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Fade in, fade out: Do shifts in visual perspective predict the consistency of real-world memories?

Victoria Wardell[1], Taylyn J. Jameson[1], Oliver J. R. Bontkes[1], M. Lindy Le[1], Tz-yu Duan[1], Peggy L. St. Jacques[2], Christopher R. Madan[3*], Daniela J. Palombo[1*]

*equal contribution

[1]Department of Psychology, University of British Columbia

[2]Department of Psychology, University of Alberta

[3]School of Psychology, University of Nottingham

Author Note

Correspondence concerning this article should be addressed to Dr. Daniela J. Palombo, Department of Psychology, University of British Columbia, 2136 West Mall, Vancouver, BC, V6T 1Z4, Canada. Email: daniela.palombo@ubc.ca

Abstract

Memories of our personal past are not exact accounts of what occurred. Instead, memory reconstructs the past in adaptive–though not always faithful–ways. Using a naturalistic design, here we asked how the visual perspective adopted in the mind's eye when recalling the past–namely, an "own" eyes versus "observer" perspective–relates to the stability of autobiographical memories. We hypothesized that changes in visual perspective over time would predict poorer consistency of memories. Young adults (*N*=178) rated the phenomenology of and freely recalled self-selected memories of everyday events at two time points (10 weeks apart). Multilevel linear modeling revealed, as expected, that greater shifts in visual perspective over time predicted lower memory consistency, particularly for emotional details. Our results offer insight into the factors that predict the fidelity of memories for everyday events. Moreover, our results may elucidate new metrics that are useful in interpreting eye-witness testimony or experiences relayed in clinical contexts.

Keywords. Autobiographical Interview, Autobiographical Memory, Memory Consistency, Visual Perspective

Statement of Relevance

For many, the act of remembering may make it feel like we can replay past experiences as if they were a video in our mind's eye. Unlike a video, however, memories are malleable–often changing with each viewing. The mental imagery associated with a memory can manifest from varied vantage points; we can watch the event from our own eyes or take on a different perspective, watching ourselves moving through our pasts like a fly on the wall. Here, we asked whether the point of view one adopts when remembering real-world events relates to the consistency of memories over time in a sample of university students. We found that greater shifts in visual perspective predicted lower memory consistency, specifically for emotional content. The malleability of memory provides us with the capacity to play with past events, twisting and turning them in the mind. By adopting a new perspective, the details we remember may change, but, in exchange, we gain the opportunity to see our lives from another point of view.

Memories of our past, that is, autobiographical memories, allow us to recall what we have done and where we have been (Conway, 2005). Far from providing a stable record, however, memories are malleable. Prominent theories suggest that memories are constructed in order to facilitate navigating the present moment, often at the expense of recalling exact accounts of what happened (Conway & Pleydell-Pearce, 2000; Schacter et al., 2011). However, it is important that memories maintain some degree of accuracy so that we can learn from the past in meaningful ways (Conway & Loveday, 2015). If memories were too vulnerable to change, they would no longer provide us with useful information. To the extent that we rely on memories to be accurate in personal and societal (e.g., eyewitness testimony) realms, it is important to understand what factors impact an autobiographical memory's vulnerability to change.

Autobiographical memory allows rememberers to mentally travel to the past, evoking imagery, sensations, or emotions, that can recreate the subjective experience of the original event (Rubin, 2006; Tulving, 1985). This sense of re-experiencing has been associated with the richness of the visual imagery elicited within the mind's eye when remembering (Zaman & Russell, 2022). Such imagery requires a *visual perspective* from which to picture the event (Rubin & Umanath, 2015; Nigro & Neisser, 1983). For decades, research has puzzled over visual perspective. Despite experiencing our lives from our own egocentric point of view memories can be pictured from one's "own" perspective or an "observer" perspective–we can watch ourselves move through past events as if watching an actor on stage (Iriye & St. Jacques, 2020; Nigro & Neisser, 1983; Robinson & Swanson, 1993). (Though, it has been speculated that situations involving self-evaluation (Nigro & Neisser, 1983) or dissociation

(Bergouignan et al., 2022) might give rise to observer perspective as a memory is being formed.) These perspectives are not mutually exclusive; a memory for a single event can shift between own and observer perspectives over time and even over the course of a single recall (Rice & Rubin, 2009; St. Jacques et al., 2017).

In spite of its enigmatic quality, the significance of visual perspective is well recognized in disparate domains of psychology, including cognitive, social, and clinical science. In the domain of cognitive science, shifts in perspective have been linked with characteristics of memory, both in the subjective experience of remembering, such as the emotional intensity of the memory (Sekiguchi & Nonaka, 2014), and the details recalled (Akhtar et al., 2017; King et al., 2022), indicating that visual perspective is one indicator of memory malleability. Here, we asked whether changes in perspective predict the *consistency* with which voluntary autobiographical memories are recalled over time: Does a change in visual perspective confer a distortion of voluntarily recalled details of past events?

Such a speculation was advanced almost 40 years ago by Nigro and Neisser (1983). Although surprisingly little evidence has materialized since, some findings lend initial credence to the idea that perspective is linked to changes in memory. Compared to adopting an own perspective, recalling events from an observer perspective is associated with less detailed (Berntsen & Rubin, 2006; D'Argembeau et al., 2003; Sutin & Robins, 2010; Vella & Moulds, 2014) and less vivid memories (Berntsen & Rubin, 2006; Butler et al., 2016; Williams & Moulds, 2008). Observer compared to own memories contain fewer sensory and affective details, though other types of details, such as physical appearance or spatial relationships, do not seem to systematically

differ as a function of perspective (Bagri & Jones, 2009; McIsaac & Eich, 2002, 2004; Piolino et al., 2006; King et al., 2022). However, these studies do not address the issue of accuracy, insofar as these data show that observer perspective memories result in less rich, but not necessarily less faithful, memories.

More central to Nigro and Neisser's proposal, one laboratory study provides a link between visual perspective change and memory *fidelity*: Marcotti and St. Jacques (2018) manipulated visual perspectives by asking participants to recall a staged event from either an own or observer perspective–an approach that allowed the researchers to corroborate the accuracy of the recall. Intentionally shifting memories from own to observer perspective reduced memory accuracy, an effect driven by vividness. Other innovative approaches have been adopted to elucidate the relationship between perspective and accuracy, including reviewing photographs of staged events from different perspectives (Marcotti & St. Jacques, 2022) and manipulating perspective at the time of encoding via virtual reality (Iriye & St. Jacques, 2021). Still, in these studies, change in perspective was an externally imposed task, as opposed to a gradual, internally driven process. It remains unclear whether naturally occurring shifts in visual perspective are associated with changes in the fidelity of autobiographical memories.

Accordingly, we assessed how own and observer perspectives correlate with the consistency of autobiographical memories. Our question is addressed through the lens of time, which creates naturalistic conditions to observe whether changes in perspective are associated with changes in memory consistency: Time exerts a major influence on memory, both in accuracy (Armson et al., 2017; Shapira & Pansky, 2019) and vividness (Cooper et al., 2019; Rice & Rubin, 2009). However, we do not merely forget details; we

embellish memories with new information (Schacter, 2022). As a memory ages, it is less likely to maintain a faithful representation of what was encoded. Fittingly, memories tend to shift away from own and towards observer perspectives over time (Butler et al., 2016; King et al., 2022; Rice & Rubin, 2009)–though perspectives can shift in opposite directions, even if less frequent (see McCarroll, 2017). Here, we tracked memories twice over 10 weeks. This design allowed us to test the hypothesis that natural *changes* in visual perspective over time for voluntary memories would be associated with reduced consistency of real-world memories for everyday experiences. Although consistency cannot be considered synonymous with accuracy, it is a useful real-world proxy for the fidelity of memories that are otherwise unverifiable.

Deidentified data for this experiment along with a codebook and the data-analysis scripts are publicly available at https://osf.io/hmt9a/. The study reported in this article was not preregistered. Materials available upon request.

Methods

Participants

Students from the University of British Columbia participated in this two-session online study in exchange for course credit. To be included in the analyses, participants had to complete both sessions, pass all attention checks embedded throughout the study (three in session one and one in session two), and provide valid event recalls at both sessions. We defined a valid recall as being an event that (1) occurred within the last three weeks at the time of the participant's first session; (2) was remembered at the second session; and (3) had narratives at both sessions that reflected remembering (e.g., the events could not be copy and pasted text or random keyboard entries).

