the nostalgia literature for more innovative approaches, as well as new insights and applications. To our knowledge, however, no studies have yet compared reminiscence interventions directly to ones focused specifically on nostalgia. That said, among people living with dementia, a large-scale, multi-center reminiscence intervention showed no effect over time on quality of life (Woods et al., 2016). In contrast, three nostalgia interventions among people living with dementia increased in-session social connectedness, meaning in life, self-continuity, optimism, self-esteem, and positive affect (Ismail et al., 2018).

Relatedly, in the positive psychology literature, many studies have documented the beneficial influence of remembering “past positive events” (Bryant et al., 2005) or “intensely positive experiences” (Burton & King, 2004) on happiness and health among non-clinical samples. Although these activities may seem identical to reflecting nostalgically, we contend that nostalgia is a distinct affective experience (Van Tilburg et al., 2018, 2019a) that may confer unique psychological benefits. As Davis (1977) suggested, “to merely remember the places of one’s youth is not the same as to feel nostalgia for them. Neither for that matter, does active reminiscence—however happy, benign or tortured its content—necessarily capture the subjective state characteristic of nostalgic feeling” (p. 418). Indeed, nostalgia inductions typically produce similar amounts of positive affect as positive-memory control conditions (e.g., recalling a lucky

event), but still conferred greater benefits on states such as creativity (Van Tilburg et al., 2015), inspiration (Stephan et al., 2015), and authenticity (Stephan et al., 2012) that may bolster well-being over time (Fredrickson, 2013). Important for the proposed mechanisms in the current study, participants randomly assigned to reflect on a nostalgic memory reported great social connectedness and self-continuity, but equal positive affect, to those who reflected on a time they were lucky (Sedikides et al., 2016). Thus, evidence demonstrates that nostalgia is a distinct way of contemplating the past that confers unique psychological benefits, above and beyond other types of remembering that may evoke positive affect. However, as mentioned, nostalgia's effect on well-being has only been explored in the short-term, and a longitudinal study is needed to follow effects over time.

Overview

We examined the effect of a weekly nostalgia writing activity on well-being over time. We randomly assigned participants to write about a nostalgic or ordinary (control) experience weekly for six weeks. At baseline, mid-intervention (three weeks in), post-intervention (six weeks in), and follow-up (one month after post-intervention), we assessed five indicators of well-being (PA, NA, life satisfaction, subjective vitality, and eudaimonic well-being). Immediately following each weekly writing activity, we also assessed the degree to which the activity prompted social connectedness, meaning, and self-continuity. We tested the following hypotheses:

Hypothesis 1: A weekly nostalgia intervention (vs. control) will increase well-being over time compared to a control condition, with the exception of NA.

Hypothesis 2: The nostalgia intervention (vs. control) will indirectly increase well-being via nostalgia-induced social connectedness, meaning, and self-continuity.

Hypothesis 3: The nostalgia intervention (vs. control) will be more likely to increase well-being among those who report high (than low) dispositional nostalgia at baseline.

Method

Participants

This study was approved by the Institutional Review Board at James Madison University (protocol number: 18-0285). We tested 176 James Madison University introductory psychology volunteers (127 women, 49 men) ranging in age from 18-41 years ($M = 19.10$, $SD = 1.97$). Class level was: 65.9% Freshman, 22.2% Sophomore, 8.0% Junior, 2.8% Senior, 1.1% Other. The sample's ethnic composition was: 81.8% White, 6.3% Black/African American, 4.5% Multiple Ethnicities, 3.4% Asian, 3.4% Hispanic/Latino, 0.6% Other.

Power Analyses

All of our primary analyses are regression-based. According to Cohen (1988), standardized betas of .14, .39, and .59 correspond to small, medium, and large effect sizes, respectively. Although our study constituted—to the best of our knowledge—the first multi-week nostalgia intervention on well-being, we expected the effect sizes to be similar to other positive psychological interventions that have yielded small (Bolier et al., 2013) to medium (Sin & Lyubomirsky, 2009) average effect sizes. Thus, we powered our study to detect a standardized beta of .26, which is approximately halfway between the values for small and medium effects (Fritz & MacKinnon, 2007).

We conducted an a-priori power analysis in G*Power 3.1 (*F*-test—Linear multiple regression: Fixed model, R^2 increase option; Faul et al., 2009). We set Cohen's f^2 to .0725 ($f^2 = R^2/[1-R^2]$; $.26^2/[1-.26^2]$) to estimate the necessary sample size for achieving 80% power to detect a small-to-medium effect of condition (nostalgia vs. control) on our outcome variable ($\alpha = .05$), controlling for baseline levels of the outcome. The analysis indicated that we needed a sample of 111 participants. Adding two more predictors (dispositional nostalgia and the Condition \times Dispositional Nostalgia interaction) to test moderation made a negligible difference to the required sample size.

One caveat is that our primary analyses included 15 statistical tests (i.e., five outcome variables assessed at three time points—mid-intervention, post-intervention, and follow-up), but

the current power analyses do not correct for multiple comparisons. Given that this is the first longitudinal nostalgia intervention of its kind, we prioritized *discovery*. When emphasizing discovery, being too conservative is more problematic than not being conservative enough (Rothman, 1990). We accept, however, that this creates a greater obligation to replicate our findings in future research.

Regardless of finding a total effect of condition on our outcome variables, we explored the indirect effect of nostalgia (vs. control) via our proposed mechanisms, using a percentile bootstrap approach (Hayes, 2018; Kenny & Judd, 2013). To achieve 80% power for detecting a small-to-medium indirect effect, we would need a sample size of 162 (Fritz & MacKinnon, 2007). We recruited a sample large enough to power this analysis, which was also more than sufficient to power our total effect and moderation analyses.

Materials

We include all materials and the Study Timeline in Supplemental Material. The data are available on the [Open Science Framework](#).

Positive Affect and Negative Affect

We assessed affect at every time point (T₁-T₈) with the 9-item affect-adjective scale, which includes both positive (i.e., happy, pleased, joyful, enjoyment/fun) and negative (i.e., worried/anxious, angry/hostile, frustrated, depressed/blue, unhappy) adjectives (Diener & Emmons, 1985). We added “content” to have another low-arousal positive emotion represented, and we included emotions that are positively (pride, self-compassion) or negatively (embarrassment, shame) related to nostalgia (Van Tilburg et al., 2018). Participants rated the degree to which they had experienced each of the resultant 14 feelings over the past week (last 7 days; 1 = *not at all*, 7 = *extremely*). We averaged the seven positive adjectives (PA $\alpha > .87$) and the seven negative adjectives (NA $\alpha > .79$) at each time point to form a composite.

Life Satisfaction

We assessed this construct with the 5-item Satisfaction with Life Scale (Diener et al., 1985) at baseline (T₁: Cronbach’s $\alpha = .84$), mid-intervention (T₄: $\alpha = .87$), post-intervention (T₇:

$\alpha = .88$), and follow-up (T_8 : $\alpha = .89$). Sample items are: “In most ways my life is close to my ideal” and “The conditions of my life are excellent” (1 = *strongly disagree*, 7 = *strongly agree*). We averaged responses to the items to form a composite.

Subjective Vitality

We used subjective vitality as a measure of eudaimonic well-being, given that it refers to the sense of energy and aliveness which can occur when one finds themselves in an actualized state (Ryan & Deci, 2001). We assessed subjective vitality with the 7-item Subjective Vitality Scale (Ryan & Frederick, 1997) at baseline (T_1 : $\alpha = .84$), mid-intervention (T_4 : $\alpha = .88$), post-intervention (T_7 : $\alpha = .88$), and follow-up (T_8 : $\alpha = .88$). Sample items are: “I feel alive and vital” and “I don’t feel very energetic” (reverse-scored; 1 = *not at all true*, 7 = *very true*). We averaged responses to form a composite.

Eudaimonic Well-Being

Participants completed the 21-item Questionnaire for Eudaimonic Well-Being (Waterman et al., 2010) at baseline (T_1 : $\alpha = .85$), mid-intervention (T_4 : $\alpha = .85$), post-intervention (T_7 : $\alpha = .87$), and follow-up (T_8 : $\alpha = .86$). Sample items are: “I find I get intensely involved in many of the things I do each day” and “My life is centered around a set of core beliefs that give meaning to my life” (1 = *strongly disagree*, 7 = *strongly agree*). We formed a composite by averaging responses to items.

