

# Nostalgia Fosters Self-Continuity: Uncovering the Mechanism (Social Connectedness) and Consequence (Eudaimonic Well-Being)

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Nostalgia, a sentimental longing for one's past, is an emotion that arises from self-relevant and social memories. Nostalgia functions, in part, to foster self-continuity, that is, a sense of connection between one's past and one's present. This article examined, in 6 experiments, how nostalgia fosters self-continuity and the implications of that process for well-being. Nostalgia fosters self-continuity by augmenting social connectedness, that is, a sense of belongingness and acceptance (Experiments 1–4). Nostalgia-induced self-continuity, in turn, confers eudaimonic well-being, operationalized as subjective vitality (i.e., a feeling of aliveness and energy; Experiments 5–6). The findings clarify and expand the benefits of nostalgia for both the self-system and psychological adjustment.

*Keywords:* emotion, nostalgia, self, self-continuity, social connectedness, eudaimonic wellbeing

Self-continuity, the sense that one's past is interwoven with one's present, is positively associated with psychological adjustment. With mounting evidence for the merits of self-continuity, it

becomes critical to understand the psychological processes that give rise to it. We focus on one such antecedent: the emotion of nostalgia. Past research has shown that nostalgia fosters self-continuity. But how does it do so and to what effect?

We formulated and tested two hypotheses. First, nostalgia fosters self-continuity through subjective social connectedness; that is, social connectedness mediates the positive effect of nostalgia on self-continuity. Second, the self-continuity that ensues from nostalgia enhances wellbeing; that is, there is a causal sequence leading from nostalgia to social connectedness to self-continuity to wellbeing. We tested these hypotheses separately in the tradition of establishing a causal chain.

## Nostalgia

*The New Oxford Dictionary of English* (Pearsall, 1998) defines nostalgia as “a sentimental longing or wistful affection for the past” (p. 1266). Our research findings are consistent with this definition. Hepper, Ritchie, Sedikides, and Wildschut (2012) investigated lay conceptions of nostalgia among U.K. and U.S. participants via a prototype approach, according to which people's understanding of a construct is shaped by repeated experience and is organized around a cognitive prototype (Wittgenstein, 1953/1967). The prototype is a fuzzy category with no necessary or sufficient features, but with more representative (i.e., central)

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features being closer to the prototype than less representative (i.e., peripheral) ones (Rosch, 1978).

Central features of nostalgia included fond, rose-colored, and personally meaningful recollections of childhood or social relationships. Central features also included triggers of nostalgia, such as keepsakes or sensory cues (see also Reid, Green, Wildschut, & Sedikides, 2015), and verbs such as remembering, reminiscing, reliving, longing, missing, and wanting to return to the past. Further, although positive and negative feelings were both represented among central features, the former outnumber the latter (see also Wildschut, Sedikides, Arndt, & Routledge, 2006). Peripheral features included warmth/comfort, daydreaming, change, calm, regret, success, and lethargy. Hepper et al. (2014) replicated these findings in 18 countries (e.g., Australia, Chile, China, Ethiopia, Germany, India, Japan, Romania, Uganda) that spanned five continents.

A portrait of nostalgia has emerged not only from prototype analyses (Hepper et al., 2012, 2014), but also from narrative coding of nostalgic episodes (Abeyta, Routledge, Roylance, Wildschut, & Sedikides, 2015; Batcho, 1998; Hart et al., 2011; Holak & Havlena, 1998; Wildschut et al., 2006). Nostalgia is a bitter-sweet (but mostly positive), past-oriented, and often social emotion. In nostalgic reverie, one brings to mind a fond and meaningful episode in which the self is the protagonist, often involving one's childhood or a close relationship. The nostalgizer typically recounts this episode through rose-colored glasses and may pine for that time or relational bond. The nostalgizer feels sentimental, mostly happy or even joyful but with tinges of longing or sadness (Sedikides, Wildschut, Routledge, Arndt et al., 2015).

Nostalgia is a prevalent emotion. Amid anecdotal reports that nostalgia is experienced by virtually everyone (Boym, 2001), research has ascertained that the majority of undergraduate students (Wildschut et al., 2006) and community members regardless of age (Hepper, Robertson, Wildschut, Sedikides, & Routledge, 2015) feel nostalgic at least once a week and modally three times a week. Also, nostalgia is conceptualized and felt similarly across cultures (Hepper et al., 2014).

Mounting evidence suggests that nostalgia serves as a psychological resource on which people can draw to restore and enhance a range of aspects of wellbeing (Routledge, Wildschut, Sedikides, & Juhl, 2013; Wildschut, Sedikides, & Cordaro, 2011). Although the content of nostalgic narratives is complex (Batcho, 2007; Holak & Havlena, 1992; Stephan, Sedikides, & Wildschut, 2012) and the emotion serves multiple functions (e.g., self-related, existential, behavioral; Sedikides, Wildschut, Arndt, & Routledge, 2008; Sedikides, Wildschut, Routledge, Arndt et al., 2015; Sedikides, Wildschut, Routledge, Arndt, & Zhou, 2009; Routledge, Sedikides, Wildschut, & Juhl, 2013), it is important to highlight its sociality, as this function is most relevant to the objective of the current investigation. Nostalgia in part reflects the human ability to draw strength and motivation from memories of close others rather than be burdened with the absence or loss of those relationships (Stephan et al., 2014; Zauberman, Ratner, & Kim, 2009; Wildschut, Sedikides, Routledge, Arndt, & Cordaro, 2010). In particular, nostalgia increases social connectedness, which we define as a sense of belongingness, and acceptance. Social connectedness is manifested in nostalgia's capacity to promote perceptions of friendship and social support, lower attachment avoidance and attachment anxiety, counteract loneliness, and

engender subjective interpersonal competence (Hepper et al., 2012; Routledge et al., 2013; Wildschut et al., 2006; Zhou, Sedikides, Wildschut, & Gao, 2008; Seehusen et al., 2013).

### Self-Continuity

We define self-continuity as a sense of connection between one's past and one's present (Sedikides, Wildschut, Routledge, & Arndt, 2015). Philosophical views regard self-continuity as a prerequisite of identity (Parfit, 1971; Wiggins, 2001). Among psychologists, William James (1890) was the first to propose that the self is situated in time or is temporally extended. In offering a distinction between the "I" (the self as knower) and the "Me" (the self as object), James (1890) argued that a crucial feature of the "I" is continuity. In particular, the link in memory between the past and present self is the basis of one's sense of self (the "I") and the specific content that one ascribes to it (the "Me"). Past experience, James contended, is unified by an irreducible entity, the I. Although people undergo physical and psychological changes, they remain the same person over time (Erikson, 1968; Neisser, 1988). That is, the one who feels these changes is the I: The I is the great connector or synthesizer (Madell, 1981; Williams, 1970).

The empirical evidence is consistent with the notion of self-continuity as a synthesizer of experience (Atchley, 1989; Troll & Skaff, 1997), and with self-continuity's prevalence and importance (Breakwell, 1986; Habermas & Bluck, 2000). As Lampinen, Odegard, and Leding (2004) stated, "the majority of people, the majority of time, report experiencing the self diachronically" (p. 246). Not only is self-continuity a distinguishing feature of the human self, but humans also have a potent need to attain or maintain it (Vignoles, 2011; Vignoles, Regalia, Manzi, Golledge, & Scabini, 2006).

In addition, empirical evidence points to the functionality of self-continuity. For example, self-continuity (operationalized as self-perceptions of stability across time or "sameness") is positively associated with indices of psychological adjustment. One such index is hedonic wellbeing, which focuses on happiness and in particular on pleasure attainment and pain avoidance (Ryan & Deci, 2001). Higher self-continuity is related to positive affect (Troll & Skaff, 1997), whereas lower self-continuity is related to negative affect and anxiety (Chandler, Lalonde, Sokol, & Hallett, 2003). Another index of psychological adjustment is psychopathology. In a study by Lampinen et al. (2004), "approximately 15% of the participants who described themselves as diachronically disunified had at least a 70% chance of falling into the pathologically dissociative taxon. None of the participants who described themselves as being diachronically unified had that high of a probability" (p. 248). Yet another index of psychological adjustment is existential equanimity. Self-continuity (operationalized as perceived autobiographical coherence, which is similar to "self-perceptions of stability across time or 'sameness'") protects people from fear of death by infusing them with a sense of order and significance (Landau, Greenberg, & Solomon, 2008; Landau, Greenberg, & Sullivan, 2009).

### Nostalgia as an Antecedent of Self-Continuity

Davis (1979) was the first to speculate that nostalgia might promote a sense of continuity between one's past and present.

Nostalgia, he mused, “marshal[s] our psychological resources for continuity” (p. 34; see also Sedikides, Wildschut, Gaertner, Routledge, & Arndt, 2008). The potential of nostalgia to link effectively one’s past with one’s present is suggested by narrative analyses. Stephan et al. (2012, Experiment 1) induced nostalgia experimentally with the Event Reflection Task (Sedikides, Wildschut, Routledge, Arndt et al., 2015). Participants visualized a personally experienced nostalgic event versus a personally experienced ordinary (e.g., everyday or regular) event. Subsequently, participants provided a brief narrative of the event. Stephan et al. proceeded to code the narratives for abstractness/concreteness on the basis of the Linguistic Inquiry and Word Count (Pennebaker, Booth, & Francis, 2007) and the Linguistic Category Model (Coenen, Hede-bouw, & Semin, 2006). Nostalgic (compared to ordinary) narratives contained a higher number of both abstract terms and concrete terms. Importantly, concrete terms underpinned the relevance of the nostalgic episode for the nostalgizer’s present. For example, concrete terms illustrated a behavior or state in the present (“I smile . . .”) that was instigated by a past event (“. . . when I look at my family photo on my desk”). Stephan et al. (Experiment 2) replicated these findings. Nostalgic (compared to ordinary or positive) recollections not only contained more abstract and concrete construal, but the concrete construal linked the nostalgizer’s past with her or his present.

