

Opinion

Autobiographical event memory and aging: older adults get the gist

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We propose that older adults' ability to retrieve episodic autobiographical events, although often viewed through a lens of decline, reveals much about what is preserved and prioritized in cognitive aging. Central to our proposal is the idea that the so-called gist of an autobiographical event is not only spared with normal aging but also well adapted to serve memory-guided behavior in older age. To support our proposal, we review cognitive and brain evidence indicating an age-related shift toward gist memory. We then discuss why this shift likely arises from more than age-related decline and instead partly reflects a natural, arguably adaptive, outcome of experience, motivation, and mode-of-thinking factors. Our proposal reveals an upside of age-related memory changes and identifies important research questions.

Aging and autobiographical event memory

Autobiographical event memories (see [Glossary](#)), 'episodic' memories of personal moments situated in time and place, are a defining feature of human consciousness and serve a multitude of identity, social, and decision-making functions [1,2]. Constructing autobiographical event memories requires integrating a variety of details, including perceptual and narrative information, into coherent representations of personal moments in the life story [3,4]. To date, research on normal (i.e., cognitively typical) aging has focused on showing how age-related decline in **episodic memory** translates to older adults describing autobiographical events with less specific detail, such as forgetting exactly where an event took place and the color of someone's jacket. This reduction in specific detail has been attributed to age-related deficits in several learning and memory mechanisms (among others) [5–7] and may reflect multiple age-related changes in brain functioning [8–11]. However, there is a growing body of laboratory-based research suggesting that older adults can still describe details from complex events at a general level, such as what type of experience a memory refers to (e.g., a holiday dinner) and the type of jacket worn (e.g., a parka) [12–15] (but also see [16]). In fact, as illustrated in [Figure 1](#), older adults tend to add more general details to their autobiographical event memories relative to young adults. Although this tendency toward representing events at a general level has the potential to invite irrelevant or distracting information [7], it also can capture an event's broader meaning (how this event is like other family gatherings) [3,17–20], which may be critical for functions of memory, such as generalization and integration [21]. In this opinion, we draw attention to understanding how and why general details of autobiographical event memories have such a prominent role among older adults. We propose that at the heart of this stronghold for autobiographical event memory is the preservation and prioritization of an event's 'gist,' which we view as an outcome of cognitive, brain, and motivation-driven factors that change with age.

Highlights

Cognitive aging is often viewed through the lens of loss of function. Research examining the way older adults remember autobiographical event memories, therefore, has focused on how aging reduces the ability to form and retrieve specific details, with less emphasis on understanding the aspects of event memories that are preserved among older adults.

We propose that at the heart of what is preserved in older adults' autobiographical event memories is the selective sparing of the ability to store and retrieve the gist.

We discuss why older adults' reliance on gist may be driven by multiple factors beyond cognitive decline, including changes in goals that come with age.

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Gist and specific representations of memory

Cognitive aging experiments of laboratory-derived episodic memory, largely testing memory for recently encoded nonpersonal stimuli (e.g., words and pictures paired together), have been clear on one point: Among older adults, **gist representations**, which capture general categorical (superordinate and basic category level) or prototypical details (e.g., I was shown animal words; they were superimposed on outdoor scenes), are better preserved relative to **specific representations**, meaning precise, high-fidelity details (e.g., I saw a Boston terrier paired with a beach scene) [22–24]. Several lines of work have built on these findings, including the influential Fuzzy Trace Theory [24]. Here, we take a closer look at the connection between gist representations and normal age-related changes in the way autobiographical events are formed and remembered. In doing so, our opinion goes beyond prior work on aging and gist memory in two important ways. First, much of the research on cognitive aging has viewed gist representations in a largely negative light, assuming gist is a primary source of memory errors that are more common in older adults. In contrast, we cast a positive light on gist representations as not only a bastion for older adults' capacity to remember autobiographical events in the face of declining specifics but also increasingly relevant, and arguably adapted to, age-related changes in motivated remembering. Second, whereas prior work has drawn a connection between gist representations and **semantic memory**, we, alongside others [19,20,25–28], are proposing that gist representations are situated between the boundaries of semantic and episodic memory, particularly in the context of autobiographical events (Box 1). To begin to explore our proposal, we review evidence showing that gist representations for events are intact in typically aging older adults, and we discuss how this is reflected in the brain.

