



# Can Good Memories of the Past Instill Happiness? Nostalgia Improves Subjective Well-Being by Increasing Gratitude

Bin Li<sup>1,2,3</sup> · Qin Zhu<sup>2</sup> · Aimei Li<sup>2</sup> · Rubo Cui<sup>2</sup>

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## Abstract

The positive effect of nostalgia provides an effective way to improve subjective well-being. However, there is little research on the relationship between nostalgia and subjective well-being, especially the mechanism of this link. This study tested the positive effects of nostalgia on emotional well-being (positive affect and negative affect) and cognitive well-being (satisfaction with life) via gratitude. Two experiments were conducted in samples of young adults who were randomized to experimental or control conditions. The analyses involved group comparisons as well as regression-based analyses of mediation. In Experiment 1 ( $N=196$ ), we induced nostalgia using a guided autobiographical recall procedure. The nostalgia group had higher positive affect and gratitude, and gratitude partially mediated the association between nostalgia and positive affect. In Experiment 2 ( $N=102$ ), we induced nostalgia by showing a nostalgic video from the period when the participants were children. The nostalgia group had higher positive affect and lower negative affect, and gratitude partially mediated these associations. The findings suggest that nostalgia could improve emotional well-being by increasing gratitude, but may not alter cognitive well-being.

**Keywords** Nostalgia · Subjective well-being · Gratitude · Emotional well-being · Cognitive well-being

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✉ Bin Li  
bingoli@jnu.edu.cn

✉ Aimei Li  
tliaim@jnu.edu.cn

<sup>1</sup> Institute for Enterprise Development, Jinan University, Guangzhou 510632, China

<sup>2</sup> School of Management, Jinan University, Guangzhou 510632, China

<sup>3</sup> Research Institute on Brand Innovation and Development of Guangzhou, Guangzhou 510632, China

## 1 Introduction

As the forefront topic in positive psychology, how to improve individuals' subjective well-being has been widely discussed (Anglim et al., 2020; Diener et al., 2018; Song & Gao, 2020). Research suggests that emotional experiences are essential components of subjective well-being (Diener & Emmons, 1984), and nostalgia, as a reservoir of positive emotions (Wildschut et al., 2006), is intrinsically associated with subjective well-being (Cox et al., 2015; Hepper et al., 2021; Routledge et al., 2013; Sedikides et al., 2016). Nostalgia can facilitate social connection and alleviate loneliness (Polletta & Callahan, 2017), which is also one of the primary coping mechanisms applied despite chronic isolation, fear, and widespread deprivation of freedom (Lee & Kao, 2021). When individuals experience nostalgia, they typically bring back reflections of experiences with close people, or of significant events such as the weddings and family reunions (Wildschut et al., 2006, 2011). Memories over past events (i.e., nostalgia) can be considered important assets in one's life, which makes it easier for individuals to find meaning and increase their satisfaction with life (Webster et al., 2010).

Gratitude, as a typical positive trait and positive emotional experience, is one of the key components of Positive Psychology. Positive Psychology focuses on human' positive traits and self-value, and gratitude is a subjective positive emotion elicited from positive experiences (Bono & Froh, 2009; Froh et al., 2011). Studies have examined the positive effects of state gratitude on the increased well-being (Algoe et al., 2010; Kong et al., 2021; Nezlek et al., 2017, 2019; Sztachańska et al., 2019; Zygarr et al., 2018). State gratitude is associated with higher optimism, greater satisfaction with life, more pro-social behavior, higher social support, and lower negative emotions (Froh et al., 2008). Additionally, when facing upward social comparisons, individuals with high levels of state gratitude are likely to adopt strategies of greater positivity, thereby suppressing negative emotions such as envy (Mao et al., 2021). As such, gratitude is important for the experience of happiness (Watkins et al., 2018). However, few scholars have proposed whether the temporary evocation of gratitude in daily life is still exerted on well-being positively? It also lacks some discussion on how nostalgia works on subjective well-being, does nostalgia alleviate negative emotions effectively, and how come it can increase positive affect remains unclear (Rao et al., 2018). Moreover, there is a paradox in the relationship between nostalgia and negative affect in existing studies (Holak & Havlena, 1998; Leunissen et al., 2021; Wildschut et al., 2006).

To tackle above issues, this study examined state gratitude as the mechanism by which nostalgia affects subjective well-being. First, we tested whether nostalgia has positive effects on subjective well-being, which is defined in terms of emotional well-being (higher positive affect and lower negative affect) and cognitive well-being (satisfaction with life). Focusing on the distinction between the emotional and cognitive aspects of subjective well-being, we delved into how nostalgia increases subjective well-being. Second, we tested the mediation effect of state gratitude on the relationship between nostalgia and SWB, which broadened and deepened our understanding of how nostalgia affects subjective well-being, as well as enriched the studies on the influencing factors of state gratitude and its impact on well-being.