Sedikides, Wildschut, Routledge, and Arndt (2015, Study 3) tested directly the idea that nostalgia fosters self-continuity. Using the Event Reflection Task, they induced nostalgia (vs. ordinary autobiographical recollection), and subsequently measured self-continuity. To do so, they generated four items to fit their conceptual definition of continuity (i.e., sense of connection between one’s past and one’s present). The four items, under the rubric Self-Continuity Index, were: “I feel connected with my past,” “I feel connected with who I was in the past,” “There is continuity in my life,” and “Important aspects of my personality remain the same across time.” Nostalgia (relative to control) increased self-continuity. Using the Event Reflection Task, Sedikides et al. (Study 4) induced nostalgia (vs. ordinary vs. positive autobiographical recollection), and again measured self-continuity. In replication, nostalgia (relative to both controls) increased self-continuity, and it did so above and beyond levels of positive affect. Taken together, nostalgia augmented self-continuity, in line with Davis’s (1979) speculation and Stephan et al.’s (2012) suggestive evidence.

The finding that nostalgia fosters self-continuity (Sedikides, Wildschut, Routledge, & Arndt, 2015) invites explication of how such an effect might occur. We propose that nostalgia has the capacity to foster self-continuity due, in part, to the social connectedness that it engenders. As noted previously, a number of studies demonstrate that nostalgia increases social connectedness, operationalized in terms of feelings of being loved, protected, and supported (Hepper et al., 2012; Wildschut et al., 2006; Zhou et al., 2008). But why will social connectedness, in turn, augment self-continuity?

There are good reasons to hypothesize that social connectedness augments self-continuity. When nostalgizing, figures from the past join one’s present (Sedikides, Wildschut, & Baden, 2004) and the “mind is ‘peopled’” (Hertz, 1990, p. 195). The relationships about which one nostalgizes may become part of how one thinks about one’s self at the present through reflected appraisal processes (i.e.,

seeing one’s self the way close others used to do so; Wallace & Tice, 2012) and inclusion processes (i.e., incorporating close others into one’s current self-concept; Aron & Nardone, 2012). Reflected appraisal and inclusion processes may reduce the distance (D’Argembeau et al., 2008) between one’s past self and present self, thus facilitating a representation of one’s life trajectory as a continuous social journey rather than as a series of isolated events (Landau, Meier, & Keefer, 2010). For example, nostalgic memories of a parent may serve as reminders that the love and confidence they imparted continue to buoy us to this day (reflected appraisal process). And nostalgia can remind us that the adventurous spirit we caught from a close friend while traveling together continues to inspire us (inclusion processes). Beyond these processes, the very nature of the nostalgic reflection may highlight the temporal trajectory of personal relationships that define the relational self (Andersen & Chen, 2002) and one’s consequent identity. Nostalgic memories of a first date with a current spouse or romantic partner (e.g., during one’s high school or university years) may frame both the relationship and one’s current sense of who one is, as continuing across time and life stages. In this way, the social connectedness that derives from nostalgia may help to create the perception of a social fabric that links closely the past self with the present self.

Moreover, nostalgic narratives refer to meaningful life events. Such events often reflect family customs, vacations or holidays, and, more generally, cultural rituals—what Berntsen and Rubin (2004) labeled as cultural-life-script events (e.g., family Thanksgiving, high school graduation, birthday celebration, wedding anniversary; Abeyta et al., 2015; Holak & Havlena, 1992; Wildschut et al., 2006). These textured and personally important relational events or communal traditions serve as links between one’s past and one’s present. They encapsulate and clarify an individual’s life trajectory (e.g., how one gets “from there to here”), and are the landmarks that help an individual navigate through life. Crucially, such events and traditions are defined by the people who enact them and weave the narrative thread of one’s important personal relationships. For example, nostalgic memories of a childhood family Thanksgiving may prompt memories of other Thanksgivings and evoke a mental storyboard of our relationships with parents and siblings across the years. Hence, memories of such traditions are likely to foster a sense of continuity between one’s past and present.

Building on the above rationale, we first hypothesized (Hypothesis 1) that nostalgic reverie will augment self-continuity, because it increases social connectedness. Accordingly, we test the nostalgia  $\Rightarrow$  social connectedness  $\Rightarrow$  self-continuity mediational model. We evaluated this hypothesized model in four experiments, using multiple converging approaches to the operationalization or experimental manipulation of nostalgia, as well as diverse samples and settings. In Experiment 1 (a laboratory experiment with U.K. university students), we implement a manipulation of nostalgia—which capitalizes on music’s capacity to elicit that emotion (Bartlett et al., 2010; Cheung et al., 2013; Routledge et al., 2011; Stephan et al., 2015)—and assess its effect on self-continuity via social connectedness. In Experiment 2 (a laboratory experiment with Chinese and U.K. university students), we test whether social connectedness mediates the effect of nostalgia on self-continuity in both East-Asian and Western cultures. In Experiment 3 (an online experiment with crowdsourced U.S. volunteers from Amazon’s

MTurk), we examine whether the mediating role of social connectedness replicates when we control for the role of positive affect. Experiments 1–3 use a measurement-of-mediation design to test Hypothesis 1. Experiment 4 (a laboratory experiment with U.K. university students), supplements this approach with an experimental-causal-chain design (Spencer, Zanna, & Fong, 2005). We manipulate social connectedness (the mediator) and assess its causal impact on self-continuity (the dependent variable).

### Nostalgia, Self-Continuity, and Implications for Eudaimonic Wellbeing

As we noted above, self-continuity is positively associated with psychological adjustment, such as hedonic wellbeing (e.g., positive affect; Chandler et al., 2003; Troll & Skaff, 1997) and existential equanimity (Landau et al., 2008, 2009), and is negatively associated with psychopathology (Lampinen et al., 2004). So far, however, no research has examined the causal relation between self-continuity and a pivotal type of wellbeing: eudaimonic wellbeing. Eudaimonic wellbeing focuses on meaning and self-realization, and, in particular, on the extent to which individuals are fully functioning (Ryan & Deci, 2001; Waterman, 1993). In the final two experiments, we examined the hitherto untested hypothesis that nostalgia-induced self-continuity confers eudaimonic wellbeing.

We formulated Hypothesis 2 as follows: Nostalgia, by virtue of its capacity to foster self-continuity via social connectedness, confers eudaimonic wellbeing. We operationalized eudaimonic wellbeing in terms of arguably its most archetypal index, namely subjective vitality. This refers to a feeling of energy and aliveness that can occur when one is existing in a fully actualized way (Ryan & Deci, 2001; Waterman, 1993). Higher subjective vitality is a highly diagnostic marker of healthy psychological functioning. For example, higher subjective vitality is related to increased levels of self-determination, self-actualization, extraversion, conscientiousness, authenticity, and work concentration, and is related to decreased levels of neuroticism (Dubreuil, Forest, & Courcy, 2014; Ryan & Frederick, 1997; Tekin & Satici, 2014). An additional benefit of utilizing subjective vitality as an indicator of eudaimonic wellbeing is that it focuses on the self (i.e., how energized, alive, and vital one feels) and thus offers a test of whether the social connectedness generated by nostalgia ultimately contributes to personal, and not just social, wellbeing via self-continuity.

Experiment 5 (a laboratory experiment involving U.K. university students) used an experimental-causal-chain design (Spencer et al., 2005) to manipulate self-continuity (the mediator) and assess its causal impact on eudaimonic wellbeing (the dependent variable). Experiment 6 (an online experiment with crowdsourced U.S. volunteers from Amazon's MTurk), evaluated the full mediational model (nostalgia  $\Rightarrow$  social connectedness  $\Rightarrow$  self-continuity  $\Rightarrow$  eudaimonic wellbeing): We induced nostalgia with the Event Reflection Task and then assessed social connectedness, self-continuity, and subjective vitality.<sup>1</sup>

### Experiment 1: Idiographic Induction of Nostalgia Through Song Lyrics

In Experiment 1, we aimed to test the mediational role of social connectedness in the relation between nostalgia and self-

continuity. We implemented a manipulation that capitalizes on the capacity of music (or, more precisely, song lyrics) to evoke nostalgia (Cheung et al., 2013; Routledge et al., 2011; Stephan et al., 2015). Specifically, we induced nostalgia by presenting participants with lyrics to songs that they had previously identified as nostalgic (compared with control lyrics). We hypothesized that exposure to nostalgic song lyrics (vs. exposure to control lyrics) would heighten self-continuity. We further hypothesized that this effect would be mediated by increased social connectedness.

### Method

**Participants, design, and procedure.** Participants were 40 University of Southampton undergraduate volunteers (37 females, 3 males). Their age ranged from 20–39 years ( $M = 22.00$ ,  $SD = 4.06$ ). We randomly assigned them to the nostalgia or control condition. Due to the small number of male participants, we did not consider gender in the reported analyses.