Social Connectedness, Meaning, and Self-Continuity

Immediately after each writing activity (T_2 - T_7), we prompted all participants to think about what they just wrote, and to respond (1 = *strongly disagree*, 7 = *strongly agree*) to four statements each about social connectedness (e.g., “Thinking about this event makes me feel connected to loved ones”; Hepper et al., 2012; Wildschut et al., 2006), meaning (e.g., “Thinking about this event makes me feel life is meaningful”; Hepper et al., 2012; Routledge et al., 2011), and self-continuity (e.g., “Thinking about this event makes me feel connected with my past”; Sedikides et al., 2015a, 2016). We averaged scores on the four statements for each construct at

each time point into three separate composites (social connectedness $\alpha > .93$; meaning $\alpha > .94$; self-continuity $\alpha > .83$).

Dispositional Nostalgia

At baseline, we assessed the degree to which people value and practice nostalgia in their daily lives with the Southampton Nostalgia Scale (i.e., dispositional nostalgia; Barrett et al., 2010; Routledge et al., 2008; Sedikides et al., 2015b). First, participants read, “According to the Oxford Dictionary, ‘nostalgia’ is defined as a ‘sentimental longing for the past.’” Next, participants responded to seven questions about their experiences with nostalgia. They rated the first six questions (e.g., “How valuable is nostalgia for you?” and “How prone are you to feeling nostalgic?”) on scales that reflected the degree of the underlying construct (1 = *not at all valuable*, 7 = *very valuable*; 1 = *not at all prone*, 7 = *very prone*). For the seventh question, “Specifically, how often do you bring to mind nostalgic experiences?”, participants chose from the following seven options: *At least once a day*, *Three to four times a week*, *Approximately twice a week*, *Approximately once a week*, *Once or twice a month*, *Once every couple months*, or *Once or twice a year* (reverse-scored). We averaged responses to form a composite, which was highly reliable ($\alpha = .90$). Attesting to its construct validity, the Southampton Nostalgia Scale is positively correlated with scent-evoked (Reid et al., 2015) and music-evoked (Barrett et al., 2010) nostalgia, and converges with various other nostalgia measures (Wildschut & Sedikides, 2020a).

Demographics

Participants reported their gender, age, year in school (e.g., freshman), and ethnicity.

Procedure

We administered the study via Qualtrics. We recruited participants over a 2-week period, and they provided consent and completed the baseline assessment at any time during that period. The consent form notified all participants that the purpose of the study was to explore the efficacy of a potentially happiness-increasing activity. Following recruitment, we placed all participants on the same schedule for the intervention period (T₂-T₇). Weekly for six weeks (T₂-

T₇), participants received an email at 7:00 AM on Monday with a customized link and then had until 7:00 AM the following Monday to complete that wave of the study (a writing activity and measures). We sent reminder emails on Thursday of that week to ensure high participation. We re-contacted participants one month after the intervention period ended, asking them to provide a follow-up assessment (T₈).

During the baseline assessment (T₁), participants completed the following measures (in order): life satisfaction, subjective vitality, eudaimonic well-being, PA/NA, dispositional nostalgia, and demographics.¹

At the second assessment (T₂), after a brief welcome message, Qualtrics randomly assigned participants to the nostalgia ($n = 88$) or ordinary (i.e., control; $n = 88$) condition. We induced nostalgia with the Event Reflection Task (Sedikides et al., 2015b). Participants in the nostalgia condition read a definition of nostalgia (“a sentimental longing for the past”) and were asked to bring to mind a past event that makes them feel most nostalgic. They were instructed to immerse themselves in this nostalgic experience and think about how it makes them feel. Next, they listed four keywords relevant to the nostalgic event and described in writing for a few minutes how the event makes them feel. Participants in the control condition went through the same steps, but instead thought and wrote about an ordinary experience, defined as something with “no special or distinctive features.”

Participants in the nostalgia condition reflected on events such as family gatherings, their first concert, or their first romance, whereas participants in the ordinary condition reflected on events such as eating at a typical lunch spot, engaging in polite conversation, or walking through the courtyard at their apartment complex.

Nostalgia example:

¹We focused on nostalgia and well-being outcomes in this article, but we also assessed non-well-being outcomes for separate research questions. Specifically, at T₁, T₄, T₇, and T₈, participants completed measures of dispositional humility (Brown et al., 2013), state humility (Kruse et al., 2017), state authenticity (Wood et al., 2008—adapted by Lenton et al., 2013), and state social connectedness, meaning, and self-continuity (not tied to the writing activity; adapted from cited measures in this article). At T₁, participants also completed measures of positive orientation toward the past (the Past-Positive subscale of the Zimbardo and Boyd [1999] Time Perspective Inventory) and motivation (Guay et al., 2008).

The nostalgic event that I am thinking of is a concert. My senior year of high school, my friend XXX and I went to a concert for our favorite band, XXX. I had listened to their music for years, but never in person. I just remember the music playing and everyone in the audience knowing every single word and we all sang together. The music was so loud, but not in an uncomfortable way. All I could think about was how happy I was in this moment, listening to my favorite music with my favorite friend and being in an arena with hundreds of people who were feeling the same.

Ordinary example:

This morning after I got out of class at 12:15, just as I do every Tuesday, I waited outside of XXX hall for my roommate to meet me. From there we walked to XXX, where we decided to split a sandwich, as we often do. There were a lot of people in line because 12:20 is a very popular time to get food. After we got our sandwich we sat at a table and ate our food in mostly silence. We do this every Tuesday. We would both like to switch it up but the other restaurants and lines are far too crowded for our liking.

A Linguistic Inquiry and Word Count (Pennebaker et al., 2015) analysis of what participants wrote across all time points revealed that, regardless of condition, they used more positive than negative emotion words. Participants in the nostalgia condition used almost six times as many positive emotion words ($M = 7.60$, $SD = 5.60$) as negative emotion words ($M = 1.27$, $SD = 1.38$), $t(87) = 11.21$, $p < .001$, $r = .77$, whereas participants in the ordinary condition used over three times as many positive emotion words ($M = 5.13$, $SD = 2.98$) as negative emotion words ($M = 1.61$, $SD = 1.50$), $t(87) = 11.16$, $p < .001$, $r = .77$. As expected, participants in the nostalgia condition used more positive emotion words than those in the ordinary condition, $t(174) = 3.65$, $p < .001$, $r = .27$, but the two conditions did not differ significantly on negative emotion words, $t(174) = -1.57$, $p = .119$, $r = -.12$.

Participants completed their respective activities weekly for six weeks during the intervention period (T₂-T₇). To avoid repetition, “nostalgia” and “ordinary” were only defined at T₂ and T₅ (the first and fourth administration out of six). The only other change to instructions

was that, at T₃-T₇ (the second through sixth administration), participants were informed that they could either think/write about the same event as last week or choose a new one. Regardless of condition, participants were able to advance the page forward from the writing activity whenever they wanted. Descriptive statistics of time spent on the writing page indicated that these times were positively skewed, as a few participants at each time point kept the page open for an unrealistically long time. Thus, we report the median values, given that they are likely more accurate. Across the six time points, time spent engaging in the assigned activity ranged from a minimum of 2 min and 56 sec at T₆ to a maximum of 4 min and 51 sec at T₂. Importantly, at no time point did participants in the nostalgia condition write for longer than those in the control condition, $t_s < |1.60|$.

After the writing activity each week (T₂-T₇), participants reported their social connectedness, meaning, self-continuity, and PA/NA. At mid-intervention (T₄) and post-intervention (T₇), participants also reported their life satisfaction, subjective vitality, and eudaimonic well-being. One month after post-intervention, participants completed our follow-up measures (T₈) in the following order: life satisfaction, subjective vitality, eudaimonic well-being, and PA/NA.

Results

Preliminary Analyses

We found no differences between conditions in baseline outcome variables, $t_s \leq |1.46|$. We present correlations among all outcome measures at all time points in Supplemental Material. Overall, we observed strong completion rates in both conditions. All participants ($N = 176$) completed the baseline measures (T₁) to be included in the study, and then 166 (94.32%), 168 (95.45%), 164 (93.18%), 168 (95.45%), 157 (89.20%), 160 (90.91%), and 168 (95.45%) participants completed T₂, T₃, T₄, T₅, T₆, T₇, and T₈, respectively. One hundred thirty-two participants completed all eight time points (75.00%), with an additional 30 (17.05%), 7 (3.98%), 2 (1.14%), 1 (0.57%), 1 (0.57%), and 3 (1.70%) participants completing 7, 6, 5, 4, 2, and 1 time point, respectively. Completion rates did not vary by condition, $\chi^2(6) = 3.28, p = .773$.

Similarly, 134 participants completed all six writing tasks (76.14%), with an additional 28 (15.91%), 19 (10.80%), 1 (0.57%), and 4 (2.27%) participants completing 5, 4, 3, and 0 writing tasks, respectively. Completion rates again did not vary by condition, $\chi^2(4) = 2.95, p = .566$. Of the four participants who completed zero writing tasks, three only completed the baseline assessment and therefore were not included in any of the outcome analyses, whereas one completed baseline and follow-up and was included in the follow-up analyses. Participants in the control condition were less likely to complete two of the time points than those in the nostalgia condition ($T_3: \chi^2[1] = 4.71, p = .030$; $T_6: \chi^2[1] = 2.89, p = .089$), but this was not the case at any other time point, $\chi^2(1) < 1.43$.

