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A perceived facial expression of nostalgia

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Abstract
Is nostalgia believed to have a face? We examined whether nostalgia has perceived facial expression features accompanied by trait inferences. In a Preliminary Study (N=67), two facial actions featured in expressions of nostalgia: an averted gaze and a small smile. In Experiment 1 (N=103), participants read vignettes with features that were central, peripheral, or unrelated to nostalgia, and subsequently selected the facial expression that best illustrated each vignette. Participants selected more frequently an expression with averted (vs. direct) gaze to illustrate vignettes with central or peripheral (vs. unrelated) features of nostalgia. In Experiment 2 (N=306), participants selected more frequently expressions that combined an averted gaze and small smile to illustrate vignettes with central (vs. peripheral) features of nostalgia. In Experiment 3 (N=303), participants attributed higher interpersonal warmth and nostalgia to facial expressions that combined (vs. did not combine) an averted gaze and a small smile. The findings provide first evidence for facial expression features perceived to be nostalgic—an averted gaze combined with a small smile—and show that this expression elicits attributions of interpersonal warmth.

Keywords Nostalgia · Facial expression · Gaze · Smile · Warmth

Nostalgia is defined as "a sentimental longing or wistful affection for the past" (*The New Oxford Dictionary of English*, 1998, p. 1266). The emotion typically involves fond reflections on momentous and personally relevant life events (e.g., graduation, vacation, holidays) that were shared with valued others (e.g., family, partners, friends; Abeyta et al., 2015; Madoglou et al., 2017; Wildschut et al., 2006). Hepper et al. (2012) conducted a detailed investigation of lay conceptions of nostalgia. Participants first generated features of nostalgia (Study 1), which were then ranked based on their prototypicality (Study 2). Those features that ranked comparatively high on prototypicality are commonly referred to as *central* features of nostalgic experiences, whereas those that ranked comparatively lower represent *peripheral* features. Relationships, keepsakes, and childhood emerged as examples of central (i.e., important and frequent) nostalgia features. Desire, daydreaming, and calm emerged as examples of peripheral (i.e., relatively unimportant and infrequent) nostalgia features. Indeed, vignettes with central nostalgia features were judged as being more representative of nostalgic experiences than vignettes with peripheral or non-nostalgic features (Study 5). Furthermore, when nostalgia was experimentally induced (Study 6), participants reported greater resemblance between central (than peripheral) nostalgia features and their own experiences.

Follow-up research established that these lay conceptions of nostalgia are remarkably similar across cultures. Hepper et al. (2014) asked individuals from 18 countries across five continents to rank the central and peripheral features of nostalgia. There was striking consistency in these rankings across countries, with only minor variations. Taken together, the literature has examined in considerable detail the experience of nostalgia but has not addressed its putative facial expression. Our key objective is to fill this lacuna.

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Facial expressions of emotions

Facial expressions have been a key topic of inquiry in the emotion literature (Lazarus, 1991). This inquiry was sparked by Darwin (1872), who observed that the display of emotions regulates social interactions. Building on Darwin's observation, several researchers proposed that emotion displays have an evolutionary basis, which should be reflected in the universality of their expression (Ekman, 1993; Izard, 1994; Tomkins, 1962). Since then, a body of work has illustrated a degree of universality in the expression and recognition of emotion (Ekman, 1993; Keltner et al., 2019; for a critique, see: Crivelli & Fridlund, 2019).

More to the point, consistent with Darwin's observation (1872; see Ekman, 2006, for a review), evidence suggests that the expression of emotions conveys social cues. Whereas the original wave of research focused on six emotions considered to be *basic* (i.e., happiness, surprise, sadness, fear, disgust/contempt, anger; Ekman, 2006; Russell, 1994), subsequent work examined the facial and bodily expression of other emotions such as shame, guilt, and embarrassment (Keltner, 1996), despair, interest, and boredom (Wallbott, 1998), as well as pride (Tracy & Robins, 2004a). Pride, for example, is expressed as "a small smile, head tilted slightly back, visibly expanded posture, and arms raised above the head or hands on hips" (Tracy & Robins, 2004a, p. 194), which may convey leadership ability, dominance, and status (Tracy & Robins, 2004b). Shame is expressed as "a simple head tilt downward [and] may include slumped shoulders and narrowed chest" (Tracy & Matsumoto, 2008, p. 11655), which may convey submission that facilitates social reparations after a wrongdoing (Giner-Sorolla et al., 2008).

There are boundaries to the accuracy of emotion recognition based on facial expression and to the consistency with which emotions are facially expressed across or even within societies, individuals, and situations. These boundaries are, for example, evident from variations in accuracy and speed of emotion identification across cultures and research methodologies (Krys et al., 2016; Nelson & Russell, 2013; see also Gendron et al., 2012). In addition, language modulates the perception of emotion expressions: Emotion words (e.g., "anger") that are cognitively accessible speed-up recognition (Lindquist et al., 2006). Furthermore, the accuracy of emotion recognition drops when researchers ask participants to identify emotions without providing them with a set of emotion-words to choose from (Barrett et al., 2006; Russell et al., 1994). Accordingly, Barrett (2006) proposed that facial-expression cues are only one aspect of the emotion recognition process; the level of agreement between individuals in assigning facial expressions to specific emotion categories depends on whether these individuals ascribe the same meaning to emotion-words (see also: Gendron et al., 2012; Matthews et al., 2022). As such, accuracy in recognizing facial expressions of emotion is higher when the person performing the expression is from one's own, as opposed to another, culture (Elfenbein & Ambady, 2002). Furthermore, the expression of emotions is modulated by broader psychological, sociological, and cultural context. Niedenthal et al. (2017), for example, suggested that the prominence and presence of facial expression features (e.g., the intensity of a smile) may vary as a function of past and present socio-ecological contexts, such as the historical role of pathogens in the context of avoidance-related emotions or residential mobility as a potential source of expression intensity. In summary, although facial expressions are often a key element of emotion perception, they do not operate in a vacuum. Whether facial expressions provide a good basis for the recognition and categorization of emotions depends on the meaning assigned to the relevant emotions.

