

Unlocking the Bitter Potential of Nostalgia: Covariation Between and Causal Effects of Nostalgia on Envy

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Nostalgia is a sentimental longing for the past that is experienced across people from various cultures and across the lifespan. Though nostalgia has typically been conceptualized as a mixed emotion, prior research has primarily focused on positive effects. We hypothesized that nostalgia can additionally have certain negative effects. In particular, nostalgia shares certain features with envy, a negative emotion defined as a resentful longing for another person's fortune, luck, possessions, or attributes. We predicted that nostalgia would be positively related to envy and that nostalgia would increase feelings of envy. In two cross-sectional studies (Studies 1 and 2; $N = 2,588$), nostalgia was positively related to envy between individuals and after controlling for demographics and relevant personality traits. In three daily diary studies (Studies 3–5; $N = 298$; 3,454 daily reports), daily states of nostalgia were positively related to daily feelings of envy and after controlling for daily negative events. Lagged analyses indicated bidirectional effects, such that nostalgia predicted greater envy on the following day and vice versa. In two experiments (Studies 6 and 7; $N = 513$), nostalgia increased feelings of envy. This effect was mediated by feelings of regret and envy for a past self, suggesting that nostalgia makes people feel envious of their past self which leads to general feelings of envy. These studies point to a novel bitter effect of nostalgia.

Keywords: nostalgia, envy, mixed emotions, daily diary, causal processes

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Nostalgia is a complex, mixed emotion that is experienced across diverse cultures (Hepper et al., 2014), age groups (Turner & Stanley, 2021), races, and levels of socioeconomic status (Newman, 2022). People feel a sentimental longing for the past fairly regularly in daily life (Newman et al., 2020). Therefore, it is important to understand the contexts in which nostalgia is elicited and how it may affect people's well-being. People often feel nostalgic in response to negative events and experiences, such as social exclusion (Seehusen et al., 2013; Wildschut et al., 2010), perceptions of meaninglessness (Routledge et al., 2008), during life transition periods (Batcho, 1995; Routledge et al., 2013), and the COVID-19 pandemic (Yeung, 2020). When negative events occur, people may desire to abandon their present reality to revisit a pleasant memory from the past in certain circumstances.

In many instances, nostalgic memories can yield an array of psychological benefits. In fact, a large body of predominantly experimental research has documented nostalgia's positive effects (e.g., Abeyta & Pillarsetty, 2023; Juhl & Biskas, 2023; Wildschut & Sedikides, 2023), which can often be grouped into one of three categories: self-oriented, existential, and social benefits (Frankenbach et al., 2021; Sedikides, Wildschut, Routledge, Arndt, Hepper, & Zhou, 2015). Certain nostalgia inductions can have positive implications for various self-oriented constructs. For example, participants who listened to a nostalgic song reported increased self-esteem and optimism (Cheung et al., 2013), and those who wrote about a nostalgic event reported increased authenticity (Kelley et al., 2022). Nostalgia has also been shown to act as an existential resource in particular contexts with specific manipulations and measures by

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aiding individuals in finding, maintaining, and restoring a sense of meaning in life (Abeyta & Pillarisetty, 2023; Routledge et al., 2011), as well as by augmenting self-continuity or a sense of connection between one's past and one's present (Sedikides, Wildschut, Routledge, & Arndt, 2015). Finally, certain nostalgic reflections can beneficially influence various aspects of social functioning including increasing help seeking, social connectedness, and prosocial behavior (Juhl et al., 2021; Juhl & Biskas, 2023; Zhou et al., 2012) and decreasing attachment anxiety and avoidance (Wildschut et al., 2006).

Providing further evidence of the beneficial aspects of nostalgia, multiple studies have suggested that it tends to be more closely related to positive than negative emotions. For example, when participants listed features that they believe reflected the characteristics of nostalgia (Hepper et al., 2012, 2014), they identified happiness as a central feature and sadness, regret, and anxiety as peripheral features. van Tilburg et al. (2018) reported that upon rating similarities among nostalgia and 10 other emotions, participants viewed nostalgia as most similar to positive emotions, such as self-compassion and pride, and most dissimilar to negative emotions, such as embarrassment and shame. Relatedly, after participants wrote about a past event at one time, nostalgia was found to be characterized by a somewhat ambivalent cognitive appraisal profile characterized by pleasantness, irretrievable loss, psychological distance, and uniqueness (van Tilburg et al., 2019). Yet, when nostalgia's appraisal profile was compared to the profiles of 31 other emotions, it was most similar to those of certain positive emotions (i.e., tenderness, love) and most distinct from those of certain negative emotions (i.e., anger, sadness), though it did share some notable resemblance to the profiles of homesickness and melancholy. But when a multidimensional scaling analysis was applied to consider the spatial positioning of the state experience of nostalgia and these 31 other emotions elicited from writing about the past event, nostalgia was located between emotions associated with love and loss (van Tilburg, 2023). Finally, in an integrative analysis of 41 experiments (35 of which included the Event Reflection Task where participants wrote about their most nostalgic feelings), Leunissen et al. (2021) found that overall, experimentally induced nostalgia increased indices of positive affect and ambivalent affect but did not significantly influence negative affect, relative to a reflection of an ordinary experience. These effects varied, however, as a function of nostalgia induction type. Further analyses of 56 discrete emotions (30 positive and 26 negative) revealed that experimentally induced nostalgia increased 24 positive emotions (e.g., happy, favorable, interested) but only increased two negative emotions (i.e., homesick and regretful) often relative to a reflection off an ordinary experience.

Because of work documenting nostalgia's beneficial effects and hedonic emotional character, it has frequently been depicted as a predominantly positive emotion (Wildschut & Sedikides, 2023). While these studies have been informative, most studies in this area induce nostalgia with instructions to recall one's most nostalgic memory (Frankenbach et al., 2021; Leunissen et al., 2021). It is important to acknowledge that nostalgic feelings can vary substantially, can focus on various targets (Fetterman et al., 2024), and may be elicited in a variety of different contexts. In a recent set of studies, nostalgic feelings had differential effects on well-being depending on the valence of the daily events that elicited nostalgia and the specific instructions used to induce nostalgic states

(Newman & Sachs, 2023). When measured in ecologically valid settings in daily life, nostalgic states assessed at the end of the day have covaried negatively with daily states of well-being and predict lower well-being on subsequent days (Newman et al., 2020; Newman & Sachs, 2020). When assessed during randomly selected moments in the day, they relate negatively or not significantly to concurrent well-being but may predict greater well-being (e.g., feelings of excitement and enthusiasm) later in the day (Newman et al., 2020). Thus, in comparison to specific experimentally induced nostalgic states, daily nostalgia might not be characterized quite so positively (Newman et al., 2020).

In light of these findings, we considered one potential negative effect of nostalgia that has not been examined previously, namely, feelings of envy. Characterized as a negative emotion, envy is a feeling of discontentment as one evaluates the fortune, luck, possessions, or attributes of someone else (Smith & Kim, 2007). It often entails upward social comparisons. Focusing on the positive aspects of another person can lead to feelings of dissatisfaction with the self.

It thus becomes evident that nostalgia and envy share at least one feature. They both entail a sense of longing, either for one's past (nostalgia) or for another person's life or circumstances (envy). In a sense, we surmise that nostalgia could be similar to feeling envious of one's past self.¹ Therefore, nostalgia and envy should covary. That is, they should be connected in a nomological network.

Furthermore, nostalgia could have a causal effect on envy, and we propose two potential mechanisms. First, reflecting on a pleasant memory from the past in a sentimental manner could make one feel envious of one's life in the past. In other words, nostalgic memories could make people feel jealous of the life they had in the past which could spill over into more general feelings of envy. In the context of daily life, people may feel nostalgic on a particular day for a variety of reasons, but it is more common when the day is not going well (Newman et al., 2020). When they reflect back on the past in a sentimental manner, they could feel envious of the life they used to live, particularly if the past seems better than the present. This negative feeling could linger until the following day.

Second, nostalgic feelings could make people regret their decisions in the past (Leunissen et al., 2021), which could make them feel envious of others who may get to continue to experience pleasant things. In other words, as people reflect on the past in a sentimental manner, they could be reminded of how wonderful life used to be. When comparing the rosy past to the less rosy present, people may regret some of the decisions they made. Feelings of regret may spill over to other negative emotions. The experience of regretting past decisions could also lead to comparative judgments and dissatisfaction with the present, which could cause more general feelings of envy.

When describing processes linking nostalgia to envy, we argue that it is possible that nostalgia and envy covary and that nostalgia could have a causal effect on envy. We make no assumptions about the universality of these processes apart from the fact that people across diverse cultural contexts can experience nostalgia as previous research has shown (Hepper et al., 2014). How nostalgia may

¹ There are aspects of envy, such as resentment, that do not overlap with nostalgia as these are two distinct constructs. Acknowledging one commonality between two constructs does not limit the theoretical novelty of demonstrating a causal effect of one variable on another, particularly when the overwhelming majority of research has documented positive effects.

influence other affective states can vary across cultures (Hepper et al., 2024), and how nostalgia may relate to other constructs can vary across levels of socioeconomic status (Newman, 2022) and age groups (Turner & Stanley, 2021). Though worthwhile as a program of research, the goal of the present set of studies was to examine a unique possible association and causal relationship that has not been addressed previously using samples from populations that have typically been used to study nostalgia. We also focus on average tendencies within these communities, rather than subgroup differences. Understanding how such processes may vary in diverse cultural contexts was beyond the scope of the present research.

Thus, the primary goals of this project were to examine the covariation between nostalgia and envy at between-person and within-person levels of analysis and to test the causal effects of nostalgia on envy with a diverse set of methods that address slightly different though related questions. For instance, cross-sectional studies allow participants to reflect on specific experiences and address between-person relationships. They are limited though in their ability to test causal effects and they cannot examine within-person relationships, which represent mathematically and psychologically distinct levels of analysis (Affleck et al., 1999; Nezlek, 2001).

