PNAS INAUGURAL ARTICLE | PSYCHOLOGICAL AND COGNITIVE SCIENCES OPEN ACCESS

The detection of episodic memory in others biases social choice

Elisa Ciaramelli[a,1], Anna Waisman[b,c], Debora Stendardi[a], and Morris Moscovitch[b,c,1]

This contribution is part of the special series of Inaugural Articles by members of the National Academy of Sciences elected in 2025.
Contributed by Morris Moscovitch; received October 31, 2025; accepted March 5, 2026; reviewed by Katharine C. Simon and Patrik Vuilleumier

We often share personal memories with others, but the social function of episodic memory retrieval is not clear. In two experiments (N_1 = 50, N_2 = 125), run in two different labs, in different countries with different languages, and using naturalistic as well as experimentally crafted personal narratives, we show that participants can distinguish between context-rich (episodic) memories and context-poor (semantic) memories shared by others, and consistently ascribe greater memory ability to individuals sharing episodic compared to semantic personal memories. Moreover, participants report stronger social preference and feelings of closeness for individuals sharing personal episodic memories. The appraisal of episodic quality in memories shared by others, and not inferred personality traits of the narrator, predicted interpersonal closeness on a trial-by-trial basis. These findings reveal a fundamental social function of the episodic memory system: enabling the sharing of context-rich personal memories that foster close relationships. We propose that preferring partners who display strong episodic recall may confer adaptive advantages, linking social selection to the effectiveness of memory systems, particularly hippocampal function.

episodic memory | sharing | closeness | social choice | hippocampus

Significance

Sharing personal past experiences is central to human social interaction, yet the social function of remembering remains poorly understood. We show that people can detect the contextual richness of others' memories and use this information to guide social preference, favoring individuals who share context-rich, episodic memories over those who share context-poor, semantic memories. These findings suggest that the expression of episodic memory serves as a social signal that can shape affiliation.

> *"Don't tell the moon was shining; show the glint of light on broken glass."*
> *Anton Chekhov*

Episodic memory is the ability to remember specific past experiences, including information about what happened, where, and when, with a level of vividness and an experiential richness comparable to that of direct (perceptual) experience (1). There is much research on the processes underlying episodic memory acquisition, retention and retrieval and on the hippocampus and related structures which mediate these processes. Far less is known about the contribution of episodic memory to social function even though episodic memory retrieval is prominent during social interaction. Most of our memories emerge indeed while interacting with others, and around 40% of conversational time involves sharing personal past experiences (2). The ubiquity of episodic memory in social interaction raises a fundamental, underinvestigated question about what role does episodic memory play in social interaction. What is the social utility of re-experiencing past events and sharing these context-rich memories, as opposed to merely conveying their semantic content? Do we attribute better memory to people whose narratives are rich in episodic detail and what are the social consequences of this attribution?

During the past century, research has been directed more at revealing the cognitive and neural bases of episodic memory than its social function (3). Functional MRI and neuropsychological research have shown that the hippocampus and related structures in the medial temporal lobe (MTL) are important neural substrates of episodic memory (4, 5). Indeed, individuals with MTL damage may have amnesia, a deficit in remembering past experiences with retained knowledge of facts and semantic information (6). The MTL-based processes underlying recollection also allow for the flexible recombination of elements from different experiences into novel scenarios and perspectives (7–10), which is instrumental to a variety of highly adaptive functions, including problem solving (11), creativity (12, 13), and decision-making (14, 15). The hippocampus and related structures in the MTL are also engaged while individuals track social networks and hierarchies (16, 17), and use (18) or process (19) language for social interaction. Moreover, individuals' social network size is predicted by performance on hippocampal-dependent tasks (20). Accordingly, individuals with MTL damage, beyond memory problems, have social deficits, including reduced empathy (21–23), which reinforces the view that the episodic memory system is crucial for social cognition and related emotion (3, 24–29).

Our hypothesis is that one crucial function of the episodic memory system is to enable our sharing of context-rich personal memories with others and, by doing so, forge close relationships. As anticipated, this system is implicated in a variety of highly adaptive

Author affiliations: [a]Dipartimento di Psicologia "Renzo Canestrari", University of Bologna, Bologna 40126, Italy; [b]Department of Psychology, University of Toronto, Toronto, ON M5S 3G3, Canada; and [c]Rotman Research Institute, Baycrest Health Centre, Toronto, ON M6A 1W1, Canada

Author contributions: E.C. and M.M. designed research; A.W. and D.S. performed research; E.C., A.W., and D.S. analyzed data; E.C. created materials, supervised research assistants and students; M.M. supervised research assistants and students; and E.C. and M.M. wrote the paper with contributions from A.W. and D.S.

Reviewers: K.C.S., University of California Irvine; and P.V., University of Geneva.

The authors declare no competing interest.

Copyright © 2026 the Author(s). Published by PNAS. This open access article is distributed under Creative Commons Attribution-NonCommercial-NoDerivatives License 4.0 (CC BY-NC-ND).

[1]To whom correspondence may be addressed. Email: elisa.ciaramelli@unibo.it or morris.moscovitch@utoronto.ca.

This article contains supporting information online at https://www.pnas.org/lookup/suppl/doi:10.1073/pnas.2530482123/-/DCSupplemental.

Published April 6, 2026.

Downloaded from https://www.pnas.org by 93.70.86.221 on April 6, 2026 from IP address 93.70.86.221.

functions (30). This being the case, then it would be evolutionarily advantageous to establish relationships with individuals who have a highly functional episodic memory system, and the ensuing associated cognitive benefits (7, 11, 14). Indeed, individuals who exhibit adaptive traits tend to appear more attractive to other members of their species (31). In rodents, males with better memory abilities are preferred by females in mate-choice tests (32, 33), and have a higher social rank in their group, along with greater long-term potentiation and higher memory-related gene expression in the hippocampus (34). A similar correlation between memory abilities and social rank was found in children (34).

A prime indicator of the status of the episodic memory system in humans is the episodic quality of the personal experiences they share. We predict, therefore, that individuals would be able to detect the episodic content of others' memories and use this appraisal in making social choices, preferring individuals sharing context-rich (episodic) memories as opposed to context-poor (semantic) memories. Moreover, episodic memory sharing should facilitate the listener's self-projection into the narrator's experience, promoting interpersonal closeness.

The general idea that autobiographical memory may be fundamental for sharing the past has been proposed before. Some authors, for example, have noted that sharing personal memories is a form of self-disclosure, and self-disclosure promotes intimacy (35, 36). But is sharing episodic (context-rich, specific) memories as opposed to semantic (context-poor, general) memories more (or uniquely) effective at shaping social interaction, as our evolutionary perspective would predict? Several studies have shown that people feel closer to friends with whom they discuss specific compared to general personal memories (37–41). From these studies, however, it is difficult to determine if sharing specific memories is the cause or the effect of increased intimacy, because most of them involved dyads of individuals who were acquainted with one another before assessing memory sharing. Moreover, none of the studies had an objective measure of the "episodicity" of shared memories, preventing them from controlling the extent to which the shared memory was rich in episodic detail (e.g., number of contextual details), which may have limited the ability to detect differences between conditions. More recently, a few studies controlled the memory content and showed that individuals can detect linguistic cues of recollection in others (42), and judge memories rich vs. poor in episodic detail as more accurate and credible (43, 44) but did not examine whether and how this memory appraisal influences affiliation and social choice.

Using an objective method to quantify episodic richness (45), we investigated 1) whether individuals can detect whether the memories shared by others are context-rich (i.e., episodic), and 2) whether their appraisal of others' episodic memories shapes social interaction, promoting social preference and perceived closeness toward individuals sharing memories rich in episodic detail. In Experiment 1, participants read pairs of real personal narratives. The experiences narrated in each pair were about the same theme, but one contained mostly episodic (contextual, specific) details and the other contained mostly semantic (abstract, general) details. Participants had to choose which narrator had better memory abilities and whom they would like to know better or select as a potential partner. We also explored whether participants attributed different personality traits to narrators sharing episodic compared to semantic memories. Moreover, to investigate whether the ability to detect the episodic quality of others' memories and select them as social partners is related to one's own episodic memory abilities, we asked participants to recall an event from their own life and describe it in detail. In Experiment 2, participants read experimentally created memories in which the same core event was narrated including mostly episodic vs. semantic details and they had to judge the degree to which they thought the narrator had a good memory for the event, and the degree to which they felt close to the narrator. Experiment 2 also included a (control) question about the inferred beauty of the narrator. Because our hypothesis is that the appraisal of the episodic richness of memories shared by others is related to the evaluation of their cognitive (memory) abilities, we do not expect that this appraisal would influence judgments on their physical (exterior) appearance. This control would allow us to exclude the possibility that sharing episodic memories is perceived as associated with any positive quality. In addition, to understand whether any social preference or increased feelings of closeness toward the "episodic narrator" was indeed related to the appraisal of the episodic richness of the shared memory, as opposed to inferred personality traits associated with different narrative styles, participants also rated the narrator's perceived personality qualities. Our general prediction is that individuals would be able to appraise the episodic richness of others' memories, attributing higher memory abilities to the narrators of memories rich vs. poor in episodic content, and that they would exhibit more social preference and perceived closeness toward others sharing personal episodic memories, over and above any inferred personality trait associated with narrative style.