**Nostalgia manipulation and materials.** The experiment involved a preliminary and an experimental session separated by approximately 1 week. In the preliminary session, participants received a dictionary definition of nostalgia (“A sentimental longing or wistful affection for the past”; Pearsall, 1998, p. 1266) and then listed the titles and performing artists of three songs that made them feel nostalgic. Prior to the experimental session, we randomly allocated participants to conditions. For participants in the nostalgia condition, we retrieved the lyrics of a song they listed as nostalgic. We yoked participants in the control condition to a participant in the nostalgia condition and designated them to receive the same lyrics as that person. (We ascertained that the relevant song was not one that the control participant also considered nostalgic.) In this way, we were able to use the same set of lyrics in the nostalgia and control conditions, and thus hold constant the content of the lyrics in both conditions (Cheung et al., 2013; Routledge et al., 2011; Stephan et al., 2015).

During the experimental session, participants first read the prepared lyrics and then completed a three-item nostalgia manipulation check (1 = *strongly disagree*, 6 = *strongly agree*): “Right now, I am feeling quite nostalgic,” “Right now, I am having nostalgic feelings,” “I feel nostalgic at the moment” (1 = *strongly disagree*, 6 = *strongly agree*;  $\alpha = .99$ ,  $M = 3.79$ ,  $SD = 1.60$ ). This manipulation check has been validated by prior research in the United States (Cheung et al., 2013; Routledge et al., 2011), the United Kingdom (Hepper et al., 2012; Wildschut et al., 2006), and China (Zhou, Wildschut, Sedikides, Chen, & Vingerhoets, 2012; Zhou, Wildschut, Sedikides, Shi, & Feng, 2012). Next, participants responded to an established assessment of social connectedness (Hepper et al., 2012; Wildschut et al., 2006). The items were “Right now, I feel . . . ‘connected to loved ones,’ ‘protected,’ ‘loved,’ and ‘I can trust others’” (1 = *strongly disagree*, 6 = *strongly agree*;  $\alpha = .95$ ,  $M = 3.18$ ,  $SD = 1.55$ ). Finally, participants responded to the assessment of self-continuity, the Self-

<sup>1</sup> In each experiment, we tested all participants who responded within the designated study period under the stipulation that the number of observations per condition ( $n_{\text{condition}}$ ) be equal to or greater than 20 (Simmons, Nelson, & Simonsohn, 2011), a rule that we followed in relevant prior research (Sedikides, Wildschut, Routledge, & Arndt, 2015). Degrees of freedom vary occasionally due to missing values.



Continuity Index (SCI; 1 = *strongly disagree*, 6 = *strongly agree*;  $\alpha = .93$ ,  $M = 3.51$ ,  $SD = 1.55$ ).

As mentioned before, we first used the SCI in Sedikides, Wildschut, Routledge, and Arndt (2015, Studies 3–4). Here, we proceeded further to establish the psychometric properties of this index. One hundred forty-one volunteers (72 males, 69 females) completed materials online. Participants were members of the general public in The Netherlands and ranged in age from 16–66 years ( $M = 37.70$ ,  $SD = 13.58$ ). Two participants provided incomplete data and were excluded from the analyses. Participants responded to the four-item SCI (1 = *strongly disagree*, 5 = *strongly agree*;  $\alpha = .79$ ,  $M = 3.51$ ,  $SD = 0.88$ ). We used a combination of exploratory and confirmatory factor analysis to evaluate the factor structure of the SCI (MacCallum, Roznowski, Mar, & Reith, 1994). For this purpose, we randomly divided the sample into two subgroups. A principal axis factor analysis based on the responses of the first subgroup ( $n = 69$ ) revealed one factor with an eigenvalue greater than 1 (The ratio of observations to items [ $\sim 16:1$ ] is adequate for exploratory factor analysis; Nunnally & Bernstein, 1994). All four items had high factor loadings ( $> .60$ ) on this single, dominant factor. A confirmatory factor analysis based on responses of the second subgroup ( $n = 70$ ) showed that a model specifying a single factor provided good fit:  $\chi^2(2, n = 70) = 2.86$ ,  $p = .24$ , SRMSR = .05, RMSEA = .08, CFI = .99.

## Results and Discussion

**Manipulation check.** The nostalgia induction was effective. As intended, participants who read nostalgic lyrics ( $M = 4.98$ ,  $SD = 0.72$ ) felt more nostalgic than those who read control lyrics ( $M = 2.65$ ,  $SD = 1.35$ ),  $F(1, 37) = 44.59$ ,  $p < .001$ ,  $\eta^2 = .55$ .

**Effect of nostalgia on self-continuity.** As hypothesized, participants who read nostalgic lyrics ( $M = 4.48$ ,  $SD = 0.96$ ) reported higher levels of self-continuity than those who read control lyrics ( $M = 2.55$ ,  $SD = 1.43$ ),  $F(1, 38) = 24.95$ ,  $p < .001$ ,  $\eta^2 = .40$ . Correlational patterns involving the nostalgia manipulation check provide further support for this conclusion: The more nostalgic participants felt, the more self-continuity they reported,  $r(38) = .83$ ,  $p < .001$ .

**Mediation by social connectedness.** Participants who read nostalgic lyrics ( $M = 3.93$ ,  $SD = 1.10$ ) also reported stronger social connectedness than those who read control lyrics ( $M = 2.43$ ,  $SD = 1.59$ ),  $F(1, 38) = 12.08$ ,  $p = .001$ ,  $\eta^2 = .24$ . This indicates that social connectedness qualifies as a potential mediator of the nostalgia effect on self-continuity. We used the PROCESS macro (Hayes, 2013, Model 4) to test the indirect effect (denoted as *ab*) of nostalgia on self-continuity via social connectedness (10,000 bootstrap samples). This analysis confirmed that the indirect effect of nostalgia on self-continuity via social connectedness was significant,  $ab = 1.13$ ,  $SE = 0.36$ , 95% confidence interval (CI) [0.456, 1.865]. The direct effect was also significant,  $B = 0.80$ ,  $SE = 0.24$ , 95% CI [0.307, 1.284].

In summary, reading nostalgic (compared to control) lyrics increased social connectedness and ensuing self-continuity. These results are consistent with the postulated mediating role of social connectedness. Nostalgia raises social connectedness, and this

bolstered social connectedness is at least partially responsible for nostalgia's capacity to foster self-continuity.

## Experiment 2: Cross-Cultural Evidence

In Experiment 2, we examined whether the mediating role of social connectedness in the relation between nostalgia and self-continuity would replicate in Western (U.K.) culture, but, importantly, also generalize to East-Asian (Chinese) culture.

### Method

**Participants and design.** Participants were 70 Chinese undergraduates from Sun-Yat Sen University (36 males, 34 females) and 122 U.K. undergraduates from University of Southampton (105 females, 17 males). Chinese participants ranged in age from 19–28 years ( $M = 21.98$ ,  $SD = 1.49$ ) and U.K. participants ranged in age from 18–57 years ( $M = 20.52$ ,  $SD = 5.31$ ). We randomly assigned them to nostalgia and control conditions. Participants responded to materials in their native language, with the questionnaire translated and back-translated by a “committee” of three bilingual speakers (Brislin, 1980). Preliminary analyses indicated that gender did not qualify the statistically significant findings reported below. We therefore omitted gender from the analyses, with one exception (see below).

**Procedure and materials.** We induced nostalgia (vs. ordinary autobiographical recollection) with the Event Reflection Task (Sedikides, Wildschut, Routledge, Arndt et al., 2015) in which participants visualize a personally experienced (nostalgic or ordinary) event and then provide a brief narrative of the event. The manipulation check ( $\alpha = .94$ ,  $M = 3.58$ ,  $SD = 1.36$ ), and measures of social connectedness ( $\alpha = .89$ ,  $M = 4.11$ ,  $SD = 1.26$ ) and self-continuity ( $\alpha = .78$ ,  $M = 4.20$ ,  $SD = 1.05$ ) were the same as those of Experiment 1.

## Results and Discussion

**Manipulation check.** A 2 (nostalgia: nostalgia vs. control)  $\times$  2 (country: China vs. U.K.) ANOVA revealed that, as intended, participants in the nostalgia condition ( $M = 3.79$ ,  $SD = 1.26$ ) reported feeling more nostalgic than those in the control condition ( $M = 3.33$ ,  $SD = 1.44$ ),  $F(1, 187) = 8.45$ ,  $p = .004$ ,  $\eta^2 = .04$ . Further, Chinese participants ( $M = 4.07$ ,  $SD = 1.46$ ) reported being more nostalgic than U.K. participants ( $M = 3.30$ ,  $SD = 1.23$ ),  $F(1, 187) = 15.68$ ,  $p < .001$ ,  $\eta^2 = .07$ . The interaction was not significant,  $F(1, 187) = 2.22$ ,  $p = .138$ ,  $\eta^2 = .01$ . In all, the nostalgia induction was effective.

**Effect of nostalgia on self-continuity.** Consistent with the hypothesis, participants in the nostalgia condition ( $M = 4.42$ ,  $SD = 0.83$ ) reported higher self-continuity than those in the control condition ( $M = 3.94$ ,  $SD = 1.21$ ),  $F(1, 186) = 8.53$ ,  $p = .004$ ,  $\eta^2 = .04$ . Further, Chinese participants ( $M = 4.42$ ,  $SD = 1.10$ ) reported higher self-continuity than U.K. participants ( $M = 4.07$ ,  $SD = 0.99$ ),  $F(1, 186) = 6.12$ ,  $p = .014$ ,  $\eta^2 = .03$ . The interaction was not significant,  $F(1, 186) = 1.51$ ,  $p = .221$ ,  $\eta^2 = .01$ . As in Experiment 1, correlational analyses involving the nostalgia manipulation check corroborated these findings: The more nostalgic participants felt, the more self-continuity they reported,  $r(189) = .48$ ,  $p < .001$ .