Daily diary methods excel at capturing experiences as they naturally occur and can examine whether nostalgic feelings predict envy on the following day, thus providing some evidence for the directionality of the relationship (Bolger et al., 2003; Nezlek, 2012). When considering directionality, a common practice in daily diary research is to examine the lagged relationships in both directions. Therefore, in addition to examining the lagged relationship from nostalgia to envy, which was our primary goal, we also considered the lagged relationship from envy to nostalgia as a secondary goal. Theoretically, envy could lead to greater nostalgia because envy would lead people to feel dissatisfied with their present reality, which could prompt people to escape to a rosier past. This would be consistent with prior research that has found that negative states, feelings, and experiences lead to nostalgia (Newman et al., 2020; Sedikides, Wildschut, Routledge, Arndt, Hepper, & Zhou, 2015).

Although daily diary studies excel at capturing these processes through lagged analyses in naturalistic settings, they may not be able to completely rule out third variable confounds. Experiments can control situations more strictly to minimize these confounds, trading some increased confidence in causality for ecological validity (Diener et al., 2022). By relying on these diverse methods, we aimed to capitalize on complementary strengths while offsetting potential weaknesses (McGrath, 1982). In the experimental studies, we considered the potential causal effect from nostalgia to envy as the more novel theoretical leap. Because this was our primary goal, we designed experiments to test this effect as opposed to the effect of envy on nostalgia while acknowledging that both could exist.

When considering the different methods to examine the relationships between nostalgia and envy and the causal effects of nostalgia on envy, careful attention must be given to the operationalization and measurement of these constructs. We relied on the Personal Inventory of Nostalgic Experiences (PINE) scale (Newman et al., 2020), a validated scale to measure nostalgia proneness. This measure assesses how nostalgic people feel in general when they reflect on their lives. Similar to all global evaluations or trait measures, the PINE scale is prone to heuristics, biases, and misremembering. However, this measure has also been

used successfully for daily administration through the assessment of nostalgia intensity (Newman et al., 2020; Newman & Sachs, 2020, 2023), which greatly reduces such biases. We also manipulated nostalgia by inducing different types of nostalgic feelings (Newman & Sachs, 2023). Rather than relying on a single nostalgic memory, our goal was to mimic the types of real-life experiences that might naturally elicit nostalgia.

In the measurement of envy, two distinctions warrant a brief discussion. First, some researchers have attempted to distinguish two forms of envy known as benign envy and malignant envy (Lange & Crusius, 2015; van de Ven, 2016; van de Ven et al., 2009). We decided to conceptualize envy as a unitary construct, consistent with the majority of prior research (Smith & Kim, 2007). We opted not to bifurcate the construct of envy as some researchers have done (Crusius et al., 2020; van de Ven et al., 2009) because the distinction between benign envy, which involves a motivation to improve oneself, and malignant envy, which involves a desire that others lose their superior position, status, or fortune, confounds the feeling of envy with the situational antecedents, behavioral outcomes, and motivational states (Cohen-Charash & Larson, 2017). We contend that distinct states in a process should be measured separately. Doing so provides a more parsimonious way of modeling processes involving envy. Therefore, we used the Dispositional Envy Scale (Smith et al., 1999) to capture individual differences in envy, and we measured daily and momentary states of envy with validated items that focused on the feeling of envy.

The second distinction is between the feelings of envy and jealousy. Envy and jealousy are highly related emotions, and researchers have attempted to distinguish them in various ways. Some have argued that envy typically involves two people (the person feeling envy and the target), whereas jealousy often involves three or more individuals (the person feeling envy, the target, and one other person; Smith & Kim, 2007). Envy may occur when someone lacks something that another person has or enjoys, whereas jealousy may occur when someone fears losing something they already have (Protasi, 2017). Studies designed specifically to tease apart such differences have found that the affective content of written narratives differed when discrete scenarios were described (Parrott & Smith, 1993). Whereas envy typically entailed feelings of longing, inferiority, resentment, and ill will, jealousy entailed a fear of loss, distrust, anger, and uncertainty (Smith & Kim, 2007).

Though it can be worthwhile to tease apart small differences between envy and jealousy in particular contexts to clarify conceptual differences for theoretical purposes, differentiating these states can be empirically challenging. Laypeople often use the terms envy and jealousy interchangeably and may not understand the differences between them (Salovey & Rodin, 1986). Additionally, envy and jealousy tend to co-occur quite frequently (DeSteno & Salovey, 1996; Newman et al., 2023). Moreover, when measuring states of envy in daily life, it is important to minimize the number of questions participants answer to reduce participant burden and increase compliance (Eisele et al., 2022). Similar issues should be considered in experimental settings because the preceding questions can also influence subsequent ones (Schwarz, 1999). Therefore, asking participants two questions about how envious and jealous they feel is a parsimonious means of measuring the construct of envy.

Finally, at a theoretical level, nostalgia is likely linked to both envy and jealousy. Envy involves a sense of longing, similar to nostalgia. When people feel nostalgic, they might feel as if they are

lacking in a particular area and might yearn for their past self. The sense of lacking can be more closely associated with envy than jealousy. At the same time, they may also feel a sense of loss as they reflect on a part of their past that they once had but no longer do. This sense of loss is more closely associated with jealousy than envy. Thus, nostalgia might be associated with both envy and jealousy, so it seems prudent to include items that assess each emotion. To be concise, we present the results from aggregated measures in the main text, and we provide analyses separately by item in the [Supplemental Materials](#).

After conducting each type of study (cross-sectional, daily diary, experiment), we ran preregistered replications to ensure the robustness of our findings. We present the aggregated results within each type of study as these estimates are more reliable than estimates from single studies (Fabrigar & Wegener, 2016). Results across studies were similar, and individual results are presented in [Supplemental Materials](#).

Transparency and Openness

We report how we determined our sample sizes, all data exclusions, manipulations, and measures used in the analyses for all studies, and we follow Journal Article Reporting Standards reporting guidelines. Studies 1, 3, 4, and 6 were not preregistered. Preregistrations for Studies 2 (<https://aspredicted.org/y3hr-4t6j.pdf>), 5 (<https://aspredicted.org/q4wy-7jbc.pdf>), and 7 (<https://aspredicted.org/pdk7-vvrz.pdf>) were created at aspredicted. Materials, deidentified data, and analytic scripts for all studies are posted on the Open Science Framework (<https://osf.io/pn7ry/>).

Studies 1 and 2: Cross-Sectional Relationships

Method

Participants and Procedure

We recruited participants through the survey provider ExpiWell, which draws on samples from third-party panel providers, similar to other data collection platforms like Qualtrics. ExpiWell required participants to be adults within the United States. Participants completed a cross-sectional study by completing a survey at one time and were compensated financially. The procedures and measures were the same in Studies 1 and 2. Study 1 was not preregistered, and Study 2 was a preregistered (<https://aspredicted.org/y3hr-4t6j.pdf>) direct replication of Study 1. After removing 2 (Study 1) and 14 (Study 2) participants who incorrectly answered an instructed response item (“Please select the choice ‘agree’ for this question”), data were analyzed from 1,190 ($M_{\text{age}} = 36.16$, $SD_{\text{age}} = 12.62$; 46.59% male, 50.04% female; Study 1) and 1,398 ($M_{\text{age}} = 35.57$, $SD_{\text{age}} = 13.98$; 36.34% male, 60.30% female; Study 2) participants as part of a larger study that included relevant measures of nostalgia, envy, and personality traits. Participants who incorrectly answered the instructed response question reported significantly higher scores of envy, $t(15.14) = -4.02$, $p = .001$, and were more likely to be non-Hispanic Black, $OR = 5.30$, $z = 2.86$, $p = .004$, than those who answered this question correctly. They did not differ in terms of their levels of nostalgia, $t(15.21) = -1.91$, $p = .075$; their age, $t(15.25) = -2.03$, $p = .060$; education, $t(15.17) = -.08$, $p = .933$; income, $t(15.13) = .17$, $p = .868$; or gender, $OR = 2.15$, $z = 1.45$, $p = .147$.

Additional measures that were collected to address a different purpose have been published previously (Newman et al., 2024).

The sample sizes were determined by available grant funding. Power analyses indicated that effects as small as $r = .08$ (Study 1) and $r = .07$ (Study 2) could be detected with adequate power (.80). The study was approved by the Human Research Protection Program at the University of California, San Francisco (#20-33002). Participants were fairly diverse in terms of age and income levels. On average, participants were well-educated. Several races/ethnicities were represented, though the participants were predominantly White. Full sample descriptions are presented in [Table 1](#).

Measures

Our primary measures included nostalgia and envy. We also assessed standard demographic variables and controlled for them as is common practice in large surveys with participants from diverse backgrounds. Moreover, research has found that nostalgia proneness varies by age, race, and education (Newman, 2022; Turner & Stanley, 2021). Therefore, we ran analyses with and without demographic controls for complete transparency and to account for any demographic confounds. In addition, we measured personality traits and treated them as controls because prior research has found that neuroticism is positively related to nostalgia (Newman et al., 2020; Seehusen et al., 2013) and envy (Smith et al., 1999). Though nostalgia is less consistently associated with other personality traits, we controlled for all personality traits for completeness. Researchers have different views on whether a specific subset or all traits should be controlled, but including all traits in the model provides the most robust test concerning the unique variance of envy explained by nostalgia.

Nostalgia proneness was assessed with the PINE scale, a four-item measure with excellent psychometric properties (Newman et al., 2020). Example items are “How nostalgic do you feel?” and “To what extent do you feel sentimental for the past?” Responses were recorded on a 7-point scale (1 = *not at all*, 7 = *very much*, $\alpha_{\text{study 1}} = .91$, $\alpha_{\text{study 2}} = .91$).

Envy was assessed with the eight-item Dispositional Envy Scale (Smith et al., 1999), the most widely used measure of envy proneness. Example items are “I feel envy every day” and “Feelings of envy constantly torment me.” Responses were recorded on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*, $\alpha_{\text{study 1}} = .92$, $\alpha_{\text{study 2}} = .92$).

Personality traits were assessed with the 60-item HEXACO scale (Ashton & Lee, 2009), which measures honesty–humility ($\alpha_{\text{study 1}} = .79$, $\alpha_{\text{study 2}} = .80$), emotional stability ($\alpha_{\text{study 1}} = .82$, $\alpha_{\text{study 2}} = .80$), extraversion ($\alpha_{\text{study 1}} = .87$, $\alpha_{\text{study 2}} = .84$), agreeableness ($\alpha_{\text{study 1}} = .82$, $\alpha_{\text{study 2}} = .81$), conscientiousness ($\alpha_{\text{study 1}} = .78$, $\alpha_{\text{study 2}} = .78$), and openness ($\alpha_{\text{study 1}} = .81$, $\alpha_{\text{study 2}} = .80$). Responses were recorded on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*).