## 2 Literature Review and Hypothesis

### 2.1 The concept and Phenomenon of Nostalgia

The word nostalgia originated from the combination of *nostoc* (returning home) and *algos* (pain) in Greek, which literally means the pain caused by homesickness and was initially regarded as a psychiatric disorder with symptoms of anxiety, sadness, and insomnia (Sedikides et al., 2008). Gradually, nostalgia has become a universal experience: It concerns all persons, regardless of age, gender, social class, ethnicity, or other social groupings (Sedikides et al., 2004). Studies of college students have shown that 79% of participants experience nostalgia at least once a week (Wildschut et al., 2006). Nostalgia is generally triggered by external stimuli associated with the past. These can be social or nonsocial stimuli (Holak & Havlena, 1998; Holbrook, 1993). Examples of social stimuli include friends, family members, social events such as birthdays and reunions, and major life events such as getting married. Nonsocial stimuli include examples such as music, smells, and coldness (Wildschut et al., 2006; Zhou et al., 2008) as well as adverse weather (Van Tilburg et al., 2019).

Nostalgia is a complex emotion. Some researchers have regarded nostalgia as a positive emotional experience (Holak & Havlena, 1998; Pascal et al., 2002; Wildschut et al., 2006). However, some other scholars believe that nostalgia is a negative and painful emotion (Holbrook & Schindler, 1991; Sedikides et al., 2006). Additionally, some scholars have synthesized and defined nostalgia as a bittersweet emotion (Barrett et al., 2010; Merchant et al., 2013; Werman, 1977), which means that when experiencing nostalgia, individuals may feel happy or slightly sad (Hepper et al., 2012). Davalos et al. (2015) also reported that the emotions expressed in Facebook conversations tend toward the positive and often contain mixed emotions, which is consistent with the bittersweet nature frequently discussed and debated in the nostalgia literature. When experiencing nostalgia, individuals usually recall significant others or events in their lives as protagonists, indicating that nostalgia is an emotional experience related to the self and significant others (Wildschut et al., 2006).

### 2.2 Nostalgia and Subjective Well-being

Nostalgia is an important resource for maintaining and promoting individuals' physical and psychological health. For example, nostalgia can not only alleviate some of the physiological pain caused by cold water (Zhou et al., 2012a, 2012b), it can also buffer the perceived threat of mortality (Sedikides & Wildschut, 2018), promote social connection and positive self-regard (Wildschut et al., 2006). Nostalgia is also positively associated with self-continuity (Sedikides et al., 2008), prosocial behavior (Zhou et al., 2012a, 2012b), and existential meaning (Routledge et al., 2012). Besides, it is helpfully strengthening individuals' intrinsic motivation and work effort (Van Dijke et al., 2019).

Subjective well-being is a comprehensive psychological construct that refers to personal quality of life. It is thought to include two essential components: emotional experience and life satisfaction (Diener et al., 1999). The former refers to the emotional experience of life events, including positive emotions (e.g., pleasure, ease, etc.) and negative emotions (e.g., depression, anxiety, etc.); the latter refers to the cognitive evaluation of the overall quality of life—that is, a judgment of one's personal life on the whole (Li et al., 2016). Subjective well-being is characterized by more positive emotions, fewer negative emotions, and a relatively high sense of life satisfaction. Positive and negative affect are independent

factors (Diener & Emmons, 1984), which means that individuals' scores on positive emotions do not necessarily indicate their scores on negative emotions, and vice versa, thus, nostalgia may affect on them differently. Life satisfaction is a crucial indicator of subjective well-being and as a cognitive factor that is independent of positive and negative emotions (Diener, 2000).

Previous studies explored the relationship between nostalgia and positive affect or satisfaction with life separately (Cox et al., 2015; Leunissen et al., 2021; Wildschut et al., 2006; Ye et al., 2018). In this study, we operationalized nostalgia as the arousal of positive memories and explored its different effects on the components of subjective well-being (including positive affect, negative affect and satisfaction with life). In the nostalgic condition, individuals may experience an increase in positive emotions such as warmth, relief and satisfaction by recalling past events, and they may also experience an alleviation of negative emotions such as anxiety. Additionally, the nostalgic positive evaluation of the past is based in part on the evaluation of the current situation (Davis, 1979); by comparing the present with the past, individuals may evaluate their current life more positively. Therefore, we hypothesized that:

**H1** Nostalgia will increase individuals' subjective well-being. Specifically, nostalgia will increase positive affect (H1a), decrease negative affect (H1b), and increase satisfaction with life (H1c).