Results

Experiment 1. For each variable, we computed the frequency with which the episodic narrative was selected over the semantic narrative in the 3 trials (pairs of narratives) and compared it with chance level.

Perceived memory. Qualitative ratings showed that participants were able to distinguish narratives that were rich vs. poor in episodic content, and rated the episodic narratives as more detailed (0.77 vs. 0.50; V = 1.25, $P < 0.001$; RBC = 0.96), engaging (0.75 vs. 0.50; V = 1.20, $P < 0.001$; RBC = 0.89), vivid (0.82 vs. 0.50; V = 1.25, $P < 0.001$; RBC = 0.96), familiar (0.71 vs. 0.50; V = 1.20; $P < 0.001$; RBC = 0.89), emotional (0.72 vs. 0.50; V = 1.23, $P < 0.001$; RBC = 0.94), and spatially integrated than the semantic narratives (0.73 vs. 0.50; V = 1.24, $P < 0.001$; RBC = 0.95). As predicted, participants rated the episodic narrator as having a better memory than the semantic narrator (0.82 vs. 0.50; V = 1.23, $P < 0.001$; RBC = 0.94). When the 3 memory themes were considered separately, the episodic narrator was consistently selected as the one having a better memory compared to the semantic narrator (37 to 45 out of 50 participants, 74 to 90%, all significantly above chance, binomial tests Ps < 0.001).

Perceived memory justifications. We inspected the justifications participants provided when they selected the episodic narrator (N = 123) or the semantic narrator (N = 27) as the one with a better memory. When participants selected the episodic narrator, in 48% of cases they explicitly mentioned the many details in the story, and in an additional 19% of cases they alluded to other characteristics of episodic memory such as specificity and vividness. By contrast, when participants selected the semantic narrator, detailedness was rarely mentioned (11% of cases), though a few times participants mentioned vividness (22%). In 30% of cases the justifications alluded to typical characteristics of semantic memory ("The memory seemed like something they experienced often," "The memory was linked to other memories"). To identify the words used mostly while selecting the episodic vs. semantic narrator as the one with a better memory, we entered all justifications into wordclouds.com. Aside from the words "person" (episodic: 4.6%; semantic: 4.3%) and "memory" (episodic: 1.6%; semantic: 1.5%), which were the most frequent across conditions

Downloaded from https://www.pnas.org by 93.70.86.221 on April 6, 2026 from IP address 93.70.86.221.

(as many justifications began with "this person's memory…"), the third most frequent word differed between conditions. In the episodic condition, it was "details" (1.4%), confirming our impression, whereas in the semantic condition, it was "seems" (1.2%), possibly indicating greater uncertainty when justifying a preference for semantic narratives. Interesting as these findings are, they must be tempered by the fact that most of the participants were psychology students.

Social choice. Participants stated that they would prefer to get to know better (0.77 vs. 0.50; V = 1.24, $P < 0.001$; RBC = 0.95), to select as a partner (0.81 vs. 0.50; V = 1.21, $P < 0.001$; RBC = 0.97), and judged as more similar to themselves the episodic compared to the semantic narrator (0.64 vs. 0.50; V = 1.08, $P < 0.001$; RBC = 0.69). These findings hold if we analyze separately participants who received the memory vs. social questions first, and females vs. males. When the 3 memory themes were considered separately, preference consistently favored the episodic narrator, who was selected as the person to know better and to choose as a partner by 37 to 42 out of 50 participants (74 to 84%), all significantly above chance (binomial tests Ps < 0.001). The episodic narrator was perceived as more similar to the self in 2 of the 3 memory themes (37 to 33 out of 50 participants, Ps < 0.05), not in the third theme (26/50, $P = 0.44$).

Inferred personality. Compared to the semantic narrator, the episodic narrator was more frequently judged to be open to new experiences (0.62 vs. 0.40; W = 587; $P = 0.002$; RBC = 0.58), dependable (0.70 vs. 0.53; W = 494; $P = 0.03$; RBC = 0.40), sympathetic (0.44 vs. 0.28; W = 509; $P = 0.04$; RBC = 0.37), and calm (0.77 vs. 0.23; W = 868; $P = 0.0001$; RBC = 0.92), but not different in extraversion ($P = 0.51$).

Correlation analyses.

Relation between perceived memory and memory qualities. We investigated whether perceived memory was predicted by the qualitative memory ratings or by inferred personality traits of the narrator. We ran nonparametric correlations between the frequency with which participants attributed a better memory to the episodic narrator and 1) ratings of detailedness, engagement, vividness, familiarity, emotionality, and spatial integration (all attributed to a greater degree to episodic narratives), and 2) difference scores (episodic—semantic) in openness to experience, dependability, sympathy, and calmness (all attributed to a greater degree to episodic narrators). We found that perceived memory correlated positively with detailedness ($r_{Spearman} = 0.45$; $P < 0.001$; Fisher's z = 0.48), vividness ($r_{Spearman} = 0.45$; $P < 0.001$; Fisher's z = 0.48), and engagement ratings ($r_{Spearman} = 0.32$; $P = 0.02$; Fisher's z = 0.33), but not with other memory qualities (all $P > 0.20$) or with personality scores (all Ps > 0.27). Only the correlations between perceived memory and detailedness and vividness survived Bonferroni correction.

Relation between social choice, perceived memory, and inferred personality. We investigated whether social choice was better predicted by the perceived memory qualities of narratives or by inferred personality traits of the narrator. We ran nonparametric correlations between a social preference index (average of the frequencies with which participants selected the episodic narrator as the one to know better, to select as partner, and more similar to themselves), and 1) the frequency with which participants attributed a better memory to the episodic narrator, 2) an episodic memory score of the narratives (average of memory quality ratings, i.e., detailedness, engagement, vividness, familiarity, emotionality, and spatial integration), and 3) difference scores in openness to experience, dependability, sympathy, and calmness. We found that the social preference index correlated positively with the episodic memory score ($r_{Spearman} = 0.50$; $P < 0.001$; Fisher's z = 0.56), such that participants who better appreciated the episodic qualities of others' memories were more likely to show a social preference for episodic narrators. Interestingly, the social preference index did not correlate with the global judgment on the perceived quality of the narrators' memory ($P = 0.33$). The social preference index also correlated with the inferred superior dependability of episodic narrators ($r_{Spearman} = 0.33$; $P = 0.02$; Fisher's z = 0.35), but not with the other personality traits (all Ps > 0.17). Only the correlation between the social preference index and the episodic memory score survived Bonferroni correction.

Relation between participants' detection of other's memories and their own recall of an autobiographical memory. We investigated whether the ability to detect the episodic content of others' narratives and the increased preference for episodic narrators was related to participants' own autobiographical memory. We ran nonparametric correlations between the frequency with which participants attributed a better memory to the episodic narrator, the social preference index, and the number of internal (M = 57.46; SD = 40.39) and external details (M = 18.98; SD = 17.10) they produced on the AI (45; see *SI Appendix* for more detail on AI scores). We found a negative correlation between the frequency with which participants attributed a better memory to the episodic narrator and the number of internal ($r_{Spearman} = -0.35$; $P = 0.02$; Fisher's z = 0.36) but not external details ($r_{Spearman} = -0.26$; $P = 0.07$) they produced, such that participants with lower episodic memory scores were those who more frequently ascribed a better memory to episodic narrators. Internal and external details were not related with the social preference index (all Ps > 0.73). Note that the significant correlation fails to survive Bonferroni correction (see *SI Appendix* for additional analyses on perceived memory and POS tagging of participants' memories).

Experiment 2. Table 1 shows mean ratings of detailedness, self-projection, and emotion relative to episodic and semantic narratives, and Fig. 1 shows mean perceived memory in the narrators of the episodic vs. semantic narratives. Fig. 2 shows mean closeness toward (Closeness group) and beauty attributed to (Beauty group) narrators of episodic vs. semantic narratives, and Table 2 the psychological traits inferred in episodic and semantic narrators.

Perceived memory. Qualitative ratings showed that participants were able to distinguish narratives rich vs. poor in episodic detail. Separate ANOVAs on ratings of Detailedness ($F_{1,123} = 84.63$, $P < 0.001$, $\eta_p^2 = 0.41$) and Emotion ($F_{1,123} = 31.29$, $P < 0.001$, $\eta_p^2 = 0.20$) with Group (closeness, beauty) as the between-subject factor and Condition (episodic, semantic) as the within-subject factor showed a significant effect of Condition, with higher scores for the episodic than the semantic narratives, with no effects of Group or Group x Condition interaction (all Ps > 0.14) (Table 1). The same ANOVA on Self-projection again showed an effect of Condition ($F_{1,123} = 37.20$, $P < 0.001$, $\eta_p^2 = 0.23$), with higher

Table 1. Perceived memory characteristics (mean and SD) in the episodic vs. semantic condition

		Detailedness	Self-projection	Emotion
Closeness group	Episodic	7.01 (1.22)	6.06 (1.74)	4.6 (1.90)
	Semantic	6.18 (1.30)	5.44 (1.86)	4.03 (1.80)
Beauty group	Episodic	7.05 (1.20)	5.40 (1.69)	4.33 (1.62)
	Semantic	5.92 (1.13)	4.59 (1.69)	3.78 (1.54)

Downloaded from https://www.pnas.org by 93.70.86.221 on April 6, 2026 from IP address 93.70.86.221.