For a different study, we also measured the frequency with which participants expressed gratitude to God on a 9-point scale (1 = *never*, 2 = *a few times a year*, 3 = *every other month*, 4 = *once a month*, 5 = *a few times a month*, 6 = *once a month*, 7 = *several times a week*, 8 = *once a day*, 9 = *several times a day*). Participants who indicated that they did not believe in the existence of God or a universal spirit or being were given scores of 1 ($M = 3.97$, $SD = 2.96$). Because we used this measure to recruit participants while oversampling among those who reported higher levels of gratitude to God, we controlled for this variable in our analyses that involved

Table 1
Studies 1 and 2 Descriptive Statistics

Demographic variable	Study 1		Study 2		Aggregated study			
	N	%	N	%	N	%	Nostalgia	Envy
							M (SD)	M (SD)
Gender								
Male	554	46.59	508	36.34	1,062	41.05	4.33 (1.54)	2.94 (1.40)
Female	595	50.04	843	60.30	1,438	55.59	4.34 (1.58)	3.18 (1.40)
Another gender	40	3.36	47	3.36	87	3.36	3.73 (1.71)	3.71 (1.36)
Age								
<25 years old	236	19.88	367	26.44	603	23.42	4.48 (1.46)	3.58 (1.36)
25–34 years old	394	33.19	427	30.76	821	31.88	4.34 (1.54)	3.28 (1.40)
35–44 years old	275	23.17	253	18.23	528	20.50	4.26 (1.63)	3.03 (1.43)
45–54 years old	148	12.47	156	11.24	304	11.81	4.13 (1.65)	2.64 (1.25)
55–64 years old	98	8.26	133	9.58	231	8.97	4.21 (1.68)	2.38 (1.09)
65+ years old	36	3.03	52	3.75	88	3.42	4.14 (1.64)	1.96 (1.00)
Household income								
<\$30,000	257	21.60	315	22.55	572	22.11	4.38 (1.66)	3.38 (1.41)
\$30,000–\$59,999	354	29.75	378	27.06	732	28.30	4.33 (1.57)	3.13 (1.41)
\$60,000–\$99,999	313	26.30	365	26.13	678	26.21	4.22 (1.54)	2.94 (1.38)
\$100,000+	266	22.35	339	24.27	605	23.39	4.33 (1.52)	2.97 (1.40)
Education								
Low (high school or less)	150	12.61	172	12.30	322	12.44	4.57 (1.55)	3.3 (1.40)
Medium (some college)	376	31.60	476	34.05	852	32.92	4.32 (1.59)	3.12 (1.40)
High (college degree)	664	55.80	750	53.65	1,414	54.64	4.25 (1.57)	3.04 (1.41)
Race/ethnicity								
Non-Hispanic White	816	68.57	964	69.05	1,780	68.83	4.29 (1.57)	3.04 (1.40)
Non-Hispanic Black	72	6.05	81	5.80	153	5.92	4.25 (1.55)	2.96 (1.39)
Non-Hispanic East Asian	81	6.81	106	7.59	187	7.23	4.36 (1.58)	3.49 (1.44)
Hispanic/Latino	122	10.25	136	9.74	258	9.98	4.35 (1.58)	3.16 (1.39)
Multiple races	63	5.29	56	4.01	119	4.60	4.48 (1.55)	3.28 (1.37)
Other	36	3.03	53	3.80	89	3.44	4.39 (1.61)	3.31 (1.49)

control variables as we indicated in our preregistration. The distribution of this variable was nevertheless similar to distributions of this variable in other samples. As the results below indicate, the inclusion of this variable had little impact on the results.

Results

As the results across studies were similar, we provide the aggregated results here, and we present the individual analyses in the [Supplemental Materials](#) to be transparent. After participants completed individual difference measures of nostalgia, envy, and personality traits, we standardized all continuous predictors and regressed envy on nostalgia. They were positively related, $B = .30$, 95% CI [.26, .34], $t = 15.99$, $p < .001$, $R^2 = .09$ (see [Figure 1](#)). Next, we controlled for demographics (age, gender, education, income, and race/ethnicity) and gratitude to God. The relationship between nostalgia and envy was similar after adding these controls, $B = .29$, 95% CI [.26, .33], $t = 16.40$, $p < .001$, multiple $R^2 = .20$. Next, we added the six personality traits as additional controls in a subsequent model as indicated in our preregistration. Although the relationship was attenuated, nostalgia was positively related to envy, $B = .17$, 95% CI [.14, .20], $t = 11.15$, $p < .001$, multiple $R^2 = .46$. These results show that nostalgia and envy were positively related at a between-person level of analysis, and this relationship was not completely confounded by personality traits or demographic characteristics, that is, the relationship between nostalgia and envy survived after accounting for these variables. Building on the findings by [Newman et al. \(2020, Study 2\)](#) who documented the

nomological network of nostalgia proneness as mixed, though more negative than positive, we now add one additional variable that suggests the nomological network of nostalgia may be more negative than positive when measured with the PINE scale. That is, when considering the array of related constructs from prior research along with the present results of dispositional envy, nostalgia tends to covary more strongly and consistently with negatively valenced traits than with positively valenced traits.

Studies 3 and 4: Daily States of Nostalgia and Envy

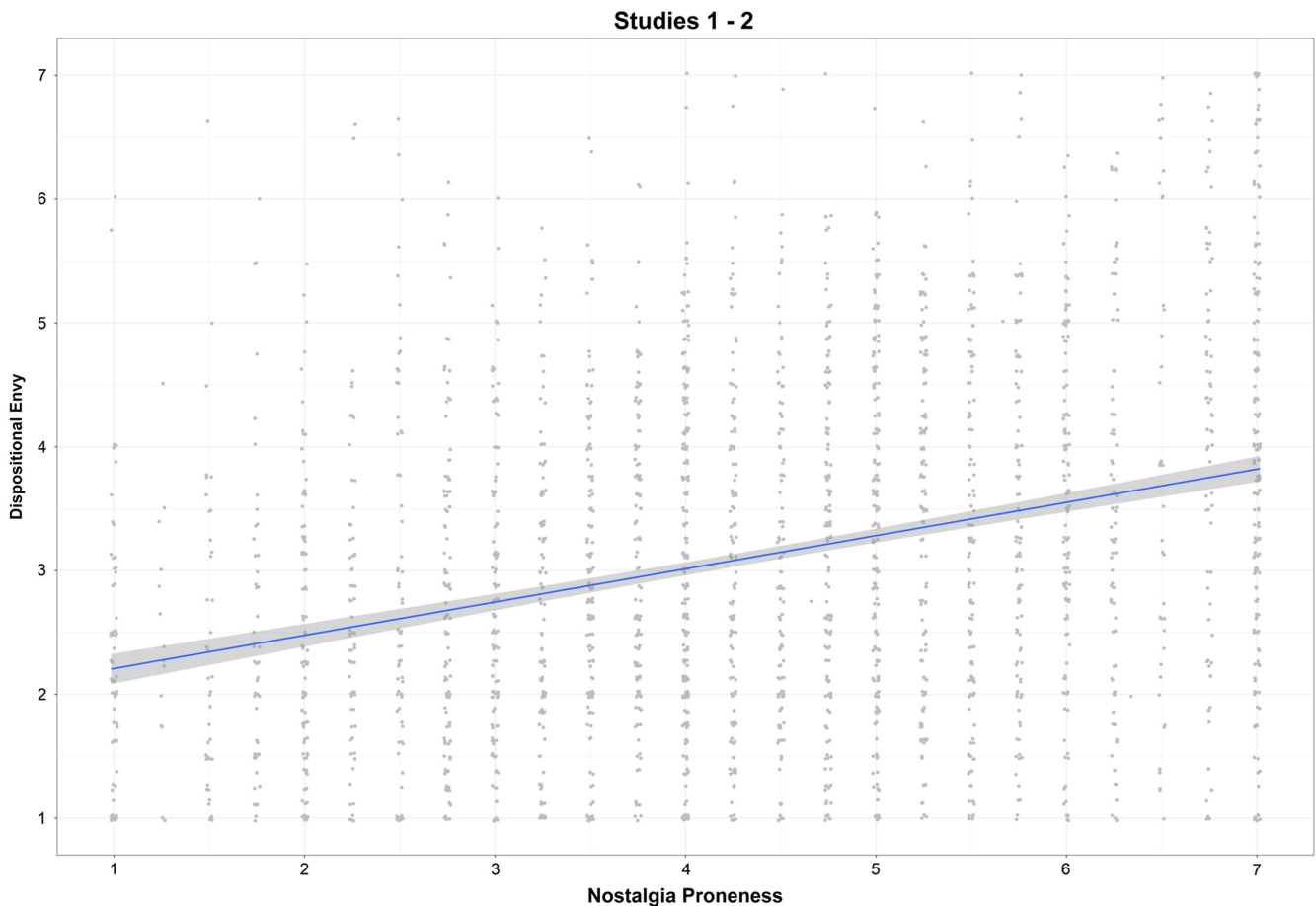
Method

Participants and Procedure

To extend our findings from between-person relationships to within-person relationships and to examine nostalgia and envy in ecologically valid contexts in daily life, we conducted two daily diary studies by asking participants questions about their daily events, affect, and feelings of nostalgia and envy each day for 2 weeks. These studies included additional measures not relevant for the analyses presented here. Analyses from these measures have been published previously ([Busseri & Newman, 2024](#); [Newman et al., 2023](#); [Newman & Sachs, 2020, 2023](#)). The studies were approved by the institutional review board at the University of Southern California under the Protocol Number UP-15-00479.

Participants were recruited from a private university in the United States. We collected data from as many participants as possible

Figure 1
Regression of Envy on Nostalgia Without Controls From Studies 1 and 2



Note. See the online article for the color version of this figure.

within the constraints of the subject pool, and participants received research credit for their participation. The total sample size exceeded the size recommended to examine the analyses of interest in our study (Maas & Hox, 2005; Nezlek, 2012). We also ran a post hoc power analysis based on the results of the within-person relationship between nostalgia and envy using Mplus. Following procedures outlined by Bolger et al. (2012) and Arend and Schäfer (2019), we calculated the residual variance, the variance of daily nostalgia, the fixed effect for the intercept and slope, the variance of the Level 2 outcome variable (envy), the variance of the slope, and the covariance between the intercept and the slope. We used these values as inputs in a simulation model with 5,000 iterations based on the estimated sample size of 166 with an average of 12 responses per participant. The results showed that we achieved .95 power to detect the effects as small as those observed in our data.