Outcome Analyses

We include means and standard deviations by condition and time point in Table 1, and results from regression analyses on outcomes in Table 2. We controlled for baseline outcome levels in these analyses. Out to mid-intervention (T_4), participants in the nostalgia (vs. control) condition reported significantly higher PA, life satisfaction, and eudaimonic well-being, as well as lower NA. Yet, none of these effects persisted out to post-intervention (T_7) or follow-up (T_8). We did not obtain significant effects of the nostalgia writing activity on subjective vitality at any time point.

An inspection of the means suggests the possibility that the ordinary condition was more beneficial than the nostalgia condition during the second half of the intervention period. However, regression analyses using condition and mid-intervention levels of the outcome variables (T_4) to predict post-intervention outcome variables (T_7) revealed that this condition difference was only significant on eudaimonic well-being. That is, the ordinary condition increased eudaimonic well-being more than the nostalgia condition from T_4 to T_7 . The means indicate that, whereas the nostalgia condition had boosted eudaimonic well-being slightly from T_1 to T_4 , the ordinary condition had decreased it slightly, and then, by post-intervention, both had returned to their baseline levels. Indeed, when baseline eudaimonic well-being is added to the

regression equation (with T_4 eudaimonic well-being and condition predicting T_7 eudaimonic well-being), the condition effect is no longer significant.

Regression analyses using condition and mid-intervention levels of the outcome variables (T_4) to predict follow-up outcome variables (T_8) revealed a significant effect of condition on subjective vitality, eudaimonic well-being, and negative affect, demonstrating that the ordinary condition improved in these three indices of well-being more than the nostalgia condition from mid-intervention (T_4) to follow-up (T_8). To explore whether these differences could be explained by distinct trajectories from T_1 to T_4 , we adjusted for baseline levels of the outcome variables and found that the condition effects on subjective vitality and negative affect were rendered nonsignificant, but the effect on eudaimonic well-being remained. Thus, even accounting for baseline levels, participants in the control condition reported greater increases in eudaimonic well-being than those in the nostalgia condition from mid-intervention to follow-up. We present detailed results from these analyses in Supplemental Material.

Analyses of Indirect Effects

We expected that differences between conditions in social connectedness, meaning, and self-continuity following the writing activity would predict differences in outcome measures. Thus, controlling for baseline outcome levels, we tested the indirect effect of nostalgia (vs. control) on each outcome via social connectedness, meaning, and self-continuity (Model 4 in Version 3.3 of PROCESS; Hayes, 2018). We intended to examine the indirect effects via social connectedness, meaning, and self-continuity separately in a parallel mediation model, but found them to be highly correlated ($r_s > .79$). As such, we averaged them to avoid multicollinearity and the associated increase in standard errors of parameter estimates (Dormann et al., 2013; see also Van Beest & Williams, 2006). We also report indirect effects analyses separately for social connectedness, meaning, and self-continuity in Supplemental Material.

For each outcome, we provided the estimated indirect effect (ab) via the average of social connectedness, meaning, and self-continuity, as well as the 95% percentile bootstrap confidence intervals based on 5,000 bootstrap samples (Table 3). Confidence intervals that do not include

zero are statistically significant. Additionally, we included unstandardized parameter estimates and 95% confidence intervals for the a , b , and c' paths from Ordinary Least Squares regression analyses (Table 3). For indirect effects out to mid-intervention (T_4) we used the average of social connectedness, meaning, and self-continuity from T_2 , T_3 , and T_4 as the mechanism, whereas for indirect effects out to post-intervention (T_7) and follow-up (T_8) we used the average of social connectedness, meaning, and self-continuity from T_2 - T_7 .

As expected, we obtained an indirect effect of nostalgia (vs. control) on most of our mid-intervention (T_4) outcomes (life satisfaction, subjective vitality, eudaimonic well-being, and PA) via the average of social connectedness, meaning, and self-continuity. Specifically, participants who felt more social connectedness, meaning, and self-continuity following the nostalgia writing activity were also more likely to report higher levels of our outcome variables at mid-intervention. Most of these indirect effects were also significant out to post-intervention (T_7) and follow-up (T_8), except for the indirect effect on eudaimonic well-being out to post-intervention. We found no evidence of an indirect effect on NA at mid-intervention, but we did so out to post-intervention and follow-up, such that those who felt more social connectedness, meaning, and self-continuity after engaging in nostalgia were less likely to report NA at post-intervention and follow-up.

In a few instances, we obtained evidence of inconsistent mediation, or suppression (MacKinnon et al., 2000), such that the indirect effect of nostalgia (vs. control) on outcomes via social connectedness, meaning, and self-continuity was positive, but the residual direct effect was negative. This pattern suggests that nostalgic reflection absent social connectedness, meaning, and self-continuity reduced some indices of long-term well-being. Specifically, we obtained a significant and negative direct effect of nostalgia (vs. control) on subjective vitality at post-intervention and at follow-up, as well as a significant positive direct effect on NA at follow-up.

As mentioned, we also explored the effect of condition on mid-intervention (T_4), post-intervention (T_7), and follow-up (T_8) outcome variables via social connectedness, meaning, and

self-continuity, each included as single mediators in separate models (full results presented in Supplemental Material). Given that we had three outcome time points (T₄, T₇, and T₈) and five outcome variables (life satisfaction, subjective vitality, eudaimonic well-being, positive affect, and negative affect), each mediator could have been supported up to 15 times. Results were consistent with those for the averaged mediators reported above. Specifically, we found significant indirect effects via social connectedness 12/15 times, via meaning 12/15 times, and via self-continuity 11/15 times (compared to our averaged values, which produced 12/15 significant indirect effects).

Moderator Analyses

We examined dispositional nostalgia as a moderator in our initial outcome analyses (Model 1 in Version 3.3 of PROCESS; Hayes, 2018). In particular, we conducted regression analyses predicting the outcome variables at mid-intervention (T₄), post-intervention (T₇), and follow-up (T₈) from the following predictors: the baseline outcome variable (centered), a dummy-coded condition variable (nostalgia vs. control), dispositional nostalgia (centered), and the interaction between dispositional nostalgia (centered) and condition. We report all OLS regression estimates in Table 4 and figures for moderator analyses on all outcomes at each time point (Figure 1).

The interaction term assesses whether dispositional nostalgia moderates the effect of the nostalgia intervention; that is, are participants above or below the average in dispositional nostalgia more likely to benefit from the nostalgia intervention or less so? Given that we dummy-coded condition, the parameter estimate for the interaction effect reflects the additional effect of dispositional nostalgia among participants in the nostalgia condition, beyond the effect of dispositional nostalgia among those in the control condition. If an interaction was at least trending ($p < .10$), PROCESS provided regions of significance with the Johnson-Neyman technique, which allowed us to determine at which levels of the moderator (i.e., dispositional nostalgia) the intervention had a significant effect (Bauer & Curran, 2005; Hayes, 2018).

In these moderator analyses, all of the condition effects mentioned in the Outcome Analyses section remained intact. Additionally, across multiple outcomes, participants who were high on dispositional nostalgia benefitted more from the nostalgia intervention (i.e., the activity fit them well). We also found some evidence that participants who were low on dispositional nostalgia suffered some decrease in well-being over time when in the nostalgia (compared to control) condition.

At mid-intervention, we obtained a marginal interaction effect on life satisfaction and a significant interaction effect on NA, such that those higher on dispositional nostalgia benefitted more from the nostalgia intervention (had higher life satisfaction and lower NA). For both life satisfaction and NA, the Johnson-Neyman values indicated that the nostalgia intervention was effective ($p < .05$) among over half of participants (56.36% and 52.12%, respectively). The effect of the nostalgia writing activity on mid-intervention subjective vitality, eudaimonic well-being, and PA was unmoderated by dispositional nostalgia.

At post-intervention, we found a significant interaction effect on subjective vitality, PA, and NA. On PA and NA, participants higher on dispositional nostalgia were more likely to benefit from the intervention (the top 40.63% and 2.50% benefitted, respectively). On subjective vitality and NA, participants low on dispositional nostalgia had adverse reactions to the nostalgia intervention. Specifically, the lowest 15.00% and 11.88% of participants on dispositional nostalgia had lower subjective vitality and higher NA, respectively, in the nostalgia (than control) condition. The effect of the nostalgia writing activity on post-intervention life satisfaction and eudaimonic well-being was unmoderated by dispositional nostalgia.