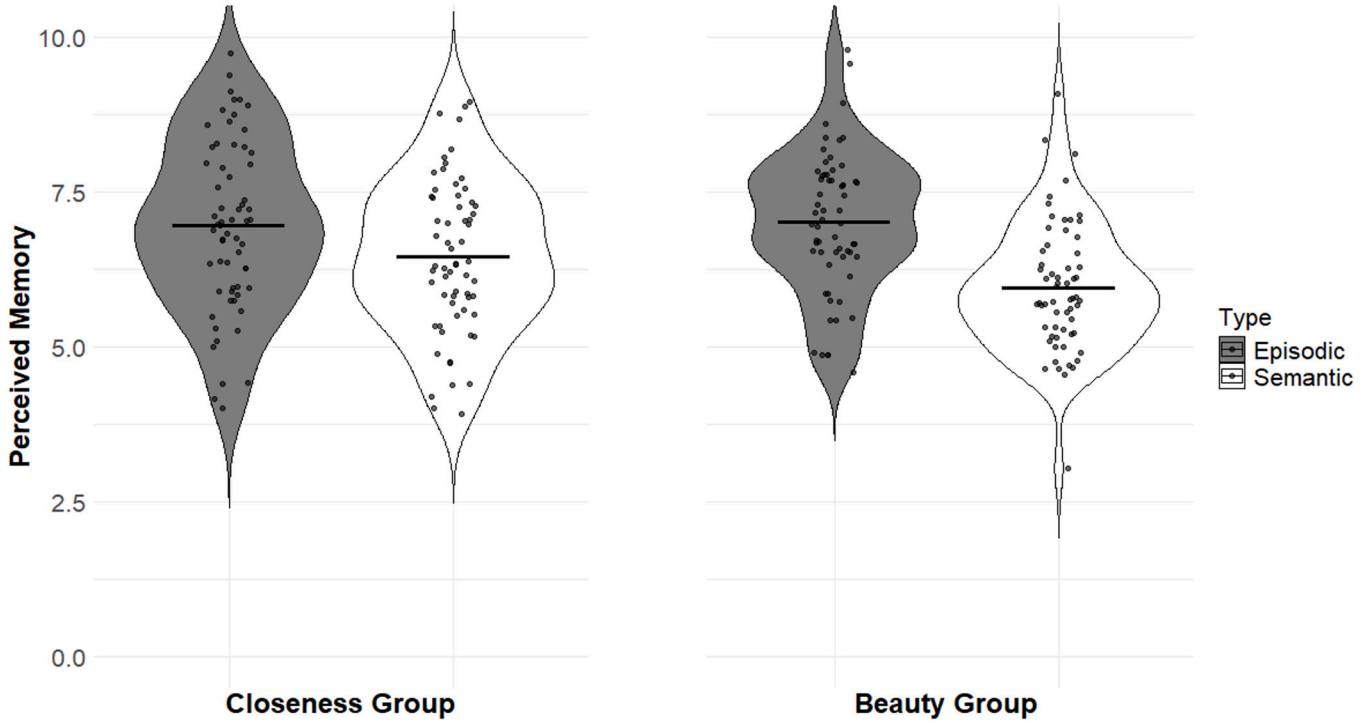

Fig. 1. Perceived memory of narrators in the episodic vs. semantic condition (on a VAS scale from 0 to 10). The horizontal lines inside violins indicate the average.

feeling of self-projection for the episodic compared to the semantic narratives, and an effect of Group ($F_{1,123}$ = 6.69, P < 0.001, η_p^2 = 0.05), with participants in the Closeness group generally reporting more self-projection than those in the Beauty group. The interaction Group x Condition was not significant (P = 0.44).

An ANOVA on perceived memory with Group (closeness, beauty) as the between-subject factor and Condition (episodic, semantic) as the within-subject factor revealed an effect of Condition ($F_{1,123}$ = 66.45, P < 0.001, η_p^2 = 0.35), such that better memory was attributed to the narrators of personal stories rich vs. poor in episodic detail (Fig. 1). There was also a significant Group x Condition interaction ($F_{1,123}$ = 7.84, P = 0.006, η_p^2 = 0.06), indicating that this difference, although present in both the Closeness group (0.52) and the Beauty group (1.05) (P < 0.001 in both cases), was more pronounced in the Beauty group. The effect of Group was not significant (P = 0.24).

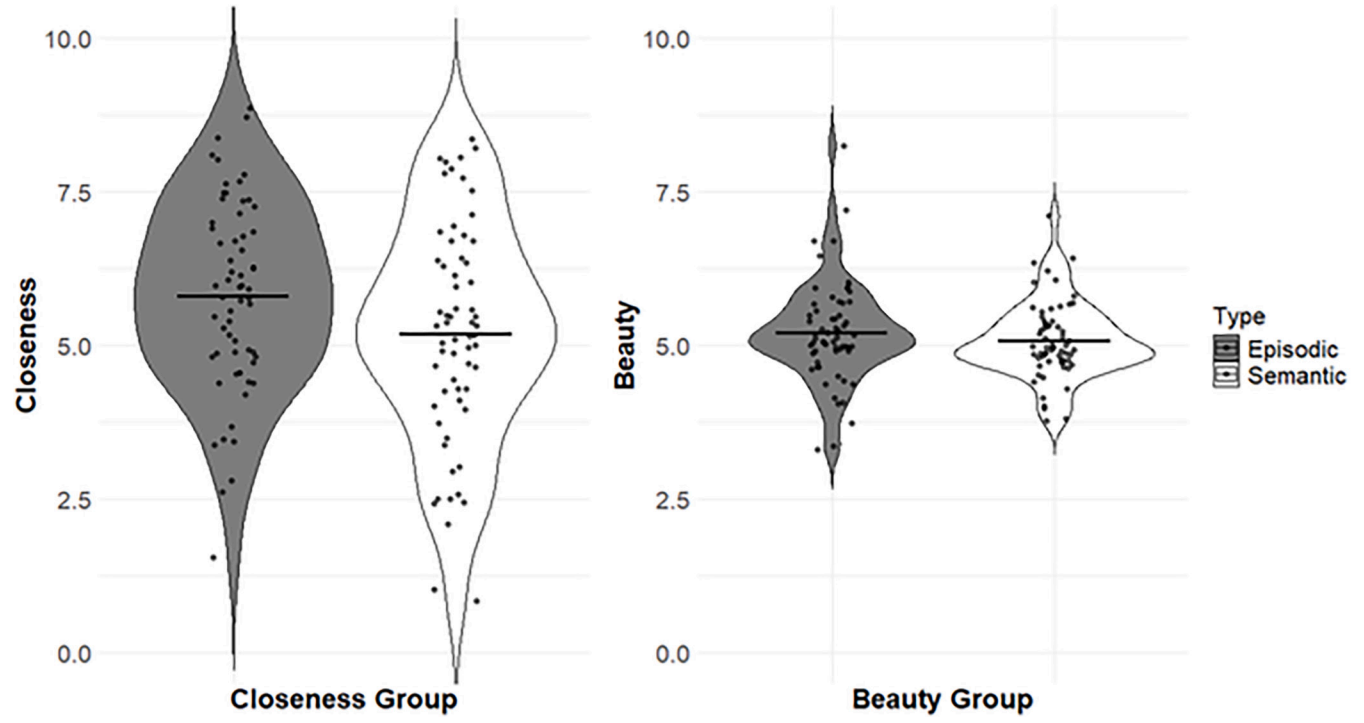

Fig. 2. Closeness and beauty ratings for narrators in the episodic vs. semantic condition (on a VAS scale from 0 to 10). The horizontal lines inside violins indicate the average.

Downloaded from https://www.pnas.org by 93.70.86.221 on April 6, 2026 from IP address 93.70.86.221.

Table 2. Inferred personality traits in the narrator (mean and SD) in the episodic vs. semantic condition

	Extroverted/reserved	Open/conventional	Anxious/calm	Critical/sympathetic	Dependable/disorganized
Episodic	5.18 (1.08)	4.82 (1.16)	4.22 (1.26)	5.00 (1.25)	4.88 (1.13)
Semantic	5.00 (1.23)	4.70 (1.14)	4.51 (1.17)	5.15 (1.07)	4.96 (1.06)

Closeness (vs. beauty). An ANOVA on participants' critical ratings of closeness/beauty with Group (closeness, beauty) as the between-subject factor and Condition (episodic, semantic) as the within-subject factor revealed and effect of Condition ($F_{1,123}$ = 17.13, P = 0.001, η_p^2 = 0.12) and a significant Group x Condition interaction ($F_{1,123}$ = 6.84, P = 0.01, η_p^2 = 0.05). Post hoc tests (Holm-corrected) indicated that only the Closeness group gave significantly higher ratings in the episodic compared to the semantic condition (Fig. 2). Thus, participants felt closer to narrators of personal stories rich vs. poor in episodic content (Closeness group: P < 0.001), but as expected, did not attribute different levels of beauty to episodic and semantic narrators (Beauty group; P = 0.85). The effect of Group was not significant (P = 0.09). This finding holds if we repeat the ANOVA inserting the order of presentation of the memory/closeness-beauty/personality questions or sex as additional factors in the ANOVA. Considering that the levels of perceived memory in the narrator were different between the Closeness group and the Beauty group, we repeated the ANOVA on the ratings of closeness/beauty with Group and Condition as factors by inserting perceived memory as a covariate. We confirmed the findings. The ANCOVA still shows a significant Group x Condition interaction ($F_{1,121}$ = 8.46, P = 0.004, η_p^2 = 0.06), indicating that participants felt closer (Closeness group: P < 0.001) but did not attribute more beauty to episodic vs. semantic narrators (Beauty group; P = 1).