Though we recognize that post hoc power analyses may be limited in certain regards, we note the complexities and challenges in running a priori power analyses given that many parameters must be estimated. We opted to remedy these issues by collecting data from as many participants as possible, and we replicated the findings in a separate sample in Study 5. In short, we believe we were

adequately powered to detect the relationships of interest for this study.

The procedures and measures from Studies 3 and 4 were the same, so we report them together. For 14 days, participants were emailed at 9:00 p.m. each evening with a link to complete a questionnaire. They were instructed to complete the questionnaire just before going to bed. A reminder email was sent at 7:00 a.m. the following morning, and questionnaires were accepted until 10:00 a.m. In total, 173 participants completed 2,164 daily reports. However, reports were excluded if they were completed after 10:00 a.m. the following morning, were duplicated entries, were completed in less than 2 min, or contained an incorrect answer to an instructed response item (e.g., "Please select 'occurred and not important' for this question"). Additionally, participants who completed less than five valid daily reports were excluded as their data would not constitute a reasonable sample (see Nezlek, 2012, for daily diary cleaning guidance). After removing reports, 166 participants ($M_{\text{age}} = 20.04$, $SD = 1.87$; 25.30% male, 74.70% female; 39.17% White, 7.83% Black, 36.14% Asian, 16.87% Hispanic/Latino, 3.61% multiple or other races) completed 2,021 daily reports ($M = 12.17$, $SD = 2.11$, $Mdn = 13$) indicating reasonable compliance. The seven participants who were

removed from the final analyses were not significantly different from the 166 participants in the final study in terms of their age, $t(6.34) = -.28, p = .790$; gender, $z = -.65, p = .517$; or race (all z s $< .940$, all p s $> .350$). Full sample descriptions are provided in Table 2.

Measures

Daily questionnaires included measures of positive and negative daily events, nostalgia, envy, and positive and negative affect. Participants were instructed to reflect on their day as they answered the questions. The daily event questions represented common daily events in social (e.g., “Had especially good interactions with friend(s) or acquaintances”) and achievement (e.g., “Completed work on an interesting project or assignment”) domains and were aggregated from the Daily Event Schedule (Butler et al., 1994). These daily event measures have been used widely (Newman & Nezlek, 2022; Newman & Sachs, 2023; Nezlek & Plesko, 2001). Responses to each daily event were recorded on a 5-point scale (0 = *did not occur*, 1 = *occurred and not important* ... 4 = *occurred and extremely important*). Composite positive and negative event scores were calculated by averaging the scores of each question in each respective category.

Daily nostalgia was measured with the four-item PINE scale that was adapted for daily use, similar to Newman et al. (2020). Responses were recorded on a 7-point scale (1 = *not at all*, 7 = *very much*). To assess daily envy, participants were presented with a list of adjectives and were asked to reflect on their day and report the extent to which they felt each one. Envy was measured with two items: envious and jealous. Responses were recorded on a 7-point scale (1 = *did not feel this way at all*, 7 = *felt this way very strongly*). Similar approaches to selecting a face-valid item from the larger scale have been used effectively (Yanhui et al., 2022).

Positive and negative affect were measured with an affective circumplex model that distinguishes valence and arousal (Feldman Barrett & Russell, 1998). Similar to the measure of envy, participants were presented with a list of adjectives and were asked about the extent to which they felt that way that day. Positive activated affect was measured with enthusiastic, delighted, happy, glad, and excited; positive deactivated affect was measured with calm, peaceful, relaxed, contented, and at ease; negative activated

affect was measured with stressed, angry, annoyed, tense, and nervous; negative deactivated affect was measured with depressed, disappointed, miserable, gloomy, and sad. The 7-point response scale was the same as for envy.

Results

Overview

Due to the nested data structure, we used multilevel modeling to account for between-person and within-person variation. Days were nested within persons in all models. Analyses were conducted in R with the *lme4* package (Bates et al., 2015). Intercepts and slopes were modeled as random unless convergence issues were present, in which case error terms were trimmed, as recommended by Nezlek (2012). We begin with descriptive statistics and then describe the primary research questions. These models addressed (a) between-person relationships between aggregated states of nostalgia and envy, (b) within-person relationships between daily nostalgia and envy, and (c) within-person lagged relationships between daily nostalgia and envy.

Descriptive Statistics

Reliabilities for daily nostalgia and daily envy were assessed in a manner described by Nezlek (2017), in which three-level models were created. Items were nested within days, and days were nested within persons. The reliability of the Level 1 intercept provides an estimate of the true variance over total variance, akin to Cronbach’s α , while maintaining the multilevel nature of the data. Nostalgia (.93) and envy (.71) had adequate levels of reliability.

We also examined null or unconditional models, which provide estimates of the means and the amount of between-person and within-person variation. As presented in Table 3, nostalgia varied more within persons than between persons, whereas envy varied slightly more between persons than within persons. However, there was substantial within-person and between-person variation of each variable to examine relationships at each level of analysis.

Primary Analyses

Moving to our primary questions, we first aimed to conceptually replicate the between-person relationships between nostalgia and envy from Studies 1 and 2 by measuring the variables as aggregated daily states. Global evaluations or trait reports and aggregated daily states are often used to assess individual differences, but the processes in which these judgments are formed vary considerably (Newman et al., 2021). To examine the between-person relationships between nostalgia and envy, we created a model in which daily envy was the outcome measure at Level 1 and an aggregated measure of daily nostalgia was the predictor at Level 2 and was centered around the grand mean as follows:

Model 1

$$\text{Day level: } y_{ij}(\text{envy}) = \beta_{0j} + r_{ij}, \tag{1}$$

$$\text{Person level: } \beta_{0j} = \gamma_{00} + \gamma_{01}(\text{aggregated daily nostalgia}) + u_{0j}. \tag{2}$$

These results indicated that nostalgia and envy were positively related at the between-person level, $b = .43$, 95% CI [.30, .56],

Table 2
Studies 3 and 4 Descriptive Statistics

Demographic variable	N	%	Nostalgia		Envy	
			M (SE)	M (SE)	M (SE)	M (SE)
Gender						
Male	42	25.30	2.31 (.18)	1.91 (.17)		
Female	124	74.70	2.45 (.10)	1.95 (.10)		
Age						
<25 years old	162	97.59	2.39 (.09)	1.93 (.08)		
25–34 years old	4	2.41	3.38 (.57)	2.42 (.53)		
Race/ethnicity						
Non-Hispanic White	65	39.16	2.31 (.19)	1.56 (.18)		
Non-Hispanic Black	13	7.83	1.68 (.42)	1.22 (.39)		
Non-Hispanic Asian	60	36.14	2.09 (.20)	1.85 (.19)		
Hispanic/Latino	28	16.87	1.26 (.29)	1.05 (.27)		
Other	6	3.61	.59 (.62)	.59 (.58)		

Note. Means (and standard errors) were calculated from multilevel models that account for between-person and within-person variation.

Table 3
Means, Variances, and Reliabilities of Daily Measures From Studies 3–5

Variable	N (people)	N (days)	Intercept	Variance		Reliability
				Within	Between	
Studies 3 and 4						
Positive events	166	2020	.90	.21	.25	
Negative events	166	2020	.48	.13	.19	
Nostalgia	166	2018	2.41	1.91	1.16	.93
Envy	166	2019	1.94	.93	1.07	.71
Positive activated affect	166	2019	3.61	1.16	1.07	.81
Positive deactivated affect	166	2019	3.55	.98	.97	.81
Negative activated affect	166	2019	2.98	1.12	.88	.65
Negative deactivated affect	166	2019	2.38	1.13	.98	.82
Study 5						
Nostalgia	132	1,436	2.67	1.15	1.41	.85
Envy	132	1,437	1.91	.88	.79	.75
Envy toward						
Friend	112	604	.25			
Acquaintance	112	604	.10			
Past/former self	112	604	.16			
Romantic partner	112	604	.11			
Family member	112	604	.15			
Coworker/colleague/classmate	112	604	.14			
God/higher power	112	604	.02			
No one in particular	112	604	.39			
Other	112	604	.05			
Positive activated affect	132	1,438	3.81	1.29	.83	.71
Positive deactivated affect	132	1,439	3.87	1.04	.72	.72
Negative activated affect	132	1,438	3.49	1.33	1.00	.69
Negative deactivated affect	132	1,438	2.74	1.21	.98	.73

Note. In Study 5, we report the descriptive statistics of the dichotomous questions toward whom people felt envious. Of the 132 participants, 112 participants reported some level of envy on at least one of the days, representing 604 days in total. Twenty participants did not report feeling envious at all. The values in the “Intercept” column represent the percentage of days people felt envious toward that particular person relative to the total number of days someone reported envy (604).

$t = 6.67, p < .001, r_b^{(f)} = .47$. The effect size, $r_b^{(f)}$, which refers to the proportion of between-person variation explained by fixed-effect slopes, was calculated following a procedure outlined by Rights and Sterba (2019) that distinguishes different sources of variance in multilevel models. We also reversed the order of the variables and found similar results, $b = .49, t = 6.65, p < .001, r_b^{(f)} = .49$.

Next, we aimed to extend the research beyond between-person relationships by examining within-person relationships, which address fundamentally distinct questions and are statistically orthogonal (Affleck et al., 1999; Nezlek, 2001). In these models, daily envy was the outcome measure and daily nostalgia was the sole Level 1 predictor, centered around each individual’s mean which provides a pure estimate of the within-person relationship (Enders & Tofighi, 2007).