At follow-up, we obtained significant interaction effects on life satisfaction, subjective vitality, and NA, as well as a marginal interaction effect on PA. Similar to the post-intervention results, we uncovered two patterns—one in which being high on dispositional nostalgia was related to more benefit from the intervention and one in which being low on dispositional nostalgia was related to an adverse effect of the intervention. Specifically, on life satisfaction and PA, participants benefitted from the intervention, if they were in the top 16.67% and top 5.95%,

respectively, on dispositional nostalgia. On life satisfaction, subjective vitality, and NA, participants were disadvantaged by the intervention, if they were in the bottom 8.93%, 30.36%, and 30.36%, respectively, on dispositional nostalgia (lower scores on life satisfaction and subjective vitality, higher scores on NA). Consistent with the mid- and post-intervention findings, the effect of the nostalgia intervention on follow-up eudaimonic well-being was unmoderated by dispositional nostalgia.

In sum, out of 15 possible Condition \times Dispositional Nostalgia interaction effects on our five outcomes at our three time points (mid-intervention, post-intervention, and follow-up), seven were significant and two were marginal. Simple effects analyses on these nine interactions indicated that six showed beneficial effects of the nostalgia (vs. ordinary) condition at higher levels of dispositional nostalgia and five showed adverse effects of the nostalgia (vs. ordinary) condition at lower levels of dispositional nostalgia (two time points showed both positive condition effects at high levels of dispositional nostalgia and negative condition effects at low levels of dispositional nostalgia). Negative affect was the only outcome to be moderated at all three time points. Figure 1 depicts these trends.

In Supplemental Material, we have also included a summary of moderated mediation analyses, combining our indirect effects and moderator analyses.

Discussion

Overall, the nostalgia intervention positively influenced life satisfaction, eudaimonic well-being, and PA and NA (but not subjective vitality) out to mid-intervention. By the end of the 6-week period, however, the beneficial influence of the intervention had worn off for most participants (i.e., the overall effects on well-being were temporary). At this point, although those highest on dispositional nostalgia were still reporting higher PA and lower NA in the nostalgia (vs. the control) condition, we also observed some adverse effects of the intervention on subjective vitality and NA among those lowest on dispositional nostalgia. At follow up, we again found no effects of the intervention, except among participants in the top or bottom percentiles on dispositional nostalgia, with those highest on dispositional nostalgia experiencing benefits on

life satisfaction and PA, and those lowest on dispositional nostalgia experiencing adverse effects on subjective vitality, NA, and life satisfaction.

Thus, for a subset of participants—those lower on dispositional nostalgia—practicing nostalgia for about three weeks (out to mid-intervention) may be neutral or even positive, but practicing it for six weeks in its current form may have an adverse influence. The adverse effects of being in the nostalgia (vs. ordinary) condition among those lower on dispositional nostalgia applied to about one third of participants (on follow-up subjective vitality and negative affect). On the other hand, participants higher on dispositional nostalgia experienced some benefits out to post-intervention (the top 40% on PA) and even a month after the intervention concluded (the top 16% on follow-up life satisfaction). The results suggest that a nostalgia intervention for mental health should be preceded by a pre-screening to identify those for whom it is likely to be beneficial. Importantly, the moderation effects were not consistent across outcomes, and so further research is needed to explore these person-activity fit issues. That said, from the current data, we cannot recommend a long-term nostalgia practice to those relatively low in dispositional nostalgia.

Notably, an analysis of the means by condition and time point (Table 1) indicates that the condition effects on life satisfaction and eudaimonic well-being out to mid-intervention were largely due to participants in the control condition decreasing in well-being to a greater extent than those in the nostalgia condition, rather than participants in the nostalgia condition increasing in well-being. This finding is not entirely surprising, given that research often demonstrates declining well-being among college students as the semester progresses and deadlines approach (Fordyce, 1983; Sheldon & Lyubomirsky, 2006b). Indeed, our mid-intervention time point (T₄) occurred during the stressful midterm exam period. Our control condition likely traced the natural well-being trajectory of students over time, whereas our nostalgia condition buffered against this shift. Past research has demonstrated that nostalgia serves a stress-buffering function, helping people overcome challenging times in their lives (Sedikides et al., 2015b; Wildschut & Sedikides, 2020b). An alternative interpretation, namely that writing about ordinary experiences

was aversive, is contradicted by evidence that participants in the control condition used considerably more positive than negative emotion words. Moreover, the condition effects on mid-intervention PA and NA were driven by increases in PA and decreases in NA in the nostalgia condition, indicating some positive effects over baseline scores rather than mere maintenance. In addition, we found no effects of nostalgia on subjective vitality at any time point. Perhaps because nostalgia is a low arousal positive emotion (Van Tilburg et al., 2018), it made people feel positive and satisfied, but not intensely energized and alive over time.

Lastly, from mid-intervention (T₄) to follow-up (T₈), the ordinary condition increased in eudaimonic well-being more than the nostalgia condition, which remained relatively stable. Given that this unexpected finding emerged for only one of our outcome variables, it should be interpreted with caution. LIWC analyses and our own reading of the responses in the ordinary condition indicated that participants wrote about pleasant topics (e.g., lunch with friends), which may have helped them appreciate day-to-day college life. Perhaps, during the adjustment period to the semester (and the stressful midterms), nostalgia was helpful for restoring meaning among our largely freshman sample. After that, focusing on mundane but pleasant experiences may have instilled a sense of meaning in their daily routine (Heintzelman & King, 2019). If corroborated in future research, this explanation would have important implications for the optimal timing of nostalgia interventions.

Incorporating Current Findings Into the Person-Activity Fit Literature

The current study contributes to knowledge about person-activity fit in happiness-increasing interventions (i.e., positive activities; Lyubomirsky & Layous, 2013). Individuals who benefitted the most from a weekly nostalgia intervention were the ones who reported valuing and engaging in nostalgia as part of their everyday lives (i.e., those who were relatively high on dispositional nostalgia). Thus, a nostalgia intervention seems to be most fitting for those who view nostalgia as a resource in their lives. Interestingly, our results contradict findings from a different type of happiness intervention—one in which participants express gratitude. Specifically, people who are lowest on dispositional gratitude benefit the most from gratitude

interventions, perhaps because they have the most room for improvement (Harbaugh & Vasey, 2014; Rash et al., 2011). Thus, our nostalgia intervention findings imply that a happiness intervention suited toward people's strengths may be most effective, whereas the gratitude intervention findings imply that a happiness intervention that addresses people's weaknesses may be most effective.

This empirical contradiction could be due to differences in the measures of dispositional nostalgia and gratitude. The Southampton Nostalgia Scale assesses how much people value nostalgia, as well as how often they experience it (Sedikides et al., 2015b), whereas the Gratitude Questionnaire-6 (the primary measure of dispositional gratitude) only assesses how often people feel grateful (McCullough et al., 2002). The more meta-cognitive questions from the Southampton Nostalgia Scale, concerning the personal value people ascribe to nostalgia, may imply a level of fit or intrinsic motivation for engaging in the pertinent activity that the Gratitude Questionnaire-6 does not.

Alternatively, nostalgic and grateful reflection may differ, in that nostalgic reflection is more suited to strengths, whereas gratitude reflection is more suited to addressing deficits. For example, perhaps people high on dispositional nostalgia experience more happiness than sadness when reflecting nostalgically, thus rendering nostalgic reflection more pleasant for them, and instilling a nostalgia habit. In contrast, those low on dispositional gratitude may be less likely to experience the downsides of grateful reflection like indebtedness and guilt (Layous et al., 2017) that may render grateful reflection more ambivalent for people high on dispositional gratitude. Future research would do well to explore aspects of personality or life circumstances that increase the likelihood of benefiting from certain happiness interventions more than others. The more information researchers and clinicians can gather about person-activity fit, the more precisely they can match specific activities to an individual's needs.

Improving the Overall Efficacy of the Nostalgia Intervention

The effects of the nostalgia writing activity out to mid-intervention were largely positive, but then ceased to be so by the end of the intervention for those who were not particularly high

on dispositional nostalgia. In an open-ended question at the end of the study, many participants noted the repetitiveness of doing an activity week after week, and this may have undermined potential well-being benefits. Perhaps our nostalgia intervention would have shown longer-term benefits if the type of nostalgic reflection had varied. For example, nostalgia can be induced via pictures, music, scents, or tastes (Sedikides et al., 2015b), and the intervention may have felt more engaging over time had we employed different modalities. Alternatively, participants could provide a pool of nostalgic memories at baseline and then be randomly presented with them on different dates, thus infusing surprise and variety into the intervention and forestalling adaptation (Lyubomirsky, 2011). Indeed, in a happiness intervention focused on kindness, those who varied the types of kind acts in which they engaged every week reported sharper increases in well-being than those who carried out the same kind acts; further, those who carried out the same kind acts each week decreased in well-being (Sheldon et al., 2012). Of course, ordinary experiences would need to be equally varied as nostalgic experiences to eliminate the possibility that variety alone and not variety plus nostalgia explained improvements in well-being.