After recruiting the maximum number of participants permitted by the participant pool, a total of 357 subjects completed the first session, although 16 of these participants failed attention checks and were excluded from further analysis. Of the 341 remaining participants, 192 returned to complete session two (all of whom passed the session two attention check). Fourteen subjects did not provide valid memory data and were excluded, leaving a final sample of 178 participants ($M(SD)_{Age}$= 20.66(2.56) years old; 84.3% women, 14.0% men, and 1.7% gender diverse). This study was approved by the local ethics committee of the University of British Columbia.

Procedure

Session One

Participants completed session one online via the survey platform Qualtrics. After obtaining informed consent, demographic information, and health histories, participants were asked to select six everyday events (three control memories; detailed below) from their past that had occurred one to 14 days ago (e.g., “within the last two weeks, not including today”) and that they would be comfortable discussing. It was requested that the events not be mundane, traumatic, or involve substance use but be distinct episodes that they could bring to mind (see Supplemental Materials). A two-week interval was selected in order to capitalize on changes in memory observed soon after encoding (see Bauer, 2015), while providing a period reasonably long enough for participants to identify unique neutral events. Given the COVID-19 Pandemic restrictions affecting this sample of students, we further asked that the events selected not include virtual coursework nor virtual video-conferencing events (i.e., Zoom), as such instances might be difficult to differentiate from one another at the time of the

second session. Participants were asked to provide a title and date for each event, which, unbeknownst to participants, would be used to cue the events at session two.

Upon selecting the six events, participants were asked to self-report the visual perspective of their memories, in a randomized order. We provided participants with a definition of both “own” and “observer” visual perspectives (see Supplemental Materials). Participants were then asked to rate the degree to which the memory of the event was pictured from both an own and observer perspective on separate scales (see Rice & Rubin, 2009). Participants continued to rate their events on additional phenomenological characteristics, including memory vividness and emotionality of the event (for a complete list of ratings, see Table S1). Participants then answered, in one sentence, “please describe what made this event unique to you, that is, a distinct detail or occurrence from this event that makes it stand out in your mind” to serve as an additional cue in session two, if the memory title alone was not effective (see Session 2 description below). Coding was embedded into the survey to randomly select three of the six events that each participant provided to be recalled in a written narrative. The remaining three events were not recalled and served as control events to ensure changes in phenomenological ratings of recalled events were not unduly influenced by virtue of recalling the memory for our study. Participants were asked to type out all the details they could remember about the three randomly selected events to be recalled. Participants were provided with an example memory to read to ensure they understood the types of details we were requesting them to provide (see Supplemental Materials). Each event was then recalled, one at a time. Participants were unable to progress in the survey until they had provided a minimum of 1200 characters for their event. This was

instigated to ensure task adherence and to encourage participants to provide all the details they could.

After providing recalls for three events, participants completed a battery of questionnaires for ancillary hypotheses to be tested outside of this paper (see Supplemental Materials).

Session Two

Participants completed the second session approximately 10 weeks later. Participants were provided with the event title and date that they had provided in the first session for all six of their original events in a randomized order and were asked to indicate if they remembered the event. If they indicated that they did, they proceeded to re-rate the event on the same phenomenological ratings as session one. If they indicated that they did not remember the event, they were shown their response to the question “what made this event unique to you” from session one to use as a cue. Participants were asked to indicate if, after the cue, they now recognized the event. Participants then proceeded to the ratings, regardless of whether or not the event was remembered. Although events noted as not being remembered were not analyzed, ratings were still collected to ensure that participants did not indicate not remembering their event simply to speed through the study.

Participants were then asked to type out all the details they could remember for the three events they had recalled during session one, in a randomized order. The same instructions and example memory were used to direct participants towards recalling as many details as possible. As in session one, each event was recalled, one at a time, requiring a minimum of 1200 characters.

Following recall, a second battery of questionnaires were administered (see Supplemental Materials).

Data Processing

With 178 participants recalling three events each, there was an initial dataset of 534 events. However, prior to analyzing the data, 28 individual events were excluded for being outside of our date range. Although participants were instructed to provide events from within the last two weeks at session one, the accepted interval was increased to three weeks in order to preserve as much data as possible while maintaining recollections recent enough to capture changes in memory between sessions. A further 16 events were excluded due to participants indicating that they could not remember the event at session two despite the event title and one-sentence cue. Finally, 20 additional events were excluded due to the provided recall not reflecting remembering (e.g., random key entries (four events), no internal details in the narrative (four events), or the subject recalling the wrong event at session two (12 events). After excluding these events there was a final dataset of 470 events. All 178 participants had at least one valid event recall that was included in analyses. Specifically, ten participants had only one event included in analyses, 44 participants had two events, and the remaining 124 had all three events retained for analyses.

The written recalls of events from both sessions were scored according to the Autobiographical Interview (AI) scoring procedure (Levine et al., 2002). This procedure identifies the types of details produced during autobiographical memory recall. A detail is defined as any piece of information (such as an occurrence, observation, or thought) and is often associated with a grammatical clause. For example, *“I found my mask in*

my car" would be scored as two details, one for *"I found my mask"* and one for *"in my car"*. In the AI procedure, details are categorized as internal and external. Internal details encompass any episodic detail that refers directly to the event being recalled while external details encompass any detail that does not refer directly to the event being recalled. As details unrelated or tangential to the event being recalled, such as information about other events (e.g., "just like the last time we went to the beach") or semantic knowledge (e.g., "I like rocky beaches more than sandy beaches"), are not inherent to the accuracy of the recall, we considered details related to the specific episode only (i.e., internal details). Internal AI details were further parsed into detail categories: event (i.e., what happened, who was there), perceptual (i.e., sensations and percepts), emotion/thoughts (i.e., emotions and thoughts), place (i.e., location) and time (i.e., temporal setting) in accordance with the AI protocol (see Levine et al., 2002; Wardell et al., 2021).

Once event recalls were scored for AI detail types, the episodic details of corresponding transcripts between sessions were compared for their consistency using a novel procedure developed in our lab dubbed the AI-Consistency Supplement ("AI-CONS"; see Dev, Wardell et al., 2022; Odinot et al., 2013; Orbach et al., 2012 for similar approaches). Episodic details in transcripts from session two were identified as either consistent, contradictory, reminiscent, or new in relation to the details provided in transcripts from session one. Resembling Marcotti & St. Jacques (2018)'s conservative scoring scheme, in our study, we reserved the "consistency" category only for episodic details that nearly precisely matched the corresponding session one detail. Furthermore, session one transcript details not included at session two were scored as

omitted (see Table 1). For an example of a scored recall, see Supplemental Materials. A strength of our approach is that it allowed us to examine consistency across the canonical detail categories used in the AI protocol. Such an approach (i.e., combining the AI with consistency scoring) has not, to our knowledge, been employed in the literature on autobiographical memory. Using this technique, we can illuminate (1) what types of details are most/least consistent over time[1] and (2) which consistent detail types, if any, are associated with visual perspective.

Six experimenters contributed to scoring the data. As preparation, all six scorers demonstrated reliable scoring of the AI by scoring memory narratives previously analyzed by the curators of the procedure. Four of these scorers went on to score transcripts for AI details. The remaining two scorers were further trained to score memories for consistency using the AI-CONS procedure. To confirm the reliability of scoring across experimenters, a subset of 10% of the memories were scored by all four scorers conducting the AI procedure and a separate 10% of the memories were scored by both AI-CONS scorers. Intraclass correlation (ICC) analyses on these subsets of memories confirmed excellent agreement between scorers on internal AI details (α=.97) and AI-CONS consistency details (α=.94; See Table S3 for ICCs of all detail types).

Data Analysis

To explore our main research question, namely, how shifts in visual perspectives relate to the consistency of episodic details in autobiographical memories over time, we

[1] Of note, AI details are, in part, influenced by the narrative structure of the detail provided. For example, “the lights were on” would be scored as a perceptual detail, while “I turned the lights on” would be scored as an event detail. Our AI-CONS scoring procedure does not penalize participants for recalling consistent details framed in ways that shift AI detail categorization across sessions, despite introducing a small amount of noise into the data (e.g., the proportion of consistent event details provided at session two and the proportion of omitted event details provided at session one will, in a small minority of memories, not equal one).

first calculated shifts in visual perspectives using absolute values of difference scores. Specifically, shifts in visual perspective between session one and session two were calculated by subtracting session one ratings from session two. Absolute values were then calculated, with higher numbers indicating greater shifts and a value of zero indicating that the rating did not change. We opted to use absolute values *a priori* on the basis that *any change* in perspective should result in a change in consistency, not just shifts from an own to observer perspective. Next, memory consistency was calculated as the proportion of consistent episodic details provided at session two out of the total number of episodic details provided at session two. Based on our scoring scheme, we predicted a negative correlation between change in visual perspective and consistency.