A facial expression of nostalgia

We focus on identifying facial expression features that people ascribe to nostalgia. Horstmann (2002) proposed that the mental representation of emotions follows goal-derived categories. Specifically, the extent to which a target (e.g., a specific facial expression) is seen as a good exemplar of an emotion category (e.g., nostalgia) depends on the extent to which the target serves the goal associated with that category. Identifying what facial expressions feature in an emotion can thus provide insights not merely into what the emotion looks like, but also into the goal(s) that this emotion serves.

Indeed, there are good reasons to expect that nostalgia has a perceived facial expression. A primary function of emotions is communication of social cues (Darwin, 1872; Ekman, 2006), and this view has been backed by considerable research on a variety of emotions (Ekman, 1992; Keltner, 1996; Tracy & Matsumoto, 2008; Tracy & Robins, 2004a, 2004b). Nostalgia also serves to maintain social relationships (Juhl & Biskas, 2023; Sedikides et al., 2015). In particular, nostalgia promotes social connectedness (Wildschut et al., 2006), builds secure attachment (Wildschut et al., 2010), increases empathy as well as charitable giving (Zhou et al., 2012), and boosts interpersonal competence (Wildschut et al., 2006) that is needed for help-seeking (Juhl et al., 2021). Likewise, collectively shared nostalgia facilitates ingroup prosociality (Sedikides & Wildschut, 2019; Wildschut et al., 2014). A facial expression of nostalgia may be expected to convey (pro)sociality. That is, people may ascribe to nostalgia a facial expression that signals to perceivers that the nostalgizer is inclined toward (pro)

sociality—a signal that will likely encourage attributions of positive interpersonal qualities (e.g., kindness, warmth).

Overview

To investigate the perceived facial expression of nostalgia, we conducted four studies. In a Preliminary Study, we instructed participants to display a facial expression of nostalgia. We coded these facial expressions using the Facial Actions Coding Scheme (FACS; Ekman & Rosenberg, 1997) and exploratorily derived two common facial actions: averted gaze and a small smile. In the ensuing experiments, we sought to validate and confirm these facial-expression characteristics and test their communicative function.[1] In Experiment 1, we tested whether an averted gaze characterizes the perceived facial expression of nostalgia. In Experiment 2, we tested if the perceived facial expression of nostalgia features an averted gaze and small smile by manipulating these features orthogonally. Lastly, in Experiment 3, we examined trait inferences elicited by this nostalgic facial expression. All experiments (including the Preliminary Study) were approved by the respective Institutional Review board of the University of Southampton, except for the Supplement Materials study, which was approved by University of Essex.

Open practices and data availability. We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study. All data and analysis code are available online (Van Tilburg et al., 2026). We analyzed the data using *R*, version 4.0.3 (R Core Team, 2020). For all analyses we provided standardized effect sizes, as well as 95% confidence intervals. We did not pre-register the main studies, but did pre-register an ancillary experiment reported in Supplemental Material (Experiment S1; Van Tilburg et al., 2023).

[1] We used experimental designs in which participants selected or evaluated facial expressions multiple times. This practice resulted in nested data, with each participant contributing several responses. To account for this, we implemented multilevel modelling (MLM) in preliminary analyses. MLM partitions the error terms into a micro (observations within participants) and macro (participants) level. These preliminary MLM analyses, however, indicated that the macro-unit variance (i.e., the variance associated with between-subjects differences after partialling out micro-unit variance) was very low across the studies, with the intra-class correlations (ICC)—"the degree of resemblance between micro-units belonging to the same macro-unit" (Snijder & Bosker, 2012, p. 16)—being close to zero for all effects (ICCs ≤ .043). Accordingly, we treated the multiple responses within participants as units of analysis and analyzed these using general (log)linear modelling and chi-square tests.

Preliminary study

As part of a class exercise, we instructed 67 undergraduate students residing in the United Kingdom[2] to submit a photograph in which they displayed a facial expression of nostalgia. The students were given a definition of nostalgia ("a sentimental longing or wistful affection for the past"; *The New Oxford Dictionary of English*, 1998, p. 1266). Two judges coded facial expressions with the FACS (Ekman & Rosenberg, 1997; Shiota et al., 2003). It allows the detailed and reliable coding of facial displays using categories that correspond to the activation of specific facial muscles. The judges coded both occurrence (*absent* vs. *present*) and intensity (1 = *trace*, 5 = *maximum*) of action. We report below the percentages of facial actions where both judges agreed on their presence. The judges were trained through self-study of the FACS manual, instructional videos, and publicly available materials, but were not certified. As seen below, the consistency between ratings was very high, suggesting that the judges could reliably code the actions.

Most displays featured an averted gaze ($M = 70.15\%$, inter-rater $\kappa = 0.673$), which was directed left (AU61; $M = 26.87\%$, $\kappa = 0.730$), right (AU62; $M = 41.78\%$, $\kappa = 0.939$), up (AU63; $M = 31.34\%$, $\kappa = 0.663$), or down (AU64; $M = 13.43\%$, $\kappa = 0.784$). Most expressions with upward gaze also displayed left/right averted gaze ($M = 80.95\%$), and the majority of expressions with downward gaze also displayed left/right averted gaze ($M = 55.56\%$). We therefore focus on horizontally-averted gaze. Furthermore, a high proportion of displays included pulled lip corners (AU12; $M = 46.27\%$, $\kappa = 0.593$) and raised cheeks (AU6; $M = 40.30\%$, $\kappa = 0.619$). However, few displays included parted lips (AU25; $M = 10.61\%$, $\kappa = 0.798$). Thus, many participants expressed a smile with closed mouth. Intensity scoring indicated some degree of lip corner pulling ($M = 1.93$, $SD = 0.82$; inter-rater $r = 0.699$, $p < 0.001$) and cheek raises ($M = 1.69$, $SD = 0.70$; $r = 0.65$, $p < 0.001$). These exploratory results suggest that nostalgia displays involve frequently an averted gaze and a small smile.