### 2.3 Gratitude as Mediator Between Nostalgia and Subjective Well-being

Gratitude is defined as an individual's positive emotional response to others' assistance and kindness (Grant & Gino, 2010; McCullough et al., 2001; Spence et al., 2014; Tsang, 2006), which includes trait gratitude and state gratitude. State gratitude is a positive emotion of short duration and can change dramatically (Emmons & McCullough, 2003; McCullough et al., 2004). It is generally activated by specific events or circumstances referring to the receipt of material or non-material assistance from others in everyday life and work (McCullough et al., 2001). Research on gratitude suggests that receiving gifts or assistance from others stimulates the feelings of gratitude (Emmons & Crumpler, 2000; Grant & Gino, 2010; McCullough et al., 2001, 2008; Tsang, 2006). Nostalgia is primarily a positive, self-relevant social emotion (Hepper et al., 2012; Sedikides et al., 2008), whose principal source is the recollection of significant life events, generally involving fond and personally meaningful memories of childhood or intimate relationships (Hepper et al., 2012). When individuals experience nostalgia, they typically recall past experiences with close associates, such as friends and family, or significant events like weddings and family reunions (Wildschut et al., 2006, 2011). These specific memories concerning interactions with others tend to be more positive and able to recall back to those good times (Evans et al., 2021). State gratitude is an emotion connected with social interactions, often induced by interventions (Dickens, 2017; Sedikides & Wildschut, 2020; Sedikides et al., 2015), hence when individuals recall past events, they probably think of the assistance and support received from significant others, which leads them to a sense of gratitude for what they have (Puente-Díaz & Cavazos-Arroyo, 2021).

Therefore, we hypothesized that:

**H2** Nostalgia will increase individuals' gratitude.

Studies have shown that state gratitude enables individuals to better cope with incidents and regulate their behavior, which in turn leads to a better understanding of well-being (McCullough et al., 2001). Many studies on subjective well-being have been based on the theory of happiness, which maintains that overall well-being involves the pursuit of happiness and subjective well-being (including high positive emotions, low negative emotions, high life satisfaction and avoidance of pain) (Li et al., 2022). It is demonstrated that state gratitude interacts with high and low arousal-positive emotions (McCullough et al., 2008) and can affect subjective well-being by boosting positive experiences and buffering negative affects (Nelson, 2009; Ouweneel et al., 2014). Interventions that encourage participants to reflect on gratitude for a person, an object, or a particular moment contribute to increased subjective well-being, greater life satisfaction, the feeling of optimism and self-esteem, as well as reduced negative affect (Emmons & McCullough, 2003; Froh et al., 2008; Rash et al., 2011). For example, interventions to induce gratitude could aid older adults and patients in alleviating anxiety and depression symptoms, improving mental health and maintaining relational well-being (Cregg & Cheavens, 2021; Dickens, 2017; Emmons & McCullough, 2003). Bohlmeijer et al. (2021) revealed that long-term practices of gratitude interventions did increase well-being, despite failure to reduce distress. Bohlmeijer et al. (2021) revealed that long-term practices of gratitude interventions did increase well-being, despite failure to reduce distress. Giving even brief gratitude interventions, such as meditating or memorizing previous positive experiences for a few sustained minutes, helped improve immediate mood (Emmons & McCullough, 2003; Watkins et al., 2003; Wood et al., 2010).

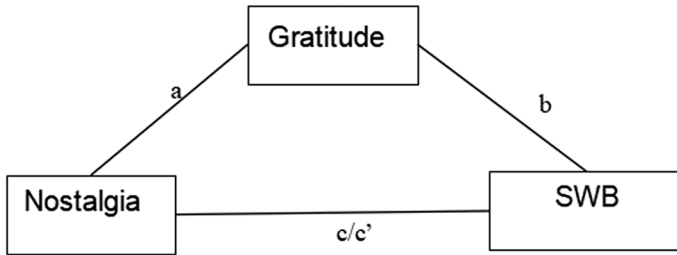
Thus, we hypothesized that:

**H3** Gratitude will mediate the relationship between nostalgia and subjective well-being. Specifically, nostalgia will increase individuals' positive affect (H3a), decrease negative affect (H3b), and increase satisfaction with life (H3c) through gratitude.

We conducted two experiments. All participants in the current study provided informed consent. The participants were informed that they had the right to withdraw from the study at any time without penalty. They were also told that their responses would be kept confidential. In Experiment 1, we induced nostalgia with a guided autobiographical recall procedure to test whether nostalgia had a causal effect on subjective well-being. Subjective well-being was defined as emotional well-being (positive affect and negative affect) and cognitive well-being (satisfaction with life). Self-reported gratitude was tested as a mediator of the association between nostalgia and these two aspects of subjective well-being. Experiment 2 was conducted to replicate the results of Experiment 1 using a different induction method, namely, a nostalgic video. The full model is presented in Fig. 1.

### 3 Experiment 1

In Experiment 1, we manipulated nostalgia by using the classic paradigm in which participants randomized to recall a nostalgic memory (nostalgia condition) or an ordinary memory (control condition) from their past (Routledge et al., 2011; Wildschut et al., 2006). The effects of nostalgia on gratitude and subjective well-being were then measured. We tested the hypotheses that nostalgia improves both emotional well-being and cognitive well-being and that these effects are mediated by gratitude.