Inferred personality. We conducted separate ANOVAs with Group (closeness, beauty) as the between-subject factor and Condition (episodic, semantic) as the within-subject factor on the degree to which the narrator was perceived as extroverted (vs. reserved), open to new experiences (vs. conventional), anxious (vs. calm), critical (vs. sympathetic), dependable (vs. disorganized) with experimental condition (episodic, semantic) as a factor (Table 2). We found an effect of Condition only on the anxious/calm trait, with the episodic narrator being perceived as more anxious than the semantic narrator ($F_{1,123}$ = 4.02, P = 0.047, η_p^2 = 0.03), with no effect of Group or Group x Condition interaction (Ps > 0.09). There were no significant effects in the analyses for other traits (all Ps > 0.08).

Regression models.

Perceived memory. A mixed effect model with perceived memory in the narrator as the dependent variable, and detailedness ratings, self-projection ratings, emotion ratings, and inferred anxiousness in the narrator as fixed effects revealed significant effects of detailedness (β = 0.68, CI = [0.63 to 0.73], P < 0.001) and self-projection (β = 0.14, CI = [0.08 to 0.21], P < 0.001), indicating that perceived memory in the narrator was predicted, on a trial by trial basis, by the degree to which participants thought the narrative was detailed and felt projected into it. The effects of anxiousness and emotion ratings were not significant (all Ps > 0.3).

Closeness (vs. beauty). A mixed effect model with closeness as the dependent variable (Closeness group), and detailedness ratings, self-projection ratings, emotion ratings, perceived memory in the narrator, and inferred anxiousness in the narrator as fixed effects revealed significant fixed effects of self-projection (β = 0.52, CI = [0.42 to 0.61], P < 0.001) and emotion (β = 0.26, CI = [0.17 to 0.35], P < 0.001), indicating that closeness felt toward the narrator was predicted, on a trial by trial basis, by the degree to which participants felt projected into the narrative, and felt emotions in response to it. The effects of detailedness, perceived memory, and anxiousness were not significant (all Ps > 0.2). The same model run on beauty (Beauty group) showed a significant effect of anxiousness (β = 0.25, CI = [0.16 to 0.35], P < 0.001), such that more beauty was inferred in narrators who were perceived as less anxious. Detailedness, self-projection, emotion, and perceived memory ratings had no significant effect (all Ps > 0.2).

Correlation between perceived memory and closeness (vs. beauty) and the linguistic features of narratives. We explored whether perceived memory in the narrator and closeness felt toward the narrator (vs. beauty attributed to the narrator) were related to a set of basic and advanced linguistic features of narratives, including their morphosyntactic structure, semantic coherence, informational richness, and concreteness.

We found that perceived memory in the narrator was significantly related to the concreteness of narratives (r = 0.48, P = 0.03), but not to their semantic coherence (P = 0.99), informational richness (P = 0.19), or basic grammatical (POS) elements (all Ps > 0.20). Analogously, closeness toward the narrator was significantly related to the concreteness (r = 0.60, P = 0.005), but not to the semantic coherence (P = 0.70), informational richness (P = 0.10), or basic POS elements of narratives (all Ps > 0.28). By contrast, beauty attributed to the narrator was not related to either the concreteness (P = 0.66), semantic coherence (P = 0.94), informational richness (P = 0.54), or basic POS elements of narratives (all Ps > 0.06; see *SI Appendix* for similar analyses on the narratives of Experiment 1).

Discussion

The objective of this study was to investigate whether individuals are able to detect whether others' personal memories are rich or poor in episodic content, and to examine the effects of sharing episodic vs. semantic personal memories on interpersonal closeness and social choice. Our hypothesis was that because episodic memory is a highly adaptive function, conferring not only the ability to remember but also contributing to other cognitive functions such as imagining, problem-solving, empathy, and the awareness of social structure and status (7–9, 11, 12, 16, 30), it would be evolutionarily advantageous to detect individuals with a highly functional episodic memory to include in our social circle. Because the episodic richness of others' memories is reflected in the quality of the narratives they share in social situations (conversations) and is indicative of the functioning of their episodic memory system (and perhaps of the integrity of their hippocampus), we predicted that individuals would be able to appraise the quality of memories shared by others. Moreover, we predicted that this appraisal would shape their social preference and feelings of closeness for people sharing memories rich vs. poor in episodic content.

These hypotheses were confirmed in two experiments. First, we found that individuals distinguished between personal narratives that were context-rich (containing mainly episodic details) vs. context-poor (containing mainly semantic details) and consistently attributed a better memory to individuals sharing narratives rich vs. poor in episodic detail. These findings are in line with previous research showing that linguistic cues to recollection (42) and

Downloaded from https://www.pnas.org by 93.70.86.221 on April 6, 2026 from IP address 93.70.86.221.

episodic details (43, 44) increase the perceived accuracy, veracity, and credibility of memories. This advantage was evident across experiments, regardless of whether we used real personal narratives (Experiment 1) or "memories" experimentally crafted to narrate the same event but with more or fewer episodic details (Experiments 2), and was mostly related by participants to the wealth of details in episodic narratives (Experiment 1; see also ref. 43). Correlation analyses (Experiment 1) and a regression model (Experiment 2) confirmed that perceived memory in the narrator is predicted by the detailedness of personal narratives. Accordingly, the brain default network, which is implicated in autobiographical memory retrieval (46), is also activated when individuals listen to complex narratives (47–49), with the speaker-listener neural synchrony predicting comprehension and shared experience (50). Memory mechanisms tuned to social information may also be present within the MTL: region CA2 of the hippocampus is primarily dedicated to social memory (e.g., memory for conspecifics; 51) and processing of social information (52). Moreover, boundary-related neural representations in the MTL were recently found that were modulated by one's own as well as another individual's location in a known environment (53).

In line with our hypothesis, sharing personal narratives rich in episodic content shaped social choice. Across two experiments, we found that participants felt closer to individuals sharing personal narratives that were rich vs. poor in episodic detail (Experiment 2) and were more willing to include them in their social circles or select them as potential partners (Experiment 1). These findings do not seem to reflect a general tendency to attribute any positive quality to narrators depending on their narrative (episodic) style. For example, episodic narrators were not judged as more physically attractive than semantic narrators (Experiment 2). Moreover, using a set of memories controlled for content (Experiment 2), we found that episodic compared to semantic narrators were perceived as more anxious, perhaps because they narrated mildly negative events using a wealth of details.

Rather, the results of our correlations (Experiment 1) show that social preference is related to the episodic qualities of the shared personal narratives (and not to personality traits preferentially attributed to episodic narrators). In addition, regressions models (Experiment 2) indicate that interpersonal closeness is predicted, on a trial-by-trial basis, by the episodic qualities of shared memories, including the degree to which participants felt projected into the shared memory, and the degree to which they felt emotions in response to shared experience, while not being significantly related to the narrators' inferred personality traits. By contrast, beauty was related to (inferred from) the narrator's perceived personality traits (being relaxed as opposed to anxious), and not to the episodic qualities of the narratives. Our findings align with previous evidence that sharing specific personal memories is associated with intimacy and desire to provide social support (35, 38, 39, 54). In addition, our experimental (episodic vs. semantic) manipulation allows us to conclude that it is the sharing of episodic memories that can enhance interpersonal closeness and shape social choice. Indeed, perceived memory and interpersonal closeness (but not beauty) were related to the concreteness of shared narratives, a characteristic that is linked to the sensory qualities and imageability typical of episodic memory (55), and not to other potentially appealing qualities of narratives, such as their semantic coherence or informational richness. Concreteness of a narrative may be related to how easily an experience is evoked in the listener, promoting self-projection into others' perspective.