Similarly, participants could be given a choice each week about the type of nostalgic reflection that they would prefer to implement, thus increasing the degree to which their autonomy is supported and boosting their intrinsic motivation to engage in the activity (Silverman et al., 2013; Vansteenkiste et al., 2004). Our finding that participants high on dispositional nostalgia were most likely to benefit from the intervention may reflect that they were inherently more motivated to nostalgize. Still, one could boost this intrinsic motivation in future participants through some of the above-suggested modifications (e.g., infusing variety and choice).

Strong Evidence for the Indirect Effect of Nostalgia on Global Well-Being

As noted, we obtained a positive effect of the nostalgia intervention on life satisfaction, eudaimonic well-being, and PA and NA out to mid-intervention. All of these condition effects—excepting NA—were mediated by our hypothesized mechanisms: social connectedness, meaning, and self-continuity (aggregated; see Supplemental Material for separate analyses). In

addition, even in the absence of a total effect of the nostalgia intervention on most of our outcomes at post-intervention and follow-up, we still obtained significant indirect effects of nostalgia via our proposed mechanisms.

In the interest of reducing participant fatigue, we focused on three key mechanisms (social connectedness, meaning, self-continuity)—ones that have been well-established in the nostalgia literature. Future research could explore additional mechanisms, such as approach motivation (Stephan et al., 2014; Turner et al., 2018), self-esteem (Reid et al., 2015; Wildschut et al., 2006), optimism (Cheung et al., 2013, 2016), and inspiration (Stephan et al., 2015).

Nostalgia and Negative Affect

Results for NA revealed a complex picture. Contrary to our hypothesis, the nostalgia (compared to control) condition decreased NA directly out to mid-intervention, and also decreased NA indirectly, via the mechanisms, at post-intervention and follow-up. We had expected that the tinge of sadness that accompanies nostalgic reflection would have prevented the intervention from decreasing NA (Leunissen et al., 2020), but this prediction received, at best, qualified support. That said, most studies thus far have measured NA immediately following nostalgic reflection and therefore may capture sadness or longing that eventually dissipates as the positivity of the memory takes over (Skowronski et al., 2014). In addition, even if nostalgia has a mixed emotional profile in the short-term, it could still contribute to global increases in well-being over time, as NA could spur action that promotes well-being in the long-term (Sedikides & Wildschut, 2016; Wildschut et al., 2019). For example, someone experiencing longing or loss after a nostalgic reflection might reach out to family members, thus strengthening relationships and promoting greater future happiness.

Furthermore, everyone experiences challenges and transitions in life that may cause negative feelings and undermine meaning. Past research has demonstrated that, when people feel lonely and question meaning in their lives, they also feel more nostalgic (Sedikides & Wildschut, 2018), but this co-occurrence in the short-term is only part of the story. Evidence also suggests that reflecting nostalgically on past events can help people overcome meaning deficits and

restore their well-being (Sedikides & Wildschut, 2018). Thus, although nostalgic reflection is bittersweet in the short-term, it may decrease NA over time by helping people navigate the inevitable difficulties of life. Importantly, dispositional nostalgia moderated the effect of the nostalgia intervention on NA at mid-intervention, post-intervention, and follow-up, indicating that people higher in dispositional nostalgia decreased in NA in the nostalgia (vs. ordinary) condition (at mid-intervention and post-intervention) and people lower in dispositional nostalgia increased in NA in the nostalgia (vs. ordinary) condition (at post-intervention and follow-up). Thus, dispositional nostalgia is key for understanding how nostalgic reflection affects NA. Our study is the first study to explore the effect of nostalgia on NA over time, so future studies would do well to continue to explore the effects of nostalgia on short- and long-term NA.

Limitations and Additional Research Directions

Our results can only speak to the effects of a nostalgia intervention among a primarily White and female sample of college students, and therefore follow-up work would need to explore how the results generalize to other populations. Recent findings suggest that nostalgic reflection may be an effective way to maintain well-being across the lifespan (Hepper et al., 2020), but, thus far, no longitudinal nostalgia intervention has been conducted among older adults. Arguably, older (compared to younger) adults could benefit substantially from nostalgic reflection, as they have many more memories from which to draw, they appreciate those memories more (Carstensen, 2006), and they nostalgize more frequently (Madoglou et al., 2017). Indeed, therapies focused on some types of reminiscing about the past have facilitated well-being among older adults (Pinquart & Forstmeier, 2012), and therapeutic techniques with an explicit focus on nostalgia may be even more potent.

In addition, we tested students during their spring semester, when most had adapted to being away from home. Given nostalgia's capacity to serve as a resource during times of stress and transition (Reid et al., 2020; Sedikides et al., 2015b), our intervention may have been more efficacious if timed for the fall semester, when many freshmen are adjusting to their new home and schedule. Future longitudinal nostalgia interventions could target samples going through

particular life transitions, both positive (e.g., getting married, becoming a parent) and negative (e.g., being laid off, receiving a chronic disease diagnosis), to examine whether nostalgia aids in navigating these transitions. In the laboratory, nostalgia inductions help individuals to overcome existential threats (Sedikides & Wildschut, 2018) and loneliness (Wildschut et al., 2011), but, with one exception (Wildschut et al., 2019), no studies have addressed the restorative function of nostalgia during a naturalistic life transition. Perhaps our nostalgia intervention was effective for three weeks because it helped students transition to their new semester and complete their midterms, but, once past those initial challenges, most students were no longer in need of nostalgia's palliative benefit. As other positive intervention studies have done, future research could attempt to pinpoint the appropriate timing and "dosage" for nostalgia interventions, and how person-activity fit acts as a moderator (Lyubomirsky & Layous, 2013).

Lastly, it seems unlikely that social connectedness, meaning, and self-continuity stemming from six instances of weekly nostalgic reflection would predict well-being out to a one-month follow-up, yet this is what our indirect-effects analyses revealed (for other examples of short-term effects promoting long-term outcomes, see: Cohen & Sherman, 2014; Walton & Wilson, 2018). Short-term social connectedness, meaning, and self-continuity may have prompted immediate behavioral changes that increased long-term well-being (Funder & Ozer, 2019; Miller et al., 2017). For example, if a participant felt more socially connected after a nostalgic reflection, she or he may have decided to call a friend to catch up, thus strengthening that relationship and precipitating social interaction. In the current study, we did not aim to capture any nostalgia-induced behavioral outcomes likely to drive global well-being outcomes, but future investigations could do so. Similarly, in the current study, participants completed weekly assessments, but perhaps daily experience sampling or day reconstruction methods could afford a fuller picture of the emotional and behavioral landscape following nostalgic reflection.

Conclusion

We obtained evidence that a weekly practice of nostalgic (vs. control) reflection can promote well-being for most individuals for up to three weeks, and that these differences in well-

being are largely mediated by nostalgia-induced social connectedness, meaning, and self-continuity. We also found evidence that the nostalgia intervention is particularly suited to those who reported being disposed to nostalgic reflection in their everyday lives. This latter finding highlights the importance of person-activity fit in happiness interventions, and the potential to screen participants on dispositional nostalgia before recommending long-term practice of nostalgia. Moreover, the diminishing marginal utility of our weekly nostalgia practice could point to the need to vary the modalities with which nostalgia is induced (e.g., through scents, music, or pictures; not just writing), thus keeping the activity fresh and engaging. Our work represents the first test of the effect of a multi-week nostalgia intervention on well-being. We hope that the promising findings spur additional investigations of nostalgia as a facilitator of well-being.