**Fig. 1** A schematic representation of the full model. SWB=subjective well-being. The model specifies a direct positive effect of nostalgia on SWB (path  $c$ ) and a positive indirect effect of nostalgia on SWB via gratitude (path  $ab$ ). The indirect effect consists of a positive effect of nostalgia on gratitude (path  $a$ ) and a positive effect of gratitude on SWB (path  $b$ ). Paths  $c'$  denote partial effects of nostalgia on SWB when gratitude is introduced as a mediator

### 3.1 Method

#### 3.1.1 Participants and Design

Participants were 196 Chinese undergraduate students from a large public university, ranging in age from 18 to 24 years (140 females,  $M_{age} = 21.74$ ,  $SD_{age} = 1.36$ ). Participants were randomly assigned to one of two conditions (nostalgia vs. control) and they were given a small monetary reward to thank them for their time and effort. Calculated using G\*power, when the total sample size is 196, assuming  $\alpha = 0.005$ ,  $\beta = 0.95$ , the effect size  $f$  for  $F$  tests is 0.26 (medium).

#### 3.1.2 Procedure

**Manipulation.** We induced nostalgia using a recall procedure (Wildschut et al., 2006, see Study 5; see also Routledge et al., 2008; Zhou et al., 2008). In the nostalgia condition, participants read some examples of nostalgia and were asked to bring to mind a nostalgic event in their life: "Specifically, try to think of a past event that makes you feel most nostalgic. Take a few moments to think about the nostalgic event and how it makes you feel." In the control condition, participants read a description of scenic spot and were asked to write down keywords or sentences to briefly reflect on the scenery and their feelings.

**Manipulation check.** Following this instruction, participants were asked to complete a manipulation check (Wildschut et al., 2006) consisting of three items, for example, "Right now, I am feeling quite nostalgic," "Right now, I have nostalgic thoughts," and "I feel nostalgic at the moment" (1 = *strongly disagree*, 6 = *strongly agree*;  $\alpha = 0.912$ ). Attesting to the effectiveness of the manipulation, participants in the nostalgia condition reported feeling more nostalgic than those in the control condition,  $t_{(1, 194)} = 6.711$ ,  $d = 0.966$ .

#### 3.1.3 Materials

**Gratitude.** Gratitude was measured using the self-report Gratitude Schedule (McCullough et al., 2002). Participants were given three gratitude-related adjectives (grateful, thankful,

and appreciative) and asked how accurately each adjective described them (1 = *inaccurate*, 6 = *accurate*). The internal consistency was  $\alpha = 0.955$ .

**Subjective well-being.** Subjective well-being included emotional well-being and cognitive well-being. Emotional well-being was measured by the Revised Positive Affect and Negative Affect Scale (PANAS) (Qiu et al., 2008), which consists of 9 items assessing positive affect (PA; e.g., “interested,” “enthusiastic”;  $\alpha = 0.928$ ) and 9 items assessing negative affect (NA; e.g., “distressed,” “upset”;  $\alpha = 0.877$ ). Participants were instructed to indicate how they felt by rating the PANAS items on a six-point scale (1 = *very slightly or not at all*; 6 = *extremely*). Cognitive well-being was measured by the Satisfaction with Life Scale (SWLS; Diener et al., 1985). All five items are rated on a six-point scale (1 = *strongly disagree*; 6 = *strongly agree*,  $\alpha = 0.631$ ). The SWLS is a widely used and well-validated scale (Pavot & Diener, 1993).

### 3.2 Results

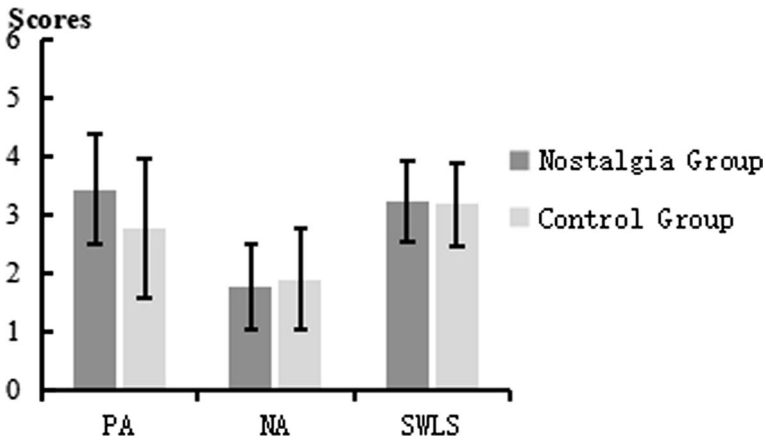
**Group differences.** As expected, participants in the nostalgia condition ( $M = 3.42$ ,  $SD = 0.95$ ) scored significantly higher on the PA index than those in the control condition ( $M = 2.76$ ,  $SD = 1.18$ ),  $F_{(1, 194)} = 18.785$ ,  $p < 0.001$ ,  $\eta^2 = 0.088$ . However, there was no significant group difference for NA ( $M_{\text{nostalgia}} = 1.76$ ,  $SD = 0.73$  vs.  $M_{\text{control}} = 1.88$ ,  $SD = 0.87$ ;  $F_{(1, 194)} = 1.028$ ,  $p = 0.312$ ,  $\eta^2 = 0.005$ ) or SWLS ( $M_{\text{nostalgia}} = 3.22$ ,  $SD = 0.70$  vs.  $M_{\text{control}} = 3.17$ ,  $SD = 0.72$ ,  $F_{(1, 194)} = 0.197$ ,  $p = 0.658$ ,  $\eta^2 = 0.001$ ). Thus, H1a was supported, but not H1b or H1c. See Fig. 2.