Why would sharing episodic memories shape social interaction? Across species, individuals who display adaptive traits appear more attractive to other members of their species (31), and, therefore, individuals who prove to possess a highly functional episodic memory system (and the ensuing cognitive and social advantages) would tend to be preferred during social interaction, with the goal of including them in one's social circle and increasing the likelihood of mating with them. Even though our effects are consistent with the predictions, it remains to determine the mechanism by which episodic memories induce a feeling of closeness. One possible mechanism, supported by the results of our regression models, is self-projection: the contextual details populating episodic memories promote the listener's adoption of the narrator's perspective, favoring shared (vicarious) experience, and sharing experiences fosters closeness (26, 29, 56, 57). Interestingly, the provision of detailed descriptions of characters' actions, words, and feelings (as opposed to the author's opinions about them) is also integral to well-known writing techniques, such as the "Show-don't tell" method (which quotes Chekhov), to promote the effective projection of the reader into the character's perspective (58). According to Barthes (59), the semiotic function of such descriptive details is to produce "effects of reality" in the story. Indeed, Mahr and Csibra (3) have recently noted that sharing detailed episodic memories acts as proof that the narrator had firsthand access to an event, and therefore is entitled to report on it reliably, promoting trust (see also ref. 43). Consistently, in mock testimony experiments, eyewitnesses providing more details (even trivial details, peripheral to the event) were judged to be more credible (60). These findings indicate that the appraisal of episodic memory in others influences the evaluation of their social qualities and value.

Possibly related to our evolutionary hypothesis is the evidence that participants' ability to detect episodic memory in others was numerically (though not significantly) anticorrelated to their ability to recall their own memories in detail (Experiment 1), as if participants who do not have a good memory themselves were more capable of detecting who does. These results take on added significance considering Clark et al.'s observation that the size of the CA2/3 region of the hippocampus is positively related to the number of episodic details of autobiographical narratives, especially in people with poor performance (61). Note, however, that social choice was not related to participants' own memory abilities in our sample, and it is therefore an interesting question for future research whether individuals prefer to partner with others displaying similar or complementary memory abilities to their own. Assortative mating is known to be very high for intelligence (spouse correlations ~ 0.40) compared to other behavioral or personality traits (62), but it is currently unknown for episodic memory.

We end by highlighting the limitations and future directions of our research. Our finding that the detection of episodic (vs. semantic) memory in others biases social choice, and the evolutionary perspective we proposed to explain it, do not, of course, imply we deem semantic memory as not adaptive. Our experiments suggest that the basic affiliative tendencies we investigated are driven by the appraisal of episodic content. However, future studies should investigate other perceived cognitive qualities that we instead potentially ascribe more to semantic than to episodic narrators (e.g., erudition, or even intelligence), or situations in which we would rather prefer to partner with individuals who do not display high levels of episodic detail in shared memories but high semantic content (e.g., STEM activities that draw upon amodal reasoning abilities; see ref. 63). Relatedly, we are mindful that there is a significant correlation between performance in episodic (64, 65) and semantic (66) memory tests and verbal intelligence and reasoning. Choosing someone with a good episodic memory, therefore, might also make it more likely to partner with someone who is also intelligent. Future research is needed to determine which aspect of autobiographical memory is more closely

Downloaded from https://www.pnas.org by 93.70.86.221 on April 6, 2026 from IP address 93.70.86.221.

related to measures of intelligence, and if it has an impact on social choice.

Future studies should incorporate a wider variety of narrative stimuli to study the generalizability of the observed effects. Although the regression models indicate that our findings are consistent across narratives, the events described were uniformly trivial in content, and featured protagonists (narrators) with rather neutral connotations. What are the boundary conditions under which the effect emerges? Would we obtain similar findings for highly emotional events, or in the extreme case of negatively connoted narrators (e.g., "I watched her for a long time while she cried on the floor after I offended her" vs. "I can be sadistic at times"), or in such cases the appraisal of the narrator would be driven primarily by the core event, with reduced influence of narrative style (episodic vs. semantic)? Other interesting questions are whether the ability to detect episodic memory in others and to use it during social choice is modulated by the sex of the narrator/listener (aiming for a more balanced distribution than we had in Experiment 2), and whether it is preserved in individuals with impaired episodic memory, such as amnesic patients and older adults, or with altered social skills due to psychiatric or developmental conditions (e.g., social anxiety, autism). Finally, cultural differences may be important. We studied Italians and Canadians, but it would be interesting to investigate whether our effects hold more universally, for example across individualistic (Western) and collectivistic (Asian) cultures, or cultures that differ in the premium they place on detail in narratives.

To conclude, in two experiments, we have shown that individuals are able to detect the episodic content of memories shared by others and show a decided preference for individuals who share memories rich in episodic compared to semantic detail, who attract more feelings of closeness and willingness for social contact. The detection of the episodic content of memories shared by others predicted interpersonal closeness on a trial-by-trial basis. These findings reveal the human ability to appraise others' episodic memories, in addition to recalling their own, and an adaptive function of the episodic memory system: enabling the sharing of detail-rich personal memories that help forge close relationships.

Materials and Methods

Experiment 1. In this first experiment, to be naturalistic, we collected actual personal narratives, scored them according to the Autobiographical Interview (AI; see ref. 45), and selected pairs of narratives which varied in episodic richness (number of internal details) while having the same general topic.

Participants. We recruited 76 younger adults through the undergraduate psychology participant pool of the University of Toronto. Only individuals without a history of psychiatric, neurological, or medical conditions capable to interfere with participation and who were fluent in English were included in the study, which led to the exclusion of 28 individuals for health reasons, or for not being fluent in English. The final sample consisted of 50 young adults (23 females/27 males; mean age = 20.69; SD = 3.34; mean education = 14.38; SD = 2.33). This sample size was judged adequate based on a previous study on (dyadic) closeness using similar sample sizes (41), which was the study closest to ours at the time we ran this study (2018–2020). Twenty-two participants performed the task on paper, whereas 28 participants completed an equivalent, online version of the task (due to the COVID-19 health emergency), using Qualtrics and a Zoom conference call, during which the autobiographical interview was administered (45). Participants were also administered self-report measures of empathy (Interpersonal Reactivity Index, IRI; 67) and positive and negative affect (PANAS; 68), and the Ten-Item Personality Inventory (TIPI; 69), which were not found to be significantly related to our variables (*SI Appendix*). Participants were compensated with either course credit or $ 10. Participants gave informed consent to participate in the study, which was approved by the Research Ethics Board of the University of Toronto.

Materials and Procedure. The narratives consisted of 6 actual transcripts of personal narratives provided by participants involved in previous experiments conducted at the Moscovitch or Levine lab (see *SI Appendix* for the set of narratives). The narratives revolved around three different themes: making friends, searching for a lost watch, going to a restaurant. For each theme, two narratives were selected: one narrative contained more episodic, contextual details (e.g., spatial and temporal context, i.e., episodic narrative) and the other contained more semantic, abstract details (i.e., semantic narrative). Of course, the episodic and semantic narratives about the same theme differed in the specific content, as they were real personal narratives. The six narratives were scored for internal (episodic) and external (semantic) details according to the AI scoring method (45), where internal details refer to specific, contextual information related to central event, and external details refer to general semantic information, information unrelated to the central event, or metacognitive/editorializing statements. The formal analysis of details confirmed that the episodic narratives contained significantly more internal (21 vs. 6; $t_4 = 2.92$; $P = 0.04$) and fewer external details than the semantic narratives (0.66 vs. 9.66; $t_4 = -3.81$; $P = 0.02$), while containing a comparable number of words (140 vs. 139; $t_4 = 0.02$; $P = 0.98$) or details (22 vs. 15; $t_4 = 1.15$; $P = 0.31$). We had originally included an additional theme (breakup in a relationship) but we realized that the episodic and the semantic narratives differed too much in content (one of the narrators admitted having been mean) and, therefore, did not include this theme in the analyses (but the findings do not change meaningfully if we include this theme).

Participants received an experimental paper booklet or a link to a form containing a series of narratives. The episodic and semantic narratives relative to each theme were always presented one after the other on the same page of the booklet/section of the online form, with the order of presentation of the two narratives randomized for each theme. The two narratives were followed by a series of questions. For each pair of narratives, participants were told that the transcripts referred to the memories of two different persons, e.g., person A and person B (different among themes), and that they had to read the narratives and answer a series of questions. Participants had to state whether they thought person A or person B had a better memory and provide a brief justification for their choice. Then they had to choose which of the two narratives, between that of person A and person B, was the most detailed, engaging, vivid, familiar, emotional, and spatially integrated (memory questions). They then read the pair of narratives again and had to state whom, between person A and person B, they would like to know better and would select as a partner. Finally, to explore the inferred personality traits associated with different narrative styles, we adapted the TIPI personality questionnaire (69), and asked participants whether they thought person A and person B were extroverted/reserved/neither, open to new experiences/conventional/neither, anxious/calm/neither, critical/sympathetic/neither, dependable/disorganized/neither, and who between A and B they thought was more similar to them (social questions). The order of presentation of the memory vs. social sets of questions was randomized across participants.

At the end of the experiment, participants' memory abilities were assessed with a shortened version of the AI (45). Participants were instructed to recall a personal event that occurred at a specific time and place, at least 1 y ago, and described it in detail without any guidance or feedback from the experimenter for 5 min (free recall). A general probe was then administered to elicit more detail. The AI data of four participants were lost due to a technical problem. Transcripts of the personal memories were scored by author AW according to the AI procedure (45). Details from free recall phase and additional details from the general probe phase were summed to yield the total number of internal and external details.

Statistical Analyses.