Experiment 1

We proceeded to test experimentally whether an averted gaze (i.e., the most frequent facial action in Preliminary Study) characterizes one aspect of what is perceived as a nostalgic facial expression. Participants read short vignettes developed by Hepper et al., (2012, Study 5). The vignettes were embedded with either central, peripheral, or unrelated features of nostalgia (Supplemental Material). We

[2] We did not record demographic information (e.g., age, gender) in the Preliminary Study.

instructed participants to select from a line-up, involving three expressions, the one that best illustrated the vignette. We varied gaze, such that the line-up included expressions with averted-left gaze, averted-right gaze, and direct gaze. Based on the Preliminary Study's results, we hypothesized that participants would be more likely to select an expression with an averted (compared to direct) gaze to illustrate vignettes with central or peripheral (relative to unrelated) features of nostalgia (Hypothesis 1 or H1). We further hypothesized that participants would be more likely to select an expression with an averted (relative to direct) gaze to illustrate vignettes with central (compared to peripheral) features of nostalgia (H2). Accordingly, we partitioned the vignette-type manipulation with two planned orthogonal contrasts: central and peripheral features pooled versus unrelated features (testing H1), and central versus peripheral features (testing H2).

Method

Participants and design

Participants were 103 undergraduate students residing in the United Kingdom (76 women, 26 men, 1 unreported; M_{age}=21.69, SD_{age}=4.48). The design included one within-subjects independent variable: vignette type (central vs. peripheral vs. unrelated features). Selection of averted versus direct gaze was the dichotomous dependent variable. This sample size afforded sensitivity to detect effects sized Cramer's V=0.17, with power of $(1 - \beta)$=0.90, α=0.05 (Faul et al., 2007).

Procedure and materials

Participants read six vignettes (Hepper et al., 2012, Study 5). Two vignettes were embedded with central features of nostalgia, two with peripheral features, and two with unrelated features. An example of a vignette embedded with central nostalgia features read:

> Sheena is reminiscing about an event from her past. She looks at a photo, a keepsake that reminds her of this event. The memory is a fond one and is very special to her. Sheena dwells on the memory and relives the event in her mind. She misses the event and wishes she could return to that time. Sheena feels emotional as she thinks about it.

An example vignette embedded with peripheral nostalgia features read:

> As Sheena daydreams about an event from her past, at first, she feels a faint sense of comfort. As the memory lingers she begins to dwell on the negative aspects of the event. Sheena realizes how much she has changed since then and has mixed feelings about this. Sheena feels emotional pain and sadness. Sheena's memory makes her feel lonely and reminds her that she is aging.

The vignettes with ordinary features did not contain terms that were associated with nostalgia in prior research, for example:

Sheena thinks about an event which was fairly ordinary. She thinks about where she was and what she was doing at each time of the day. As she recalls the facts of the event, Sheena does not really feel any emotions. She thinks that the event was pretty mundane and normal. She begins to think about what to have for dinner today.

The Supplemental Material contains these and the other vignettes. We varied the vignettes' order via Latin-Square rotation. Importantly, the vignettes did not use the term 'nostalgia,' thereby circumventing possible demand characteristics (Orne, 1962).

Above each vignette, we displayed a line-up with color photographs of three female faces. We instructed participants to indicate: "Which of these three pictures best illustrates the story below?" Each line-up consisted of three models drawn from the Radboud Faces Database (Langner et al., 2010). The facial expressions in each line-up were neutral with an averted-left gaze, averted-right gaze, or direct gaze. We randomly paired the three gaze orientations with one of the models in each line-up, and we counterbalanced the order of the models and gaze orientations in each line-up. We restricted ourselves to female faces to avoid gender as confounding variable in the stimuli.

Results and discussion

Participants read six vignettes and selected a facial expression to illustrate each one. Thus, each participant generated six observations. Small deviations from the full sample size resulted from participants who skipped a vignette. Preliminary analyses revealed no significant effects involving the distinction between averted-left and averted-right gaze (Supplemental Material). Accordingly, we collapsed these selections to form an overall averted-gaze selection. Given that each line-up included two faces with averted gaze and one face with direct gaze, chance selection of faces would result in 66.7% averted gaze and 33.3% direct gaze. We display the results in Table 1. Loglinear analysis revealed a significant effect of vignette type (central vs.

Table 1 Selected Facial Expressions as a Function of Vignette Type in Experiment 1

Vignette type	Averted gaze		Direct gaze	
	f	*P*	*f*	*P*
Central	162	80.2%	40	19.8%
Peripheral	156	78.0%	44	22.0%
Unrelated	95	47.0%	107	53.0%

f denotes absolute frequency of the selected facial expression. *P* denotes the proportion of selected facial expressions for each vignette type. Given that each line-up included two faces with averted gaze and one face with direct gaze, chance selection of faces would result in 66.7% averted gaze and 33.3% direct gaze

peripheral vs. unrelated features) on gaze direction (averted vs. direct). We denote this as Vignette Type × Gaze Direction, $\chi^2(2, N=604)=62.65$, $p<0.001$, Cramer's $V=0.32$, 95% CI = [0.24, 0.40].

The first planned contrast on the vignette-type variable showed that participants selected more frequently expressions with averted (relative to direct) gaze to illustrate vignettes with central or peripheral features ($n=318$, 79.1%) than vignettes with unrelated features ($n=95$, 47.0%); Contrast 1 × Gaze Direction, $\chi^2(1, N=604)=62.36$, $p<0.001$, $V=0.32$, 95% CI = [0.24, 0.40]. The second planned contrast indicated that participants did not select more frequently expressions with averted (relative to direct) gaze to illustrate vignettes with central features ($n=162$, 80.2%) than vignettes with peripheral features ($n=156$, 78.0%); Contrast 2 × Gaze Direction, $\chi^2(1, N=402)=0.29$, $p=0.588$, $V=0.03$, 95% CI = [0.00, 0.12]. Averted gaze was selected above chance (=66.7%) to illustrate vignettes with central ($\chi^2[1, N=202]=16.64$, $p<0.001$, $V=0.29$, 95% CI = 0.15, 0.42]) and peripheral ($\chi^2[1, N=200]=11.56$, $p<0.001$, $V=0.24$, 95% CI = [0.10, 0.38]) features, and below chance to illustrate vignettes with unrelated features ($\chi^2[1, N=202]=35.05$, $p<0.001$, $V=0.42$, 95% CI = [0.28, 0.55]).