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Table 1*Outcome Means (SDs) by Condition and Time Point*

	Baseline (T ₁)		Mid-Intervention (T ₄)		Post-Intervention (T ₇)		Follow-Up (T ₈)	
	<i>n</i>	<i>M(SD)</i>	<i>n</i>	<i>M(SD)</i>	<i>n</i>	<i>M(SD)</i>	<i>n</i>	<i>M(SD)</i>
Positive Affect								
Nostalgia Condition	88	4.46 (1.01)	85	4.86 (1.11)	80	5.08 (1.23)	85	4.74 (1.25)
Control Condition	88	4.69 (1.01)	80	4.46 (1.22)	80	4.98 (1.15)	83	4.81 (1.08)
Negative Affect								
Nostalgia Condition	88	2.68 (0.76)	85	2.46 (0.90)	80	2.16 (0.89)	85	2.64 (1.00)
Control Condition	88	2.63 (0.92)	80	2.69 (1.09)	80	2.09 (0.81)	83	2.45 (0.96)
Life Satisfaction								
Nostalgia Condition	88	5.11 (1.14)	85	4.97 (1.27)	80	5.10 (1.26)	85	5.23 (1.27)
Control Condition	88	5.15 (0.99)	80	4.73 (1.21)	80	5.03 (1.16)	83	5.28 (1.05)
Subjective Vitality								
Nostalgia Condition	88	4.81 (1.10)	84	4.82 (1.21)	80	4.90 (1.18)	85	4.80 (1.15)
Control Condition	88	4.92 (1.14)	80	4.72 (1.14)	80	5.14 (1.16)	83	5.05 (1.05)
Eudaimonic Well-Being								
Nostalgia Condition	88	5.02 (0.69)	84	5.08 (0.70)	80	5.00 (0.68)	85	5.03 (0.72)
Control Condition	88	5.07 (0.60)	80	4.95 (0.61)	80	5.08 (0.69)	83	5.14 (0.56)

Table 2*Unstandardized Regression Coefficients (Standard Errors) Predicting Outcomes from Condition*

Outcomes	Mid-Intervention (T ₄)		Post-Intervention (T ₇)		Follow-Up (T ₈)	
	<i>b</i> (SE)	95% CI	<i>b</i> (SE)	95% CI	<i>b</i> (SE)	95% CI
Positive Affect						
Constant	4.39 (0.11)***	[4.18, 4.60]	4.91 (0.12)***	[4.67, 5.14]	4.74 (0.10)***	[4.53, 4.94]
Centered Baseline	0.67 (0.07)***	[0.52, 0.81]	0.57 (0.08)***	[0.41, 0.73]	0.69 (0.07)***	[0.55, 0.83]
Condition (Nostalgia vs. Control)	0.52 (0.15)**	[0.23, 0.81]	0.25 (0.17)	[-0.08, 0.58]	0.10 (0.15)	[-0.19, 0.38]
Negative Affect						
Constant	2.74 (0.10)***	[2.54, 2.93]	2.12 (0.09)***	[1.94, 2.30]	2.50 (0.10)***	[2.32, 2.69]
Centered Baseline	0.59 (0.08)***	[0.43, 0.76]	0.46 (0.08)***	[0.31, 0.61]	0.58 (0.08)***	[0.42, 0.74]
Condition (Nostalgia vs. Control)	-0.28 (0.14)*	[-0.55, -0.01]	0.04 (0.13)	[-0.22, 0.29]	0.13 (0.13)	[-0.14, 0.39]
Life Satisfaction						
Constant	4.70 (0.09)***	[4.52, 4.88]	4.97 (0.10)***	[4.77, 5.17]	5.23 (0.09)***	[5.05, 5.42]
Centered Baseline	0.87 (0.06)***	[0.75, 0.99]	0.76 (0.07)***	[0.63, 0.89]	0.75 (0.06)***	[0.63, 0.87]
Condition (Nostalgia vs. Control)	0.29 (0.13)*	[0.04, 0.54]	0.15 (0.14)	[-0.14, 0.43]	0.02 (0.13)	[-0.23, 0.28]
Subjective Vitality						
Constant	4.68 (0.09)***	[4.51, 4.85]	5.06 (0.09)***	[4.89, 5.23]	5.00 (0.09)***	[4.83, 5.17]
Centered Baseline	0.81 (0.06)***	[0.71, 0.92]	0.80 (0.06)***	[0.69, 0.91]	0.69 (0.06)***	[0.58, 0.80]
Condition (Nostalgia vs. Control)	0.16 (0.12)	[-0.07, 0.40]	-0.08 (0.12)	[-0.32, 0.16]	-0.14 (0.12)	[-0.38, 0.11]
Eudaimonic Well-Being						
Constant	4.91 (0.05)***	[4.82, 5.01]	5.03 (0.05)***	[4.93, 5.12]	5.11 (0.05)***	[5.02, 5.20]
Centered Baseline	0.79 (0.05)***	[0.68, 0.89]	0.83 (0.06)***	[0.71, 0.94]	0.77 (0.05)***	[0.67, 0.87]
Condition (Nostalgia vs. Control)	0.17 (0.07)*	[0.04, 0.30]	0.02 (0.07)	[-0.13, 0.16]	-0.05 (0.07)	[-0.18, 0.08]

Note: Condition is dummy coded (nostalgia = 1; control = 0) and baseline levels of each outcome is centered. Thus, the constant is the average score on the dependent variable for people in the control condition at the average level of the baseline outcome. Condition is the effect of being in the nostalgia (vs. control) condition in addition to the constant. Unstandardized parameter estimates and confidence intervals are calculated with Ordinary Least Squares regression (i.e., they are not bootstrapped).

† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$

Table 3*Indirect Effect of Nostalgia (vs. Control) Condition on Outcomes via Social Connectedness, Meaning, and Self-Continuity*

Outcomes	Mid-Intervention (T ₄)		Post-Intervention (T ₇)		Follow-Up (T ₈)	
	Effect (SE)	95% CI	Effect (SE)	95% CI	Effect (SE)	95% CI
Positive Affect						
<i>a</i>	1.06 (0.15)***	[0.77, 1.36]	0.97 (0.15)***	[0.68, 1.26]	0.99 (0.14)***	[0.70, 1.27]
<i>b</i>	0.23 (0.08)**	[0.08, 0.38]	0.39 (0.09)***	[0.22, 0.56]	0.27 (0.08)***	[0.12, 0.43]
Indirect Effect (<i>ab</i>)	0.24 (0.08)	[0.09, 0.40]	0.38 (0.10)	[0.20, 0.60]	0.27 (0.10)	[0.09, 0.46]
Direct Effect (<i>c'</i>)	0.28 (0.17) [†]	[-0.05, 0.60]	-0.13 (0.18)	[-0.48, 0.22]	-0.17 (0.16)	[-0.49, 0.15]
Negative Affect						
<i>a</i>	1.03 (0.15)***	[0.72, 1.33]	0.93 (0.15)***	[0.63, 1.23]	0.95 (0.14)***	[0.66, 1.23]
<i>b</i>	-0.08 (0.07)	[-0.22, 0.05]	-0.18 (0.07)**	[-0.31, -0.04]	-0.22 (0.07)**	[-0.35, -0.08]
Indirect Effect (<i>ab</i>)	-0.09 (0.07)	[-0.22, 0.06]	-0.16 (0.07)	[-0.32, -0.03]	-0.20 (0.07)	[-0.35, -0.07]
Direct Effect (<i>c'</i>)	-0.20 (0.15)	[-0.50, 0.11]	0.18 (0.14)	[-0.09, 0.46]	0.33 (0.15)*	[0.04, 0.62]
Life Satisfaction						
<i>a</i>	1.03 (0.15)***	[0.73, 1.32]	0.94 (0.14)***	[0.65, 1.22]	0.95 (0.14)***	[0.68, 1.23]
<i>b</i>	0.17 (0.07)**	[0.04, 0.30]	0.20 (0.08)**	[0.05, 0.36]	0.32 (0.07)***	[0.18, 0.45]
Indirect Effect (<i>ab</i>)	0.18 (0.08)	[0.03, 0.33]	0.19 (0.08)	[0.05, 0.36]	0.30 (0.09)	[0.14, 0.48]
Direct Effect (<i>c'</i>)	0.11 (0.14)	[-0.17, 0.39]	-0.04 (0.16)	[-0.35, 0.27]	-0.27 (0.14) [†]	[-0.55, 0.01]
Subjective Vitality						
<i>a</i>	1.05 (0.15)***	[0.75, 1.35]	0.96 (0.15)***	[0.67, 1.25]	0.97 (0.14)***	[0.69, 1.25]
<i>b</i>	0.21 (0.06)***	[0.09, 0.33]	0.22 (0.06)***	[0.10, 0.35]	0.28 (0.06)***	[0.15, 0.40]
Indirect Effect (<i>ab</i>)	0.22 (0.07)	[0.08, 0.35]	0.21 (0.07)	[0.09, 0.36]	0.27 (0.08)	[0.11, 0.42]
Direct Effect (<i>c'</i>)	-0.05 (0.13)	[-0.31, 0.21]	-0.30 (0.13)*	[-0.56, -0.03]	-0.39 (0.13)**	[-0.65, -0.13]
Eudaimonic Well-Being						
<i>a</i>	1.06 (0.14)***	[0.77, 1.34]	0.98 (0.14)***	[0.70, 1.26]	0.98 (0.13)***	[0.72, 1.25]
<i>b</i>	0.08 (0.04)*	[0.01, 0.15]	0.05 (0.04)	[-0.03, 0.13]	0.10 (0.04)*	[0.02, 0.17]
Indirect Effect (<i>ab</i>)	0.08 (0.05)	[0.00, 0.18]	0.05 (0.04)	[-0.03, 0.15]	0.10 (0.04)	[0.02, 0.18]
Direct Effect (<i>c'</i>)	0.08 (0.08)	[-0.06, 0.23]	-0.04 (0.08)	[-0.20, 0.12]	-0.14 (0.07)	[-0.29, 0.01]

Note: Condition is dummy-coded (nostalgia = 1; control = 0). Standard errors and 95% confidence intervals for the indirect effect were calculated with the percentile bootstrap approach based on 5,000 bootstrap samples (Hayes, 2018). The unstandardized parameter estimates and 95% confidence intervals for the *a*, *b*, and *c'* paths were calculated with Ordinary Least Squares regression. For effects out to mid-intervention, the mechanism was the average of social connectedness, meaning, and self-continuity from T₂-T₄. For the effects out to post-intervention and follow-up, the mechanism was the average of social

connectedness, meaning, and self-continuity from T₂-T₇. For indirect effects analyses, confidence intervals are considered significant if they do not include zero. For *a*, *b*, and *c'* paths, we used the following schema to indicate significance: †*p* < .10; **p* < .05; ***p* < .01; ****p* < .001.