Episodic vs. semantic preference in perceived memory, memory quality, and social choice. For each variable, we computed the proportion of trials (out of three narrative pairs) in which the episodic narrative was selected over the semantic narrative. These proportions were compared against chance level (0.50) using Wilcoxon signed-rank tests (V), with rank-biserial correlations (RBC) reported as effect sizes. Binomial tests were used to examine preferences for individual narrative pairs.

Personality ratings. Differences between episodic and semantic narrators for each variable were assessed using Wilcoxon signed-rank tests (W), with RBC reported as effect sizes.

Downloaded from https://www.pnas.org by 93.70.86.221 on April 6, 2026 from IP address 93.70.86.221.

Correlation analyses. Correlations between variables were examined using Spearman's rank correlations and Fisher's *z* reported as a measure of effect size. Bonferroni correction was applied to account for multiple comparisons.

Experiment 2. Because in Experiment 1 the narratives were idiosyncratic (real) and therefore not fully controlled for content, our findings on social preference and inferred personality may be related in part to their specific content of the narratives. In Experiment 2, by substituting internal with external details depending on the experimental condition, we created pairs of narratives featuring the same event but which differed from one another in the number of episodic and semantic details (but not in the number of words or self-references). In Experiment 2, we also added a condition to control for the possibility that participants would attribute any positive quality, such as beauty, to individuals sharing personal memories rich vs. poor in episodic detail. Finally, because the episodic quality of shared memories may also influence the personality attributed to the narrator, we also tested whether the perceived episodic quality of the narratives influenced participants' perceived memory in the narrator and feeling of closeness toward the narrator over and above any inferred personality traits.

Participants. One hundred and 25 individuals (97 females/28 males; mean age: 19.98 y, SD = 1.62; 15 y of education in all cases) were recruited from an introductory course at the Department of Psychology of the University of Bologna, and allocated randomly to the "Closeness" (experimental) group (N = 63; 51 females/12 males) or the "Beauty" (control) group (N = 62; 46 females/16 males). An additional participant was tested but was excluded because she did not complete the task. A sample size of 100 participants (50 per condition) was set based on the sample size of the previous study. We slightly overshot that goal based on a higher show-up rate than we had planned. The experimental and the control group were matched for age (20.14 vs. 19.80; $t_{122} = -1.17$, $P = 0.24$), and proportion of females and males ($\chi^2 = 0.82$; $P = 0.36$). Participants gave informed consent to participate in the study, which was approved by the Bioethical Committee of the University of Bologna.

Materials and Procedure. The materials consisted of 20 short first-person narratives in which a main character (the narrator) described events that ostensibly occurred in the past. Most narratives involved social interactions and ended with a mildly disappointing outcome for the protagonist (e.g., being ignored by a friend on the street, missing a train (70); see *SI Appendix* for the set of narratives). Infact, the 20 narratives were experimentally constructed by creating two versions, episodic and semantic, of each of 10 events. Each pair narrated the same core event but differed in the type of details with which the event was described. The episodic narrative provided a rich description of the spatial context of the event and of the sensorial experiences of the protagonist in the event (e.g., "Some of the tables were wooden barrels with chairs around them," "The stones that pave the square made my bike shake"), whereas the semantic narrative mainly included semantic and abstract information (e.g., "I was not someone who cheated at school," "Children usually take a lot of speed doing these games"). Details filling episodic and semantic narratives were created having in mind the distinction between internal details and external details at the AI (45), where internal details (prominent in episodic narratives) refer to event, time, place, and perceptual details related to a specific event, and external details (prominent in semantic narratives) refer to semantic information, information unrelated to the central event, or metacognitive/editorializing statements. We refrained from adding emotional details in the episodic versions of the stories to avoid the possibility that the hypothesized greater closeness toward the episodic compared to the semantic narrator was due to higher emotional disclosure. Minor aspects of the stories (e.g., proper names, pronouns) were modified so that for female participants the protagonist (narrator) was female, and for male participants the protagonist was male.

As a manipulation check, we had two independent raters (not involved in the study) score the semantic and episodic narratives for number of internal and external details according to the AI procedure (45). An ANOVA on the mean number of details with Narrative (episodic, semantic) and Detail (internal, external) as factors yielded a significant effect of Detail ($F_{1,9} = 115.44$; $P = 0.001$; $\eta_p^2 = 0.93$) and a significant Detail x Narrative interaction ($F_{1,9} = 317.66$; $P = 0.001$; $\eta_p^2 = 0.97$), which confirmed that episodic narratives had more internal details (27.10 vs. 14.20; $P = 0.001$) but fewer external details than semantic narratives (5.35 vs. 15.40; $P = 0.001$). In particular, the episodic narratives had more event, time, place, and perceptual details than the semantic versions ($t_9 > 3.00$, $P < 0.02$ in all cases) but not more emotions/thoughts ($P = 0.25$), whereas the semantic narratives had more semantic and external-event details than the episodic narratives ($t_9 > 2.00$, $P < 0.03$ in both cases), but not more repetitions ($P = 0.50$). The total number of words (171.00 vs. 171.40; $t_9 = -0.29$; $P = 0.77$) and the number of references to the self–i.e., first-person singular and first-person plural pronouns and possessive cases (Italian equivalents of I, me, my, mine, we, us, ours) were not significantly different between episodic and semantic narratives (7.70 vs. 7.90; $t_9 = -0.22$; $P = 0.83$). Because in Italian the desinence of the verb identifies the subject even if the pronoun is not explicitly stated (e.g., both "io sono" and "sono" mean "I am"), we also counted self-references including verbs with no expressed pronoun, and confirmed no differences in self-references between episodic and semantic narratives (16.80 vs. 16.50; $t_9 = -0.23$; $P = 0.82$).

As a further check, we did an additional scoring of self-relevant information and of situational information conveyed by our episodic and semantic narratives, different from the AI scoring (45) that drove the construction of our set. For each narrative, we counted 1) the number of actions made by the protagonist (narrator) in the narrated event (self-related actions; e.g., "I hid a ticket between the calculator and its case"), 2) the number of emotions of the protagonist in that event (e.g., "I was not happy with the idea because that path was dangerous"), 3) the number of self-related facts the protagonist shares that are not specific to the narrated event (personal semantics about the protagonist and actions made by the protagonist in different events; e.g., "I was not someone who cheated at school"; "I had met him at a college student party"), 4) situational information (spatial/perceptual information; e.g., "The classroom had three blocks of desks"). We found that the episodic narratives had more self-related actions (7.00 vs. 5.6; $t_9 = 4.12$; $P = 0.003$) but fewer self-related facts than semantic narratives (1.20 vs. 4.40; $t_9 = -3.80$; $P = 0.004$), while emotions did not differ between episodic and semantic narratives (1.90 vs. 1.70; $P = 0.50$). Thus, the sum of self-related information (categories 1 + 2 + 3) did not differ between episodic and semantic narratives (and was numerically higher in semantic narratives; 10.10 vs. 11.70; $P = 0.08$). By contrast, episodic narratives contained more situational information than semantic narratives (11.80 vs. 2.30; $t_9 = 15.80$; $P = 0.001$). This additional scoring confirmed that episodic narratives contained more situational information than semantic narratives, while the two types of narratives did not convey a different amount of self-relevant information. Rather, the type of self-related information differed between narratives: episodic narratives emphasized the protagonist's actions in a specific event, whereas semantic narratives predominantly contained semantic information about the protagonist, in line with our original AI-based scoring.

Participants were tested in small groups in a classroom of the University of Bologna. They received an experimental paper booklet displaying 10 narratives, including 5 episodic and 5 semantic narratives (about different events), one per page. The assignment of the events to the episodic vs. semantic narrative was counterbalanced across participants, as was the order of the narratives in the booklet. Participants were requested to read each narrative carefully, and to answer a series of questions. A set of questions pertained to the perceived quality of the narrator's memory and its characteristics (memory questions), a question pertained to the perceived closeness felt for the narrator (in the Closeness group) or to the beauty attributed to the narrator (in the Beauty control group) (closeness/beauty question), and a set of questions pertained to the personality attributed to the narrator (personality questions). In particular, using a VAS ranging from 0 (not at all) to 10 (a lot), participants in the Closeness group rated the degree to which they a) thought the narrator had a good memory (memory question–common to both groups), and b) felt close to the narrator, meaning that they felt sympathy for him/her, felt similar to him/her, and would like to interact with him/her (closeness question). Additionally, participants rated c) the degree to which they thought the narrative was detailed, d) how self-projected they were into the narrative, as if they experienced it themselves, and e) how emotional they felt on reading the narrative. To understand whether any preference for the episodic narrator was due to inferred personality traits, we asked participants about the personality they attributed to the narrator (69). Participants rated, on a VAS from 0 to 10, the degree to which they thought the narrator was f) extroverted (low values) vs. reserved (high values), g) open to new experiences (low values) vs. conventional (high values), h) anxious (low values) vs. calm (high values), i) sympathetic (low values) vs. critical (high values), l) dependable (low values) vs.

Downloaded from https://www.pnas.org by 93.70.86.221 on April 6, 2026 from IP address 93.70.86.221.

disorganized (high values). Participants in the Beauty group underwent a similar procedure and received the same instructions as those in the Closeness group, with the exception that instead of the critical closeness question they received a control question asking to rate the degree to which they thought that the narrator was physically attractive (beauty question). The order of the memory, closeness/beauty, and personality sets of questions was counterbalanced across participants.