Supporting H1, participants considered averted gaze illustrative of vignettes with central or peripheral (compared to unrelated) features of nostalgia. Contrary to H2, however, participants did not consider averted gaze more illustrative of vignettes with central than peripheral features of nostalgia. Thus, an averted gaze alone was not regarded as particularly illustrative of vignettes with central (compared to peripheral) nostalgia features.

Experiment 2

Experiment 1 results were consistent with H1: the perceived facial expression of nostalgia involves an averted gaze. However, the results were inconsistent with H2, that participants would preferentially select an expression with an averted gaze to illustrate vignettes with central (compared to peripheral) nostalgia features. If an averted gaze alone is insufficient, are there other facial-expression features that would be considered illustrative of nostalgia? In addition to averted gaze, the Preliminary Study suggested that the facial expression of nostalgia includes a small smile. Accordingly, in Experiment 2, we tested the hypothesis that individuals differentiate between vignettes with central versus peripheral features when averted gaze is combined with a small smile (H3). Furthermore, we explored in an ancillary analysis whether this putative pattern would hold across two cultures.

Method

Participants and design

Participants were 206 individuals (109 men, 96 women, 1 non-specified; 104 US residents, 101 Indian residents, 1 unspecified; $M_{age}=33.95$, $SD_{age}=11.89$) recruited through Amazon's Mechanical Turk. The design included one within-subjects independent variable: vignette type (central vs. peripheral vs. unrelated features). The factorial combination of two dichotomous dependent variables (gaze direction and small smile) created a four-level response profile: (1) averted gaze with small smile, (2) averted gaze without small smile, (3) direct gaze with small smile, and (4) direct gaze without small smile. The sample size afforded sensitivity to detect effects sized Cramer's $V=0.19$, with power of $(1-\beta)=0.90$, $\alpha=0.05$ (Faul et al., 2007).

Procedure and materials

The procedure was identical to that of Experiment 1, with one exception. In addition to varying gaze direction (as in Experiment 1), we varied the presence (vs. absence) of a small smile. Expressions without small smile were identical to the neutral expressions of Experiment 1. To create a small smile, we modified these neutral expressions by raising the lip corners (AU12) and cheeks (AU6) using photo-manipulation software—a tested practice in the generation of facial expression stimuli (Surguladze et al., 2004). Accordingly, each line-up of facial expressions comprised six (rather than three) expressions. We randomly selected six line-ups to accompany the six vignettes (Fig. 1).

Results and discussion

As in Experiment 1, preliminary analyses revealed no significant effects involving the distinction between averted-left and averted-right gaze, and therefore we collapsed these

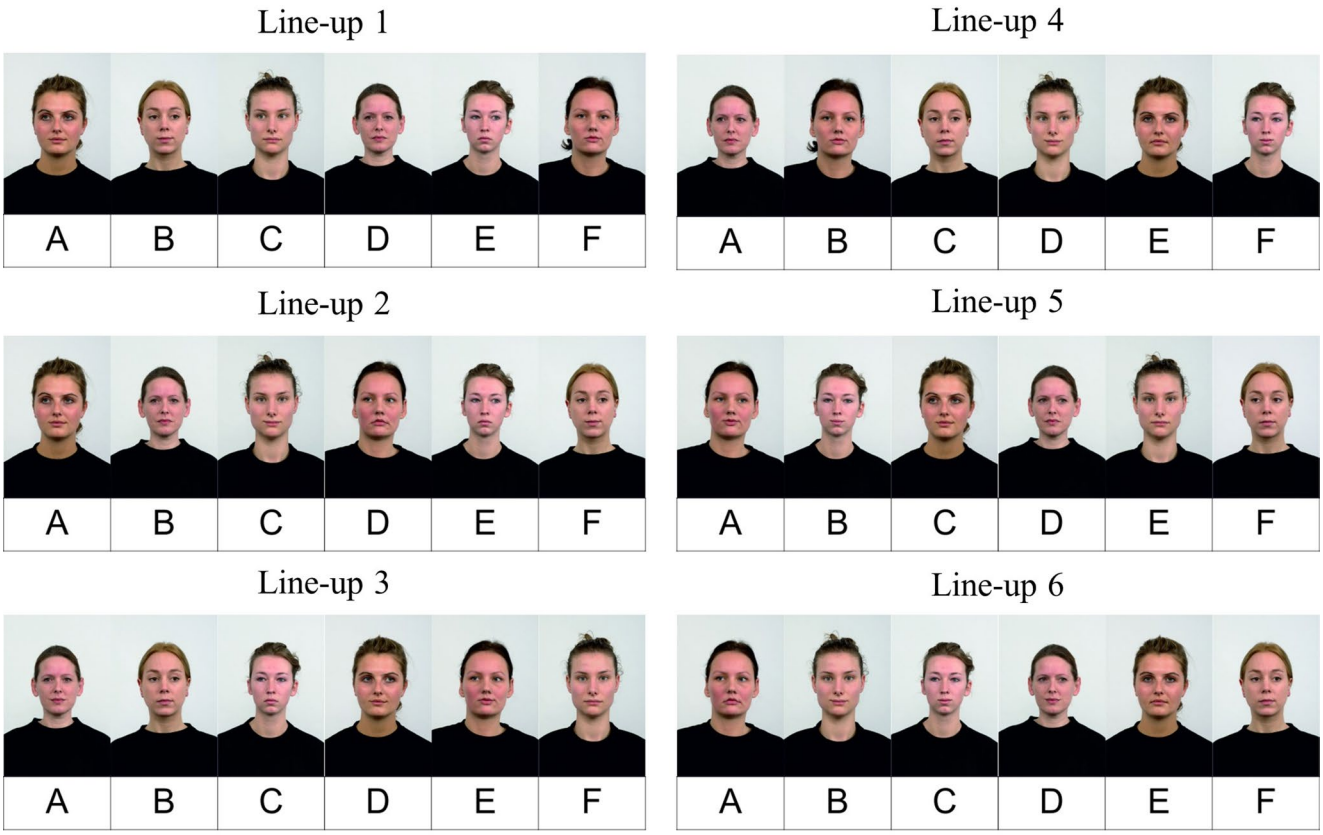

Fig. 1 Facial Expression Line-Ups in Experiments 2 and 3

Table 2 Selected Facial Expressions as a Function of Vignette Type in Experiment 2