We employed mixed linear modeling (MLM) to examine the relationship between shifts in visual perspectives and memory consistency. MLM was selected due to its flexibility in modeling fixed and random effects. Participants and events were both treated as random effects, which allowed us to (1) account for our within subject design and (2) consider memory-level, as opposed to participant-level, effects. That is, instead of aggregating across memories to reflect average tendencies of individual participants, we were able to examine each individual memory (see Devitt et al., 2017 for similar logic). Shifts in visual perspectives were treated as fixed effects and used as predictors in our hierarchical model with proportion of consistent details as our outcome variable. MLM analyses were run using the R package lme4 (Bates et al., 2015).

Results

Descriptive Statistics

General

Recalled events ranged from 1-19 days old at session one (*M*(*SD*)=7.08(4.20)) and 73-105 days old at session two (*M*(*SD*)=84.44(5.15)) with days between sessions ranging from 71-93 days (*M*(*SD*)=77.36(3.15)). Ratings of phenomenological characteristics showed that the memories selected were, on average, of mid-range importance and uniqueness at both sessions, indicating that we were successful in capturing everyday but not overly mundane experiences (see Table S4). Critically, phenomenological characteristics of recalled events did not differ from rated events that were not recalled (i.e., control events) in session two (see Table S5). This indicates that recalling events for our study *per se* did not alter their phenomenology. MLM analyses revealed that subjective ratings of memory vividness (β=–.22, p<.001, R^2=.39, 95%CI=[.34, .43]) and episodic (internal) details recalled (β=–.25, p<.001, R^2=.49, 95%CI=[.45, .54]) decreased between sessions, showing that the data in our paradigm behaved in expected ways (i.e., memory fading), based on prior work and, further, that our test-retest time frame was appropriate for assessing changes in memories. Together, these patterns in the data show that our paradigm elicited the appropriate types of memories to address our research question.

Visual Perspective

Consistent with past research showing decreases in own and increases in observer visual perspectives over time, MLM analysis revealed that, overall, own visual perspective ratings tended to be lower at session two compared to session one (β=–.18, p<.001, R^2=.36, 95%CI=[.31, .41]) while observer visual perspective ratings tended to be higher (β=.10, p<.001, R^2=.35, 95%CI=[.30, .40]; also see Figure S1). Still, shifts in

perspectives for individual memories were not uniform: descriptively, own perspective ratings at session two decreased for 45.5% of events, 32.6% showed no change, and 21.9% showed increases in own perspectives. For observer perspectives, 26.8% of ratings at session two decreased, 30.2% showed no change, and 43.0% showed increased ratings. Furthermore, own and observer perspectives were negatively associated at session one (β=–.74, p<.001, R^2=.64, 95%CI=[.59, .69]) and session two (β=–.70, p<.001, R^2=.69, 95%CI=[.65, .74]), indicating the two constructs are related but not redundant (also see Rice & Rubin, 2009). These data show (1) that our design choice, namely, to place sessions approximately 10 weeks apart, successfully elicited sufficient changes in visual perspective across memories; (2) over time, both own and observer visual perspective naturally shift up and down; and (3) separate analysis of own and observer visual perspective is warranted.

Consistency

Measured as the total number of consistent details over total episodic details at session two (i.e., consistent episodic details / episodic details), consistency had a mean proportion of 0.43 (*SD*=0.17; Range: 0-1). Two events had no consistent internal details provided at session two. However, these memories were quality checked to confirm that participants had indeed recalled the same event at both sessions. Hence, as shown in Figure 2, overall, consistency was not very high, with a large spread across participants. Still, we note that the number of contradictory details was fairly low; memories were inconsistent not because of contradictions, but because participants provided a lot of new information that was not recalled at session one (and left out a lot of details provided at session one; i.e., errors of commission and omission, see Figure 2).

Main Analyses

Visual inspection of density and Q-Q plots indicated that residuals in our models were normally distributed. One outlier, defined as any datapoint more than three times the interquartile range above the third or below the first quartile, were identified in our data. The outlier in question pertained to internal detail production only. To ensure results were not influenced by the outlier, analyses were run with the data point excluded. The pattern of results did not change and thus our results are reported with this memory included.

Consistent with our hypothesis, our main analysis revealed that the more own visual perspectives shifted over time, the less consistent memories were between sessions (β=–.13, p=.004), accounting for 28.4% (95%CI=[.22, .35]) of the variance in consistency observed. Similarly, the more observer visual perspectives shifted over time, the less consistent memories were between sessions (β=–.11, p=.017), accounting for 26.4% (95%CI=[.20, .33]) of the variance in consistency observed. Entering both own and observer perspective ratings into our model did not increase the variance explained, suggesting that shifts in *either* perspective predicts a substantial portion of changes in memory consistency (see Table 2).

Follow-up exploratory analyses were run to examine whether direction of shifts in visual perspective was related to consistency by using difference scores in place of absolute value shifts in perspective ratings. Results of follow-up analyses were run after our main analyses. These effects were non-significant, indicating that a change, more so than a loss or gain in a given perspective, predicted the consistency of the memory. Furthermore, as memories have been found to stabilize over time (e.g., Winningham et

al., 2000; also see Bauer, 2015), and our initial retrieval window spanned from 1 to 21 days, we conducted a sensitivity analysis that included the age of the event at session one in our models to ensure that any relationship observed between consistency and visual perspective was not attributable to time. The pattern of results did not change (see Table S6).

We then turned to individual AI detail subtypes to assess whether the relationship observed between shifts in visual perspectives and changes in memory consistency were driven by changes in consistency associated with a specific detail subtype. We restricted our analyses to event, perceptual, and emotion/thought details, as the range of place (0-14; *Mdn*=2; *M(SD)*=2.13(2.12)) and time (0-8; *Mdn*=0; *M(SD)*=0.76(1.03)) details provided at session two was restricted. For shifts in own perspective, no significant effects on memory consistency were observed for specific AI detail subtypes. In contrast, shifts in observer perspective were specifically associated with the consistency of emotion/thought details (β=–.16, p=.001, R^2=.23, 95%CI=[.16, .29]); that is, the greater the shift in observer perspective, the more inconsistent participants were for emotion/thought details. No significant effects were observed for the remaining AI subdetail types (all ps>.083). See Figure 3 for visualizations of significant effects.

Discussion

We show that naturally occurring shifts in visual perspective are associated with changes in the consistency of voluntary autobiographical memories; less consistent recalls were associated with larger shifts in both own and observer perspectives. While the relationship between consistency and shifts in own perspective was not driven by a particular type of detail, shifts in observer perspective were associated with less

consistent emotion/thought details. We first discuss the phenomenon of visual perspective change in its own right, and then discuss its relationship with memory consistency.

Visual perspectives underwent large shifts over 10 weeks, with similar absolute value changes for both own (18.7% shift from session one) and observer perspectives (19.7% shift from session one). On average, we observed a decrease in own and an increase in observer perspective, akin to retrospective and cross-sectional studies (e.g., Rice & Rubin, 2009) and work that has measured own and observer perspectives on a single scale (Talarico & Rubin, 2003). Yet, there was considerable variability in the *direction* of shifts in our data. Certain event characteristics may predict perspective changes, as some types of events seem to encourage a given perspective over another–events involving self-evaluation versus evaluation of others elicit more observer than own perspective, and vice versa (D'Argembeau & Van der Linden, 2008; also see Rice & Rubin, 2011). Alternatively, degree and direction of perspective shifts may reflect individual differences (Rubin, 2021; Berg et al., 2021). Future work exploring these possibilities is important.