Model 2

$$\text{Day level: } y_{ij}(\text{envy}) = \beta_{0j} + \beta_{1j}(\text{nostalgia}) + r_{ij}, \tag{3}$$

$$\begin{aligned} \text{Person level: } \beta_{0j} &= \gamma_{00} + u_{0j}, \\ \beta_{1j} &= \gamma_{10} + u_{1j}. \end{aligned} \tag{4}$$

These results indicated that daily nostalgia was positively related to daily envy, $b = .11, 95\% \text{ CI } [.06, .15], t = 4.78, p < .001, r_w^{(f)} = .28$. For the average individual, the more nostalgic the person

felt, relative to their average or typical levels, the more envy they felt on that particular day. As a means of comparison, we also present the within-person relationships between nostalgia and positive affect and negative affect. For complete transparency, we note that though these studies were not preregistered, these analyses were not initially planned. We report them because a reviewer wondered whether the positive within-person relationship between daily nostalgia and envy was similar to relationships involving other affective states, particularly positive ones. These within-person relationships from Study 4 were reported as supplemental analyses by Newman and Sachs (2023). Aggregated across Studies 3 and 4, daily nostalgia was not significantly related to positive activated affect, $b = .00, 95\% \text{ CI } [-.03, .04], t = .19, p = .852, r_w^{(f)} = .07$, or positive deactivated affect, $b = -.00, 95\% \text{ CI } [-.04, .04], t = -.05, p = .964, r_w^{(f)} = .14$. Nostalgia was positively related to negative activated affect, $b = .12, 95\% \text{ CI } [.08, .17], t = 5.36, p < .001, r_w^{(f)} = .24$, and negative deactivated affect, $b = .15, 95\% \text{ CI } [.11, .20], t = 6.40, p < .001, r_w^{(f)} = .30$. These results are consistent with prior research (Newman et al., 2020; Newman & Sachs, 2020). Moreover, we controlled for negative activated and negative deactivated affect in the relationship between nostalgia and envy and found that the relationship was still significant, $b = .05, 95\% \text{ CI } [.01, .09], t = 2.72, p = .007$. Thus, the relationship between nostalgia and envy is unique and not due purely to a general association with negative affect.

Next, because people may feel envious in response to certain negative events or experiences during the day, we controlled for daily events in the initial model (Model 2) that examined the within-person relationship between daily nostalgia and daily envy by adding positive events and negative events as predictors at Level 1, which were also centered around each individual's mean. This model showed that nostalgia was still positively related to envy, $b = .08$, 95% CI [.04, .12], $t = 3.62$, $p < .001$, albeit slightly attenuated as expected. Thus, the positive within-person relationship between nostalgia and envy cannot be attributed to daily events that occurred during the day.

Finally, we conducted lagged analyses to examine the directionality of the within-person relationships between nostalgia and envy. In the model that tested the effect of nostalgia on envy, yesterday's nostalgia (day $n - 1$) predicted today's envy (day n) after controlling for yesterday's envy (day $n - 1$). A similar model was created to examine the effect in the opposite direction.

Model 3a

$$\text{Day level: } y_{ij}(\text{envy day } n) = \beta_{0j} + \beta_{1j}(\text{nostalgia day } n - 1) + \beta_{2j}(\text{envy day } n - 1) + r_{ij}, \quad (5)$$

$$\begin{aligned} \text{Person level: } \beta_{0j} &= \gamma_{00} + u_{0j}, \\ \beta_{1j} &= \gamma_{10} + u_{1j}, \\ \beta_{2j} &= \gamma_{20} + u_{2j}. \end{aligned} \quad (6)$$

Model 3b

$$\text{Day level: } y_{ij}(\text{nostalgia day } n) = \beta_{0j} + \beta_{1j}(\text{nostalgia day } n - 1) + \beta_{2j}(\text{envy day } n - 1) + r_{ij}, \quad (7)$$

$$\begin{aligned} \text{Person level: } \beta_{0j} &= \gamma_{00} + u_{0j}, \\ \beta_{1j} &= \gamma_{10} + u_{1j}, \\ \beta_{2j} &= \gamma_{20} + u_{2j}. \end{aligned} \quad (8)$$

These models indicated that yesterday's nostalgia predicted greater present-day envy, $b = .05$, 95% CI [.01, .09], $t = 2.45$, $p = .016$, while the reverse was only marginally significant, $b = .08$, 95% CI [-.01, .16], $t = 1.82$, $p = .075$. These results demonstrated that nostalgia and envy were not only significantly related on concurrent days, but nostalgia predicted greater levels of envy on the following day.

In sum, aggregated states of nostalgia and envy were positively related at the between-person level, and a within-person analysis showed that concurrent daily states of each variable were positively related. This relationship remained significant after controlling for the effects of daily events. Lagged analyses indicated that daily nostalgia predicted greater envy on the following day.

Study 5: Daily Nostalgia and Targets of Envy

Method

Participants and Procedure

The goal of Study 5 was to replicate the main findings from Studies 3 and 4 with participants from a different population and to extend the analyses by examining the target of people's feelings of envy in a daily diary study with a similar procedure. Participants were

undergraduate students from a public university in Eastern Canada. In exchange for their participation, students received course credit and one ticket for a 200-dollar draw for every survey they completed throughout the course of the study. We recruited as many participants as possible within the constraints of the subject pool. Similar to Studies 3 and 4, our sample size exceeded recommendations (Maas & Hox, 2005; Nezlek, 2012). Additionally, a power analysis based on the results from the within-person relationship between nostalgia and envy from Studies 3 and 4 showed that our sample would achieve .94 power to detect similarly sized effects. The study was approved by Carleton University's research ethics board under the ID no. 116323.

The procedure was similar to the prior studies. Each evening at 8:00 p.m. for 14 days, participants received a notification to complete a questionnaire on their phone. During the information session, participants were shown how to download and use the ExpiWell app and were instructed to complete their daily surveys near the end of their night but before midnight, as the surveys would expire at this time. We allowed for a 1-hr grace period for responses to be recorded by ExpiWell and accepted entries until 1:00 a.m. Participants had the option of receiving a reminder email for their daily surveys at a time of their choosing. In total, 1,448 daily reports were completed by 135 participants. We planned to first remove duplicate entries and then those that were completed after 1:00 a.m., but there were no such entries. Next, we removed participants who completed less than five valid entries. The final data set included 1,439 daily reports ($M = 11.45$, $SD = 2.23$, $Mdn = 12$) from 132 participants; however, demographic data were only available from 124 participants ($M_{\text{age}} = 21.20$, $SD_{\text{age}} = 4.97$; 26.61% male, 72.58% female, .81% other; 41.94% White, 15.32% Black, 29.84% Asian, 2.42% Native/Aboriginal People, 4.03% Hispanic/Latino, 4.03% other races). The three participants who were removed from the final analyses were not significantly different from the 124 participants in the final study who provided baseline data in terms of their age, $t(2.13) = -2.27$, $p = .144$; gender (all z s $< .260$, all p s $> .797$); or race (all z s $< .791$, all p s $> .431$). Full sample descriptions are provided in Table 4.

Measures

Measures of daily nostalgia and daily envy were the same as before. On days when participants indicated they felt a level of envy greater than the minimum ("did not feel this way at all today"), they were asked who they felt envious toward. Options included friend, acquaintance, past/former self, romantic partner, family member, coworker/colleague/classmate, God/higher power, no one in particular, and other. They were allowed to select more than one option. The measures of envy and nostalgia were preregistered.

We also measured daily affect, but we did not preregister these measures. We include these measures and analyses involving these measures as requested by a reviewer to address how the relationship between daily nostalgia and envy compares to relationships between daily nostalgia and other affective states. Using an affective circumplex similar to studies 3 and 4, positive activated affect was measured with delighted, happy, and excited; positive deactivated affect was measured with calm, peaceful, and at ease; negative activated affect was measured with stressed, tense, and nervous; negative deactivated affect was measured with depressed, gloomy, and sad. The 7-point response scale was the same as for envy. Additional measures were also collected as part of the project, and

Table 4
Study 5 Descriptive Statistics

Demographic variable	N	%	Nostalgia		Envy	
			M (SE)	M (SE)	M (SE)	M (SE)
Gender						
Male	33	26.61	2.83 (.21)	2.06 (.16)		
Female	90	72.58	2.58 (.13)	1.86 (.10)		
Another gender	1	.81	4.19 (1.25)	2.31 (.96)		
Age						
<25 years old	108	87.10	2.71 (.12)	1.93 (.09)		
25–34 years old	9	7.26	2.12 (.42)	1.40 (.31)		
35–44 years old	5	4.03	2.66 (.56)	2.57 (.42)		
45–54 years old	1	.81	2.00 (1.24)	1.42 (.93)		
Missing	1	.81				
Race/ethnicity						
Non-Hispanic White	52	41.94	2.54 (.17)	1.95 (.13)		
Non-Hispanic Black	19	15.32	3.10 (.28)	2.12 (.22)		
Non-Hispanic Asian	37	29.84	2.79 (.20)	1.94 (.16)		
Hispanic/Latino	5	4.03	2.35 (.55)	1.55 (.43)		
Native/Aboriginal People	3	2.42	1.74 (.71)	1.58 (.54)		
Other	5	4.03	1.96 (.55)	1.27 (.42)		
Missing	3	2.42				

Note. Demographic data were only available for 124 participants. Means (and standard errors) were calculated from multilevel models that account for between-person and within-person variation.

some analyses that addressed different questions from the present study have been published previously (Lutz et al., 2023, 2024).

Results

All analyses were preregistered (<https://aspredicted.org/q4wy-7jbc.pdf>) with the exception of the within-person relationships between daily nostalgia and affect, which are presented as requested by a reviewer. Similar to Studies 3 and 4, there was substantial within-person and between-person variation in daily nostalgia and envy (see Table 3). The between-person relationships between aggregated daily states of nostalgia and envy replicated the results from Studies 3 and 4, $b = .42$, 95% CI [.30, .53], $t = 7.25$, $p < .001$, $r_b^{(f)} = .57$.

The within-person relationship between daily nostalgia and daily envy was $b = .23$, 95% CI [.16, .30], $t = 6.40$, $p < .001$, $r_w^{(f)} = .38$, similar to the results from Studies 3 and 4. As a means of comparison, we also examined the within-person relationships between nostalgia and positive affect and negative affect. Daily nostalgia was not significantly related to positive activated affect, $b = .04$, 95% CI [−.04, .12], $t = .96$, $p = .340$, $r_w^{(f)} = .24$, or positive deactivated affect, $b = −.02$, 95% CI [−.10, .05], $t = −.65$, $p = .514$, $r_w^{(f)} = .25$. Nostalgia was positively related to negative activated affect, $b = .14$, 95% CI [.05, .23], $t = 3.17$, $p = .002$, $r_w^{(f)} = .31$, and negative deactivated affect, $b = .18$, 95% CI [.10, .27], $t = 4.15$, $p < .001$, $r_w^{(f)} = .35$. Moreover, we controlled for negative activated and negative deactivated affect in the relationship between nostalgia and envy and found that the relationship was still significant, $b = .17$, 95% CI [.12, .24], $t = 5.72$, $p < .001$. Similar to Studies 3 and 4, the relationship between nostalgia and envy is unique and is not due purely to a general association with negative affect.