**Mediation by social connectedness.** Preliminary analyses produced a significant main effect of gender on social connectedness; therefore, we retained gender in the reported analyses. A 2 (nostalgia)  $\times$  2 (country)  $\times$  2 (gender) ANOVA on social connectedness indicated that social connectedness was significantly higher in the nostalgia ( $M = 4.39$ ,  $SD = 1.00$ ) than in the control ( $M = 3.79$ ,  $SD = 1.44$ ) condition,  $F(1, 182) = 4.14$ ,  $p = .043$ ,  $\eta^2 = .02$ . Further, Chinese participants ( $M = 4.48$ ,  $SD = 1.06$ ) reported higher social connectedness than U.K. participants ( $M = 3.89$ ,  $SD = 1.32$ ),  $F(1, 182) = 15.39$ ,  $p < .001$ ,  $\eta^2 = .07$ . Finally, women ( $M = 4.20$ ,  $SD = 1.31$ ) reported higher social connectedness than men ( $M = 3.86$ ,  $SD = 1.09$ ),  $F(1, 182) = 9.67$ ,  $p = .002$ ,  $\eta^2 = .04$ . No other effects were significant. Note that the nostalgia main effect on social connectedness was also significant when we did not retain gender in the analyses,  $F(1, 186) = 8.97$ ,  $p = .003$ ,  $\eta^2 = .04$ .

Social connectedness tracked the effect of nostalgia on self-continuity and thus qualifies as a potential mediator. A bootstrapping analysis (Hayes, 2013, Model 4) confirmed that the indirect effect of nostalgia on self-continuity via social connectedness was significant,  $ab = 0.14$ ,  $SE = 0.05$ , 95% CI [0.046, 0.238]. The direct effect was not significant,  $B = 0.09$ ,  $SE = 0.06$ , 95% CI [-0.037, 0.210]. Note that this model controlled for culture and the Nostalgia  $\times$  Culture interaction. When we additionally controlled for gender and the Gender  $\times$  Nostalgia interaction, the indirect effect remained significant (and was essentially unaltered),  $ab = 0.14$ ,  $SE = 0.05$ , 95% CI [0.045, 0.243]. In all, the effect of nostalgia on self-continuity was mediated by social connectedness.<sup>2</sup>

### Experiment 3: Implementation of a Positive-Affect Control Condition

In Experiment 3, we examined whether the mediating role of social connectedness in the nostalgia  $\Rightarrow$  self-continuity relation would replicate when we control for positive affect. After all, work on nostalgia shows that the content of nostalgic narratives is more positive than negative (Wildschut et al., 2006), and nostalgia typically increases positive affect (Hepper et al., 2012; Verplanken, 2012; Wildschut et al., 2006). Although research has established unique effects of nostalgia above and beyond positive affect (Routledge, Wildschut, Sedikides, Juhl, & Arndt, 2012; Turner, Wildschut, Sedikides, & Gheorghiu, 2013; van Dijke, Wildschut, Leunissen, & Sedikides, 2015; van Tilburg, Sedikides, & Wildschut, 2015; Zhou, Wildschut, Sedikides, Shi et al., 2012), we needed to gauge the role of positive affect in the context of the current investigation. To achieve this, we implemented a positive affect control condition, in which participants were instructed to recall a lucky event from their past. We hypothesized that participants who reflected on a nostalgic event would experience more social connectedness and concomitant self-continuity than those who reflected on a lucky event.

### Method

**Participants.** Participants were 90 English-speaking residents of the United States (55 females, 35 males) who were recruited via Amazon's MTurk and received \$1.50 upon completion. Participants' ages ranged from 19–73 years ( $M = 39.59$ ,  $SD = 13.71$ ).

Participants had a track record of a 95% or better job acceptance rate. We randomly assigned them to the nostalgia or control condition.

**Procedure and materials.** We implemented a version of the Event Reflection Task. Participants in the nostalgia condition thought of a nostalgic event in their life (see Experiment 2), whereas participants in the control condition thought of a lucky event in their life (“... bring to mind a lucky event in your life. Specifically, try to think of a positive past event that was brought on by chance rather than through your own actions”). Next, participants completed the same measures of social connectedness ( $\alpha = .93$ ,  $M = 4.72$ ,  $SD = 1.31$ ) and self-continuity ( $\alpha = .88$ ,  $M = 4.91$ ,  $SD = 1.02$ ) as in Experiments 1–2. Following this, participants completed a two-item assessment of positive affect (“... happy” and “... in a good mood”;  $\alpha = .90$ ,  $M = 5.24$ ,  $SD = 0.86$ ) and the same nostalgia manipulation check as in Experiments 1–2 ( $\alpha = .98$ ,  $M = 4.40$ ,  $SD = 1.46$ ). We administered the manipulation check last to address the possibility that, in Experiments 1–2, we created experimental demand by placing the manipulation check prior to the social connectedness and self-continuity measures.

### Results and Discussion

**Manipulation check.** Participants in the nostalgia condition ( $M = 5.15$ ,  $SD = 1.04$ ) reported feeling more nostalgic than those in the control (i.e., luck) condition ( $M = 3.68$ ,  $SD = 1.45$ ),  $F(1, 88) = 30.36$ ,  $p < .001$ ,  $\eta^2 = .26$ , thus attesting to the effectiveness of the nostalgia induction. Crucially, the nostalgia ( $M = 5.33$ ,  $SD = 0.83$ ) and control ( $M = 5.16$ ,  $SD = 0.89$ ) conditions did not differ significantly on positive affect,  $F(1, 87) = 0.91$ ,  $p = .343$ ,  $\eta^2 = .01$ . The nostalgia and control condition differed significantly on state nostalgia, but were approximately matched on positive affect.

**Effect of nostalgia on self-continuity.** As hypothesized, participants in the nostalgia condition ( $M = 5.36$ ,  $SD = 0.68$ ) reported higher self-continuity than those in the control condition ( $M = 4.48$ ,  $SD = 1.10$ ),  $F(1, 88) = 20.91$ ,  $p < .001$ ,  $\eta^2 = .19$ . Similar to Experiments 1–2, correlational analyses involving the nostalgia manipulation check showed that the more nostalgic participants felt, the more self-continuity they reported,  $r(90) = .53$ ,  $p < .001$ .

Participants in the current experiment had a wider age range than those in Experiments 1–2, allowing us to examine the role of age. The age distribution in our sample was positively skewed (i.e., relatively few participants over the age of 50). We therefore examined the conditional simple effect of nostalgia on self-continuity for those in the 25th (28 years), 50th (median; 38 years), and 75th (49 years) age percentile (i.e., we modeled the simple effect of nostalgia for these three points on the age continuum). Age was positively associated with self-continuity,  $B = .017$ ,  $SE = .007$ ,  $F(1, 86) = 5.63$ ,  $p = .020$ . The Nostalgia  $\times$  Age

<sup>2</sup> A bootstrapping analysis showed that the indirect effect of culture on self-continuity via social connectedness was significant,  $ab = .159$ ,  $SE = .046$ , 95% CI [.072, .255]. These results are consistent with mediation of the culture effect on self-continuity by social connectedness. It is possible that more collectivist culture engenders a general sense of connectedness to others (Cai, Sedikides, & Jiang, 2013; Sedikides, Gaertner, & Cai, 2015), which in turn facilitates a narrative thread (via reflected appraisal or inclusion processes) similar to what we proposed nostalgia facilitates.

interaction was not significant,  $F(1, 86) = 2.41, p = .125, \eta^2 = .02$ . Supporting its generality, the conditional simple effect of nostalgia was significant at the 25th,  $F(1, 86) = 18.66, p < .001$ , 50th,  $F(1, 86) = 20.25, p < .001$ , and 75th,  $F(1, 86) = 7.23, p = .009$  age percentile.

**Mediation by social connectedness.** Participants in the nostalgia condition ( $M = 5.30, SD = 0.95$ ) also reported stronger social connectedness than those in the control condition ( $M = 4.16, SD = 1.40$ ),  $F(1, 88) = 20.73, p < .001, \eta^2 = .19$ . This indicates that social connectedness qualifies as a potential mediator of the nostalgia effect on self-continuity. A bootstrapping analysis (Hayes, 2013, Model 4) confirmed that the indirect effect of nostalgia on self-continuity via social connectedness was significant,  $ab = 0.46, SE = 0.18, 95\% CI [0.181, 0.869]$ . The direct effect was also significant,  $B = 0.42, SE = 0.18, 95\% CI [0.057, 0.791]$ . As expected (given that the nostalgia and control conditions did not differ on positive affect), controlling for positive affect by including it as a covariate did not alter these results.

Experiment 3 therefore provided evidence that social connectedness mediates the effect of nostalgia on self-continuity, and does so independently of positive affect.

#### Experiment 4: An Experimental-Causal-Chain Approach

In Experiments 1–3, we used a measurement-of-mediation design to test whether the effect of nostalgia on self-continuity is mediated by social connectedness. Results across the three experiments supported the postulated nostalgia  $\Rightarrow$  social connectedness  $\Rightarrow$  self-continuity mediational model. However, this particular approach to testing mediation has attracted critical scrutiny (Bullock, Green, & Ha, 2010; Fiedler, Schott, & Meiser, 2011; Spencer et al., 2005). A limitation is that both the mediator (i.e., social connectedness) and the dependent variable (i.e., self-continuity) are measured, which introduces uncertainty regarding their causal ordering. Underscoring this issue, supplementary analyses revealed that Experiments 1–3 also supported an alternative mediational model, in which the order of social connectedness and self-continuity was reversed (nostalgia  $\Rightarrow$  self-continuity  $\Rightarrow$  social connectedness). Hence, it is vitally important to corroborate the proposed causal effect of social connectedness on self-continuity. Experiment 4 therefore supplemented the measurement-of-mediation design that we implemented in the preceding experiments with the experimental-causal-chain design advocated by Spencer et al. (2005).