Gist representations are spared in typical aging

For older adults to effectively support the type of general detail preserved and often elevated in their autobiographical event memories, gist representations cannot simply offer a vague theme of the past. Rather, older adults must be able to call on gist representations to capture a basic degree of fidelity for several defining qualities of a singular event, including the items, scene, time, and narrative storyline behind their experiences. In recent years, laboratory-based research has begun to reveal evidence in favor of such a role for gist. For instance, several studies have found that although older adults forget specific details about singular items (e.g., an item's exact cost), they nonetheless can recall as well as young adults basic or superordinate category-level features about particular items (e.g., whether the item was given a fair market value or was overpriced) [29,30]. Similar results of spared gist-level memory for singular elements of event memory come from a recent study [31] in which older adults were comparable to young adults in their ability to learn cause-and-effect associations for basic category-level knowledge (i.e., what types of food would cause an allergic reaction), despite older adults' showing a disadvantage for remembering which items were used in the learning phase.

Emerging evidence from laboratory studies also shows that older adults remember general time and location detail about event memories. For instance, one study [32] asked whether, relative to young adults, older adults could learn the weather of an upcoming week. Although older adults had more difficulty recalling specific details (e.g., exact temperatures on certain days), they retained as well as young adults a gist memory for the weather forecast, such as noting which days prompted carrying an umbrella. Another study [33] drew a similar conclusion regarding location detail. Here, older adults could extract the gist of people-location events as well as young adults, which was examined by pairing images of faces with scenes. True and false memory performance revealed that the ability to retrieve gist memories of these associations was unaffected in older adults (e.g., older adults remembered that older men, not younger

Glossary

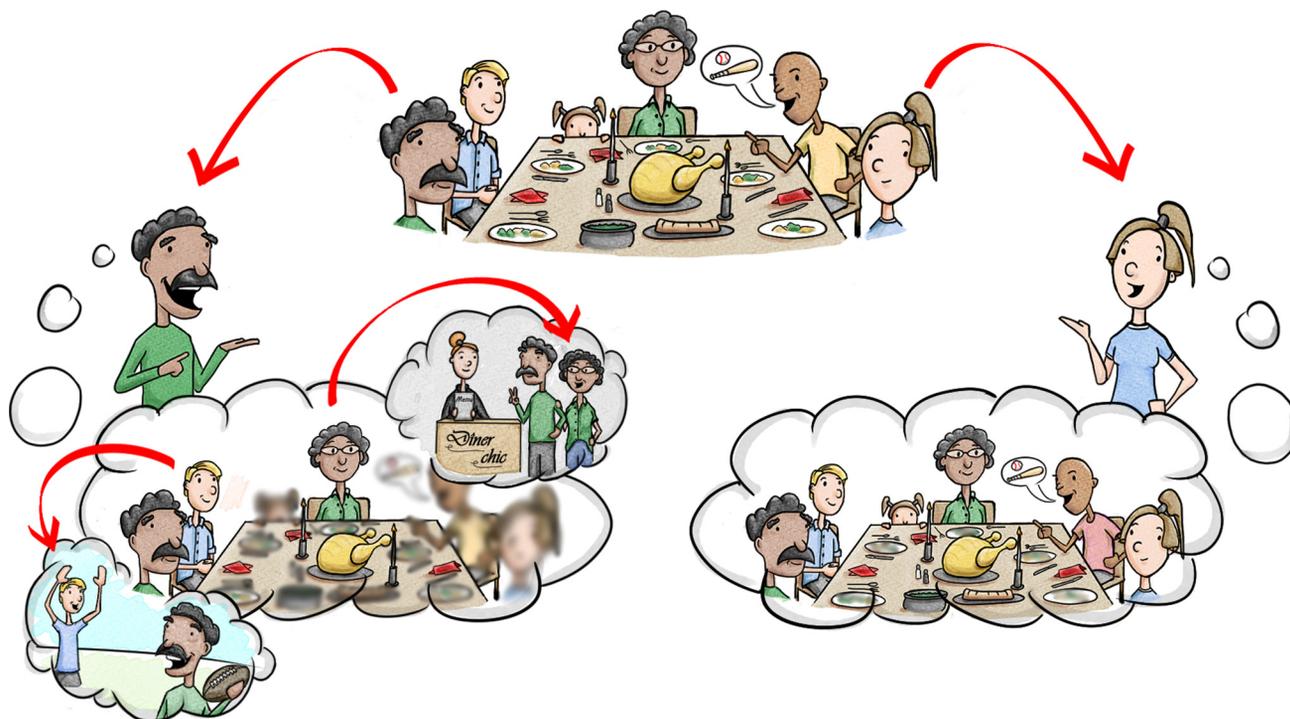
Autobiographical event memory: mental representations of complex, autobiographical events that are consciously re-experienced and situated in a particular time and place. At a conceptual level, autobiographical event memory is definitionally synonymous with episodic memory, although there are important methodological differences (see episodic memory). Relatedly, autobiographical event memories are believed to typically include general or nonspecific detail that is often described as semantic memory (see semantic memory).