The lagged relationship from yesterday’s nostalgia to today’s envy was not significant though in the positive direction, $b = .03$, 95% CI [−.02, .09], $t = 1.13$, $p = .261$. The lagged relationship from

yesterday’s envy to today’s nostalgia was also not significant though in the positive direction, $b = .05$, 95% CI [−.03, .12], $t = 1.25$, $p = .217$. Though different interpretations exist concerning what constitutes a replicated result, we note here that the lagged relationships in Study 5 were in the same direction as those in Studies 3 and 4. Results in the same direction though not significant may sometimes bolster the confidence in the aggregated results (Fabrigar & Wegener, 2016). We address these issues in the Aggregated Results From Studies 3–5 section below.

To understand whom people felt envious toward when they felt nostalgic, we examined the within-person relationships between the target of envy and daily nostalgia on days when people indicated some level of envy ($N = 604$). In separate models, dichotomous dummy-coded variables to indicate the target of envy were outcome measures at Level 1, and daily nostalgia was the Level 1 predictor, centered around each individual’s mean.

Model 4

$$\text{Day level: Prob}(\text{envy target} = 1 | \beta_{0j}) = \varphi,$$

$$\ln(\varphi / (1 - \varphi)) = \beta_{0j} + \beta_{1j}(\text{nostalgia}), \tag{9}$$

$$\text{Person level: } \beta_{0j} = \gamma_{00} + u_{0j},$$

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

Daily nostalgia was positively related to envy toward a family member, $OR = 1.46$, $z = 3.06$, $p = .002$, and envy toward one’s past self, $OR = 1.58$, $z = 3.13$, $p = .002$. All other targets of envy were not significant, $zs < 1.58$, $ps > .110$. This indicates that when people felt nostalgic, they typically felt envious of a family member and/or their past self.

Aggregated Results From Studies 3–5

We also aggregated the data from Studies 3–5 to examine the robustness of the key results. Within persons, daily nostalgia was positively related to daily envy, $b = .15$, 95% CI [.11, .19], $t = 7.80$, $p < .001$ (see Figure 2). The lagged relationship from yesterday’s nostalgia to today’s envy was positive, $b = .05$, 95% CI [.01, .08], $t = 2.62$, $p = .010$, as was the lagged relationship from yesterday’s envy to today’s nostalgia, $b = .07$, 95% CI [.01, .13], $t = 2.38$, $p = .019$. Thus, the within-person lagged relationship between nostalgia and envy was bidirectional.

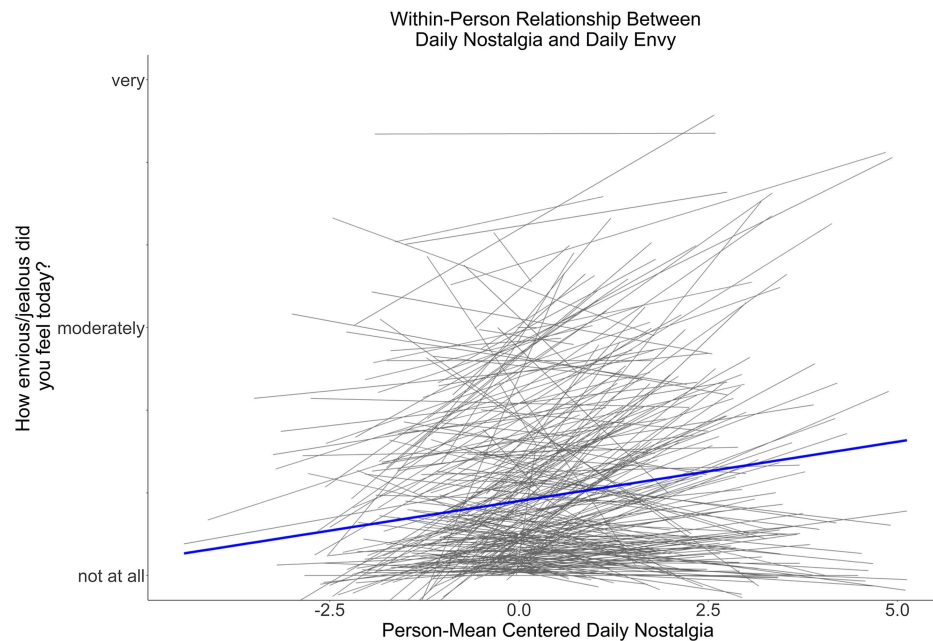
Studies 6 and 7: Experimental Effects of Nostalgia on Envy

Method

Although lagged analyses provide the most robust causal evidence about the directionality of naturally occurring states in daily life, they are limited in the sense that unmeasured third variables may account for the lagged effects. To address this limitation, we experimentally manipulated nostalgia in different ways to test the causal effect of nostalgia on envy.² Because most previous research has focused on the effects of negative events and

² We also acknowledge that experiments are limited in several ways (Diener et al., 2022). Our goal of combining correlational and experimental methods was to integrate methods with complementary strengths and weaknesses (McGrath, 1982).

Figure 2
Within-Person Relationship Between Person-Mean Centered Daily Nostalgia and Daily Envy Aggregated Across Studies 3–5



Note. Black lines represent regression slopes for each individual, and the blue line represents the average slope. See the online article for the color version of this figure.

experiences on nostalgia while neglecting the negative effects of nostalgia (Sedikides, Wildschut, Routledge, Arndt, Hepper, & Zhou, 2015), we sought to examine the potentially more novel causal effect of nostalgia on envy while examining potential mediators of the effect. In two experiments with between-subject designs, participants were randomly assigned to one of two different nostalgia conditions or a control condition. Study 7 was a preregistered (<https://aspredicte.d.org/pdk7-vvrz.pdf>), direct replication of Study 6. Results are provided across the aggregated data set, and separate results across studies are presented in Supplemental Materials. The studies were approved by the Human Research Protection Office at Columbia University under the ID IRBAAAT3955.

Participants in Study 6 were undergraduate students at a private university in the United States ($N = 213$; $M_{\text{age}} = 20.10$, $SD = 2.60$; 44.13% male, 54.46% female, 1.41% other gender; 44.1% White, 9.9% Black, 23.5% Asian, 18.3% Hispanic/Latino, 3.3% multiple or other races) and received research credit as compensation. We collected data from as many participants as possible from the subject pool. Participants in Study 7 were recruited from Prolific ($N = 300$; $M_{\text{age}} = 37.50$, $SD = 12.84$; 49.00% male, 49.00% female, 2.00% other gender; 81.0% White, 8.0% Black, 9.3% Asian, 5.7% Hispanic/Latino, 0.3% multiple or other races) and were compensated financially. A power analysis based on the effect sizes from Study 6 indicated that a sample of 214 was needed to achieve 80% power. Full sample descriptions of participants in Studies 6 and 7 are provided in Table 5.

Our goal was to manipulate nostalgia in two different manners to capture a range of different nostalgic feelings. We used the same manipulation as Newman and Sachs (2023) who induced different

types of nostalgic feelings that had divergent effects on well-being. The reason for selecting different nostalgic inductions with divergent effects was to make sure we were not “stacking the deck” by only selecting nostalgic memories that may be overly positive or atypical, for instance. Note that we are not bifurcating nostalgia; rather, we are attempting to elicit different instances of the same unitary construct. Similar to nearly all nostalgia manipulations (Leunissen et al., 2021), participants in both nostalgia conditions were presented with the Oxford Dictionary definition of nostalgia (“nostalgia is defined as a sentimental longing for the past”). Next, they were told that “People are often nostalgic about times with other people, such as family, friends, a partner, or close others.” Next, participants in the connected and disconnected nostalgia conditions were instructed to think of a nostalgic event in their life that involved people they remained close to or with whom they no longer kept in touch, respectively. The instructions for the connected nostalgia (disconnected nostalgia) conditions read as follows:

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

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

Table 5
Studies 6 and 7 Descriptive Statistics

Demographic variable	Study 6		Study 7		Aggregated study			
	N	%	N	%			Nostalgia	Envy
					N	%	M (SD)	M (SD)
Gender								
Male	94	44.13	147	49.00	241	46.98	4.92 (1.63)	2.59 (1.62)
Female	116	54.46	147	49.00	263	51.27	5.05 (1.73)	2.53 (1.64)
Another gender	3	1.41	6	2.00	9	1.76	5.22 (.94)	3.50 (2.25)
Age								
<25 years old	202	96.19	45	15.00	247	48.43	4.93 (1.63)	2.69 (1.68)
25–34 years old	6	2.86	95	31.67	101	19.80	4.91 (1.75)	2.66 (1.63)
35–44 years old	2	.95	82	27.33	84	16.47	5.10 (1.59)	2.68 (1.70)
45–54 years old			43	14.33	43	8.43	5.28 (1.69)	2.30 (1.55)
55–64 years old			23	7.67	23	4.51	4.80 (2.30)	1.70 (1.19)
65+ years old			12	4.00	12	2.35	5.33 (1.17)	1.58 (.82)
Race/ethnicity								
Non-Hispanic White	94	44.13	243	81.00	337	65.69	5.00 (1.70)	2.59 (1.61)
Non-Hispanic Black	21	9.86	24	8.00	45	8.77	4.77 (1.81)	2.64 (1.86)
Non-Hispanic East Asian	50	23.47	28	9.33	78	15.20	4.94 (1.68)	2.65 (1.81)
Hispanic/Latino	39	18.31	17	5.67	56	10.92	5.30 (1.52)	2.29 (1.38)
Other	7	3.29	1	0.33	8	1.56	5.06 (1.18)	1.38 (.74)

Next, they were instructed to write about the experience for a few minutes while noting how it made them feel. Consistent with prior research (Sedikides, Wildschut, Routledge, Arndt, Hepper, & Zhou, 2015; Wildschut et al., 2006), participants in the control condition listed four keywords about an ordinary experience and then wrote about how it made them feel.