Table 4

Unstandardized Regression Coefficients (Standard Errors) Predicting Outcome from Condition, Dispositional Nostalgia, and Condition × Dispositional Nostalgia

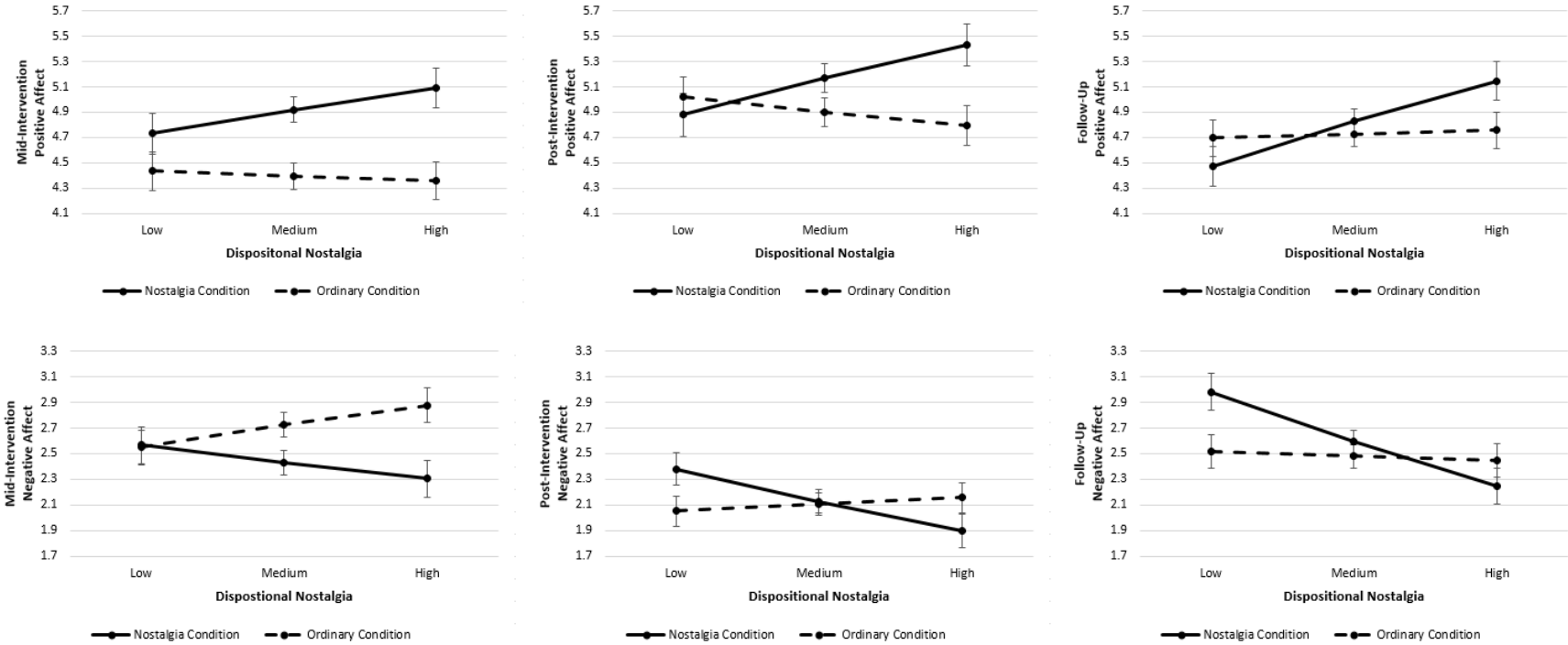
Effects	Mid-Intervention (T ₄)		Post-Intervention (T ₇)		Follow-Up (T ₈)	
	<i>b</i> (SE)	95% CI	<i>b</i> (SE)	95% CI	<i>b</i> (SE)	95% CI
Positive Affect						
Constant	4.39 (0.11)***	[4.18, 4.60]	4.90 (0.12)***	[4.68, 5.13]	4.74 (0.10)***	[4.54, 4.94]
Centered Baseline DV	0.66 (0.07)***	[0.52, 0.80]	0.57 (0.08)***	[0.41, 0.73]	0.67 (0.07)***	[0.53, 0.82]
Condition (Nostalgia vs. Control)	0.52 (0.15)***	[0.23, 0.81]	0.26 (0.16)	[-0.07, 0.58]	0.09 (0.14)	[-0.19, 0.38]
Centered Dispositional Nostalgia	-0.03 (0.09)	[-0.20, 0.14]	-0.11 (0.10)	[-0.30, 0.09]	0.03 (0.08)	[-0.14, 0.19]
Condition × Dispositional Nostalgia	0.18 (0.13)	[-0.08, 0.44]	0.36 (0.15)*	[0.07, 0.65]	0.25 (0.13) [†]	[-0.001, 0.50]
Negative Affect						
Constant	2.74 (0.10)***	[2.55, 2.93]	2.12 (0.09)***	[1.95, 2.30]	2.50 (0.09)***	[2.32, 2.69]
Centered Baseline DV	0.59 (0.08)***	[0.43, 0.76]	0.46 (0.08)***	[0.31, 0.61]	0.58 (0.08)***	[0.42, 0.73]
Condition (Nostalgia vs. Control)	-0.29 (0.14)*	[-0.55, -0.02]	0.03 (0.13)	[-0.22, 0.28]	0.12 (0.13)	[-0.13, 0.38]
Centered Dispositional Nostalgia	0.14 (0.08) [†]	[-0.02, 0.29]	0.05 (0.07)	[-0.10, 0.19]	-0.03 (0.08)	[-0.18, 0.12]
Condition × Dispositional Nostalgia	-0.24 (0.12)*	[-0.48, -0.004]	-0.27 (0.11)*	[-0.49, -0.04]	-0.27 (0.12)*	[-0.50, -0.05]
Life Satisfaction						
Constant	4.70 (0.09)***	[4.52, 4.88]	4.97 (0.10)***	[4.78, 5.17]	5.23 (0.09)***	[5.05, 5.41]
Centered Baseline DV	0.87 (0.06)***	[0.75, 0.98]	0.74 (0.07)***	[0.61, 0.87]	0.73 (0.06)***	[0.61, 0.85]
Condition (Nostalgia vs. Control)	0.29 (0.13)*	[0.04, 0.54]	0.15 (0.14)	[-0.13, 0.43]	0.03 (0.13)	[-0.23, 0.28]
Centered Dispositional Nostalgia	-0.07 (0.07)	[-0.22, 0.07]	0.05 (0.08)	[-0.11, 0.22]	-0.03 (0.07)	[-0.18, 0.12]
Condition × Dispositional Nostalgia	0.19 (0.11) [†]	[-0.03, 0.41]	0.19 (0.13)	[-0.06, 0.44]	0.30 (0.11)*	[0.07, 0.52]
Subjective Vitality						
Constant	4.68 (0.08)***	[4.51, 4.85]	5.06 (0.08)***	[4.89, 5.23]	5.00 (0.09)***	[4.83, 5.17]
Centered Baseline DV	0.79 (0.05)***	[0.68, 0.90]	0.78 (0.05)***	[0.67, 0.88]	0.67 (0.05)***	[0.56, 0.78]
Condition (Nostalgia vs. Control)	0.17 (0.12)	[-0.07, 0.40]	-0.08 (0.12)	[-0.32, 0.16]	-0.14 (0.12)	[-0.37, 0.10]
Centered Dispositional Nostalgia	0.09 (0.07)	[-0.05, 0.22]	0.01 (0.07)	[-0.13, 0.15]	0.02 (0.07)	[-0.12, 0.15]
Condition × Dispositional Nostalgia	0.09 (0.11)	[-0.12, 0.30]	0.22 (0.11)*	[0.01, 0.44]	0.22 (0.11)*	[0.01, 0.43]
Eudaimonic Well-Being						
Constant	4.92 (0.05)***	[4.82, 5.01]	5.03 (0.05)***	[4.93, 5.12]	5.11 (0.05)***	[5.02, 5.20]
Centered Baseline DV	0.77 (0.05)***	[0.67, 0.87]	0.80 (0.06)***	[0.69, 0.91]	0.76 (0.05)***	[0.65, 0.86]