Episodic memory: conceptually akin to autobiographical event memory in that both are believed to reflect consciously retrieved unique events bound to a time and place. However, methodologically episodic memory is often tested with nonpersonal stimuli. The number of event-defining elements also is often much more limited relative to autobiographical event memories, and generalities are often controlled (e.g., all pictures of outdoor scenes).

Gist representations: a general memory for the superordinate, basic category, and prototype features of elements making up a singular event. Applied to autobiographical events, gist representations capture the basics about who, what, and where, as well as an event's general storyline and emotion. Gist representations serve as a solid conceptual base from which to draw meaning and to make connections with related experiences.

Semantic memory: knowledge of autobiographical and nonpersonal concepts or 'facts.' Semantic memories are derived from experience but are believed to be retrievable without reconstructing the specifics around the time and place from which they were extracted.

Specific representations: memory for concrete features of elements that constitute a singular event. Applied to autobiographical events, specific representations capture visual, auditory, and other sensory modalities and are defined as any detailed information that adds to an event's uniqueness, including an element's physical features and location, the length of time and sequencing of actions within an event, and a verbatim-like record of dialogue.



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Figure 1. Contrasting two ways to view autobiographical event remembering in older adults. The initial memory representation of an experience shared by hypothetical young and older adults. There are two ways to approach interpreting the differences between the young adult's autobiographical event memory (on the right) and the older adult's autobiographical event memory (on the left). Most cognitive aging research has taken a decline-oriented perspective, describing what is missing for the older adult. From this perspective, we notice that the amount of specific detail captured in the event's memory differs with age such that the young adult has stored a more reproducible, specific representation, including visual details, location details, and a more verbatim recollection of the conversation. An alternative perspective, however, is to ask what is spared and perhaps fortified in this autobiographical event memory of the older adult. With this fresh vantage point, we notice that the older adult has extracted the general idea of the main setting (e.g., a dinner gathering), emotional tone (e.g., positive valence), and narrative (e.g., conversation about a sporting event) as well as their younger counterpart. Also, by taking a more wide-angle view, the older adult has situated this moment in a broader context that transforms, and arguably enhances, the event's integration in the life story, laying down rich connections with other life experiences that are categorically related (e.g., the two added memories here capture similar types of interactions, either involving playing a sport or going out to another meaningful dinner). This example illustrates the overarching thesis of this article, namely that when we take a closer look at how older adults remember past events, we observe that they effectively reconstruct the essence of their autobiographical events, which we attribute to the sparing of gist representations of event elements in older adults.

men, were paired with park scenes, as opposed to another scene, such as an indoor mall), whereas memory for more specific details was reduced in older age.

In line with the findings described in the preceding text, recent work on narrative memory for verbal stories indicates that older adults can retain the gist of extended events learned in a laboratory as well as young adults. For example, by auditorily presenting short stories containing both perceptual (referred to as peripheral) and gist (i.e., core to the plot or the story's meaning) details, one recent study [14] showed that although older adults retain fewer perceptually specific details, they effectively remember the central content making up a story's narrative similar to young adults. In fact, older adults retain narrative gist for a wide range of content in a storyline, including detail about where and when an event occurred [34]. Several additional studies bolster the idea that gist representations for narratives are effectively formed by older adults [13,15,35,36].