Given that Experiments 1–3 supplied evidence for a causal effect of nostalgia (the independent variable) on social connectedness (the mediator), the key objective of Experiment 4 was to examine the next link in the causal chain by testing the causal effect of social connectedness (the mediator) on self-continuity (the dependent variable). We operationalized social connectedness in terms of loneliness (Baumeister & Leary, 1995; Leary, 2010). We reasoned that high social connectedness would entail low loneliness and vice versa. We predicted that high (compared to low) social connectedness would raise self-continuity.

## Method

**Participants and design.** Participants were 93 University of Southampton undergraduates (82 females, 11 males). Their ages ranged from 19–50 years ( $M = 20.45, SD = 4.70$ ). We randomly assigned them to experimental conditions (high vs. low social connectedness).

**Procedure and materials.** We induced social connectedness through an established manipulation (Wildschut et al., 2006; Zhou et al., 2008). Participants completed the “Southampton Loneliness Scale,” which comprised 15 statements drawn from the UCLA Loneliness Scale (Russell, Peplau, & Cutrona, 1980). For each statement, participants indicated whether they disagreed (coded 0) or agreed (coded 1). In the high-connectedness condition, the statements were phrased in a manner to elicit disagreement (e.g., “I always feel that I am ‘out of tune’ with the people around me”), whereas, in the low-connectedness condition, the statements were phrased in a manner to elicit agreement (e.g., “I sometimes feel that I am ‘out of tune’ with the people around me”). As intended, participants in the high-connectedness condition ( $M = 2.15, SD = 2.29$ ) agreed with fewer statements than those in the low-connectedness condition ( $M = 8.77, SD = 3.02$ ),  $F(1, 91) = 141.41, p < .001, \eta^2 = .61$ . Following this, participants received false feedback. Those in the high-connectedness condition learned that they were in the 12th percentile of the loneliness distribution and were therefore “very low on loneliness” compared with other University of Southampton undergraduates. Conversely, those in the low-connectedness condition learned that they were in the 62nd percentile of the distribution of loneliness and were therefore “above average on loneliness” compared with other University of Southampton undergraduates. Participants were then asked to provide reasons for their score on a separate sheet of paper.

Next, participants completed the same measure of social connectedness as in Experiments 1–3, which served as a manipulation check ( $\alpha = .86, M = 4.40, SD = 1.03$ ). Finally, they completed the same measure of self-continuity (SCI;  $\alpha = .85, M = 4.30, SD = 1.00$ ), as in Experiments 1–3.

## Results and Discussion

**Manipulation check.** As intended, participants in the high-connectedness condition reported higher social connectedness levels ( $M = 4.89, SD = 0.91$ ) than those in the low-connectedness condition ( $M = 3.93, SD = 0.93$ ),  $F(1, 91) = 25.04, p < .001, \eta^2 = .22$ . The social connectedness induction was effective.

**Self-continuity.** Participants in the high-connectedness condition ( $M = 4.58, SD = 0.85$ ) reported stronger self-continuity than those in the low-connectedness condition ( $M = 4.03, SD = 1.06$ ),  $F(1, 91) = 7.58, p = .007, \eta^2 = .08$ .

Taken together, Experiment 4 provided vital experimental evidence for a causal effect of social connectedness on self-continuity, as stipulated in Hypothesis 1. Of course, whereas this finding fits with hypotheses guiding the research, it does not rule out the possibility of a reciprocal causal relation between social connectedness and self-continuity. We return to this issue in the General Discussion.

Consistent with Hypothesis 1, Experiments 1–4 demonstrated that social connectedness mediates the effect of nostalgia on self-continuity. We obtained these patterns across diverse experimental



procedures and across East-Asian (China) and Western (U.K., U.S.) samples. In the following two experiments, we tested Hypothesis 2: that nostalgia-induced self-continuity confers eudaimonic wellbeing. As a reminder, we define eudaimonic wellbeing as reflecting the extent to which the person sees themselves as functioning at an optimal and meaningful level (Ryan & Deci, 2001), and we operationalize it in terms of subjective vitality (Ryan & Frederick, 1997).

### Experiment 5: An Experimental-Causal-Chain Approach

We know of no previous research that has manipulated self-continuity and assessed its causal impact on eudaimonic wellbeing. We did just that in Experiment 5, predicting that self-continuity will increase eudaimonic wellbeing and thus aiming to obtain a crucial piece of evidence in the putative causal chain (nostalgia  $\Rightarrow$  social connectedness  $\Rightarrow$  self-continuity  $\Rightarrow$  eudaimonic wellbeing).

#### Method

**Participants and design.** Participants were 135 U.S. residents (68 females, 65 males, 2 gender unreported), who were recruited via Amazon's MTurk and received \$1.50 upon completion. Their ages ranged from 18–75 years ( $M = 35.94$ ,  $SD = 12.63$ ). Participants had a track record of a 95% or better job acceptance rate. We randomly assigned them to the self-continuity or control condition.

**Procedure and materials.** We adapted the self-continuity manipulation from Weinstein, Deci, and Ryan (2011). This manipulation was consistent with our conceptual definition of self-continuity ("a sense of connection between one's past and one's present"). We began by asking participants to think of themselves as they were 3 years ago ("Think about yourself 3 years ago and who you were as a person"). We did so in order to keep the temporal distance from the present constant across all participants regardless of age. We then proceeded with instructions according to experimental condition. Participants in the self-continuity condition focused on the continuity between their past and present self ("Spend some time writing about how you feel connected with your past. Describe the way in which important aspects of your personality remain the same across time"), whereas those in the control condition focused on their past self only ("Spend some time writing about who you were in the past. Describe important aspects of your personality in the past").

Next, participants completed the SCI ( $\alpha = .89$ ,  $M = 4.48$ ,  $SD = 1.26$ ), as in Experiments 1–4, as a manipulation check of self-continuity. Subsequently, participants completed a measure of state-level eudaimonic wellbeing: the Subjective Vitality Scale (SVS; Ryan & Frederick, 1997). This scale assesses the state of feeling alive and alert—a state that is indicative of eudaimonic wellbeing (Ryan & Deci, 2001). It consists of seven items (e.g., "I feel alive and vital," "I have energy and spirit") rated on a 6-point scale (1 = *strongly disagree*, 6 = *strongly agree*;  $\alpha = .92$ ,  $M = 4.11$ ,  $SD = 1.19$ ).

#### Results and Discussion

**Manipulation check.** As intended, participants in the self-continuity condition reported higher levels of self-continuity ( $M =$

4.85,  $SD = 1.08$ ) compared to those in the control condition ( $M = 4.08$ ,  $SD = 1.32$ ),  $F(1, 132) = 13.85$ ,  $p < .001$ ,  $\eta^2 = .10$ .

**Eudaimonic wellbeing.** Participants in the self-continuity condition ( $M = 4.32$ ,  $SD = 1.10$ ) reported greater eudaimonic wellbeing than those in the control condition ( $M = 3.87$ ,  $SD = 1.25$ ),  $F(1, 133) = 4.83$ ,  $p = .03$ ,  $\eta^2 = .04$ . In all, we obtained evidence for a causal effect of self-continuity on state-level eudaimonic wellbeing.

The wide age range of participants allowed us to examine the role of age. As in the MTurk sample of Experiment 3, the age distribution was positively skewed. We therefore examined the conditional simple effect of self-continuity on eudaimonic wellbeing at the 25th (26 years), 50th (median; 31 years), and 75th (42 years) age percentile. Age was not significantly associated with eudaimonic wellbeing,  $B = .008$ ,  $SE = .008$ ,  $F(1, 129) = 0.97$ ,  $p = .335$ . More importantly, the Self-Continuity  $\times$  Age interaction was not significant,  $F(1, 129) = 0.01$ ,  $p = .904$ ,  $\eta^2 = .0001$ . The conditional simple effect of self-continuity on eudaimonic wellbeing was marginal at the 25th,  $F(1, 129) = 2.76$ ,  $p = .099$ , 50th,  $F(1, 129) = 3.69$ ,  $p = .057$ , and 75th,  $F(1, 129) = 3.10$ ,  $p = .081$  age percentile.

### Experiment 6: Testing the Full Causal Sequence

In Experiment 6, we examined the full causal sequence from nostalgia to social connectedness to self-continuity to eudaimonic wellbeing. Experiment 6, then, allowed us to test in full the hypothesis that nostalgia will confer eudaimonic wellbeing benefits through its effect on social connectedness and self-continuity. We induced nostalgia with the Event Reflection Task, and then proceeded to measure social connectedness, self-continuity, and eudaimonic wellbeing.

We also addressed a potential limitation of several prior experiments pertaining to the phrasing of the nostalgia manipulation check. Participants in Experiments 1–3 completed self-report assessments of state nostalgia (e.g., "Right now, I am feeling quite nostalgic"). It is possible that the phrasing of these manipulation checks introduced experimental demand. More precisely, participants who were instructed to recall a nostalgic event from their past may have felt compelled to endorse the manipulation check items even when they did not experience nostalgia (of course, this limitation is likely less pertinent to Experiment 1 where nostalgia was induced via song lyrics). To address this issue in Experiment 6, instead of the self-report ratings of state nostalgia, judges coded the participant-generated autobiographical narratives for intensity of expressed nostalgia.