Vignette type	Averted gaze with small smile		Direct gaze with small smile		Averted gaze without small smile		Direct gaze without small smile	
	f	*P*	*f*	*P*	*F*	*P*	*f*	*P*
Central	202	49.6%	68	16.7%	92	22.6%	45	11.1%
Peripheral	69	16.9%	26	6.4%	257	63.0%	56	13.7%
Unrelated	115	28.3%	67	16.5%	139	34.2%	85	20.9%

f denotes frequency of the selected facial expression. *P* denotes the proportion of selected facial expressions for each vignette type. Given that each line-up included four faces with averted gaze (two with small smile, two without small smile) and two faces with direct gaze (one with small smile, one without small smile), chance selection of faces would result in 66.7% averted gaze (33.3% with small smile, 33.3% without small smile) and 33.3% direct gaze (16.7% with small smile, 16.7% without small smile)

selections to form an overall averted-gaze selection. Given that each line-up included four faces with averted gaze and two faces with direct gaze, chance selection of faces would result in 66.7% averted gaze and 33.3% direct gaze. We present the results in Table 2. Loglinear analysis produced a significant effect of vignette type (central vs. peripheral vs. unrelated features) on gaze direction (averted vs. direct): Vignette Type × Gaze Direction, $\chi^2(2, N=1221)=30.349$, $p<0.001$, $V=0.16$, 95% CI=[0.10, 0.21]. The analysis further yielded a significant effect of vignette type on small smile (present vs. absent): Vignette Type × Small Smile, $\chi^2(2, N=1221)=157.690$, $p<0.001$, $V=0.35$, 95% CI=[0.30, 0.41]. These results were qualified, however, by a significant effect of vignette type on the association between gaze direction and small smile: Vignette Type × Gaze Direction × Small Smile, $\chi^2(2, N=1221)=6.14$, $p=0.046$. The latter effect indicates that participants selected different combinations of gaze direction (averted vs. direct) and small smile (present vs. absent) to illustrate the three types of vignette (central vs. peripheral vs. unrelated features). As in Experiment 1, we partitioned the vignette-type manipulation with two planned orthogonal contrasts: central and peripheral features pooled versus unrelated features (Contrast 1), and central versus peripheral features (Contrast 2).

Contrast 1: central and peripheral features pooled versus unrelated features

The first planned contrast on the vignette-type variable showed that participants selected more frequently expressions with averted (relative to direct) gaze to illustrate vignettes with central or peripheral features (n=620, 76.1%) than with features unrelated to nostalgia (n=254, 62.6%): Contrast 1 × Gaze Direction, χ^2(1, N=1221)=23.75, p<0.001, V=0.14, 95% CI=[0.09,. 20]. No other dependencies were statistically significant, χ^2(1, N=1221)<0.76, ps>0.384. Averted gaze was selected above chance (=66.7%) to illustrate vignettes with central (χ^2[1, N=407]=5.68, p=0.017, V=0.12, 95% CI=[0.02, 0.22]) and peripheral (χ^2[1, N=408]=32.16, p<0.001, V=0.12, 95% CI=[0.18, 0.38]) features, and below chance to illustrate vignettes with unrelated features, although this difference from chance was not statistically significant (χ^2[1, N=406]=3.08, p=0.079, V=0.09, 95% CI=[0.00, 0.18]). Participants considered averted gaze illustrative of vignettes with nostalgia features. These results replicate those of Experiment 1.

Contrast 2: central versus peripheral features

The second planned contrast revealed that participants selected more frequently expressions with (relative to without) a small smile to illustrate vignettes with central (n=270, 66%) than peripheral (n=95, 23%) features of nostalgia: Contrast 2 × Small Smile, χ^2(1, N=815)=156.95, p<0.001, V=0.43, 95% CI=[0.36, 0.50]. This result was qualified, however, by a significant effect of the second contrast on the association between gaze direction and small smile: Contrast 2 × Gaze Direction × Small Smile, χ^2(1, N=815)=6.49, p=0.011. Specifically, participants selected far more frequently expressions that combined averted gaze with a small smile (relative to expressions that did not combine these features) to illustrate vignettes with central (n=202, 49.6%) than peripheral (n=69, 16.9%) features of nostalgia, χ^2(1, N=815)=101.53, p<0.001, V=0.35, 95% CI=[0.28, 0.42]. Expressions that combined averted gaze and small smile were selected above chance (=33.3%) to illustrate vignettes with central features (χ^2[1, N=407]=48.65, p<0.001, V=0.35, 95% CI=[0.25, 0.44]) and below chance to illustrate vignettes with peripheral features (χ^2[1, N=408]=49.51, p<0.001, V=0.35, 95% CI=[0.25, 0.45]). Supporting H3, participants differentiated decisively between vignettes with central versus peripheral nostalgia features when averted gaze was combined with a small smile. These results extend those of Experiment 1.

Ancillary analyses: nationality

We conducted an ancillary loglinear analysis in which we included participant nationality (USA vs. Indian) as an independent variable. The focal effect of vignette type on the association between gaze direction and small smile remained significant: Vignette Type × Gaze Direction × Small Smile, χ^2(2, N=1215)=7.02, p=0.030. Importantly, this effect was not significantly qualified by nationality: Nationality × Vignette Type × Gaze Direction × Small Smile, χ^2(2, N=1215)=2.75, p=0.253. The key pattern for participants to select more frequently expressions that combine averted gaze with a small smile (relative to other expressions) to illustrate vignettes with central (compared to peripheral) features of nostalgia emerged clearly in both the USA (χ^2[1, N=413]=80.65, p<0.001, V=0.44, 95% CI=[0.35, 0.54]) and India (χ^2[1, N=398]=27.53, p<0.001, V=0.26, 95% CI=[0.16, 0.36]). Even among Indian nationals, who showed a numerically smaller effect, expressions that combined averted gaze and small smile were selected above chance (=33.3%) to illustrate vignettes with central features (χ^2[1, N=199]=8.75, p=0.003, V=0.21, 95% CI=[0.07, 0.35]) and below chance to illustrate vignettes with peripheral features (χ^2[1, N=199]=18.15, p<0.001, V=0.30, 95% CI=[0.16, 0.44]). These results provide preliminary evidence that the perceived facial expression of nostalgia is shared across more individualistic (USA) and more collectivistic (India) cultures.