Bringing these findings together, there is growing evidence that older adults appear to be able to store and retrieve general detail about unique event elements at a gist level (i.e., the features about

Box 1. Gist contributes to the debate surrounding episodic and semantic memory

The possibility that episodic memory (i.e., memory for unique events) and semantic memory (i.e., knowledge extracted from experiences) may depend on dissociable brain systems has inspired decades of human memory research [104,105]. Recent work, however, suggests that the neural and cognitive boundaries between episodic memory and semantic memory are less striking when we consider methodological and theoretical issues [25–27,56,106]. These findings bring to the forefront an earlier framework suggesting that episodic and semantic memory may fall on a single continuum, such that semantic knowledge is stored at various levels of abstraction, with many forms of knowledge approximating the qualities of episodic memory [23].

If we entertain the idea of a continuum, we believe it is best to view gist representations as a type of memory taking an intermediate position. On the one hand, a gist representation includes the main elements (i.e., items) and setting (i.e., scene) of a unique event and therefore maintains a semblance of episodicity. On the other hand, these elements are represented in terms of their generalities, which pushes gist representations to some extent toward the abstract end of the continuum. As such, gist representations cannot be firmly situated within the camp of either episodic memory or semantic memory, based on their traditional definitions.

This way of framing gist representations aligns with recent neuropsychological findings [56,106,107] suggesting that the hippocampus/medial temporal lobe contributes to the retrieval of personal knowledge, but only if the knowledge has qualities typically ascribed to episodic memory. A continuum framework also might help to explain different profiles of event memory impairment in age-related neurodegenerative diseases. For example, although progressively worsening knowledge loss is the defining feature of semantic dementia, the retrieval of autobiographical event memories also is affected. Interestingly, several studies have shown that in the early stages of semantic dementia, when atrophy is most pronounced in anterolateral temporal lobe regions connected to the anterior hippocampus, it is remote, gistlike autobiographical event memories that are primarily affected, with recent, highly specific autobiographical event memories being relatively spared until posterior cortical thinning advances in later stages [108,109]. In contrast to semantic dementia, recent work involving individuals with amnesic mild cognitive impairment raises the possibility that Alzheimer's disease may affect both gist and specific event memory representations early on [15], which is consistent with evidence of widespread pathology affecting both anterior and posterior hippocampal-cortical circuitry in early to intermediate stages of the disease [110].

singular items [29,30], location [33], and time [32]), and they seem to be capable of integrating this gist detail into the basic multielement narrative of an event. We conclude, therefore, that the reviewed behavioral studies, and others [37,38], provide evidence that the type of detail spared and enhanced in typically aging older adults' autobiographical event memories can be plausibly attributed to the preservation of gist representations.

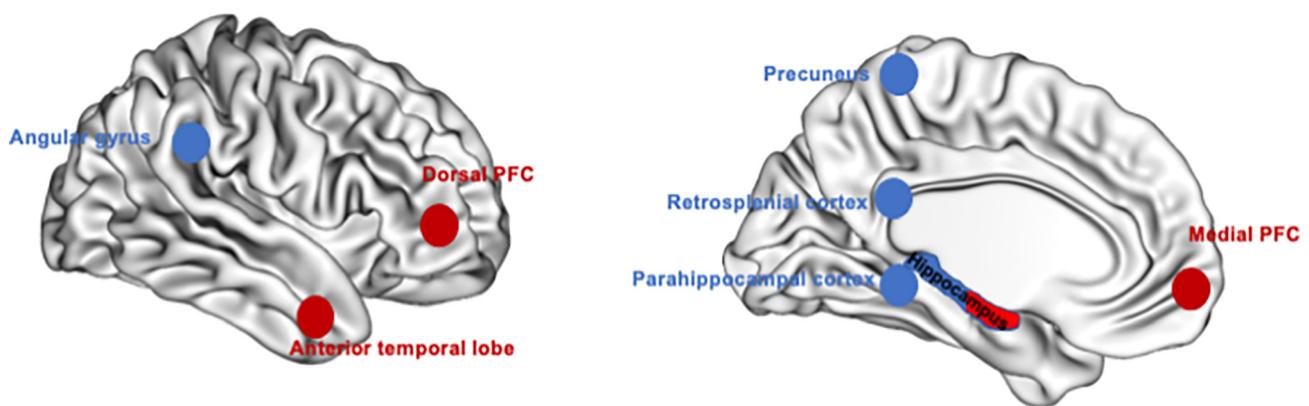
Neural evidence for a specific-to-gist shift with aging