#### Method

**Participants.** Participants were 110 English-speaking U.S. residents (55 females, 54 males, 1 gender unreported), who were recruited via Amazon's MTurk and received \$1.50 upon completion. Their ages ranged from 18–80 years ( $M = 35.52$ ,  $SD = 11.62$ ). Participants had a track record of a 95% or better job acceptance rate. We randomly assigned them to the nostalgia or control condition.

**Procedure and materials.** We induced nostalgia with the Event Reflection Task (nostalgic vs. ordinary autobiographical recollection; Sedikides et al., 2015). Then, participants completed



measures of social connectedness, self-continuity, and eudaimonic wellbeing. The measure of social connectedness was the same as in Experiments 1–4 ( $\alpha = .90$ ,  $M = 3.96$ ,  $SD = 1.18$ ). As before, we assessed self-continuity with the SCI ( $\alpha = .79$ ,  $M = 4.31$ ,  $SD = 0.94$ ). Finally, we assessed eudaimonic wellbeing with the SVS ( $\alpha = .92$ ,  $M = 3.73$ ,  $SD = 0.99$ ), as in Experiment 5.

## Results and Discussion

**Manipulation check.** We transcribed the participant-generated autobiographical narratives. Five judges (unaware of experimental condition) coded these narratives for intensity of expressed nostalgia (“How much nostalgia did the person who wrote this narrative experience?”; 1 = *very little*, 7 = *very much*; interrater reliability:  $\alpha = .98$ ). As intended, narratives written by participants in the nostalgia condition ( $M = 5.82$ ,  $SD = 1.28$ ) expressed more nostalgia than narratives written by participants in the control condition ( $M = 1.52$ ,  $SD = 0.79$ ,  $F(1, 108) = 465.24$ ,  $p < .001$ ,  $\eta^2 = .81$ ). This manipulation check did not rely on self-report, yet provided evidence for the validity of the Event Reflection Task. Consistent with Experiments 1–3, correlational analyses involving coded nostalgia revealed that the more nostalgia participants expressed in their narratives, the more self-continuity they reported,  $r(110) = .39$ ,  $p < .001$ .

**Relations among nostalgia, social connectedness, self-continuity, and wellbeing.** We present zero-order correlations among the study variables in Table 1. One-way ANOVAs revealed that participants in the nostalgia condition ( $M = 4.21$ ,  $SD = 1.09$ ) reported higher social connectedness than those in the control condition ( $M = 3.74$ ,  $SD = 1.22$ ),  $F(1, 108) = 4.41$ ,  $p = .038$ ,  $\eta^2 = .04$ . Participants in the nostalgia condition ( $M = 4.65$ ,  $SD = 0.84$ ) also reported higher self-continuity than those in the control condition ( $M = 4.02$ ,  $SD = 0.93$ ),  $F(1, 108) = 13.78$ ,  $p < .001$ ,  $\eta^2 = .11$ . Further, participants in the nostalgia condition ( $M = 4.00$ ,  $SD = 0.91$ ) reported greater eudaimonic wellbeing than those in the control condition ( $M = 3.50$ ,  $SD = 1.01$ ),  $F(1, 108) = 7.33$ ,  $p = .008$ ,  $\eta^2 = .06$ .

The wide age range of participants allowed us to examine the role of age. As in the preceding MTurk samples (Experiments 3 and 5), the age distribution was positively skewed. We therefore examined the conditional simple effect of nostalgia on self-continuity and eudaimonic wellbeing at the 25th (27 years), 50th (median; 32 years), and 75th (41 years) age percentile. As in Experiment 3, age was positively associated with self-continuity,  $B = .016$ ,  $SE = .007$ ,  $F(1, 105) = 4.80$ ,  $p = .031$ . The Nostalgia  $\times$

Age interaction effect on self-continuity was not significant,  $F(1, 105) = 0.81$ ,  $p = .370$ ,  $\eta^2 = .0001$ . Attesting to its generality, the conditional simple effect of nostalgia on self-continuity was significant at the 25th,  $F(1, 105) = 6.05$ ,  $p = .016$ , 50th,  $F(1, 105) = 10.89$ ,  $p = .001$ , and 75th,  $F(1, 105) = 13.99$ ,  $p < .001$  age percentile. Age was marginally associated with greater eudaimonic wellbeing,  $B = .013$ ,  $SE = .008$ ,  $F(1, 105) = 2.92$ ,  $p = .091$ . More importantly, the Nostalgia  $\times$  Age interaction effect on eudaimonic wellbeing was not significant,  $F(1, 105) = 0.01$ ,  $p = .914$ ,  $\eta^2 = .0001$ . Supporting its generality, the conditional simple effect of nostalgia on eudaimonic wellbeing was significant at the 25th,  $F(1, 105) = 4.04$ ,  $p = .047$ , 50th,  $F(1, 105) = 5.95$ ,  $p = .017$ , and 75th,  $F(1, 105) = 5.62$ ,  $p = .019$  age percentile.

The main effects of nostalgia on, respectively, social connectedness, self-continuity, and eudaimonic wellbeing are represented as zero-order correlations in the first column of Table 1. This table further shows that social connectedness was significantly correlated with self-continuity, and that both social connectedness and self-continuity were significantly correlated with eudaimonic wellbeing. Older (compared to younger) participants experienced more social connectedness ( $r[110] = .20$ ,  $p = .042$ ) and more self-continuity ( $r[110] = .18$ ,  $p = .057$ ). However, controlling for gender and age did not alter the above-described pattern of zero-order correlations (Table 1, above diagonal). These findings set the stage for testing the mediational model depicted in Figure 1.

**Mediational analyses.** We estimated the Figure 1 model with AMOS. We calculated bias corrected 95% bootstrap CIs and bootstrap standard errors for direct and indirect effects. We present tests of direct and indirect effects in Table 2. All but one direct effect (i.e., paths in Figure 1) were significant. Nostalgia increased social connectedness (path a) and self-continuity (above and beyond social connectedness; path b), and did not significantly increase eudaimonic wellbeing (above and beyond social connectedness and self-continuity; path c). Social connectedness predicted increased self-continuity (above and beyond nostalgia; path d), and also predicted increased eudaimonic wellbeing (above and beyond nostalgia and self-continuity; path e). Finally, self-continuity predicted increased eudaimonic wellbeing (above and beyond nostalgia and social connectedness; path f).

In addition to these direct effects, all indirect effects in Figure 1 were significant. Consistent with preceding evidence that the link between nostalgia and self-continuity is mediated by social connectedness, there was an indirect effect of nostalgia on self-continuity via social connectedness (path a \* path d). Relevant to the link between nostalgia and eudaimonic wellbeing, there was a significant total indirect effect of nostalgia on eudaimonic wellbeing via social connectedness and self-continuity. This total indirect effect was partitioned into a significant indirect effect via social connectedness (a \* e) and a significant indirect effect via self-continuity. The indirect effect via self-continuity, in turn, was partitioned into a significant indirect effect that was independent of social connectedness (b \* f) and a significant indirect effect that was mediated by social connectedness (a \* d \* f). The latter indirect effect (a \* d \* f) provides further evidence for the postulated extended causal sequence leading from nostalgia to social connectedness to self-continuity to eudaimonic wellbeing.

We proceeded to trim the nonsignificant direct path from nostalgia to eudaimonic wellbeing and then calculate fit indices for the resultant nonsaturated model using AMOS (Figure 1, minus path

Table 1  
Zero-Order and Partial Correlations in Experiment 6

Measure	1	2	3	4
1. Nostalgia manipulation	—	.20*	.33***	.23*
2. Social connectedness	.20*	—	.67***	.72***
3. Self-continuity	.34***	.68***	—	.64***
4. Wellbeing	.25**	.73***	.65***	—

Note. The nostalgia manipulation was coded  $-1 =$  control,  $1 =$  nostalgia. Correlations below the diagonal are zero-order correlations ( $n = 110$ ). Correlations above the diagonal are partial correlations, controlling for gender and age ( $n = 109$ ).

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

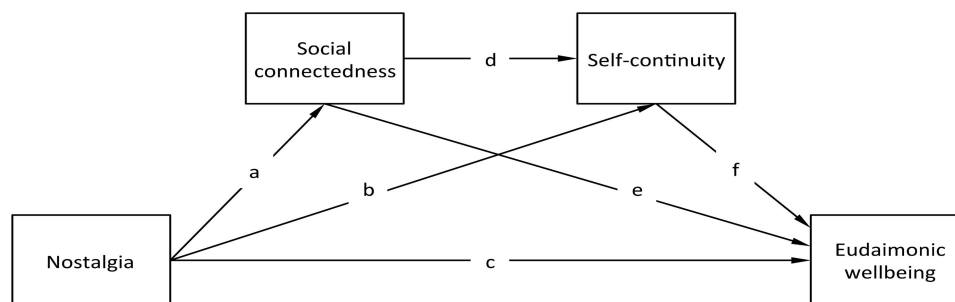


Figure 1. Mediation model tested in Experiment 6.

c). This model provided extremely good fit:  $\chi^2(1, N = 110) = 0.75, p = .387, SRMSR = .02, RMSEA = .00, CFI = 1.00$ . Thus, Experiment 6 revealed a *total* effect of nostalgia on social connectedness, self-continuity, and eudaimonic wellbeing (see Table 1). Additionally, we found support for a model in which nostalgia exerted an *indirect* effect on eudaimonic wellbeing via social connectedness and concomitant self-continuity.<sup>3</sup>

**Supplementary analyses: Does self-continuity moderate the effect of nostalgia on eudaimonic wellbeing?** Iyer and Jetten (2011) proposed and found that, rather than mediating the beneficial effect of nostalgia on various outcomes linked to wellbeing, self-continuity acts as a moderator, such that nostalgia strengthens those outcomes when self-continuity is high but weakens them when self-continuity is low. Specifically, Iyer and Jetten (Studies 2–3) manipulated nostalgia and self-continuity and then measured perceived academic obstacles, excitement about being at university, sadness about being at university, interest in new opportunities, and interest in familiar opportunities. In a longitudinal investigation (Study 1), these authors assessed nostalgia and self-continuity and then measured perceived academic obstacles and satisfaction with life (an index of hedonic wellbeing) over time.