Shifts in both own and observer perspective predicted lower consistency in the episodic content recollected over time, suggesting that changes in perspective represent changes in memory. The mental imagery that typically accompanies recall likely mimics memory's reconstructive nature (Moscovitch, 2008; Schacter et al., 2011). Here, we use the term reconstruction broadly to refer to the process of piecing together elements of past experiences to be recalled in the present moment. Notably, memory retrieval varies in the intentionality and effort involved (see Barzykowski & Staugaard,

2016). Some have posited that different pathways to retrieval may be driven by distinct types of reconstruction (see Harris et al., 2015). As past research has shown that direct manipulation of perspective can alter memories, this relationship may be bidirectional. For example, Marcotti and St. Jacques (2018) found that adopting an observer perspective when recalling a laboratory experience leads to a reduction in overall accuracy for temporal order, spatial relations, actions, and sensations. In another study, memory accuracy for spatial, but not non-spatial, details was lower when individuals reviewed event photographs from an observer perspective before recall (Marcotti & St. Jacques, 2022). The limited range of time and space details recalled in our data precluded analysis of these detail types.

Instead, we found that shifts in observer perspective were particularly associated with reductions in the consistency of emotion/thought details, indicating that observer perspective might reflect an ability to change one's internal experience of an event after it has occurred. Shifting to an observer perspective can impact the emotionality of memories (Küçüktaş & St. Jacques, 2022), perhaps allowing us to distance ourselves from the past so that we can remember events without re-experiencing every detail (Libby & Eibach, 2011; Fernández, 2015; McIsaac & Eich, 2004; Siedlecki, 2015). Indeed, observer perspectives are more likely to accompany recollection of events that elicit high degrees of self-awareness or distress (Rice & Rubin, 2011; D'Argembeau & Van der Linden, 2008). In light of our findings, we looked at the relationship between shifts in observer perspective and ratings of emotional valence and arousal. We found no relationship (all *p*s > .05). That our data show a relationship between observer perspective and emotion/thought details for memories of *everyday* experiences

suggests that the utility of this mechanism may go beyond distancing the self from uncomfortable moments. Perhaps observer perspectives allow us to experience the event as someone other than ourselves–literally enabling us to adopt another's point of view. Although the idea of a 'social perspective' has not been explored in depth, observer perspective may be used in the service of understanding others' event interpretations (Libby & Eibach, 2011). A related idea is that as memories age, one's sense of self in a memory changes (i.e., that was "past me"). Shifts up or down in observer perspective may reflect changes in the degree to which one toggles between an emphasis on the perspective of different versions of the self/others.

In the spirit of observing memories naturalistically, we opted for a correlational approach. Thus, we cannot ascertain whether changes in perspective are causally related to changes in consistency. Moreover, consistency is not synonymous with accuracy; we cannot verify details. Still, our findings suggest that memories that veer from their original perspective are not necessarily less trustworthy with respect to the unfolding of the event or the perceptual content, a finding of particular importance in eyewitness testimony. Integrating this study with work that has manipulated perspective (e.g., Marcotti & St. Jacques, 2018) suggests that the relationship between perspective and memory fidelity is nuanced and divergent in naturalistic versus laboratory settings. Still, it is not possible to predict whether the effects observed here would be present for the types of events that are common subjects in such contexts. Unlike the courtroom, where high fidelity is critical, clinical work targeting appraisals of past experiences may benefit from encouraging shifts in observer perspective, given the relationship observed between observer perspective and malleability in emotion/thought details. Exploring

memory phenomenology in therapeutic techniques such as emotion regulation (e.g., Webb et al., 2012) and resolving past experiences (i.e., ‘closure’; see Crawley, 2007) will be important to consider in light of the present findings and clinical work implicating mental imagery as a powerful therapeutic tool (Blackwell, 2019; Hackmann & Holmes, 2004). Still, further work is needed to understand if the relationship between changes in emotion/thought details and observer perspective is causal and whether such a relationship may be similar or different for more emotionally evocative or traumatic events (see Berntsen & Nielsen, 2022; Talarico & Rubin, 2003). As recall of emotion/thought details has been found to distinguish emotional from neutral events in naturalistic narrative recall (see St. Jacques & Levine, 2007; Wardell et al., 2021), exploring nuances in the relationship between detail consistency, perspective, and emotion in autobiographical memories are exciting avenues for future research. Indeed, some evidence indicates that voluntary autobiographical memories are more likely to be associated with observer than own perspectives in some clinical populations, including depression (Kuyken & Moulds, 2009; Warne & Rice, 2022) and post-traumatic stress disorder (Berntsen et al., 2003). Understanding the timing of shifts towards observer perspectives, and whether the shift coincides, drives, or follows changes in consistency, will be important to explore in order to bridge the current work with these clinical data.

Importantly, autobiographical memories are informed not only by the content we are attempting to remember, but also retrieval context and demands–the intention and utility of remembering shapes how the memory manifests (Barzykowski et al., 2021; Barzykowski & Mazzoni, 2022; Harris et al., 2015). Here, we focus on everyday, voluntarily recalled autobiographical memories that were retrieved following directed

instructions targeting specific past episodes. Future work exploring the relationship between perspective and consistency in involuntary autobiographical memories, autobiographical memory at varying levels of episodicity, and effort or mode of retrieval (e.g., direct versus generative) will be crucial in identifying the boundaries of the relationship demonstrated here. Probing memories at varied delays will also be important to explore: Here, we initially collected memories of events that occurred 1-24 days ago and again after a retention interval of approximately 10 weeks. Shifting these intervals will be crucial in developing our understanding of the life course of an autobiographical memory. Further, demonstration of the relationship between visual perspective and memory consistency in more diverse, community samples with balanced gender ratios is needed to generalize these findings more broadly.

Memories provide us with the record of our past. Yet, the reconstructive nature of memory can render this record labile and, at times, misleading. Even the most faithful memories are reconstructions. The ability for humans to change the perspective of a memory in the mind's eye, be it own or observer, mirrors memory's reconstructive nature. We show that shifts in perspective over time predict the consistency of episodic recall. Memory for the emotions/thoughts experienced is particularly vulnerable–or apt–at changing in relation to perspective. Humans can take varied perspectives, which may offer us a unique social advantage, allowing us to step into the eyes of another or a different version of ourselves. The utility of this feat may outweigh the cost to memory fidelity. However, such findings ask us to reconsider how to understand our memories, as there may be a need to shift away from an emphasis on reality and embrace our ability to retroactively adjust our experiences.

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Table 1. *Consistency of Episodic Details Scored in Narrative Recalls*

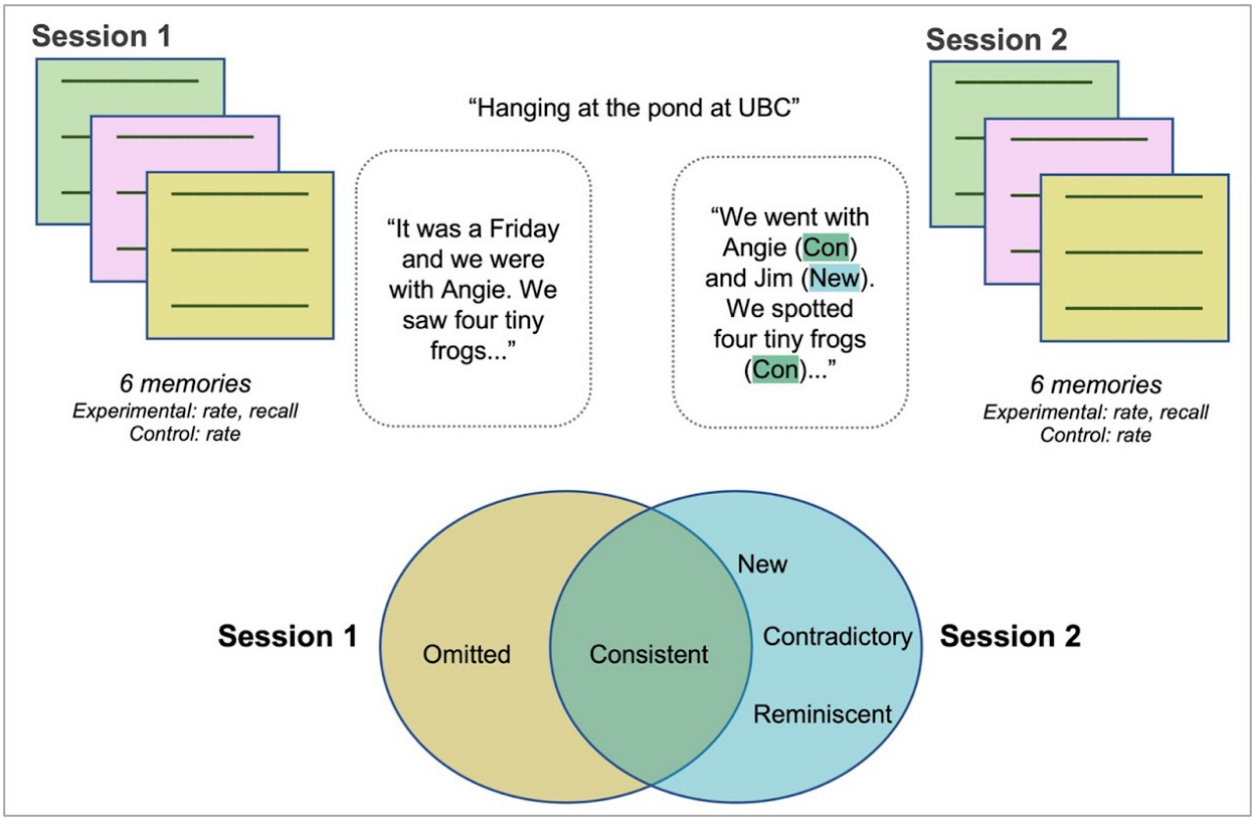
AI-CONS Detail Type	**Description**	**Example**	
		Session One Transcript	Session Two Transcript
Consistent	Detail was in both the session one and session two transcripts	*I met up with my friend*	*I met with my friend*
Contradictory	Detail in session two transcript contradicted detail in session one transcript	*It was so dark in the cave*	*It was really bright in the cave*
Reminiscent	Detail in session two transcript was reminiscent of detail in session one transcript	*I was kind of embarrassed*	*I felt so ashamed*
New	Detail in session two transcript that was not in session one transcript	-	*It was late at night*
Omitted	Detail in session one transcript that was not in session two transcript	*I was at my house*	-