The retrieval of autobiographical event memories is supported by a widespread set of brain regions that centers on the hippocampus. This network of brain regions has also been implicated in studies of nonpersonal episodic memory tasks and has been referred to by many terms: the default network, the autobiographical memory network, the posteromedial anterotemporal network, and the recollection network [1,39–42]. Regardless of the term used to describe this 'core' network, many contemporary neurocognitive models (for in-depth reviews, see [1,27,28,39,43,44]) have proposed that brain regions within this network specialize in cognitive processes that appear to be relevant to the gist versus specific distinction. For instance, several posterior cortical regions, including the parahippocampal cortex, precuneus, angular gyrus, and retrosplenial cortex, have been implicated in memory processes that are associated with reinstating specific details of an event, either in a single or multimodal/content manner [43,45]. These memory processes include so-called episodic detail retrieval [46,47], self-reported memory vividness [48,49], retrieving spatial features of autobiographical events [50], and constructing precise item and spatial location detail [51,52]. In comparison, other cortical regions, such as the anterolateral temporal lobe and dorsal and ventral medial prefrontal cortex, are believed to support functions that may have a prominent role in forming and retrieving the generalities of event details. These generalities include themes of autobiographical events [50], social knowledge [53], conceptual representations of personal identity [54], and abstract autobiographical

facts [55,56]. Similar distinctions in memory representations have been made in the hippocampus. That is, although there is broad agreement that the hippocampus has a central role in the reconstruction of event memories, a few models propose that the anterior hippocampus may support general features of events (so-called conceptual, global, or coarse features), whereas the posterior hippocampus may be crucial for remembering specific features of events (so-called fine-grained, sensory-perceptual, and contextual features) [1,28,57].

On the basis of these neurocognitive models [1,27,28,39,42–44], in Figure 2, we illustrate a basic schematic of how the selective sparing of gist representations among older adults may alter the engagement of the neural network underlying autobiographical event memory. That is, if gist representations are selectively spared at encoding and retrieval, older adults might show relatively intact, or greater use of, the anterior hippocampus and cortical regions implicated in processing and retrieving an autobiographical event memory's generalities. Equally important, older adults might show underuse of the posterior hippocampus and cortical regions essential to processing and later reconstructing the specifics of event elements.

Findings from several recent neuroimaging studies using laboratory-based stimuli can be taken as support for Figure 2's proposed signature of selective sparing of gist representations among older adults. One such fMRI study [58] analyzed brain activity of more than 500 participants as they viewed a complex movie, a proxy for personal events. By focusing on activation around event boundaries, which are believed to be crucial for event memory formation, they found that older participants (i) showed spared anterior hippocampal activation but reduced posterior hippocampal activation, (ii) exhibited decreased activation among several posterior cortical regions, and (iii) engaged the medial prefrontal cortex more than young adults. Collectively, these findings support the possibility of older adults showing an enhanced reliance on gist representations during the formation of an event memory. Related findings emerged from another recent fMRI study that involved scanning young and older adults as they encoded and retrieved visual scenes [59]. The experimenters used deep convolutional neural networks to code presumed neural