To examine the possibility that self-continuity moderates the beneficial effect of nostalgia on eudaimonic wellbeing, we tested the Nostalgia  $\times$  Self-Continuity interaction effect on eudaimonic wellbeing (controlling for its constituent main effects and for social connectedness). The Nostalgia  $\times$  Self-Continuity interaction effect was not significant,  $B = 0.095, SE = 0.071, 95\% CI [-0.047, 0.236], F(1, 106) = 1.77, p = .186$ .<sup>4</sup> Self-continuity mediated, but did not moderate, the beneficial effect of nostalgia on eudaimonic wellbeing.

## General Discussion

Nostalgia functions to fortify the self-system and confer wellbeing benefits. We tested this general proposition, examining empirically the notions that nostalgia fosters self-continuity and eudaimonic wellbeing by increasing social connectedness. We relied on a converging operations approach (Campbell & Fiske, 1959) to nostalgia (varying experimental manipulations and manipulation check assessments), on samples from multiple cultures, and on samples collected in differing settings. Our aim was to test a causal chain (Spencer et al., 2005), namely: nostalgia  $\Rightarrow$  social connectedness  $\Rightarrow$  self-continuity  $\Rightarrow$  eudaimonic wellbeing.

## Summary of Findings

The construct of self-continuity has a long history in philosophy (Parfit, 1971) and psychology (James, 1890). It is considered essential for identity or one's selfhood, as it synthesizes or integrates diverse past experiences to provide the sense of sameness (Atchley, 1989). Self-continuity is a defining feature of the human self (Breakwell, 1986), with some authors describing its attainment as a human imperative (Vignoles, 2011). At first blush one might not think of the propensity to reflect nostalgically on days gone by to be an effective catalyst toward the experience of self-continuity. Yet prior work suggests that it is (Sedikides, Wildschut, Routledge, & Arndt, 2015; Sedikides, Wildschut, Gaertner, Routledge, & Arndt, 2008). In the present research, we asked how nostalgia

<sup>3</sup> We tested an alternative model in which eudaimonic wellbeing preceded social connectedness and self-continuity in the postulated causal sequence. This model was analogous to the original model (Figure 1, minus path c) but with eudaimonic wellbeing in the place of social connectedness, social connectedness in the place of self-continuity, and self-continuity in the place of eudaimonic wellbeing. We calculated fit indices for this alternative model in AMOS. This model provided marginal fit:  $\chi^2(1, N = 110) = 6.86, p = .009, SRMSR = .05, RMSEA = .23, CFI = .97$ . Within a set of models for the same data, the Akaike Information Criterion (AIC; Akaike, 1974) can be used to compare competing models that need not be nested. The model with the smallest AIC value is considered the best fitting model. For the alternative model, we found AIC = 24.86. By comparison, for the original model, we found AIC = 18.75. Note that the fit statistics for the alternative model are identical to those for a second alternative model, in which eudaimonic wellbeing follows social connectedness but precedes self-continuity. The reason for this is that the two alternative models differ only in the direction of the link between social connectedness and eudaimonic wellbeing but are otherwise identical. Any two models that have the same paths between the same variables will have the same fit, even if some paths are in a different direction. We conclude that the original model is preferable to alternative models in which vitality precedes social connectedness and/or self-continuity.

<sup>4</sup> The fact that, in the preceding analyses, self-continuity mediated the effect of nostalgia on eudaimonic wellbeing may raise the question whether it is appropriate, in the present analysis, to treat self-continuity as a moderator of said effect. It is therefore important to note that, in a moderation analysis, the independent variable and the moderator need not be orthogonal (i.e., uncorrelated). Hayes's (2013) Model 4 describes a situation in which the same variable operates simultaneously as mediator and as moderator. This model is analogous to the one we tested. Specifically, the dependent variable (in our case, eudaimonic wellbeing) is regressed on the independent variable (nostalgia), the mediator (self-continuity), and the interaction between the independent variable and the mediator (Nostalgia  $\times$  Self-Continuity). The latter effect tests for moderation.

Table 2  
*Tests of Direct and Indirect Effects in Mediation Model of Experiment 6*

Effect	Figure 1 path	Coeff.	SE	95% CI	
				LL	UL
Direct effects					
Nostalgia $\Rightarrow$ Social connectedness	a	.233*	.109	.015	.439
Nostalgia $\Rightarrow$ Self-continuity	b	.196*	.065	.067	.326
Nostalgia $\Rightarrow$ Wellbeing	c	.057	.071	-.077	.201
Social connectedness $\Rightarrow$ Self-continuity	d	.514*	.055	.401	.619
Social connectedness $\Rightarrow$ Wellbeing	e	.450*	.076	.301	.600
Self-continuity $\Rightarrow$ Wellbeing	f	.276*	.081	.121	.440
Indirect effect: Nostalgia $\Rightarrow$ Self-continuity					
Via social connectedness	a * d	.120*	.060	.010	.250
Indirect effect: Nostalgia $\Rightarrow$ Wellbeing					
Total		.192*	.073	.058	.344
Via social connectedness	a * e	.105*	.055	.009	.226
Via self-continuity		.087*	.034	.035	.175
Independent of social connectedness	b * f	.054*	.023	.019	.112
Mediated by social connectedness	a * d * f	.033*	.020	.004	.086

Note. CI = confidence interval; Coeff. = unstandardized path coefficient;  $n = 110$ .

\*  $p < .05$ .

fosters self-continuity and what the wellbeing implications of this process are. We expected nostalgia to be associated with, and foster, higher self-continuity (Davis, 1979). We obtained confirmatory evidence (Experiments 1–3, 6), replicating prior findings (Sedikides, Wildschut, Routledge, & Arndt, 2015). Nostalgizing imbues the self-system with self-continuity.

We also asked how nostalgia elicits self-continuity. A prominent function (out of several) that nostalgia serves is social connectedness (Sedikides, Wildschut, Routledge, Arndt et al., 2015). Nostalgic narratives enliven important figures or social relationships, while the content of these narratives reflects crucial links between past and present selves and highlights one's life trajectory through reflected appraisal, social inclusion, and relational self processes. On this basis, we expected that social connectedness would mediate the effect of nostalgia on self-continuity (Hypothesis 1). A combination of measurement-of-mediation and experimental-causal-chain approaches (Experiments 1–4, 6) lent support to the hypothesis. These findings build on those of Sedikides, Wildschut, Routledge, and Arndt (2015, Studies 3–4) by pinpointing the relational content of nostalgic memories as a core means by which they enhance self-continuity. It will be useful to explore further whether this happens via semantic processes (e.g., activating self-attributes that derive from reflected appraisal or social inclusion; Aron & Nardone, 2012; Wallace & Tice, 2012) or episodic processes (e.g., activating memories of related sociocultural rituals across time; Berntsen & Rubin, 2004). Sedikides, Wildschut, Routledge, and Arndt (2015, Studies 1–2) also found that nostalgia was triggered by experiences of negative discontinuity (e.g., stressful life changes), consistent with other evidence that nostalgia serves a homeostatic function (e.g., to counteract loneliness or existential anxiety; Routledge, Arndt, Sedikides, & Wildschut, 2008; Zhou et al., 2008). Future studies could examine whether in times of discontinuity people especially recruit nostalgic memories of close others (as opposed to places or personal achievements, e.g.) in order to restore self-continuity. Overall, "peopling" the mind with nostalgic memories of close others helps to weave a sense of connection between one's past and present.

Finally, we wondered about the downstream implications of the effect of nostalgia (via social connectedness) on self-continuity. Taking off from the hedonic wellbeing (Chandler et al., 2003) and existential equanimity (Landau et al., 2009) benefits of self-continuity, we proposed Hypothesis 2. According to this, nostalgia fosters self-continuity by augmenting social connectedness. Self-continuity, in turn, confers eudaimonic wellbeing (i.e., subjective vitality). A combination of an experimental-causal-chain and measurement-of-mediation approaches (Experiment 5–6) yielded support to the hypothesis. These findings extend the aforementioned benefits of self-continuity to a new aspect of wellbeing. That is, when people perceive consistency between their past and present they feel alive and vital—a key marker of human actualization (Ryan & Deci, 2001). The findings also add to the body of evidence on the psychological significance of nostalgia. Past research has often found nostalgia to boost positive affect—an indicator of hedonic wellbeing (Hepper et al., 2012; Verplanken, 2012; Wildschut et al., 2006). However, nostalgia is a complex and bittersweet emotion (Sedikides & Wildschut, in press) that also entails traces of negative affect (Hepper et al., 2012; Stephan et al., 2012; Wildschut et al., 2006), and so its function is unlikely to center around hedonic pleasure. The eudaimonic perspective on wellbeing focuses not on pleasure but on realizing one's true potential across key aspects of life, which allows one to feel "intensely alive and authentic" (Ryan & Deci, 2001, p. 146). Researchers have found that people report a sense of authenticity associated with their nostalgic recollections (Baldwin & Landau, 2014; Stephan et al., 2012), and the present results suggest that nostalgia, by increasing social connectedness and self-continuity, promotes subjective vitality. Together, the evidence points to nostalgia serving to foster eudaimonic (as opposed to hedonic) wellbeing.