Table 2. Results of MLM Consistency Analysis

	Episodic/Internal Detail Consistency			Event Detail Consistency			Perceptual Detail Consistency			Emotion/Thought Detail Consistency		
	β	p	R^2	β	p	R^2	β	p	R^2	β	p	R^2
Own	−.13	.004	0.28	−.08	.083	0.24	.02	.708	0.07	−.08	.106	0.22
Observer	−.11	.017	0.26	−.05	.239	0.23	−.06	.213	0.07	−.16	.001	0.23
Own + Observer			0.28			0.24			0.07			0.23
Own	−.10	.062		−.07	.197		.09	.152		.02	.796	
Observer	−.05	.385		−.01	.841		−.11	.062		−.17	.006	

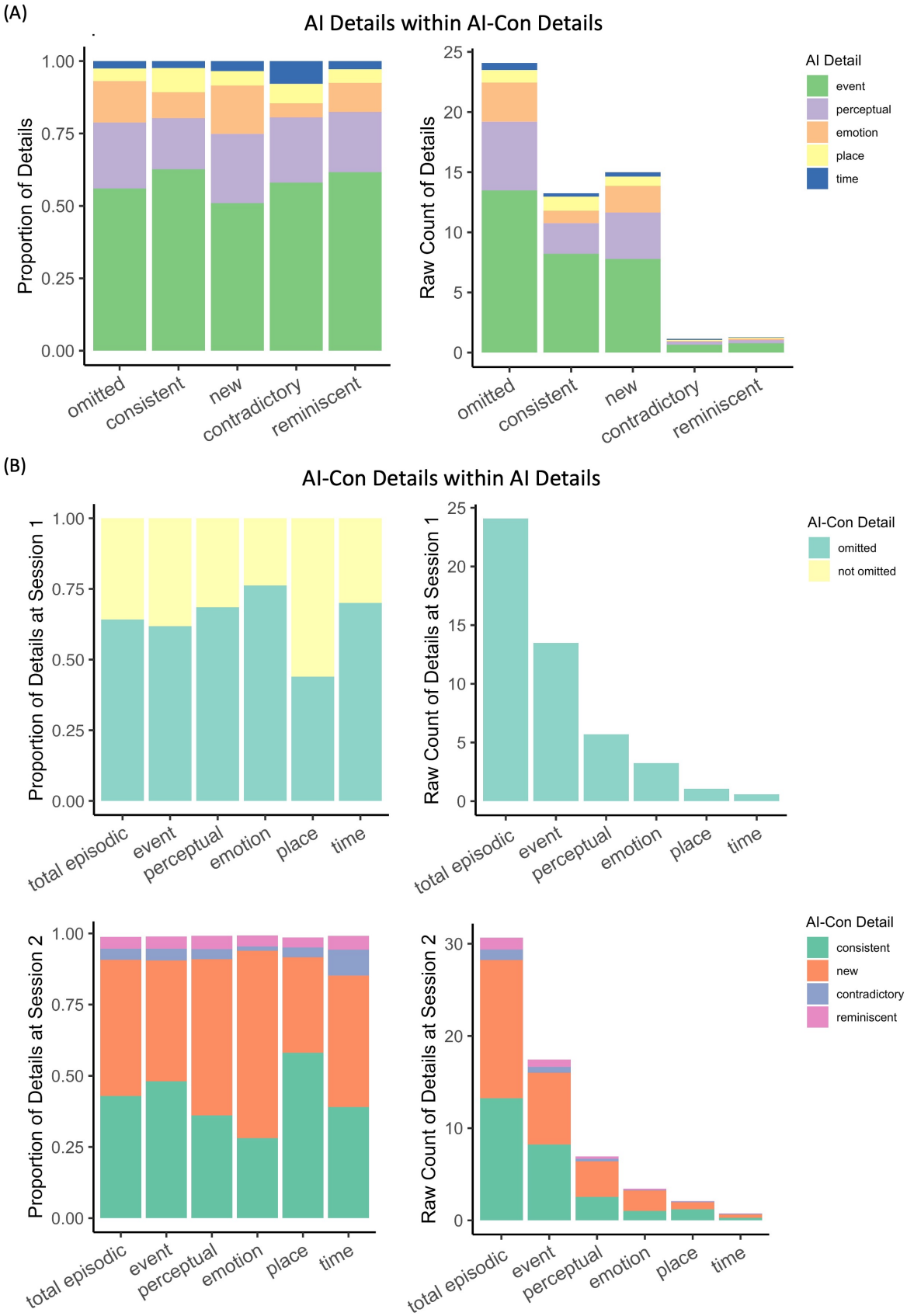
Note. Results of MLM analysis revealed that shifts in own and observer perspective independently predicted lower consistency of episodic details provided across sessions. Furthermore, while shifts in own perspective were not driven by a specific AI detail subtype, the relationship between shifts in observer perspective and lower consistency was associated with a lack of consistency in emotion/thought details per se.