Statistical Analyses.

Episodic vs. semantic differences in perceived memory, memory quality, closeness, beauty, and inferred personality. Average ratings for each variable were analyzed using repeated-measures ANOVA, with Group (closeness, beauty) as a between-subject factor and Condition (episodic, semantic) as a within-subject factor. Partial η^2 was reported as a measure of effect size.

Regression models. Three regression models were run to understand which factors, among those found to be significantly different between the episodic and semantic conditions, best predicted the superior perceived memory in and closeness felt toward (vs. beauty attributed to) episodic compared to semantic narrators. All variables were standardized, and all mixed effect models were run with the lme4 package in R (version 1.1-35.5; 71). R^2 were obtained following Rights and Sterba (72). In all cases, we first tested the model with the random effect of subject identity against the model with the two crossed random effects (subject identity and narrative) and then selected the best model based on the lowest Bayesian Information Criterion (BIC) value. All models allowed for both a random intercept and a random slope for each fixed effect. We report the final model for each analysis, following the principle of parsimony. BIC values, lme4 model equations, VIF values, and R^2 are reported as Supporting Information.

Correlation between perceived memory and closeness (vs. beauty) and linguistic features of narratives. We extracted both basic and advanced linguistic features of narratives: 1) morphosyntactic structure: using Part-Of-Speech (POS) tagging, each word was assigned a grammatical class (verb, pronoun, adverb, auxiliary verb, adposition, common noun, determiner, proper noun, adjective) and the frequency of each grammatical class was calculated for each narrative; 2) semantic coherence: latent semantic analysis (LSA) was applied using the Italian itwac semantic space (73). We first computed semantic similarity between all sentence pairs (divided by full stops), by using the coherence function in R (LSA fun package, version 0.7.1; 74). We then averaged the values of semantic similarity between adjacent sentences, yielding a mean semantic coherence value per narrative; 3) concreteness: word-level concreteness scores were taken from the Brysbaert et al. (2014)'s database (75) after translating our narratives to English (as there is no such extended dataset for Italian) and averaged per narrative; 4) informational richness: measured as the number of distinct ideas (number of propositions) divided by the number of words (as in ref. 76, see also ref. 77). Pearson's correlations were computed between these linguistic features and the ratings of perceived memory, closeness, and beauty across the 20 narratives. Since POS elements capture overlapping dimensions of morphosyntactic structure, their relationship with perceived memory, closeness, and beauty was examined using three linear regression models with the number of verbs, pronouns, adverbs, auxiliary verbs, adpositions, common nouns, determiners, proper nouns, and adjectives as independent variables.

The data were analyzed using JASP (version 0.16) and R (version 4.3.0).

Data, Materials, and Software Availability. Data and codes have been deposited in Open Science Framework (OSF; https://osf.io/p2kjs/?view_only=b3240b2f5f43494da2a6a37b19e77fd1) (78).

ACKNOWLEDGMENTS. We thank Elena Bertossi, Matilde Conti, Angela Gong, Debora Marchesini, and Flavia De Luca who supported data collection, Signy Sheldon and Brian Levine for supplying us with the narratives used in Experiment 1, Maryline Ziegler for her help in coordinating Experiment 1, and Dave Flora for helpful comments on the paper. We are grateful for the comments received at a "Rambling" event organized by Alessandro Treves in Trieste (June 24, 2019) and at the Recollection, Familiarity, and Novelty conference in Liège (March 17, 2023). Natural Sciences and Engineering Research Council of Canada Discovery grant (#A8347) and Canadian Institutes of Health Research grant (#MOP49566) to M.M., PRIN grant from the Italian Ministry of Education, University, and Research to E.C. (#20224FWF2J).

1. E. Tulving, Memory and consciousness. *Can. Psychol.* **26**, 1 (1985).
2. J. L. Dessalles, "Why talk?" in *The Social Origins of Language*, D. Dor, C. Knight, J. Lewis, Eds. (Oxford University Press, 2014).
3. J. B. Mahr, G. Csibra, Why do we remember? The communicative function of episodic memory. *Behav. Brain Sci.* **41**, 1–93 (2017).
4. M. Moscovitch, R. Cabeza, G. Winocur, L. Nadel, Episodic memory and beyond: The hippocampus and neocortex in transformation. *Ann. Rev. Psychol.* **67**, 105 (2016).
5. F. Stella, E. Cerasti, B. Si, K. Jezek, A. Treves, Self-organization of multiple spatial and context memories in the hippocampus. *Neurosci. Biobehav. Rev.* **36**, 1609–1625 (2012).
6. W. B. Scoville, B. Milner, Loss of recent memory after bilateral hippocampal lesions. *J. Neurol. Neurosurg. Psychiatry* **20**, 11 (1957).
7. D. R. Addis, A. T. Wong, D. L. Schacter, Remembering the past and imagining the future: Common and distinct neural substrates during event construction and elaboration. *Neuropsychologia* **45**, 1363–1377 (2007).
8. D. Hassabis, D. Kumaran, S. D. Vann, E. A. Maguire, Patients with hippocampal amnesia cannot imagine new experiences. *Proc. Natl. Acad. Sci. U.S.A.* **104**, 1726–1731 (2007).
9. D. L. Schacter *et al.*, The future of memory: Remembering, imagining, and the brain. *Neuron* **76**, 677–694 (2012).
10. F. De Luca *et al.*, Boundary extension is attenuated in patients with ventromedial prefrontal cortex damage. *Cortex* **108**, 1–12 (2018).
11. S. Sheldon, M. P. McAndrews, M. Moscovitch, Episodic memory processes mediated by the medial temporal lobes contribute to open-ended problem solving. *Neuropsychologia* **49**, 2439–2447 (2011).
12. D. E. Warren, J. Kurczek, M. C. Duff, What relates newspaper, definite, and clothing? An article describing deficits in convergent problem solving and creativity following hippocampal damage. *Hippocampus* **26**, 835–840 (2016).
13. A. Viol, A. Treves, E. Ciaramelli, Navigating through the ebbs and flows of language. *Curr. Opin. Neurobiol.* **70**, 130–136 (2021).
14. D. Kwan *et al.*, Cueing the personal future to reduce discounting in intertemporal choice: Is episodic prospection necessary? *Hippocampus* **25**, 432–443 (2015).
15. D. J. Palombo, M. M. Keane, M. Verfaellie, The medial temporal lobes are critical for reward-based decision making under conditions that promote episodic future thinking. *Hippocampus* **25**, 345–353 (2015).
16. R. M. Tavares *et al.*, A map for social navigation in the human brain. *Neuron* **87**, 231–243 (2015).
17. M. Schafer, D. Schiller, Navigating social space. *Neuron* **100**, 476–489 (2018).
18. M. C. Duff *et al.*, Hippocampal amnesia disrupts the flexible use of procedural discourse in social interaction. *Aphasiology* **22**, 866–880 (2008).
19. J. Kurczek, S. Brown-Schmidt, M. Duff, Hippocampal contributions to language: Evidence of referential processing deficits in amnesia. *J. Exp. Psychol.: Gen.* **142**, 1346–54 (2013).
20. J. Stiller, R. I. M. Dunbar, Perspective-taking and memory capacity predict social network size. *Soc. Netw.* **29**, 93–104 (2007).
21. J. N. Beadle, D. Tranel, N. J. Cohen, M. C. Duff, Empathy in hippocampal amnesia. *Front. Psychol.* **4**, 69 (2013).
22. J. S. Rabin, N. Carson, A. Gilboa, D. T. Stuss, R. S. Rosenbaum, Imagining other people's experiences in a person with impaired episodic memory: The role of personal familiarity. *Front. Psychol.* **24**, 588 (2013).
23. C. Sawczak *et al.*, I remember therefore I am: Episodic memory retrieval and self-reported trait empathy judgments in young and older adults and individuals with medial temporal lobe excisions. *Cognition* **225**, 105124 (2022).
24. N. Spreng, R. A. Mar, I remember you: A role for memory in social cognition and the functional neuroanatomy of their interaction. *Brain Res.* **1428**, 43–50 (2012).
25. E. Ciaramelli, F. Bernardi, M. Moscovitch, Individualized theory of mind (iToM): When memory modulates empathy. *Front. Psychol.* **1**, 4 (2013).
26. B. Gaesser, D. L. Schacter, Episodic simulation and episodic memory can increase intentions to help others. *Proc. Natl. Acad. Sci. U.S.A.* **111**, 4415–4420 (2014).
27. E. Ciaramelli, G. di Pellegrino, Ventromedial prefrontal cortex and the future of morality. *Emot. Rev.* **3**, 308–309 (2011).
28. B. B. O'Connor, Z. Fowler, How imagination and memory shape the moral mind. *Pers. Soc. Psychol. Rev.* **27**, 226–249 (2023).
29. M. C. Vollberg, B. B. O'Connor, P. Vuillemier, D. Sander, M. Cikara, Place-related representations in setting the stage for empathy. *Cognition* **266**, 106327 (2026).
30. N. Spreng, J. R. Andrews-Hanna, The default network and social cognition. *Brain Mapping* **1316**, 165–169 (2015).
31. C. Darwin, *The Descent of Man* (D. Appleton, New York, 1871).
32. M. D. Spritzer, D. B. Meikle, N. G. Solomon, Female choice based on male spatial ability and aggressiveness among meadow voles. *Anim. Behav.* **69**, 1121–1130 (2005).
33. N. J. Boogert, T. W. Fawcett, L. Lefebvre, Mate choice for cognitive traits: A review of the evidence in nonhuman vertebrates. *Behav. Ecol.* **22**, 447–459 (2011).
34. Y.-J. Chou *et al.*, Potential cross-species correlations in social hierarchy and memory between mice and young children. *Commun. Biol.* **5**, 230 (2022).
35. N. Alea, S. Bluck, Why are you telling me that? A conceptual model of the social function of autobiographical memory. *Memory* **11**, 165–178 (2003).
36. D. Pillemer, Directive functions of autobiographical memory: The guiding power of the specific episode. *Memory* **11**, 193–202 (2003).
37. N. Alea, S. Bluck, I'll keep you in mind: The intimacy function of autobiographical memory. *Appl. Cogn. Psychol.* **21**, 1091–1111 (2007).
38. M. Pasupathi, S. Lucas, A. Coombs, Conversational functions of autobiographical remembering: Long-married couples talk about conflicts and pleasant topics. *Discourse Process.* **34**, 163–192 (2002).
39. M. Pasupathi, L. L. Carstensen, Age and emotional experience during mutual reminiscing. *Psychol. Aging* **18**, 430 (2003).
40. M. D. Schulkind, T. A. Rahhal, M. R. Klein, S. R. Lacher, The specificity and organization of autobiographical memories. *Memory* **20**, 923–934 (2012).