Following the writing task, participants answered two questions about how nostalgic they were feeling as a manipulation check: “How nostalgic do you feel right now?” and “Right now, to what extent do you feel sentimental for the past?” (1 = *not at all*, 4 = *moderately*, 7 = *very much*, $\alpha = .90$). As the primary dependent variable, participants then answered two questions about how envious they felt: “How envious do you feel right now?” and “Right now, how jealous do you feel?” (1 = *not at all envious/jealous*, 4 = *moderately envious/jealous*, 7 = *very envious/jealous*, $\alpha = .87$).³

Following these questions, we included several potential mediator variables. Envy toward others was assessed with two items: “Specifically, how envious do you feel right now toward other people?” and “Right now, how jealous do you feel specifically toward other people?” ($\alpha = .94$). Envy toward a past self was assessed with the two questions: “Thinking about yourself during this experience you just wrote about, how envious do you feel toward your past self?” and “Continuing to think about yourself during this experience you just wrote about, how jealous do you feel toward your past self?” ($\alpha = .90$). Response scales were the same as general envy. Past satisfaction was measured with the single item, “How satisfied were you with your life back then?” (1 = *very dissatisfied*, 7 = *very satisfied*). Present satisfaction was measured with the item, “Now, how satisfied are you with your life currently?” Three items were included to measure regret: “If I could go back to that situation, there are many things I would do differently,” “I wish I could avoid many of the mistakes I made during this time in my life,” and “When I think about this situation and this time of my life, I feel a great sense of regret” (1 = *strongly disagree*, 7 = *strongly*

agree, $\alpha = .85$). Past and present satisfaction were only assessed in Study 7.

Results

As a manipulation check, levels of nostalgia were significantly higher in the connected nostalgia condition ($M = 5.43$, $SD = 1.40$) and disconnected nostalgia condition ($M = 5.53$, $SD = 1.29$) than the control condition ($M = 4.01$, $SD = 1.84$), $t(318.85) = 8.03$, $diff = 1.42$, 95% CI [1.07, 1.77], $p < .001$, and $t(305.98) = 8.87$, $diff = 1.51$, 95% CI [1.18, 1.85], $p < .001$, respectively. The connected and disconnected nostalgia conditions did not differ significantly, $t(339) = -.65$, $diff = -.09$, 95% CI [-.38, .19], $p = .516$. Thus, our manipulation was effective.

Our primary preregistered question concerned whether the nostalgia conditions differed from the control condition, so we ran planned contrasts that compared the two nostalgia conditions with the ordinary control condition. As presented in Table 6 and Figure 3, general envy was significantly higher in the nostalgia conditions than in the control condition. We also detected significantly higher levels of envy toward one’s past self, satisfaction with the past, and regret in the nostalgia conditions than in the control condition. Levels of envy toward others and satisfaction with the present in the nostalgia conditions did not differ significantly from the control condition.

To understand why nostalgia increases feelings of envy, we ran mediation models in which the nostalgia predictor variable was a dichotomous variable (1 = connected or disconnected nostalgia condition, 0 = control condition), general envy was the outcome

³ Results indicated people were able to distinguish clearly between measures of nostalgia and envy. They were moderately correlated, $r = .35$, and a factor analysis of the four items yielded eigenvalues of 2.43, 1.18, .23, and .17. Nostalgia items loaded highly on one factor (.96, .94), and envy items loaded highly on the second factor (.91, .97) while cross-loadings were small (absolute values <.09).

Table 6
Dependent Variables as a Function of Connected and Disconnected Nostalgia (Studies 6 and 7)

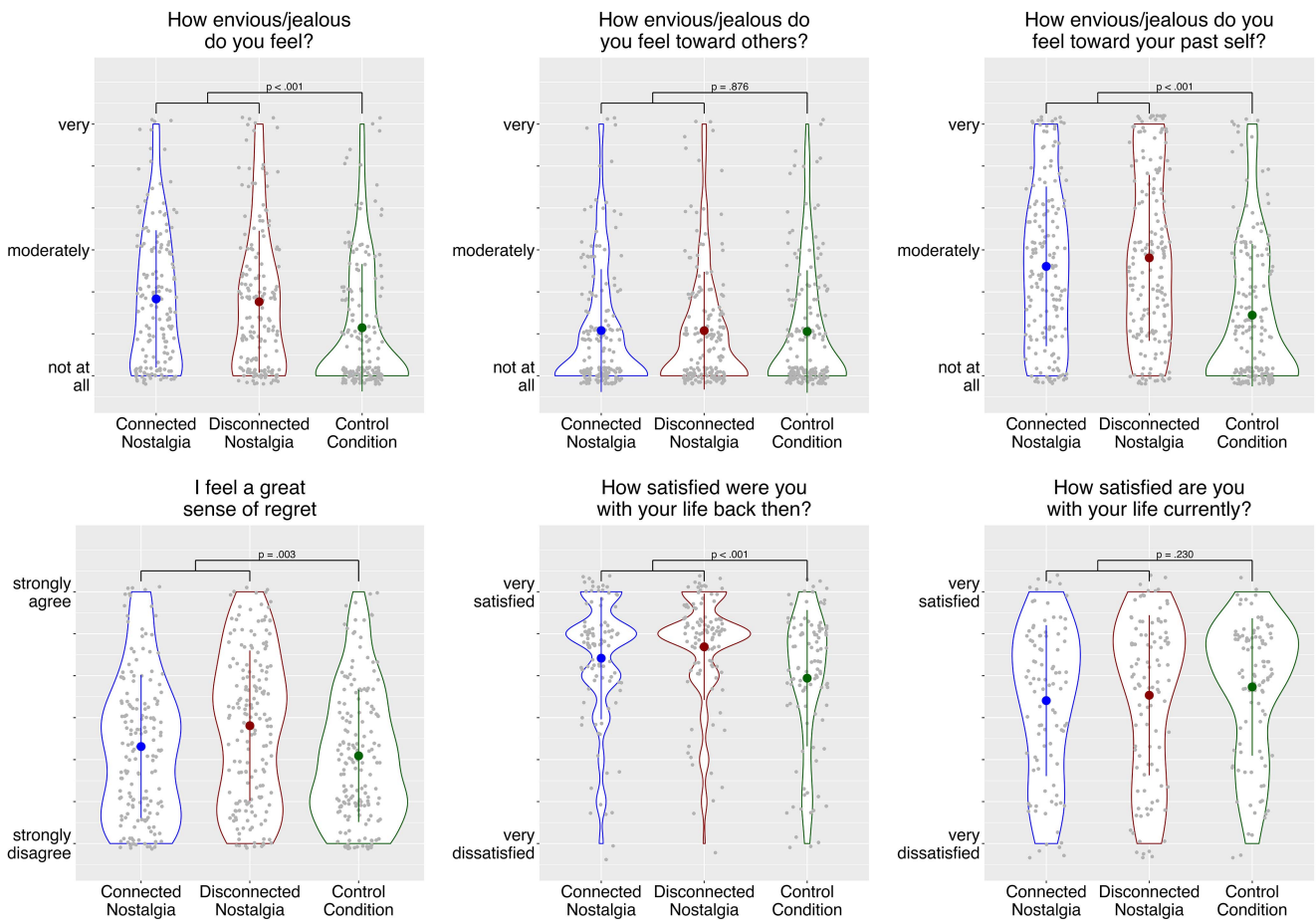
Dependent variable	N	Condition			Omnibus test			Planned contrast			
		Connected nostalgia	Disconnected nostalgia	Control	F	p	η^2	Diff [95% CI]	t	p	d
General envy	513	2.83 (1.64)	2.76 (1.69)	2.15 (1.52)	9.37	<.001	.035	.653 [.356, .950]	4.32	<.001	.404
Envy toward others	513	2.08 (1.46)	2.07 (1.40)	2.06 (1.46)	.01	.988	.000	.021 [−.244, .286]	.16	.876	.015
Envy toward one's past self	513	3.61 (1.90)	3.81 (1.98)	2.44 (1.70)	26/91	<.001	.095	1.26 [.922, 1.607]	7.26	<.001	.679
Regret	513	3.31 (1.70)	3.81 (1.79)	3.09 (1.58)	8.15	<.001	.031	.469 [.158, .780]	2.96	.003	.277
Satisfaction with past	300	5.42 (1.46)	5.69 (1.27)	4.94 (1.62)	6.90	.001	.044	.61 [.26, .96]	3.44	<.001	.421
Satisfaction with present	300	4.41 (1.80)	4.53 (1.91)	4.73 (1.64)	.84	.433	.006	−.26 [−.69, .17]	−1.20	.230	.147

Note. Satisfaction with the past and satisfaction with the present were only assessed in Study 7. CI = confidence interval; Diff = difference.

variable, and the following variables were mediators in separate models: envy toward one's past self, regret, and satisfaction with the past. The total effect for all models was, $b = .65$, 95% CI [.36, .95], $t = 4.32$, $p < .001$. To calculate the indirect effects, we used a

bootstrapping technique with 5,000 bootstrap resamples and a bias-corrected confidence estimates with a 95% confidence interval (Hayes, 2017; Preacher & Hayes, 2008). The indirect effects for envy toward the past self, $b = .72$, $SE = .10$, 95% CI [.52, .92],

Figure 3
Violin Plots for Each Dependent Variable Across Conditions in Studies 6 and 7



Note. Planned contrasts compared the two nostalgia conditions with the control condition. See the online article for the color version of this figure.

partially standardized effect = .44, and regret, $b = .08$, $SE = .03$, 95% CI [.02, .15], partially standardized effect = .05, were significant. The direct effects were $b = -.07$, 95% CI [-.30, .17], $t = -.56$, $p = .575$, and $b = .57$, 95% CI [.28, .87], $t = 3.82$, $p < .001$, respectively. The indirect effect for satisfaction with the past was not significant, $b = -.00$, $SE = .04$, 95% CI [-.09, .08].