Figure 1. Overview of Study Design



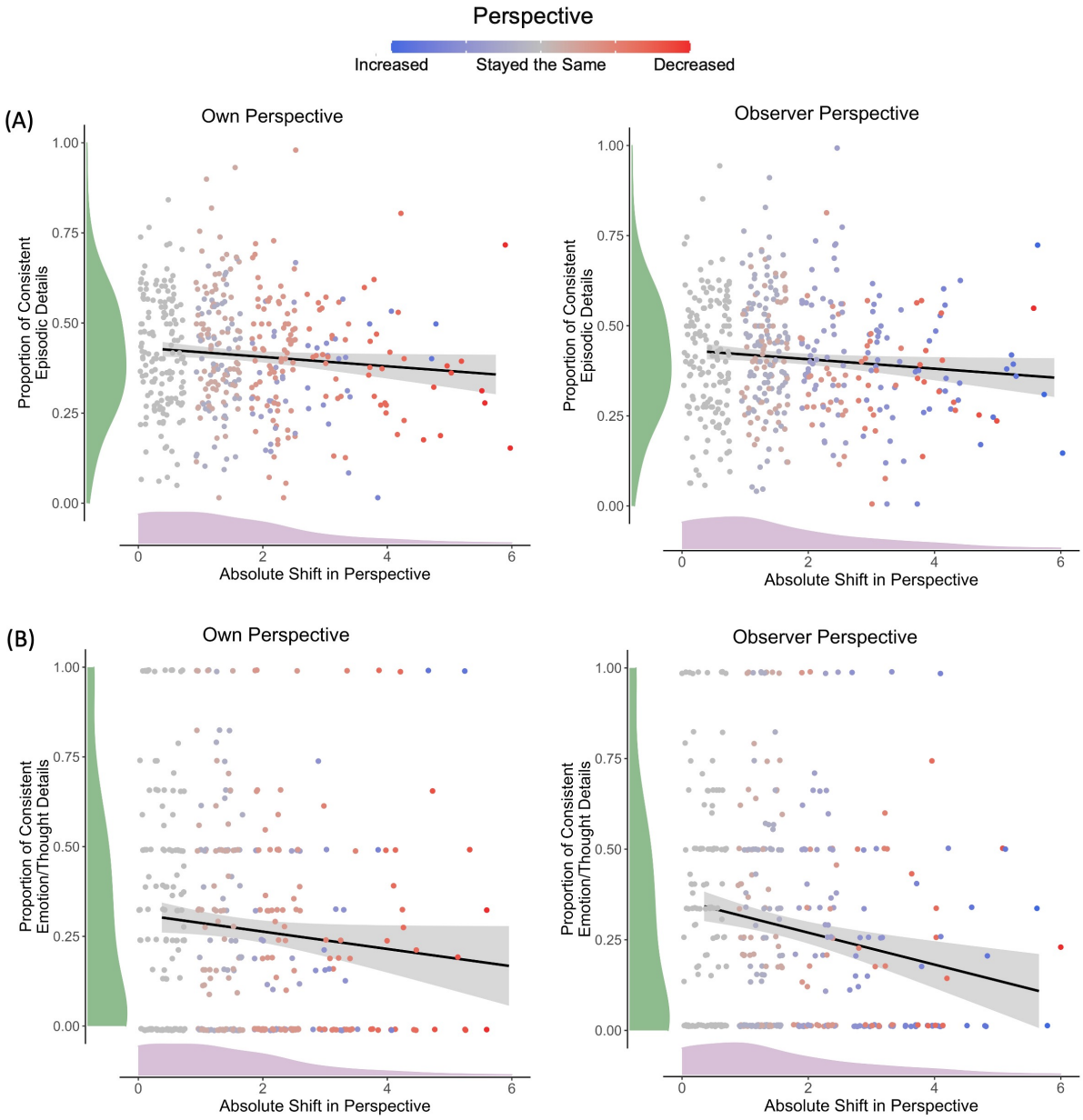
Note. Overview of study design and AI-CONS scoring (see Main Text). Participants recalled memories on two occasions, spaced approximately 10 weeks apart. Session two memories were scored for consistency of episodic details and could contain consistent (con), new, contradictory, or reminiscent details. Session one memories were scored for omitted episodic details (i.e., details that were in session one but not in session two). See Table 1 for definitions. See Supplemental Materials for a representative scoring example of our data.

Figure 2. Memory Consistency Over Time


(A)
AI Details within AI-Con Details
Proportion of Details
Raw Count of Details
omitted
consistent
new
contradictory
reminiscent
AI Detail
event
perceptual
emotion
place
time
(B)
AI-Con Details within AI Details
Proportion of Details at Session 1
Raw Count of Details at Session 1
total episodic
event
perceptual
emotion
place
time
AI-Con Detail
omitted
not omitted
Proportion of Details at Session 2
Raw Count of Details at Session 2
AI-Con Detail
consistent
new
contradictory
reminiscent

Note. Figure 2A depicts the average distribution of AI details within each AI-CONS detail category. Figure 2B depicts the average distribution of AI-CONS details within each AI detail category. As consistent, new, contradictory, and reminiscent details were scored in session two, calculations for the proportion of these AI-CONS details were done with AI details identified in session two. As omitted details were scored in session one, calculations for the proportion of omitted details were computed with AI details identified in session one.

Figure 3. Shifts in Visual Perspective Predicts Consistency of Recalls



Note. Greater changes in own and observer visual perspective predicted lower consistency of memories at session two (A). Furthermore, the relationship between consistency and own perspective was not driven by a specific detail type. In contrast, the relationship between consistency and observer visual perspective was driven by

changes in the consistency of emotion/thought details provided across sessions per se (B). Shifts in perspective ratings were calculated by computing difference scores (absolute value) between ratings at session one and session two. Data were analyzed using mixed linear modeling (see Main Text).

Supplemental Materials

Event Selection Instructions. The following instructions were provided to participants during event selection.

> Please come up with personal events from your life that you are comfortable sharing. These events should be from within the past two weeks, but should not include events that occurred today.
>
> *Please do...*
> Select events that you were personally involved in, and have a recollection of being personally involved in. The events must be from a specific time and place, typically lasting no more than a few hours. For example, describing a weekend trip to your cabin would not be sufficient. However, a specific incident that happened over that weekend, such as going water skiing with your friend, would be good. Try to come up with six unique events.
>
> *Please do not...*
> Select events that have similar themes, for example, not all of your memories should be of a camping trip. Please do not include overly mundane events, or things you do often, such as “making myself breakfast”, etc. Please do not include events in which you were under the influence of substances, such as alcohol or drugs. Please avoid extremely emotional events, including traumatic experiences. Please do not include virtual meetings or "hang-outs" such as classes held over Zoom or Facetiming with a friend. Finally, please do not include academic course related events, such as taking a test or exam, or completing an assignment.
>
> Please select and title your 6 events. Please include a description of:
>
> **What** happened. For example, a good "what" would be "Going on a 30-minute bike ride with Jane." or "Watching the first Harry Potter movie". On the other hand, something like "Bike ride" or "Watching a movie" is insufficient.
>
> **Where** it happened. For example, a good "where" would be "Arbutus Greenway." or "Bean Around the World". On the other hand, something like "Bike path" or "Coffee shop" is insufficient.
>
> **When** it happened (i.e., 2020/10/21, in yyyy/mm/dd format). We recognize you might not know the exact date that an event occurred. In this case, please take your best guess and enter an approximate date. Please do not refer to a calendar.

> We ask that your event title be specific enough that by reading the title you will know exactly which event it refers to.

Definition of Own and Observer Perspectives. The following description of visual perspectives was provided to participants when they were asked to rate the perspective from which they pictured their memories.

> When people recall an event from their past, often the memory triggers imagery within the “mind's eye”. This image is pictured from a visual perspective, that is, we view the event from a specific point of view, either from our own perspective, an observer's perspective, or a mix of both. When we picture a past event from our own perspective, we see it from our point of view, in first-person, as we would have seen it during the actual event. We are in our own bodies and watching the event unfold. In contrast, when we picture a past event from an observer's perspective, we see it in third-person, as if we were watching ourselves in the event, perhaps from a birds-eye view or similar outsider point of view. For example, when remembering a speech or presentation, you might have a picture of standing behind a podium, watching the audience as you speak. This would be from your own perspective. Alternatively, you might picture the event as if you were an audience member, watching yourself stand there and present. This would be from an observer's perspective.

Table S1. *Self-Reported Phenomenological Characteristics*

Construct	Item	Source
Observer Perspective	To what degree is the memory you have for this event pictured from an observer's perspective? *1 (No imagery in my mind's eye is from an observer's perspective) – 7 (All the imagery in my mind's eye is from an observer's perspective)*	See Rice & Rubin, 2009
Own Perspective	To what degree is the memory you have for this event pictured from your own perspective? *1 (No imagery in my mind's eye is from my own perspective) – 7 (All the imagery in my mind's eye is from my own perspective)*	
Vividness	While remembering the event, I feel as though I am reliving it. *1 (Not at all) – 7 (As clearly as if it were happening now)*	

	While remembering the event, I can see it in my mind. *1 (Not at all) – 7 (As clearly as if it were happening now)*	Talarico et al., 2004
Belief	I believe the event in my memory really occurred in the way I remember it and that I have not imagined or fabricated anything that did not occur. *1 (100% imaginary) – 7 (100% real)*	
Rehearsal	Since it happened, I have thought or talked about this event. *1 (Not at all) – 7 (More than for any other memory)*	
Coherence	My memory comes to me in words or in pictures as a coherent story or episode and not as an isolated fact, observation, or scene. *1 (Not at all) – 7 (Completely)*	
	This memory comes in pieces, with bits missing. *1 (Not at all) – 7 (Completely)*	
Importance Now	How personally important IS this event to you NOW? *1 (No importance at all) – 6 (Of great importance)*	Levine et al., 2002
Importance Then	How personally important WAS this event to you THEN? *1 (No importance at all) – 6 (Of great importance)*	
Emotional Valence	How emotional was this event? Memories with close to no emotional content should be rated -1 or 1 *-5 (Intense negative emotion) – 5 (Intense positive emotion)*	Wardell et al., 2021
Arousal	How did you feel during this event? *1 (Very calm) – 6 (Very aroused (excited or agitated))*	
Uniqueness	How unique was this event? *1 (Something I do very often) – 6 (Something I rarely do)*	

Note. Self-report ratings for phenomenological characteristics of the memory were obtained for events at both session one and session two. Vividness and coherence scores were calculated by averaging ratings on the two items associated with the construct.