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Figure 2. Spared gist representations shaping event remembering in the aging brain. A proposed schematic of how reliance on relatively spared gist representations for autobiographical events may shape remembering in the aging brain. Following developments in current neurocognitive models [1,26,28,43,44], relying on gist representations at retrieval should translate to spared or enhanced use of brain regions that have been strongly implicated in so-called conceptual, knowledge-based, or general (i.e., superordinate or basic category) cognitive processes and content. The anterior hippocampus, the anterior temporal lobe, and the dorsal and medial prefrontal cortex (PFC; shown in red) could be key regions meeting this criterion. In comparison, brain regions believed to support cognitive processes and content that contribute to specific representations of event elements, such as episodic detail retrieval, perceptual and location precision, and vividness, should be underused among older adults. Neural regions meeting this criterion may include the posterior hippocampus, angular gyrus, precuneus, retrosplenial cortex, and parahippocampal cortex (shown in blue). In light of current neurocognitive models, in the text, we discuss several considerations that could lead to a refinement of this basic schematic.

representations for the perceptual features of a scene in early visual cortex (bilateral calcarine, cuneus, and lingual gyrus) and the categorical (i.e., conceptual or gist) features of scenes in the anterior temporal lobe (left dorsal temporal pole and ventral temporal pole), and they estimated the amount of item-specific neural encoding-retrieval similarity within these brain regions. Although older age was associated with a reduction in item-specific encoding-retrieval similarity within early visual cortex, older adults had enhanced item-specific encoding-retrieval similarity relative to young adults in the anterior temporal lobe, with the latter associated with better recognition memory in only the older adults. The described neuroimaging results align with other recent findings of encoding and retrieval using laboratory-based stimuli, showing older age-related spared or increased involvement of anterior cortical regions implicated in gist-aligned cognitive processes and decreased posterior hippocampal and posterior cortical regions relevant to event specificity [49,60–63].

Findings from neuroimaging studies of autobiographical event memory also generally support the proposal illustrated in Figure 2. A recent study examined the associations between hippocampal and temporal lobe volumes with autobiographical event retrieval in young and older adults. The ability of older adults to generate detailed autobiographical event memories was positively associated with temporal pole volume and, in a sex-specific manner, the anterior hippocampus [64]. Along the same lines, a recent meta-analysis that examined the neural substrates of autobiographical event memory retrieval in young and healthy older adults found that both age cohorts commonly activated several left-lateralized regions (left hippocampus, medial parietal cortex, posterior cingulate cortex, angular gyrus) and that the older adult group had additional activation of regions including the medial and lateral temporal gyrus and the right anterior hippocampus [65]. Neuroimaging studies using both laboratory-based stimuli and autobiographical events, therefore, suggest that older adults tend to show a specific-to-general shift in several brain regions underlying remembering.

In closing this section, we note again that the proposal in Figure 2 is viewed as a basic schematic that can be refined with additional research. For instance, on the one hand, according to a few models [27,39,43,44], it could be that some neural regions underused by older adults reflect areas specialized in certain types of specific detail or cognitive operations. A reduced ability to combine these specific details, on the other hand, may be most strongly evident in the hippocampus, the posterior hippocampus in particular, according to some models [1,28]. Along the same lines, some brain regions spared and used more by older adults may specialize in forming and retrieving certain types of general content of an event, whereas the spared integration of this content with other memories may be most strongly reflected in the anterior hippocampus in particular. A second consideration is that although the proposal in Figure 2 highlights key brain regions in which we might expect to see a reliance on gist representations shaping autobiographical event memory, other areas involved in coding detail from an autobiographical event, such as the auditory cortex [66], may show specific-to-general shifts as well. A final consideration is that neural regions that may have a more central role in integrating both general and specific content together into a coherent memory, such as the posterior cingulate cortex [43,46], may show local shifts within their neuroanatomical boundaries that reflect specific-to-gist representational formation. Indeed, what constitutes event-specific versus gist regions, networks, or functional patterns is an interesting avenue for future work.

Older adults' reliance on gist: a multifactorial outcome

So far, we have covered behavioral data indicating that the gist of autobiographical event memories is selectively spared in older adulthood, and we have suggested how this may be reflected in the brain. A common interpretation of a shift to gist in older adults is that it is strictly a

compensatory, automatic reaction to cognitive and brain decline. However, in this final section, we bring forward evidence that the specific-to-gist shift, in addition to being partly driven by age-related decline, may also reflect a natural outcome of older adult cognitive development [67]. That is, although specific memory may be optimal for young adults (Box 2), older adults may rely on gist representations because of natural changes to the availability of memories that occur with time and experience, normative motivation-based changes in older adults, and the momentum of a ‘gist mode of thinking’ that naturally occurs with aging.