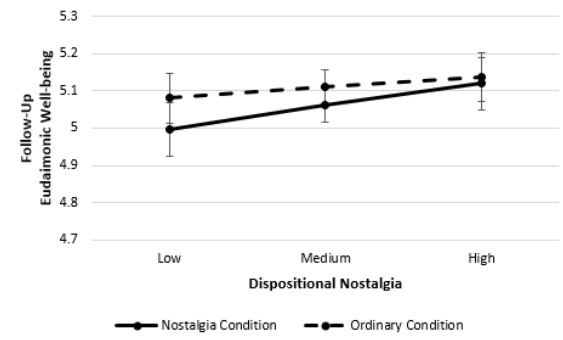
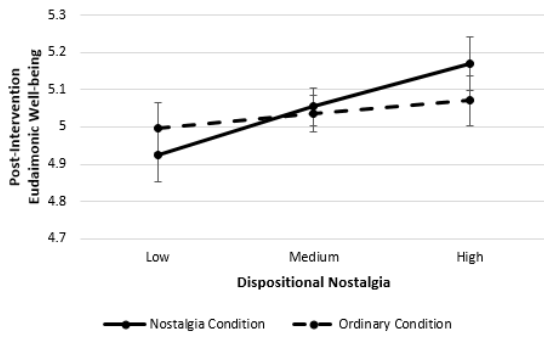
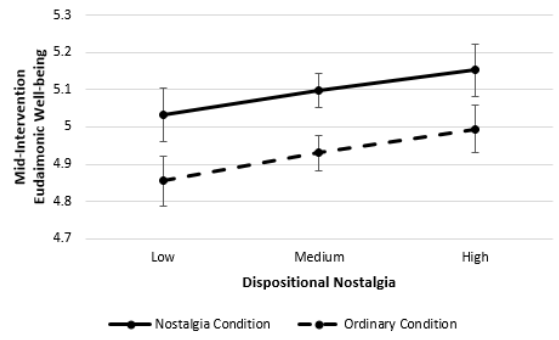
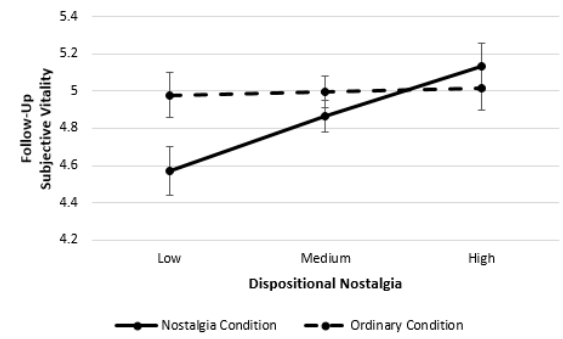
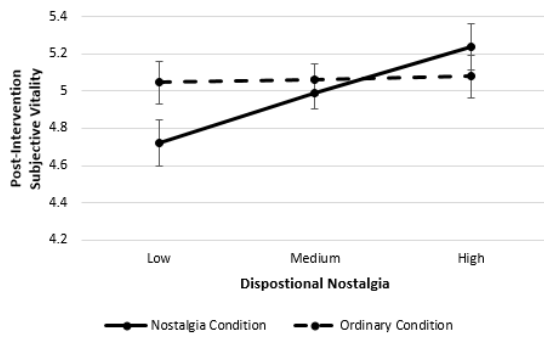
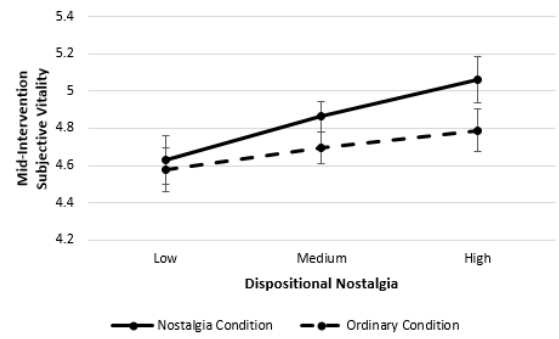
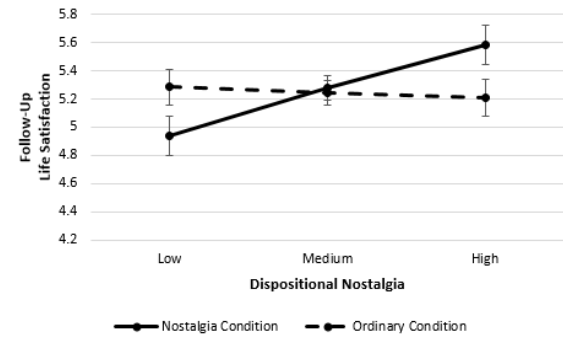
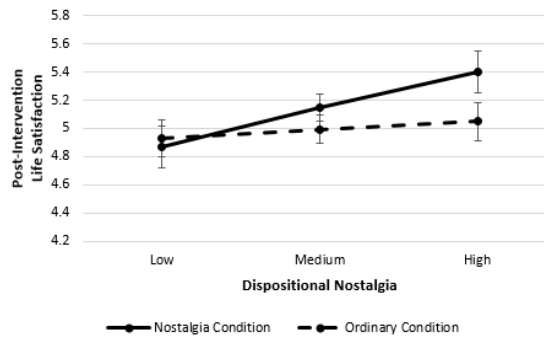
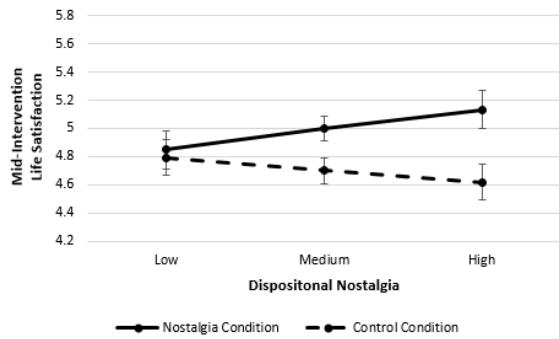
Condition (Nostalgia vs. Control)	0.17 (0.07)*	[0.04, 0.30]	0.01 (0.07)	[-0.12, 0.15]	-0.05 (0.07)	[-0.18, 0.08]
Centered Dispositional Nostalgia	0.06 (0.04)	[-0.02, 0.13]	0.03 (0.04)	[-0.05, 0.12]	0.02 (0.04)	[-0.05, 0.10]
Condition × Dispositional Nostalgia	-0.01 (0.06)	[-0.13, 0.11]	0.08 (0.06)	[-0.05, 0.20]	0.03 (0.06)	[-0.09, 0.14]

Note: Condition is dummy coded (nostalgia = 1; control = 0), dispositional nostalgia is centered, and baseline levels of each outcome are centered. Thus, the constant is the average score on the dependent variable for people in the control condition at the average level of dispositional nostalgia and the baseline outcome. Condition is the effect of being in the nostalgia (vs. control) condition in addition to the constant. Centered dispositional nostalgia is the additional effect of being above or below the average level of dispositional nostalgia for people in the control condition. Condition × Dispositional nostalgia is the additional effect of being above or below the average level of dispositional nostalgia for participants in the nostalgia condition (beyond the effect of dispositional nostalgia among those in the control condition). Confidence intervals are calculated with Ordinary Least Squares regression (i.e., they are not bootstrapped).
[†] $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Figure 1

Model-Predicted Outcomes by Condition and Dispositional Nostalgia





Note. The five panels present predicted means from a model predicting outcome variables at mid-intervention, post-intervention, and follow-up (from left to right, respectively) from experimental condition (nostalgia vs. control), centered dispositional nostalgia (as measured by the Southampton Nostalgia Scale), and the interaction between condition and centered dispositional nostalgia, controlling for baseline levels of the respective outcome variable. From top to bottom, the five panels present predicted means for (1) PA, (2) NA, (3) life satisfaction, (4) subjective vitality, and (5) eudaimonic well-being. For dispositional nostalgia, Low is the 16th percentile, Medium is the 50th percentile, and High is the 84th percentile. Error bars represent standard errors. Predicted means and standard errors were generated by the plot=2 command in Model 1 of PROCESS Version 3.3 (Hayes, 2018).