Recall Instructions. The following instructions and example of a memory recall were provided to participants to ensure they understood the types of details we were asking them to provide.

> In the next section, you will be asked to type out everything that you can remember about three of these specific events. Please type out all details that come to mind for each specific event. Nothing is too trivial. This exercise is meant to be a stream of consciousness. Please do not worry about grammar, spelling, or flow. This is not an essay. Please type everything that comes to mind. To ensure you have provided as many details as possible, you will not be able to move forward until you have entered at least ~300 words (1200 characters). Please read through the example below to get a sense of what we are looking for.
>
> "It was my graduation ceremony for my PhD. Before my graduation ceremony I decided to go to the mall with my sister to kill some time before the ceremony and so we went to Sherway, and while we were there at some point, just as I was gonna leave, I ran into my friend. And her mom. And it was a good friend that I haven't seen in a long time. So, even though I felt like I really needed to go to get to the ceremony I decided to stay a few extra minutes to talk to her. And then I realized I really had to leave, and I got into the car and I started to feel a little bit nervous that I was running late. But I got in the car, and I went on the highway, and there was a lot of traffic. So I started to get even more nervous that I was gonna be late. And I didn't have a cell phone at the time, so I couldn't call anyone that was gonna be at the ceremony to let them know that I was late. So my husband and my parents and my sister were meeting me at the Convocation Hall. So eventually I got there with a couple minutes left to spare. But realized that I need to find parking. And everything was super busy, there were no parking spots anywhere near Convocation Hall so I had to drive around and was getting more and more anxious. And feeling like I was really running out of time. I eventually found a parking spot and ran over to the front of Convocation Hall where I saw my husband and my family looking at me like, where have you been? And feeling like I was gonna cry. And somebody came up to me and helped me, sort of, get sorted out with my cap and gown. And I was able to get that just moments before my class was walking in. And so I snuck to the back of the line and managed to make it inside on time. And I remember after the ceremony being outside taking pictures with my husband and sister and parents. And my mom was wearing a white jacket and my husband was wearing a suit."

Table S2. *Questionnaire Battery*

Construct	Questionnaire	Source	Session Collected
Depression	Center for Epidemiological Studies-Depression (CES-D)	Radloff, 1977	1 and 2
Anxiety	Shortened State/Trait Anxiety Inventory (STAI)	Zsido et al., 2020	1 and 2
Rumination	Ruminative Thought Style Questionnaire (RTS)	Brinker & Dozois, 2009	1
Dissociation	Dissociative Experiences Scale (DES-II)	Carlson & Putnam, 1993	1
Verbal Ability	Shipley-2	Shipley et al., 2009	1
Divergent Thinking/ Creativity	Alternative Uses Task (AUT)	Silvia et al., 2008	2
Mental Imagery	Object-Spatial Imagery Questionnaire (OSIQ)	Blajenkova et al., 2006	2

Note. Data from questionnaires was collected for ancillary hypotheses beyond the scope of the present paper and are not reported here.

Scored Recall. The following example reflects a typical recall and the scoring procedures we applied. We first scored recalls in accordance with Levine and colleagues' Autobiographical Interview (AI; 2002). While our analysis concerned total internal details provided (i.e., episodic details specific to the event being recalled), we scored external details (i.e., details non-specific to the event being recalled) as well as the sub-details of internal and external detail categories as per the AI protocol.

Event Title: Making Macaroons for the First Time

Session 1

I love baking /ext_sem/ but i never seem to have the time anymore /ext_sem/omit/. I had planned to make macaroons since winter started /ext_sem/omit/ but never got around to it /ext_sem/omit/. Macaroons are one of the most challenging desserts to make /ext_sem/ but I was feeling ready to conquer the challenge /int_emo/omit/. Earlier that day /int_tm/omit/, I went to the store /int_pl/ to buy some ingredients /int_ev/: almond flour /int_ev/omit/, gel food colouring /int_ev/omit/, and heavy cream /int_ev/omit/. I watched several videos /int_ev/ and followed the recipe exactly /int_ev/omit/. I did have some challenges along the way /int_ev/. I found it really really hard to pipe my batter out onto the tray /int_emo/ because the shape /int_ev/omit/ or size kept getting wrecked /int_ev/. I also ended up adding to much gel food colouring /int_ev/omit/ so i had super vibrant cookies /int_perc/omit/! Eventually, i decided that i had done my best /int_emo/omit/ and put all my effort into it /int_emo/omit/. So, i popped the tray in the oven /int_ev/omit/ and hoped for the best /int_emo/omit/! I remember feeling a little overwhelmed /int_emo/omit/ and frustrated /int_emo/omit/ when i came across these challenges but i felt relief /int_emo/omit/ when i heard the oven timer go off /int_perc/omit/ and opened the oven /int_ev/omit/ to these delicious smelling cookies /int_perc/omit/. I made a smooth /int_perc/omit/, rich /int_perc/omit/ mocha buttercream filling /int_ev/omit/ to go between my cookies /int_ev/omit/ (buttercream is my speciality when it comes to baking /ext_sem/omit/). I piped my buttercream /int_ev/omit/ on all my macaroons /int_ev/omit/ and then enjoyed them /int_emo/omit/! They turned out pretty good /int_emo/, considering it was my first time making them /ext_sem/.

Session 2

I have made macaroons several time since this date now /ext_sem/oth/, but this date above was the first time I had ever made macaroons/int_ev/cons/. Macaroons are a challenging dessert to make /ext_sem/cons/ so I had always been intimidated by all the steps /ext_sem/new/ and details that go into making them /ext_sem/new/. I remember having some difficulties with getting the batter the right texture /int_ev/new/ and piping them to be the perfect size /int_ev/remi/ but overall I think they turned out pretty good/int_emo/cons/, especially considering it was my first time /ext_rep/oth/**.** Like I said, I did have some problems with piping them /ext_rep/oth/, and I had to try this step over and over again/int_ev/new/ because I could not get them all to be equal size/int_ev/new/. I think I had made just a simple vanilla flavoured macaroon/int_ev/cont/, I have since experimented with many different flavours /ext_sem/oth/ and my family loved them /ext_sem/new/. I think I had gone grocery shopping at save on foods /int_pl/remi/ for the ingredients either earlier that day/int_ev/cons/, or the night before /ext_oth/oth/. They took a lot of time to make/int_perc/new/, especially because I wanted to make sure I did every step correctly /int_emo/new/ and I tend to take my time when baking /ext_sem/new/ just because it is something I enjoy /ext_sem/cons/ and take pride in /ext_sem/new/. I watched several videos before making them /int_ev/cons/ to see what mistakes to avoid /int_ev/new/ and tips on how to make sure I bake them right/int_ev/new/. I remember being exhausted after making them /int_emo/new/ but it was definitely worth it /int_emo/new/!

Note. AI Details are coded in green (internal details, i.e., 'int') and blue (external details, i.e., 'ext'), where tm = time, pl = place, ev = event, perc = perceptual, emo = emotion/thought, sem = semantic, oth = other, rep = repetition. AI-CONS details are coded in pink (session one consistency) and yellow (session two consistency), where omit = omitted, oth = other, cons = consistent, new = new, remi = reminiscent.