Because regret and envy toward the past self were significant mediators, we ran exploratory (nonpreregistered) analyses to examine whether regret and envy toward a past self were significant mediators of each specific nostalgia condition separately as opposed to aggregated together. Envy toward a past self significantly mediated the relationships between the connected nostalgia condition and general envy, $b = .68$, $SE = .12$, 95% CI [.45, .93], partially standardized effect = .42, and between the disconnected nostalgia condition and envy, $b = .78$, $SE = .12$, 95% CI [.54, 1.03], partially standardized effect = .48. Thus, the mediation effect of feeling envious toward a past self was robust across different elicitations of nostalgia. In contrast, regret mediated the effect of disconnected nostalgia on general envy, $b = .16$, $SE = .05$, 95% CI [.06, .27], partially standardized effect = .10, but did not significantly mediate the effect of connected nostalgia on envy, $b = .04$, $SE = .03$, 95% CI [-.02, .11], partially standardized effect = .02. Thus, regret may mediate the effect of nostalgia on envy in situations when nostalgia is elicited under negative circumstances only, which is consistent with the positive within-person covariation between these daily states (Newman et al., 2020).

General Discussion

The present set of studies represents the first examination of the relationships between nostalgia and envy and the causal effects and processes of nostalgia on envy. Across a diverse range of methods, we found that nostalgia was positively related to envy at between-person and within-person levels of analysis. That is, nostalgia-prone individuals reported higher levels of envy than less nostalgia-prone individuals even after statistically accounting for demographic characteristics and relevant personality traits. On days when people felt more nostalgic than they typically do, they reported higher envy, even after statistically accounting for daily negative experiences that might predict feelings of envy. Lagged analyses indicated that nostalgia predicted higher levels of envy on the following day, and envy predicted higher levels of nostalgia on the following day. Moreover, experimentally induced nostalgic reflections increased feelings of envy relative to a reflection of an ordinary experience. This effect was mediated quite robustly by specific feelings of envy toward one's past self and by feelings of regret in particular contexts. These results provide novel insights into the nature of nostalgia as a complex mixed emotion and offer important theoretical and practical implications.

At a theoretical level, the present findings suggest that nostalgia may not be quite so positive as prior research has suggested (Sedikides, Wildschut, Routledge, Arndt, Hepper, & Zhou, 2015) given that envy is widely considered a negative emotion (Smith & Kim, 2007). This negative effect of nostalgia on well-being stands in contrast to much of the prior literature, which has almost exclusively examined positive outcomes instead of including negative outcomes (Sedikides, Wildschut, Routledge, Arndt, Hepper, & Zhou, 2015). Moreover, most experimental inductions of nostalgia have relied on a manipulation in which participants have been asked to recall their most nostalgic feeling (Leunissen et al., 2021), which is a more

positive nostalgic feeling than people's typical or daily nostalgic feelings (Newman et al., 2020). Experiments that have manipulated nostalgia by asking people to reflect on different types of nostalgic feelings have yielded divergent effects on well-being (Newman & Sachs, 2023). Interestingly, when we induced nostalgia in ways that have led to positive and negative outcomes in prior research, we found that the effect of nostalgia on envy was not driven solely by the more negative nostalgia condition (disconnected nostalgia) but was also found in the more positive nostalgia condition (connected nostalgia).

Though the negative effect of nostalgia on well-being may differ from much of the experimental research on nostalgia, the mixed nature of nostalgia is consistent with the broader literature on mixed emotions (Barford et al., 2020; Oh, 2022; Oh & Tong, 2022). For instance, in a 10-year longitudinal study, emotional ambivalence predicted lower psychological well-being (Oh, 2022). Across three experience sampling method studies, mixed emotions were more closely linked to changes in negative affect and negative events than positive affect and positive events. Individuals who experienced higher levels of mixed emotions also reported greater neuroticism (Barford et al., 2020). Though clearly not an exhaustive list of examples, these studies highlight some negative associations between mixed emotions and well-being, and our findings are consistent with these patterns.

Though the present results point to a more negative depiction of nostalgia than prior research, these conclusions should be tempered after considering two important findings from the present research. First, the lagged analyses from the diary studies indicated possible bidirectional relationships, which means that daily states of envy could lead to greater nostalgia on the following day. This is consistent with prior research that shows that nostalgia is often elicited in response to negative events and experiences (Newman et al., 2020; Sedikides, Wildschut, Routledge, Arndt, Hepper, & Zhou, 2015). It is possible that experimental manipulations of envy could produce nostalgia too. Second, the causal effect of nostalgia on envy was mediated primarily by feelings of envy toward a past self as opposed to envy toward others. Whereas feelings of envy directed toward another person are purely negative, feeling envious toward one's own past self is a bit more positive since it acknowledges a positive feature or attribute of oneself albeit in the past, which may be viewed as distinct from the present self, depending on the context (Pronin & Ross, 2006). When considered as a whole, these specific findings highlight the mixed nature of nostalgia.

The present set of results holds important practical implications as well because feelings of nostalgia increased following the onset of the COVID-19 pandemic (Yeung, 2020). In response to negative events, it is particularly important to understand how nostalgia may influence people's well-being, and the present findings point to one potentially negative outcome. Given how negative emotions can influence people's health (Kubzansky et al., 2014), it may be important to consider these findings as policymakers provide recommendations for public health (Aknin et al., 2022).

Limitations and Future Directions

Though the participants in the cross-sectional and experimental studies were fairly diverse in regard to several demographic characteristics, caution should be exercised when attempting to generalize the findings more broadly, particularly across cultures

and levels of socioeconomic status. The participants in the diary studies were undergraduate students, similar to most studies in this area, and thus, future research is needed to examine the generalizability of the findings. Therefore, we make no assumptions about the universality of these processes. Rather, the present set of studies relied on a diverse set of methods to address a unique relationship and processes that have not been considered previously. Though the diverse set of methods highlights one strength of the article, the present studies are limited in their ability to generalize to people from different cultural backgrounds.

Along these lines, we used two different inductions of nostalgia in Studies 6 and 7, both of which involved reflections of other individuals. Although many nostalgia memories involve other people, not all of them do (Juhl & Biskas, 2023; Sedikides, Wildschut, Routledge, Arndt, Hepper, & Zhou, 2015; Wildschut et al., 2006). To generalize the causal effects of nostalgia on envy more broadly, it could be useful in future research to manipulate nostalgia in different ways. Participants could recall nostalgic memories of places for instance. This limitation is offset to some degree by the daily diary studies that found that daily states of nostalgia predicted greater feelings of envy on the following day because daily feelings of nostalgia tend to capture a broad array of different types of nostalgic feelings (e.g., Newman & Sachs, 2023). Nevertheless, in future studies, it would be useful to expand the range and types of nostalgia inductions to generalize the causal effects more broadly.

We briefly mention four interesting avenues for future research. First, though we found some support that the effect of nostalgia on envy was mediated by feelings of regret and envy toward a past self, future research is needed to tease apart these nuances. For instance, nostalgia could cause one to regret one's decisions in the past, which could lead to feelings of envy. This might be explained by certain specific comparisons, such as one's life in the past with the present situation.

Second, in addition to the effect of nostalgia on envy, we found that certain nostalgic feelings also increased feelings of regret, which was a significant mediator of the effect of the disconnected nostalgic feelings on envy. The mediation models are limited though in that the mediators and outcomes were all measured and not manipulated. In future research, it could be beneficial to examine these separate causal processes in addition to the possibility that nostalgia could cause envy which could lead to greater regret. It might also be the case that nostalgia elicits particular appraisals that could lead to feelings of regret and envy in parallel.

Third, it would behoove researchers to consider the long-term effects of nostalgia on envy and other downstream consequences. Envy is a negative emotion, but it could have beneficial effects in particular contexts. For example, feeling envious of a sibling's job could spur one to work harder and improve one's life, ultimately leading to a redemptive narrative (Wildschut et al., 2006). Thus, feelings of envy could lead to or interact with certain motivational states that could yield beneficial long-term effects. Though we do not recommend confounding feelings of envy with motivational states and behavioral outcomes when measuring envy (Cohen-Charash & Larson, 2017), we believe that nostalgic feelings that cause envy could yield certain beneficial outcomes in the future. These beneficial outcomes would be similar to some of the positive outcomes described in measures of benign envy (e.g., improving one's life, accomplishing personal goals).

In contrast, in other situations, feelings of envy elicited by nostalgia could lead to more negative outcomes. For instance, feeling envious of another person's expensive jewelry could lead one to criticize this person's character in an attempt to make one feel better about oneself, ultimately harming the relationship. This type of outcome might be more similar to the types of outcomes described in measures of malicious envy. These types of situations could also be integrated with the bittersweet variation model of nostalgia (Newman & Sachs, 2023), a model that posits that nostalgia elicited under more positive circumstances should lead to more beneficial outcomes, whereas nostalgia elicited in negative situations could lead to worse outcomes. Testing these processes remains a fruitful avenue for future research.

Fourth, how nostalgia is measured might have implications for how it relates to envy. We relied on the PINE scale as this has received the most rigorous psychometric testing of any nostalgia scale and adequately assesses general feelings of nostalgia (Newman et al., 2020). Related measures of nostalgia might be associated with envy in different ways. For example, the Southampton Nostalgia Scale combines nostalgia proneness with valuing nostalgia (Barrett et al., 2010), and this measure is related to well-being in distinct ways from the PINE. In one study, the PINE was positively related to a measure of depression, whereas the Southampton Nostalgia Scale was not (Newman et al., 2020). Therefore, the relationships between the Southampton Nostalgia Scale and envy may not be as strong as the relationships between the PINE and envy reported here. Another scale that has been widely used is the Nostalgia Inventory, which asks participants about the extent to which they miss certain objects or aspects of their lives (Batcho, 1995). This measure may assess different factors that relate to nostalgia (Huang & Uricher, 2024), and this measure could be useful in understanding how envy might be particularly relevant to certain aspects of one's life as opposed to other aspects that one misses. Relatedly, scales that assess other aspects associated with nostalgia could be related to envy in different ways. When considering such questions in future studies, we urge researchers to consider best psychometric practices when measuring nostalgia and rely on scales that have received adequate testing.

Conclusion

Nostalgia is a sentimental longing for the past that shares certain features with envy, a resentful feeling or even longing for another person's attributes, possessions, or good fortune. Nostalgia is not only positively related to envy both between and within individuals, but nostalgia can cause people to feel envious. Documenting negative effects of nostalgia on well-being is an important consideration when characterizing this mixed emotion.

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