Experiment 3

A primary function of facial expressions of emotions is to convey social cues (Ekman, 1992). We proposed that nostalgia displays elicit positive interpersonal attributions. We tested, in Experiment 3, whether observers attribute relatively more interpersonal warmth to persons who display a facial expression that combines an averted gaze with a small smile (i.e., a facial expression of nostalgia) than to persons who do not display this facial expression (H4), such that participants will attribute more interpersonal warmth to an averted (vs. direct) gaze in the presence of a small smile (vs. no small smile).

Independent of nostalgia, prior research indicates that people attribute more interpersonal warmth to smiling others than to non-smiling others (Cuddy et al., 2011). Furthermore, an averted (vs. direct) gaze typically evokes less perceived interpersonal warmth (Kleinke, 1986) and causes others to socially distance themselves (Wirth et al., 2010). Accordingly, we expected to find, in addition to the hypothesized Gaze Direction × Small Smile interaction, a main effect of gaze direction, such that participants would

attribute less interpersonal warmth to faces with an averted gaze (vs. direct gaze); and a main effect of small smile, such that participants would attribute more interpersonal warmth to faces with a small smile (vs. no small smile).

Our second objective was to complement Experiments 1–2, in which participants matched facial expressions with previously validated vignettes, by instructing participants to identify which facial expression (in a line-up of six) conveyed the most nostalgia. We thus sought converging evidence for the proposed perceived facial expression of nostalgia. We hypothesized that facial expressions that combine an averted gaze with a small smile would convey more nostalgia than expressions that do not combine these features (H5).

Method

Participants

Participants were 303 US residents (164 men, 131 women, 8 undeclared; $M_{age}=33.41$, $SD_{age}=11.08$) recruited via Amazon's Mechanical Turk. This sample size afforded sensitivity to detect effects sized Cramer's $V=0.22$, with power of $(1-\beta)=0.90$, $\alpha=0.05$ (Faul et al., 2007).

Procedure and materials

Participants assigned attributes to six persons in facial expression line-ups. We used the same six unique line-ups as in Experiment 2 (Fig. 1), and randomly provided each participant with one of these six line-ups. Each line-up depicted the following facial expressions: left-gaze with small smile, direct gaze with small smile, right gaze with small smile, left-gaze without small smile, direct gaze without small smile, right gaze without small smile. Underneath these line-ups, participants read the stem "Which one of these six persons is the most…" followed by several attribute descriptors. Participants assigned each trait to one of the facial expressions (out of six) in the line-up. We assessed interpersonal warmth with the following five traits: "kind," "likeable," "warm," "trustworthy," and "respectful of others" (Russell & Fiske, 2008). The final attribute was "nostalgic," and served to test if an averted gaze combined with small smile was indeed seen as the most nostalgic.

Results

Interpersonal warmth

We examined the main and interaction effects of small smile (present vs. absent) and gaze direction (averted vs. direct) using Wickens' (1989) corrected χ^2-tests. This test averages the χ^2 values of individual traits, resulting in an overall χ^2 value. Wickens noted that this is a conservative test. We found a significant main effect of gaze direction, revealing that the positive interpersonal warmth traits were assigned less frequently to faces with an averted than direct gaze, $\chi^2_W(1)=15.49$, $p<0.001$, $V=0.23$, 95% CI=[0.11, 0.34]. A significant small smile main effect indicated that the positive interpersonal warmth traits were more often attributed to faces with a small smile than without small smile, $\chi^2_W(1)=32.47$, $p<0.001$, $V=0.33$, 95% CI=[0.22, 0.44]. As hypothesized (H4), these main effects were qualified by a significant Gaze Direction × Small Smile interaction, $\chi^2_W(1)=5.37$, $p=0.020$, $V=0.13$, 95% CI=[0.02, 0.25]. The presence (vs. absence) of a small smile increased the warmth attributed to faces that featured an averted gaze, $\chi^2_W(1)=31.61$, $p<0.001$, $V=0.50$, 95% CI=[0.32, 0.67], to a significantly greater extent than to faces that featured a direct gaze, $\chi^2_W(1)=5.63$, $p=0.018$, $V=0.17$, 95% CI=[0.03, 0.31]. Contrast analysis furthermore confirmed that interpersonal warmth was proportionally more often assigned to the facial expression that combined a small smile with an averted gaze than to the other three expression configurations combined, $\chi^2_W(1)=12.94$, $p<0.001$, $V=0.21$, 95% CI=[0.09, 0.32]. We summarize the results in Table 3. Facial expressions that combine a small smile with an averted gaze convey particularly high levels of interpersonal warmth (H4).

Nostalgia

A significant main effect of gaze direction indicated that nostalgia was more frequently assigned to facial expressions that featured an averted gaze than a direct gaze, $\chi^2(1, N=300)=24.00$, $p<0.001$, $V=0.28$, 95% CI=[0.17, 0.40]. Furthermore, a significant small smile main effect indicated that nostalgia was also more frequently allocated to facial expressions that featured a small smile as opposed to ones that did not, $\chi^2(1, N=300)=4.32$, $p=0.038$, $V=0.12$, 95% CI=[0.00, 0.23]. Importantly, we also found the anticipated Gaze Direction × Small Smile interaction effect, $\chi^2(1, N=300)=6.25$, $p=0.012$, $V=0.14$, 95% CI=[0.03, 0.26]. The presence (vs. absence) of a small smile increased the attribution of nostalgia to faces that featured an averted gaze, $\chi^2(1, n=240)=8.82$, $p=0.003$, $V=0.19$, 95% CI=[0.07, 0.32], but this smile effect was smaller and not significant for faces that featured a direct gaze, $\chi^2(1, n=60)=1.67$,

Table 3 Attributed Traits as a Function of Gaze Direction and Small Smile in Experiment 3