**Gratitude.** Participants in the nostalgia condition ( $M = 4.47$ ,  $SD = 1.24$ ) reported significantly more gratitude than those in the control condition ( $M = 3.52$ ,  $SD = 1.51$ ),  $F_{(1, 194)} = 22.879$ ,  $p < 0.001$ ,  $\eta^2 = 0.105$ , which supported H2. Furthermore, gratitude was positively correlated with nostalgia,  $r_{(196)} = 0.61$ ,  $p < 0.001$ , and with PA,  $r_{(196)} = 0.42$ ,  $p < 0.001$ . There was no significant relationship between gratitude and NA,  $r_{(196)} = 0.082$ ,  $p = 0.25$ , or between nostalgia and SWLS,  $r_{(196)} = 0.09$ ,  $p = 0.193$ . These results indicated that gratitude qualified as a potential mediator of the nostalgia effect on PA.

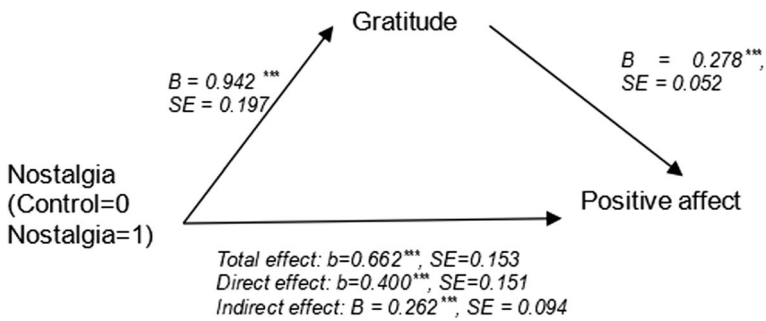
**Gratitude as a mediator.** We used the PROCESS macro in SPSS, Model 4 (Hayes, 2017; Preacher & Hayes, 2004) (5000 bootstrap samples) to test the indirect effect of nostalgia on SWB via gratitude. Group assignment was the independent variable, and was coded as 0 = control, 1 = nostalgia. Nostalgia was significantly positively related to positive affect, and the indirect effect via gratitude was significant:  $B = 0.262$ ,  $SE = 0.094$ , 95% CI [0.106, 0.474]. The mediation effect explained 40% of the variance in the total effect. The conditional direct effect was still significant,  $B = 0.400$ ,  $SE = 0.151$ , 95% CI [0.102, 0.698], which suggests partial mediation. Thus, H3a was partially supported. Nostalgia was not significantly associated with either negative affect ( $B = -0.117$ ,  $SE = 0.115$ , 95% CI [-0.344, 0.110]) or satisfaction with life ( $B = 0.045$ ,  $SE = 0.101$ , 95% CI [-0.155, 0.245]). Thus, H1b and H1c were not supported. See Fig. 3.

### 3.3 Discussion

Experiment 1 provides partial support for our conceptual model. Nostalgia predicted positive affect both directly and indirectly through the partial mediating effect of gratitude. Contrary to expectations, nostalgia not associated with lower negative affect or higher satisfaction with life. Considering the possibility that particular manipulation may effect



**Fig. 2** The PA, NA, and SWLS in Experiment 1. PA=positive affection; NA=negative affection; SWLS=satisfaction with life scale. The vertical bars represent the range of  $\pm 1$  SD. The results show significant group difference for PA, but not for NA and SWLS



**Fig. 3** Mediation of the effect of nostalgia on positive affect by gratitude in Experiment 1. All coefficients are unstandardized. \*\*\* $p < 0.001$

on nostalgia and state gratitude, we used a different paradigm to manipulate nostalgia in Experiment 2.