The reported studies involved mostly experimental but also correlational methods, tested female and male university students and community members of varying ages, and included participants from four countries (China, The Netherlands, U.K., U.S.). Nostalgia fostered self-continuity through social connectedness,



and, by so doing, conferred eudaimonic wellbeing. Nostalgia promotes the vitality of the self-system by nurturing self-continuity.

Whereas the direction of the effect of nostalgia on self-continuity was consistent across studies, its magnitude varied. Specifically, the effect size in Experiment 1 ( $\eta^2 = .40$ ) was considerably larger than the more homogenous effect sizes in Experiment 2 (overall  $\eta^2 = .04$ ; U.K. sample  $\eta^2 = .06$ ; Chinese sample  $\eta^2 = .01$ ), Experiment 3 ( $\eta^2 = .19$ ), and Experiment 6 ( $\eta^2 = .11$ ). We attribute this to the fact that, whereas Experiments 2, 3, and 6 implemented the Event Reflection Task (Sedikides, Wildschut, Routledge, Arndt et al., 2015) to induce nostalgia, Experiment 1 used song lyrics. Manipulation check results from Experiments 1–3 (Experiment 6 used a different manipulation check) are consistent with the possibility that the song-lyrics induction is more potent than the Event Reflection Task (effect sizes:  $\eta^2 = .55$ ,  $\eta^2 = .04$  [U.K. sample  $\eta^2 = .01$ ; Chinese sample  $\eta^2 = .05$ ], and  $\eta^2 = .26$ , respectively).

### Implications for Future Research

Our research has at least four sets of implications. The first refers to more refined testing of the two hypotheses. The second concerns individual differences both in nostalgia proneness and in self-continuity. The third implication pertains to different forms of continuity: collective continuity and future continuity. The final implication involves practical applications.

**More refined tests of the hypotheses.** Hypothesis 1 posited mediation by social connectedness of the effect of nostalgia on self-continuity. The mediational status of social connectedness was supported. In addition, experimental evidence affirmed the causal impact of social connectedness on self-continuity (Experiment 4). Nevertheless, the evidence, albeit consistent with the idea that social connectedness mediates the effect of nostalgia on self-continuity, does not necessarily rule out an alternative sequence—that self-continuity also mediates the effect of nostalgia on social connectedness (Bullock et al., 2010; Fiedler et al., 2011). Testing the reciprocal causal relation between social connectedness and self-continuity (path d in Figure 1) is a priority for future investigations. Moreover, in several studies, the indirect effects were unexpectedly accompanied by a remaining significant nostalgia  $\Rightarrow$  self-continuity direct effect. Therefore nostalgia may also boost self-continuity via another mechanism(s). Meaning in life is a viable candidate. Nostalgic recollections refer to personally relevant events from one's past—events imbued with meaning. Nostalgizing indeed increases perceptions of life as meaningful (Routledge et al., 2011, 2012). Meaning may constitute the proverbial glue that links events from one's life to each other all the way to the present. Alternatively, nostalgic memories (regardless of their social or nonsocial content) might alter one's perception of time and thereby self-continuity by bringing the past psychologically closer. This might occur via the vivid concrete memory linking past to present (Stephan et al., 2012) or by motivated cognitions serving to bring a desired past self closer (Ross & Wilson, 2002). Thus, it may be that nostalgia not only enhances self-continuity through connectedness, but that these other influences of nostalgia result in self-continuity, which in turn feeds back to boost social connectedness. Indeed, it seems quite possible that dynamic variables such as self-continuity, social connectedness, and meaning

would have reciprocal and rippling implications across the psychological system.

Hypothesis 2 pertained to the eudaimonic wellbeing implications of nostalgia-induced self-continuity. Future research would do well to extend these implications to broader indices of eudaimonic wellbeing (e.g., gratitude, compassion), to indices of hedonic wellbeing (e.g., depression, anxiety, satisfaction with life), to exploration and creativity, as well as integration with one's socio-cultural context. Emerging findings implicate a pivotal role of nostalgia in outcomes such as inspiration (Stephan et al., 2015), and hence understanding the extent to which self-continuity contributes to such outcomes would clarify how nostalgia may be a springboard to growth and enrichment. Extensions to physical health would also broaden the scope of Hypothesis 2, especially given emerging evidence for the link between psychological adjustment and cardiovascular health (Boehm & Kubzansky, 2012) and between psychological adjustment and physical activity, abstinence from tobacco, and compliance with prescribed medications (Ng et al., 2012).

**Individual differences.** Nostalgia had a beneficial influence on eudaimonic wellbeing (through self-continuity). However, nostalgia may not be equally beneficial to all. Verplanken (2012) reported that individuals who habitually worry (compared to those who do so rarely) experienced positive affect (an index of hedonic wellbeing) immediately following nostalgia induction, but showed symptoms of depressive affect and anxiety soon thereafter. It is possible that these negative delayed symptoms may have been due to lower (rather than higher) self-continuity. That is, deeper or prolonged nostalgic reflection may decrease the perception of self-continuity among habitual worriers.

Iyer and Jetten's (2011) research also speaks to this issue in finding that self-continuity moderates the beneficial influence of nostalgia on wellbeing-related outcomes. However, this research was more pertinent to homesickness (i.e., the extent to which homesick first-year college students wished they were back in high school) than nostalgia. Homesickness is a different emotion, referring to adjustment challenges (e.g., separation anxiety) that are associated with young individuals' transitions away from the home environment. Indeed, the homesickness literature has been following its own trajectory independently of the nostalgia literature (Hendrickson, Rosen, & Aune, 2011; Kerns, Brumariu, & Abraham, 2008; Thurber & Walton, 2007). Also, Iyer and Jetten defined self-continuity as social-identity continuity, namely "the extent to which students maintained their group membership from their home community during the transition to university" (p. 97; Study 1) or the extent to which students maintained links with their home communities (Studies 2–3). When we tested Iyer and Jetten's moderational argument in the context of our research, we found no support for it. Regardless, the overall issue, that nostalgia may not be beneficial for all, is worthy of further empirical scrutiny.

**Forms of continuity.** We focused in this article on continuity of the individual self. Highly relevant is continuity of the collective or group self (Sani, Bowe, & Herrera, 2008). For example, collective continuity is associated with wellbeing, physical health, and harmonious intergroup dynamics (Haslam, Jetten, Postmes, & Haslam, 2009). It would be timely to explore the role of collective nostalgia (i.e., nostalgia about shared group experiences; Wild-

schut, Bruder, Robertson, Van Tilburg, & Sedikides, 2014) as a precursor of collective continuity.

Nostalgia impacts continuity between past and present, but may also impact continuity between one's present and one's future (Peetz & Wilson, 2008), given that nostalgia is an approach- or growth-oriented emotion (Baldwin & Landau, 2014; Stephan et al., 2014). Future continuity has been shown to predict longevity among older adults (Fry & Debats, 2011) and also higher accumulation of financial assets (Ersner-Hersfield, Garton, Ballard, Samanez-Larkin, & Knutson, 2009). It would be fitting to explore (at the individual-self or collective-self level) whether nostalgia also elicits this form of continuity, with its ensuing physical-health and monetary benefits.

**Practical applications.** The current findings have interventional potential. Nostalgia, for example, could be induced in various settings (e.g., nursing homes, hospitals, prisons) with the aim to strengthen self-continuity, thus conferring wellbeing or adjustment (and perhaps even physical health) benefits. Prescreening would ensure that individuals unlikely to profit from nostalgia (e.g., habitual worriers) received an alternative treatment. Nostalgia-based interventions may be particularly useful for persons facing life stressors or transitions that threaten to undermine self-continuity and increase discontinuity (e.g., going off to university, job loss, divorce, death of a spouse).

The current findings also suggest that nostalgia has potential use in interventions aimed at increasing physical activity and ultimately health. Abeyta and Routledge (in press) found that, starting around the age of 40, nostalgia decreases subjective age (how old one feels) and increases perceptions of youthfulness. Further, nostalgia-induced youthfulness predicts positive perceptions of physical health, confidence about one's physical abilities, and optimism regarding one's future health. These effects may result from nostalgia making middle and older-aged adults feel connected to their younger selves. Might integrating nostalgia into exercise programs and physical rehabilitation therapies promote compliance and persistence? Future work should consider this possibility as it is widely recognized that physical activity benefits psychological and physical health.

These proposed practical implications raise a legitimate question concerning the longevity of nostalgia's beneficial effects. We demonstrated that a single nostalgic recollection increased momentarily eudaimonic wellbeing via self-continuity. But can nostalgia effect long-term benefits? Relevant to this question, Fleeson (2001) conceptualized traits as density distributions of states. The vital implication of his perspective is that, across time, repeated brief episodes of nostalgia can increase the central tendency of one's eudaimonic wellbeing distribution. Indeed, if one can harvest even a single recollection repeatedly throughout life to (re)generate psychological benefits, the positive consequences of nostalgia can last for a lifetime. This may be what Dostoyevsky (1880/2007, p. 868) had in mind when he wrote, in *The Brothers Karamozov*: "If a man carries many such memories with him into life, he is safe to the end of his days, and if one has only one good memory left in one's heart, even that may sometime be the means of saving us."

## Coda

Nostalgia is a self-relevant, predominantly positive, and social emotion that is experienced by everyone and can serve vital psychological functions. The present research demonstrated one

such function. Nostalgia fosters social connectedness, which, via increases in self-continuity, promotes eudaimonic wellbeing.

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