Item	Averted gaze with small smile		Direct gaze with small smile		Averted gaze without small smile		Direct gaze without small smile		Gaze Direction Main Effect		Small Smile Main Effect		Gaze Direction × Small Smile interaction	
	f	*P*	*f*	*P*	*f*	*P*	*f*	*P*	χ^2	*p*	χ^2	*p*	χ^2	*p*
Kind	136	45.3%	86	28.7%	36	12.0%	42	14.0%	11.76	0.001	69.12	< 0.001	5.39	0.020
Likeable	138	45.8%	69	22.9%	47	15.6%	47	15.6%	3.67	0.055	42.42	< 0.001	7.58	0.006
Warm	137	46.0%	71	23.8%	48	16.1%	42	14.1%	2.82	0.093	46.72	< 0.001	4.19	0.041
Trustworthy	95	32.2%	66	22.4%	55	18.6%	79	26.8%	33.22	< 0.001	2.47	0.116	9.44	0.002
Respectful	86	29.1%	73	24.7%	70	23.6%	67	22.6%	25.97	< 0.001	1.64	0.201	0.26	0.607
Wickens' χ^2									15.49	< 0.001	32.47	< 0.001	5.37	0.020

Respectful = Respectful of others. *P* denotes the proportion of assigned trait descriptor for each facial expression. Given that each line-up included four faces with averted gaze (two with small smile, two without small smile) and two faces with direct gaze (one with small smile, one without small smile), 66.7% of participants would attribute a given trait to an averted gaze by chance (33.3% with small smile, 33.3% without small smile) and 33.3% would assign it to a direct gaze (16.7% with small smile, 16.7% without small smile)

$p = 0.197$, $V = 0.17$, 95% CI = [0.00, 0.42] (Table 4). Contrast analysis revealed that the nostalgia attribute was proportionally more often assigned to the facial expression that combined a small smile with an averted gaze than to the other three expression configurations combined, $\chi^2(1, N = 300) = 27.74$, $p < 0.001$, $V = 0.30$, 95% CI = [0.19, 0.42]. As hypothesized, faces that combine a small smile with an averted gaze are seen as more nostalgic (H5).

Discussion

We tested whether the perceived expression of nostalgia—an averted gaze with small smile—conveys interpersonal warmth (H4). The results supported our hypothesis. In addition, consistent with literature (Cuddy et al., 2011; Kleinke, 1986; Wirth et al., 2010), we found that a small smile increased, and an averted gaze reduced, interpersonal warmth attributions. Furthermore, faces that combined a small smile with an averted gaze were seen as particularly nostalgic relative to faces that did not combine these two attributes (H5).

General discussion

Summary of findings

We investigated the perceived facial expression of nostalgia. Findings of the Preliminary Study, an exploratory analysis of photographs, suggested that an averted gaze and small smile were common characteristics of nostalgia displays. Participants in Experiment 1 selected facial expressions to illustrate vignettes that contained central or peripheral nostalgia features, or events that did not contain nostalgic features. We hypothesized that participants would be more likely to select an expression with an averted (compared to direct) gaze to illustrate vignettes with central or peripheral (relative to unrelated) features of nostalgia (H1). We further hypothesized that they would be more likely to select an expression with an averted (relative to direct) gaze to illustrate vignettes with central (compared to peripheral) features (H2). Experiment 1 supported only H1: Relative to vignettes with unrelated features, participants illustrated vignettes with nostalgia features with an averted gaze, regardless of whether these features were central or peripheral to nostalgia.

Although Experiment 1 indicated that an averted gaze distinguishes vignettes with nostalgia features from those with non-nostalgic features, the averted gaze did not further distinguish between vignettes that contained central (e.g., relationships, keepsakes, childhood) versus peripheral (e.g.,

Table 4 Attributed Nostalgia as a Function of Facial Expression in Experiment 3

Averted gaze with small smile		Direct gaze with small smile		Averted gaze without small smile		Direct gaze without small smile	
f	*P*	*f*	*P*	*f*	*P*	*f*	*P*
143	47.7%	25	8.3%	97	32.3%	35	11.7%

f denotes frequency of the assigned nostalgic attribute. *P* denotes the proportion of the assigned nostalgic attribute. Given that each line-up included four faces with averted gaze (two with small smile, two without small smile) and two faces with direct gaze (one with small smile, one without small smile), chance selection of faces would result in 66.7% averted gaze (33.3% with small smile, 33.3% without small smile) and 33.3% direct gaze (16.7% with small smile, 16.7% without small smile)

desire, daydreaming, calm) nostalgia features (Hepper et al., 2012). In Experiment 2, we examined if a small smile was also characteristic of the perceived facial expression of nostalgia. We anticipated that a small smile, combined with an averted gaze, would further distinguish vignettes with central versus peripheral nostalgia. Specifically, we hypothesized that participants would be more likely to illustrate a vignette with central nostalgia features (as opposed to peripheral nostalgia features or unrelated features) using a facial expression that combined an averted gaze with a small smile (vs. expressions that did not combine these facial actions; H3). Experiment 2 findings supported this hypothesis. Furthermore, we obtained these findings in a USA sample and an Indian sample, although that the effects were smaller in the latter sample.

In Experiment 3, we examined further the communicative effects of the perceived facial expression of nostalgia. In particular, we tested whether this display of nostalgia facilitates positive trait inferences, based on prior research demonstrating that nostalgia boosts interpersonal and intragroup relations (Sedikides & Wildschut, 2019; Wildschut & Sedikides, 2020). Accordingly, we hypothesized and found that participants were more likely to attribute interpersonal warmth to persons displaying an averted gaze with a small smile compared to persons who do not combine these two facial actions (H4). In addition, people judged expressions that featured a small smile and averted gaze as conveying more nostalgia than expressions that did not combine these facial actions. Taken together, the results of Experiment 3 indicate that the display of nostalgia elicits positive trait attributions.

Perceived facial expression of nostalgia

A small smile combined with an averted gaze constituted what people considered to be facial features of nostalgia. But why these features? What might a small smile and averted gaze symbolize? The small smile is a feature shared with other (positive) emotion expressions (Cordaro et al., 2018; Mortillaro et al., 2011). For example, the display of pride includes a small smile (Tracy & Robins, 2004a). Individuals consider nostalgia and pride to be related but distinct emotions (Van Tilburg et al., 2018), and the presence of a small smile in the display of these two emotions may suggest a common facial feature in positive self-relevant emotions. Perceptions of smiles differ across situations and cultures (Krys et al., 2016; Niedenthal, 2010), and recent research has differentiated between three types of functional smiles: reward, affiliative, or dominance (Rychlowska et al., 2017). The action units identified in the present research suggest that nostalgia is accompanied by affiliative smiles. As discussed earlier, nostalgia is associated with prosociality (Sedikides & Wildschut, 2019; Wildschut et al., 2014) and the expression of an affiliative smile might be a strategy to communicate such a tendency. This is supported by the finding that the nostalgic facial expression was also perceived as warm. Future research would need to test systematically whether the main function of the small smile in expressing nostalgia is related to affiliation (and not reward or dominance).