Table S3. *Cronbach's Alpha Scores for Scored Detail*

Category		Detail Type	ICC	Fixed Effects	*p*-value	95% CI
AI	Internal	Total	.97	$F_{(91, 273)} = 38.0$	< .001	[.96, .98]
		Event	.95	$F_{(91, 273)} = 22.0$	< .001	[.94, .97]
		Perception	.92	$F_{(91, 273)} = 13.3$	< .001	[.90, .95]
		Emotion/Thought	.92	$F_{(91, 273)} = 13.0$	< .001	[.89, .95]
		Place	.93	$F_{(91, 273)} = 15.0$	< .001	[.91, .95]
		Time	.94	$F_{(91, 273)} = 18.0$	< .001	[.92, .96]
	External	Total	.93	$F_{(91, 273)} = 14.0$	< .001	[.90, .95]
		Semantic	.94	$F_{(91, 273)} = 18.0$	< .001	[.92, .96]
		Extraneous Event	.80	$F_{(91, 273)} = 5.1$	< .001	[.73, .86]
		Repetition	.55	$F_{(91, 273)} = 2.2$	< .001	[.38, .68]
		Other	.90	$F_{(91, 273)} = 9.8$	< .001	[.86, .93]
AI-CONS		Consistent	.94	$F_{(46. 46)} = 17.0$	< .001	[.89, .97]
		Contradictory	.79	$F_{(46. 46)} = 4.8$	< .001	[.62, .88]
		Reminiscent	.51	$F_{(46. 46)} = 2.0$	.008	[.12, .73]
		Other	.98	$F_{(46. 46)} = 58.0$	< .001	[.97, .99]
		New	.96	$F_{(46. 46)} = 23.0$	< .001	[.92, .98]
		Omitted	.97	$F_{(46. 46)} = 40.0$	< .001	[.96, .99]

Note. Inter-rater reliability for each detail type, with raters as fixed effects. We note that poor reliability for repetition details in AI scoring as well as contradictory and reminiscent details in consistency scoring were a result of encountering a floor effect for these detail types, with 98.5% of memories containing two or fewer repetition details, 82.8% of session 2 memories containing two or fewer contradictory details, and 82.6% of session 2 memories containing two or fewer reminiscent details. Neither detail type was used in any of our analyses.

Table S4. *Descriptive Statistics of Phenomenological Characteristic Ratings*

	Recalled Memories (N = 470)		Not-Recalled Memories (N = 484)	
	S1	S2	S1	S2
	M(SD)	M(SD)	M(SD)	M(SD)
Own Perspective	5.56(1.48)	5.01(1.61)	5.54(1.49)	5.00(1.60)
Observer Perspective	2.67(1.63)	3.02(1.68)	2.57(1.62)	2.93(1.65)
Emotional Valence	1.84(1.98)	1.75(2.03)	1.79(2.01)	1.76(1.83)
Arousal	3.45(1.65)	3.50(1.44)	3.35(1.52)	3.50(1.42)
Importance Now	2.97(1.46)	2.60(1.48)	2.96(1.43)	2.52(1.39)
Importance Then	3.62(1.50)	3.59(1.42)	3.60(1.48)	3.50(1.45)
Uniqueness	3.99(1.68)	3.89(1.63)	3.92(1.63)	3.84(1.67)
Belief in Accuracy	6.14(1.12)	5.42(1.38)	6.15(1.14)	5.37(1.44)
Vividness	4.63(1.33)	4.01(1.40)	4.67(1.39)	3.90(1.36)
Rehearsal	2.82(1.38)	2.27(1.29)	2.86(1.47)	2.18(1.28)
Coherence	4.48(1.51)	3.62(1.47)	4.41(1.54)	3.60(1.52)
Event Age	7.08(4.21)	84.44(5.15)	6.58(4.20)	84.02(5.34)
Retention Interval	–	77.36(3.15)	–	77.45(3.25)

Note. A total of 178 participants provided 470 recalled events. Not-recalled events were subject to the same exclusion procedure as recalled events, save for recall quality checks. This led to the exclusion of 47 not-recalled events (32 for being outside of our three-week timeframe, 15 for not being remembered at session two). One participant had all three of their not-recalled events excluded. This resulted in a total of 177 participants providing 484 not-recalled events.

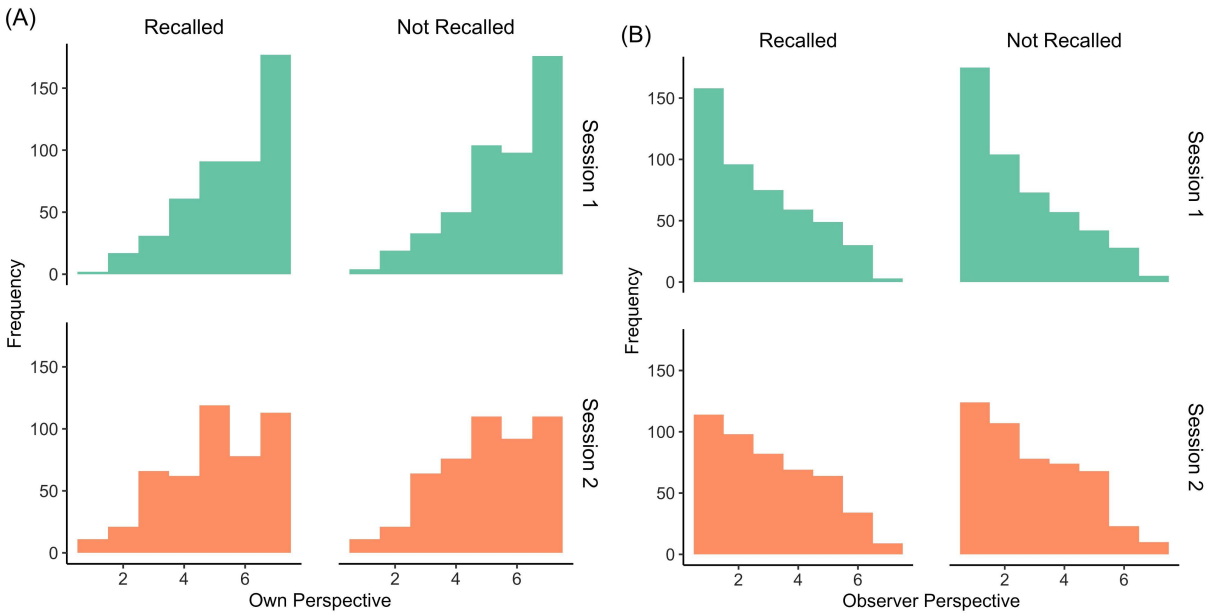
Table S5. *Differences in Absolute Value Shifts in Phenomenological Characteristics between Recalled and Not-Recalled Events*

	Recalled Events (*N* = 177)	Not-Recalled Events (*N* = 177)		
	M(*SD*)	*M*(*SD*)	*t*	*p*
Own Perspective	1.31(0.93)	1.36(0.94)	0.58	.564
Observer Perspective	1.38(0.99)	1.38(0.93)	0.04	.965
Emotional Valence	1.13(0.96)	1.08(0.80)	0.56	.580
Arousal	1.05(0.70)	1.06(0.72)	0.16	.875
Importance Now	1.00(0.62)	0.96(0.68)	0.62	.534
Importance Then	0.90(0.57)	0.89(0.54)	0.09	.930
Uniqueness	0.95(0.62)	0.96(0.58)	0.20	.839
Belief in Accuracy	1.11(0.85)	1.14(0.84)	0.47	.643
Vividness	1.18(0.71)	1.26(0.75)	1.36	.175
Rehearsal	1.06(0.73)	1.09(0.77)	0.39	.699
Coherence	1.45(0.88)	1.35(0.81)	1.31	.191
Event Age Session 1*	7.00(2.79)	6.59(2.66)	1.41	.161

Note. Absolute values of difference scores were calculated across sessions for phenomenological ratings of each event. Absolute values were then averaged within participants to compare recalled events and not-recalled events. As one participant had all three of their not-recalled events excluded, analyses were run on the remaining 177 participants.

*Absolute value difference scores were used for all variables except event age at session one, which instead reflects the number of days between the event and session one.

Figure S1. *Histogram of Visual Perspectives*



Note. Figure A depicts the distribution of own perspective for recalled and not recalled events by session. Figure B depicts the distribution of observer perspective for recalled and not recalled events by session.

Table S6. *Results of MLM when Controlling for Event Age at Session 1.*

	Episodic/Internal Detail Consistency			Event Detail Consistency			Perceptual Detail Consistency			Emotion/Thought Detail Consistency		
	β	p	R^2	β	p	R^2	β	p	R^2	β	p	R^2
Own			0.30			0.25			0.10			0.22
Own	–.13	.005		–.07	.098		.02	.645		–.08	.107	
Event Age	.15	< .001		.12	.005		.18	< .001		.002	.964	
Observer			0.28			0.24			0.11			0.22
Observer	–.11	.019		–.05	.262		–.06	.252		–.16	.001	
Event Age	.15	< .001		.13	.005		.17	< .001		–.0001	.998	
Own + Observer			0.30			0.25			0.11			0.22
Own	–.10	.071		–.07	.219		.09	.144		.02	.797	
Observer	–.05	.388		–.01	.847		–.11	.071		–.17	.006	
Event Age	.15	< .001		.12	.005		.18	< .001		–.0001	.999	

Note. While event age at session one was related to the consistency of memories, controlling for event age in our model did not change the pattern of results observed between visual perspective and episodic detail consistency.

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