### 4 Experiment 2

The objective of Experiment 2 was to provide corroborating evidence of the direct salutary effect of nostalgia on subjective well-being, and of the mediating role of gratitude in this association, using a different paradigm to manipulate nostalgia. Nostalgia was induced using a video showing objects from the period corresponding to the participants' childhoods.



## 4.1 Method

### 4.1.1 Participants and Design

We recruited 102 undergraduate students (55.9% female) from a large public university to participate in the experiment. Participants ranged in age from 20 to 24 years ( $M=21.74$ ,  $SD=1.36$ ). They were randomly assigned to the nostalgia condition or the control condition. At the end of the experiment, the participants received a small monetary reward to thank them for their effort. Calculated using G\*power, when the total sample size is 102, assuming  $\alpha=0.005$ ,  $\beta=0.95$ , the effect size  $f$  for  $F$  tests is 0.36 (medium).

### 4.1.2 Procedure and Materials

**Nostalgia manipulation.** In the nostalgia condition, all participants watched a video related to the college students' childhood memories, which included snacks, toys, electronic games and animations from that era when they were children, with corresponding nostalgic music. In the control condition, participants watched a neutral video showing natural landscapes with background music as pure music. To enhance the validity of our study, the duration of both videos was equivalent at 5 min. Screenshots from the videos were showed in Fig. 4.

**Manipulation check.** The three manipulation check items were the same as those in Experiment 1. As expected, participants in the nostalgia condition reported feeling more nostalgic than those in the control condition,  $t_{(1, 100)} = 7.039$ ,  $d = 1.399$ .

**Materials.** The same questionnaires used in Experiment 1 were used in Experiment 2. As in Experiment 1, the measures all showed good internal consistency:  $\alpha=0.941$  for the Gratitude Schedule;  $\alpha=0.925$  for PA;  $\alpha=0.761$  for NA;  $\alpha=0.808$  for SWLS.

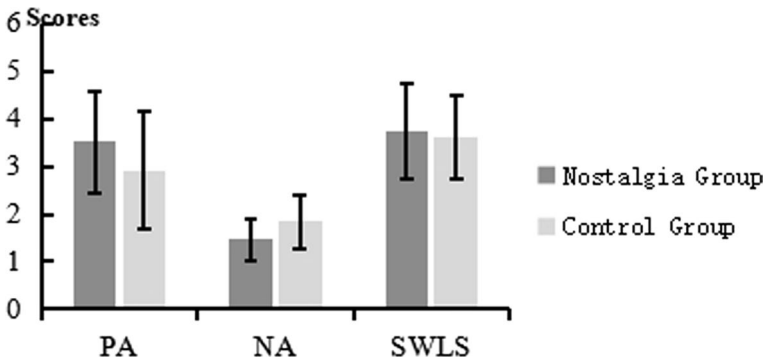
## 4.2 Results

**Group differences.** As expected, participants in the nostalgia condition scored significantly higher on PA ( $M_{\text{nostalgia}} = 3.51$ ,  $SD = 1.07$  vs.  $M_{\text{control}} = 2.92$ ,  $SD = 1.23$ ,  $F_{(1, 100)} = 6.618$ ,  $p < 0.05$ ,  $\eta^2 = 0.062$ ) and significantly lower on NA ( $M_{\text{nostalgia}} = 1.46$ ,  $SD = 0.43$  vs.  $M_{\text{control}} = 1.84$ ,  $SD = 0.57$ ,  $F_{(1, 100)} = 14.224$ ,  $p < 0.001$ ,  $\eta^2 = 0.125$ ) than those in the control condition. However, the nostalgia and control conditions did not significantly differ on SWLS ( $M_{\text{nostalgia}} = 3.73$ ,  $SD = 1.00$  vs.  $M_{\text{control}} = 3.60$ ,  $SD = 0.87$ ,  $F_{(1, 100)} = 0.542$ ,  $p = 0.463$ ,  $\eta^2 = 0.005$ ). Thus, H1a and H1b were supported, but H1c was not. See Fig. 5.

**Gratitude.** Participants in the nostalgia condition reported significantly more gratitude than those in the control condition ( $M_{\text{nostalgia}} = 4.27$ ,  $SD = 1.29$  vs.  $M_{\text{control}} = 3.33$ ,  $SD = 1.64$ ,  $F_{(1, 100)} = 10.239$ ,  $p < 0.01$ ,  $\eta^2 = 0.093$ ). Furthermore, gratitude was positively correlated