Downloaded from https://www.pnas.org by 93.70.86.221 on April 6, 2026 from IP address 93.70.86.221.

41. D. R. Beike, N. R. Brandon, H. E. Cole, Is sharing specific autobiographical memories a distinct form of self-disclosure? *J. Exp. Psychol. Gen.* **145**, 434 (2016).
42. A. Gamoran, L. Lieberman, M. Gilead, I. Dobbins, T. Sadeh, Detecting recollection: Human evaluators can successfully assess the veracity of others' memories. *Proc. Natl. Acad. Sci. U.S.A.* **121**, e2310979121 (2024).
43. L. Nadel, K. C. Simon, Perceived memory credibility: The role of details. *Proc. Natl. Acad. Sci. U.S.A.* **121**, e2416373121 (2024).
44. S. A. Martinez *et al.*, Linguistic properties of memory expressions differentially relate to accuracy, specificicty, and perceived veracity. *Psychon. Bull. Rev.* **32**, 1803–1813 (2025).
45. B. Levine, E. Svoboda, J. F. Hay, G. Winocur, M. Moscovitch, Aging and autobiographical memory: Dissociating episodic from semantic retrieval. *Psychol. Aging* **17**, 677 (2002).
46. N. Spreng, R. A. Mar, A. S. N. Kim, The common neural basis of autobiographical memory, prospection, navigation, theory of mind, and the default mode: A quantitative meta-analysis. *J. Cogn. Neurosci.* **21**, 489–510 (2009).
47. E. Simony *et al.*, Dynamic reconfiguration of the default mode network during narrative comprehension.. *Nat. Commun.* **7**, 1–13 (2016).
48. J. Chen *et al.*, Shared memories reveal shared structure in neural activity across individuals. *Nat. Neurosci.* **20**, 115–125 (2017).
49. H. Lee, B. Bellana, J. Chen, What can narratives tell us about the neural bases of human memory? *Curr. Opin. Behav. Sci.* **32**, 111–119 (2020).
50. A. Zadbood, J. Chen, Y. C. Leong, K. A. Norman, U. Hasson, How we transmit memories to other brains: Constructing shared neural representations via communication. *Cereb. Cortex* **27**, 4988–5000 (2017).
51. F. L. Hitti, S. A. Siegelbaum, The hippocampal CA2 region is essential for social memory. *Nature* **508**, 88–92 (2014).
52. N. Tzakis, M. Holahan, Social memory and the role of the hippocampal CA2 region. *Front. Behav. Neurosci.* **13**, 233 (2019).
53. M. Stangl *et al.*, Boundary-anchored neural mechanisms of location-encoding for self and others. *Nature* **589**, 420–425 (2021).
54. T. J. Barry *et al.*, Reduced autobiographical memory specificity affects general distress through poor social support. *Memory* **27**, 916–923 (2019).
55. A. D'Argembeau, M. Van der Linden, Individual differences in the phenomenology of mental time travel: The effect of vivid visual imagery and emotion regulation strategies. *Conscious. Cogn.* **15**, 342–350 (2006).
56. E. Gessaroli, E. Santelli, G. Pellegrino, F. F. Frassinetti, Personal space regulation in childhood autism spectrum disorders. *PLoS One* **8**, e74959 (2013).
57. M. Candini *et al.*, Personal space regulation in childhood autism: Effects of social interaction and person's perspective. *Autism Res.* **10**, 144–154 (2017).
58. J. Warren, *Show Don't Tell: A Guide to Purpose Driven Speech* (Jerianne Warren Publisher, 2011).
59. R. Barthes, *The Rustle of Language* (University of California Press, 1989).
60. B. E. Bell, E. F. Loftus, Trivial persuasion in the courtroom: The power of (a few) minor details. *J. Pers. Soc. Psychol.* **56**, 669 (1989).
61. I. A. Clark, M. Dalton, E. A. Maguire, Posterior hippocampal CA2/3 volume is associated with autobiographical memory recall ability in lower performing individuals. *Sci. Rep.* **13**, 7924 (2023).
62. R. Plomin, I. J. Deary, Genetics and intelligence differences: Five special findings. *Mol. Psychiatry* **20**, 98–108 (2015).
63. H. M. Sokolowski *et al.*, Visual imagery and stem occupational attainment: Gender matters. *Pers. Individ. Differ.* **250**, 113552 (2026), 10.2139/ssrn.5325312.
64. K. Matešić, V. Ružić, S. Galić, Investigating the relationship between cognitive abilities, memory function, and personality traits: A study of the WAIS-IV, WMS-IV, and NEO-FFI. *Personal. Individ. Differ.* **237**, 113045 (2025).
65. L. J. Rapport *et al.*, Relation of iq to verbal learning and memory: Test and retest. *J. Clin. Exp. Neuropsychol.* **19**, 655–666 (1997).
66. Y. Li, R. E. Beaty, S. Luchini, W. Hu, Y. N. Kenett, The role of semantic memory networks in crystallized intelligence and creative thinking ability. *Learn. Individ. Differ.* **111**, 102426 (2024).
67. M. H. Davis, Measuring individual differences in empathy: Evidence for a multidimensional approach. *J. Pers. Soc. Psychol.* **44**, 113–126 (1983).
68. D. Watson, L. A. Clark, A. Tellegen, Development and validation of brief measures of positive and negative affect: The PANAS scales. *J. Pers. Soc. Psychol.* **54**, 1063–1070 (1988).
69. S. D. Gosling, P. J. Rentfrow, W. B. Swann Jr., A very brief measure of the big-five personality domains. *J. Res. Pers.* 37, 504–528 (2003).
70. E. Ciaramelli *et al.*, The detection of episodic memory in others and its social effect. *Brain Cogn.* **170**, 106022 (2023).
71. D. Bates, M. Mächler, B. Bolker, S. Walker, Fitting linear mixed–effects models Usinglme4. *J. Stat. Softw.* **67**, 1–48 (2015).
72. J. D. Rights, S. K. Sterba, Quantifying explained variance in multilevel models: An integrative framework for defining R-squared measures. *Psychol. Methods* **24**, 309 (2019).
73. M. Baroni, S. Bernardini, A. Ferraresi, E. Zanchetta, The WaCky wide web: A collection of very large linguistically processed web-crawled corpora. *Lang. Resour. Eval.* **43**, 209–226 (2009).
74. F. Günther, C. Dudschig, B. Kaup, LSAfun-An R package for computations based on latent semantic analysis. *Behav. Res. Methods* **47**, 930–944 (2015).
75. M. Brysbaert, A. B. Warriner, V. Kuperman, Concreteness ratings for 40 thousand generally known English word lemmas. *Behav. Res. Methods* **46**, 904–911 (2014).
76. M. A. Covington *et al.*, Does ketamine mimic aspects of schizophrenic speech? *J. Psychopharmacol.* **21**, 338–346 (2007).
77. C. Fenerci *et al.*, Studying memory narratives with natural language processing. *Trends Cogn. Sci.* **29**, 516–525 (2025).
78. E. Ciaramelli, A. Waisman, D. Stendardi, M. Moscovitch, Memory Detection 25: Data from The detection of episodic memory in others biases social choice. OSF. https://osf.io/p2kjs/?view_only=b3240b2f5f43494da2a6a37b19e77fd1. Deposited 1 October 2025.

Downloaded from https://www.pnas.org by 93.70.86.221 on April 6, 2026 from IP address 93.70.86.221.