Nostalgic expressions featured a small smile combined with an averted gaze. Whereas the smile can be interpreted as an affiliative cue, an averted gaze has been associated with avoidance (Adams & Kleck, 2003). Indeed, facial expressions that included only an averted gaze were evaluated as less warm in Experiment 3. What is the communicative function of the averted gaze in expressions of nostalgia, if not to convey avoidance? It is possible that the averted gaze associated with nostalgia marks the process of mental time travel, with individuals mind wandering or 'looking back' (Evans et al., 2021; Stephan et al., 2012; Zou et al., 2018). Follow-up research would do well to examine whether an averted gaze features in other emotions that involve reflection on the distant past (e.g., regret; Gilovich & Medvec, 1995) as well as future-oriented emotions (e.g., hope; Lazarus, 1999).

Limitations and future directions

We studied perceived expressions of nostalgia rather than naturalistic expressions of nostalgia. That is to say, we examined expressions of nostalgia that participants were instructed to produce (Preliminary Study) or that were displayed by models (Experiments 1–3), rather than facial expression of nostalgia as they occur in everyday life. The characteristics of the displays we studied may deviate in

intensity from everyday expressions of nostalgia. To illustrate, whereas an expression of pride involves arms raised above the head (Tracy & Robins, 2004a), everyday expressions of pride may be more moderate and show greater variety. Indeed, research indicates that the intensity and recognition of emotion displays varies cross-culturally (Matsumoto et al., 1988), depending for example on cultural display rules (Matsumoto, 1993) and language (Lindquist et al., 2006).

Future work should examine whether the perceived expression of nostalgia is a discrete display. The term 'discrete expression' suggests that people can reliably identify and distinguish an emotion from other emotions based on its expression. We did not test how well individuals can distinguish between nostalgia and other emotions and our goal to identify the perceived facial expression of nostalgia should not be equated with the aim of finding out if nostalgia is the only or primary emotion ascribed to such a facial expression. Potential overlap in expression features of emotions is neither uncommon nor problematic. For example, sadness and boredom, emotions established as distinct (Chan et al., 2018; Van Tilburg & Igou, 2012, 2017), share several expressive features possibly reflective of their low arousal (e.g., collapsed upper body, downward leaning head, limited movement, low physical expansiveness; Walbott, 1998). Thus, a feature such as a collapsed upper body may well be a boredom expression, even if boredom is not the only emotion ascribed to a collapsed upper body. Indeed, the perceived expression of nostalgia may share similarities with other sentiments that involve mental transportation or perspective taking, such as during boredom-induced mind wandering (Eastwood et al., 2012; Van Tilburg et al., 2013) or when experiencing self-compassion, pride, or gratitude (Van Tilburg et al., 2018, 2019). In Supplemental Material, we report an ancillary, pre-registered experiment in which participants matched the labels 'nostalgia' and 'embarrassment' with facial expressions of nostalgia (small smile, averted gaze) or embarrassment (smile, downwards gaze, tilted head; Keltner, 1996)—two similar expressions (Experiment S1). Results showed that people could differentiate between the two emotion expressions (i.e., they assigned the 'nostalgia' and 'embarrassment' labels to the corresponding facial expressions above chance).

We acknowledge that our work predominantly focused on female targets. Therefore, we urge caution in generalizing our findings to nostalgia expressions in men. Future studies would need to systematically verify that the small smile and averted gaze are expression features of nostalgia in perceiving male targets as well.

In Experiments 1 and 2, we relied on vignettes with nostalgia features, but did not use the explicit emotion label 'nostalgia.' In Experiment 3, we did use this emotion label. Varying its use may be consequential. As Barrett et al. (2006) argued, studies in which emotion labels are absent (or are less cognitively accessible; Lindquist et al., 2006) may observe lower recognition rates compared to studies where such labels are explicitly mentioned. Indeed, it could well be that the accuracy of recognizing the facial expression of nostalgia drops when participants are free to assign an emotion label of their choice. We hope that follow-up investigations address in more detail the (linguistic) context in which the expression occurs.

Besides facial expressions of emotions, researchers have examined more broadly the bodily expressions of emotions (Witkower & Tracy, 2019). Wallbott (1998), for example, studied actors' rendering of emotions on spatial expansiveness, movement activity, and movement dynamics. Low arousal emotions, such as sadness and boredom, scored lowest on these three dimensions. Recent evidence indicates that nostalgia is a low arousal emotion (Van Tilburg et al., 2018). Consequently, we anticipate that the bodily expression of nostalgia will feature low expansiveness, low activity, and few movement dynamics.

Constraints on generality

We did not address exhaustively the universality or cultural specificity of the expression of nostalgia, although we included participants from India, the UK, and the USA, with generally consistent results. Cross-cultural research on nostalgia suggests that lay conceptions of this emotion are shared across 18 cultures (Hepper et al., 2014, 2024; Sedikides & Wildschut, 2022). Indeed, in Experiment 2 (USA vs. India) cultural background did not qualify systematically the results. The issue would be settled more decisively by work comparing in depth differences and similarities in nostalgia expressions across a range of cultures.

In closing

We explored and validated perceived facial expressions of nostalgia, as well as the social consequences of its display. The perceived facial expression of nostalgia combines an averted gaze with a small smile. Further, the expression conveys particularly high levels of the emotion and elicits interpersonal warmth inferences. The findings open up exciting directions for research into the facial expression of nostalgia.

Open practices

We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study. All data and analysis code are available at Van

Tilburg et al. (2026). We analyzed the data using *R*, version 4.0.3 (R Core Team, 2020). We did not preregister the main studies, but did pre-register an ancillary experiment reported in Supplemental Material (Experiment S1) at Van Tilburg et al. (2023).

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