Fig. 4 Screenshots from the videos

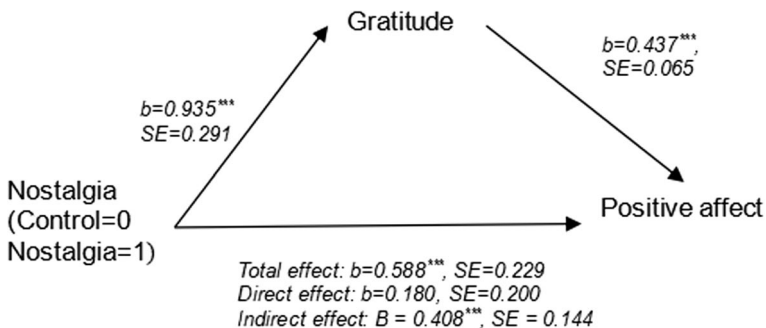


**Fig. 5** The PA, NA, and SWLS in Experiment 2. PA=positive affection; NA=negative affection; SWLS=satisfaction with life scale. The vertical bars represent the range of  $\pm 1$  SD. The results show significant group difference for PA and NA, but not for SWLS

with nostalgia,  $r_{(102)}=0.64$ ,  $p<0.001$ , and with PA,  $r_{(102)}=0.51$ ,  $p<0.001$ , and nostalgia negatively correlated with the NA,  $r_{(102)}=-0.61$ ,  $p<0.001$ . There was no significant relationship between gratitude and SWLS,  $r_{(102)}=0.15$ ,  $p=0.127$ . These results indicated that gratitude qualified as a potential mediator of the nostalgia effect on PA and NA.

Gratitude as a mediator. To test whether gratitude mediated the nostalgia effect on SWB, we used the PROCESS macro in SPSS, Model 4, with 5000 bootstrap samples (Hayes, 2017; Preacher & Hayes, 2004). Group assignment was the independent variable, and coded as 0=control, 1=nostalgia. The indirect effect of nostalgia on PA was significant:  $B=0.408$ ,  $SE=0.144$ , 95% [0.144, 0.710]. The mediation effect explained 58% of the variance in the total effect, and the conditional direct effect was not significant,  $B=0.180$ ,  $SE=0.200$ , 95% CI [-0.217, 0.578]. These results suggest full mediation. Thus, H3a was supported. See Fig. 6.

The indirect effect of gratitude in the association between nostalgia and NA was significant:  $B=-0.217$ ,  $SE=0.074$ , 95% CI [-0.168, -0.080]. The mediation effect explained 58% of the variance in the total effect. Additionally, the conditional direct effect was significant,  $B=-0.159$ ,  $SE=0.077$ , 95% CI [-0.312, -0.006], suggesting partial mediation. Thus, H3b was supported. As in Experiment 1, the indirect effect of nostalgia on SWLS



**Fig. 6** Mediation of the effect of nostalgia on positive affect by gratitude in Experiment 2. All coefficients are unstandardized. \* $p<0.05$ ; \*\* $p<0.01$ ; \*\*\* $p<0.001$

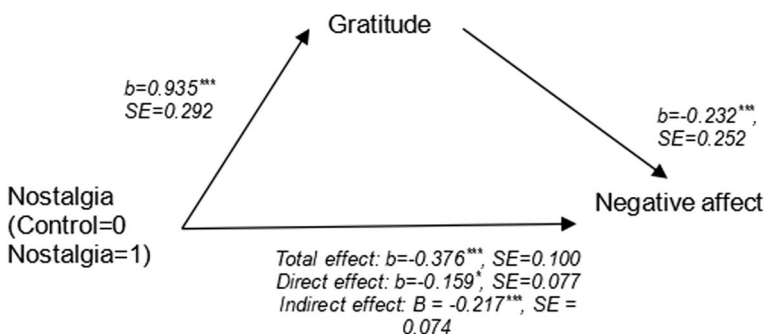
via gratitude was not significant ( $B=0.050$ ,  $SE=0.076$ , 95% CI  $[-0.083, 0.229]$ ); thus, H3c was not supported. See Fig. 7.

### 4.3 Discussion

Experiments 1 and 2 used different paradigms to manipulate nostalgia and obtained similar results concerning the nostalgia's associations with gratitude and positive affect. That is, nostalgia was associated with higher gratitude and PA, and gratitude mediated the association between nostalgia and PA. In Experiment 2, nostalgia was also related to lower NA, and this association was also mediated by gratitude. This suggests the possibility that the manipulation in Experiment 2 (a video showing toys and other objects associated with the time period when the participants were children) was more effective than that in Experiment 1 (think of a nostalgic memory and how it makes you feel). In both experiments, there was no group difference in SWLS scores, suggesting the possibility that nostalgia is more strongly linked to the emotional than cognitive aspects of well-being.

## 5 General Discussion

As hypothesized, nostalgia was significantly correlated with the emotional dimension of subjective well-being (higher positive affect), but contrary to expectations, it was not associated with the cognitive aspect (life satisfaction), and the relationship between nostalgia and negative affect was less stable. Similar conclusions have been reached in other studies, where nostalgia increased PA but had no significant effect on NA or the effect was variable and had no statistical significance (Leunissen et al., 2021; Wildschut et al., 2006), suggesting that the state nostalgia induced in the experiments promotes well-being essentially by increasing positive affect rather than decreasing negative affect. One possible reason for this finding is that experimentally manipulated nostalgia still entails negative affect (though to a lesser extent), or it is because participants' affects measured in a normal circumstance (without any negative incidents), which is inherently associated with lower negative affect. The buffering effect of nostalgia on negative affect might be more notable upon coping with negative incidents, for example, nostalgia helps to deal with adverse weather (Tilburg et al., 2018, 2019), resist the



**Fig. 7** Mediation of the effect of nostalgia on negative affect by gratitude in Experiment 2. All coefficients are unstandardized. \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

threat of death (Sedikides & Wildschut, 2018), reduce prejudice and offset loneliness (Polletta & Callahan, 2019). The emotional benefits may help explain why people are keen to purchase nostalgic commodities and participate in nostalgic activities, as this may increase happiness (Rao et al., 2018; Wulf et al., 2018).

We also found the result of gratitude as a mediator of the association between nostalgia and subjective well-being was mixed. Gratitude partially mediated the association between nostalgia and the emotional components of subjective well-being (higher PA in Experiment 1; higher PA and lower NA in Experiment 2). State gratitude induced by nostalgia indeed improves subjective well-being. This improvement is probably enabled by interactions between positive emotions. State gratitude, which is a positive emotion that can be induced via nostalgia priming, and this particular positive emotion can reflect on broader, more diffuse positive affect, increasing subjective well-being. The fact that gratitude partially mediated the effect of nostalgia on NA only in Experiment 2 suggests that the effect of nostalgia on negative affect may be conditioned by how it is induced, with biographical recollections being more actively recalling, so that individuals tend to recall a particular event or situation. Whereas, nostalgic videos designed to indirectly induce nostalgia through the reminder of external stimuli and are more diffuse in affects. These results suggest the need for further research on the link between nostalgia and emotion. For example, earlier research showed that nostalgia was significantly correlated with happiness, but not with sadness, whereas anticipated nostalgia (which means missing aspects of the present before they are lost in the future, for example, "Someone you love will leave someday") was significantly correlated with sadness, but not happiness (Batcho & Shikh, 2016). The mediating effect of gratitude in the relationship between nostalgia and cognitive well-being (life satisfaction) was not significant in Experiment 1 or Experiment 2. One possible reason is that in this research, experimental manipulation induced only a temporary state of nostalgia. Life satisfaction is an individual's overall evaluation of the quality of life over a long period (Shin & Johnson, 1978), and thus it may be related more to individuals' long-time nostalgia proneness or trait nostalgia than to a brief experience of nostalgia (state nostalgia). It is also possible that nostalgia-induced gratitude is probably a low arousal-positive emotion rather than intense, and therefore it is difficult to affect individual's satisfaction with life in the short term, or that there exist additional mediating mechanisms, such as savoring the present, a sense of hope, etc.

Previous research on subjective well-being mostly focused on the emotional aspect of subjective well-being, and there was not much investigation on the cognitive aspect. Besides, though there are many studies on nostalgia, gratitude and subjective well-being, most of these studies separate the three variables for research. There has been little research focused on the mechanisms between nostalgia and subjective well-being. We expanded on this earlier research by examining nostalgia in relation to both the emotional and cognitive aspects of subjective well-being, and by testing whether gratitude was an underlying mechanism of these links. Gratitude has received much attention from researchers in the area of positive psychology (Naito et al., 2005; Wood et al., 2008, 2010). Our results suggest that nostalgia is a potential cause of gratitude, and gratitude is a potential cause of subjective well-being. The results therefore have potential applied value, for example, in assisting older adults in sharing nostalgic memories as a way to promote more positive mood. Additionally, knowledge of the positive effects of nostalgia can also be applied to fields such as marketing, tourism and psychotherapy. Nostalgia and gratitude may be helpful to people who are isolated due to COVID-19 and may be beneficial during transitions after the pandemics.

## 6 Limitations and Future Directions

We revealed the relationships among nostalgia, gratitude and subjective well-being in two experiments, providing strong evidence for conclusions. Nevertheless, the study has limitations. First, the participants were college students, and the results need to be replicated in samples of participants with other backgrounds and ages, especially for older adults and the elderly who experience nostalgia more frequently. Second, there are thought to be many types of nostalgia, and these different types may also have different effects on subjective well-being (Li et al., 2015). For example, Stern (1992) distinguished historical and personal nostalgia, depending on whether the social experience was collective or individual and whether the experience was direct or indirect. Holak et al. (2005) divided nostalgia into four categories: personal, interpersonal, cultural, and virtual. In our study, we did not distinguish between the types of nostalgia induced, thus these types of nostalgia warrant attention. Finally, the results showed that nostalgia directly predicted more positive emotions but no higher life satisfaction, suggesting that future research should further explore the boundary condition between nostalgia and subjective well-being.

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