Aging naturally changes what memories are available

Our first non-decline-oriented point acknowledges that older adults, by the mere fact of being older, have vastly more memories of remote experiences available to them than young adults. This is relevant in part because remoteness and rehearsal, which come with older memories, naturally reduce the availability of specific details more than gist details of events [68–70]. In addition, autobiographical memories are believed to be stored in a connected fashion according to some higher-order theme, such as general event categories (e.g., holidays, surprising events) [71]. It follows, then, that older adults typically have more related memories to draw on during remembering (i.e., those from the same theme). This idea closely aligns with the ‘lifetime experience’ hypothesis [9], which suggests that older age comes with a natural increase in familiarity with categorical information, and older adults are arguably more likely than young adults to activate and draw on connections between members of a category (in this case, autobiographical event memories from the same theme). These points highlight that older adults’ inclination to retrieve gist representations may partly reflect that with more years lived comes natural changes to what memories are available, leading to an inevitable drift toward gist compared with specific representations. Although this ‘years lived’ factor may be viewed as a relatively passive outcome of typical aging, next we consider what are arguably more active, motivation-based factors that may contribute to an increased reliance on gist-based remembering.

Aging leads to motivated familiarity-seeking behavior

There is growing interest in the idea that older adults are goal-driven to focus on what is familiar, ‘exploiting’ tried-and-true experiences over ‘exploring’ new ones [72–74]. Relative to young

Box 2. Considering the value of specific remembering in young adulthood

In this opinion, we propose that there is a shift toward representing memories at a gist level in older age that is not exclusively driven by decline but rather is also partly motivated. This position implies that young adults may focus on specific memory representations for several reasons. Similar to how we do not view cognitive aging from a purely decline-oriented perspective, we do not view young adults’ focus on specific details as simply an outcome of inexperience or lack of the ability to consider gist aspects of memory. The contexts and goals driving the use of autobiographical event memory in young adulthood dictate a prioritization of specific details.

Recent findings suggest that remembering specific details has many adaptive (directive, social, and identity) functions that young adults may be inclined to capitalize on. For instance, focusing on specifics may be critical to mapping out a thorough, effective plan in novel scenarios. Compared with older adults, young adults may be motivated to engage in specific processing because they are more likely to face unfamiliar decisions and because they are generally more likely to be information seeking [111,112]. Specific memory representations also may have a vital role in updating, and perhaps maintaining, a sense of identity [107,113,114]. Given that young adults are in their formidable years of identity formation, detailed remembering may be particularly influential for this function of memory retrieval. Relatedly, specific details may provide valuable context for distinguishing social concepts of individuals. Given that the size and complexity of our social networks tend to peak in young adulthood and then steadily decline with age [115], specific details may be relied on by young adults to outline large, complex social networks spanning multiple environmental contexts (e.g., work, school, home). However, much like a focus on gist memory in older age comes with some negative side effects, so too might a focus on specific details in young adulthood. For example, an over-reliance on specific detail could limit the applicability of a memory to other relevant, but different, contexts, thus limiting transfer of learning and generalization [21]. It also seems more likely that if there is a hyperfocus on specifics, a person may miss the meaning of an event (i.e., not seeing the forest for the trees), which could translate to decisions that stray from personal values and goals.

adults, older adults spend more time in familiar environments before seeking novelty, as demonstrated by foraging paradigms [75,76]. Older adults also spend more time than young adults viewing information in their environment that is consistent with prior knowledge and therefore familiar [77]. This drive for familiarity may even translate to basic personality traits, with large cross-sectional and longitudinal studies finding that trait-level openness is lower in older age, hinting at a shift toward less exploration [78,79]. Interestingly, recent work [80] has shown that familiar spatial environments tend to spontaneously cue semantic memories more than highly specific event memories, suggesting that older adults' preference for familiar experiences may naturally spark gist-based remembering. More broadly, a focus on processing what is familiar may disproportionately block specific details, consistent with cue overload theory [81,82]. Familiarity seeking may further increase the relevance of schemas to learning and remembering, which capture category typical or general features of an event situation (e.g., what is found in a doctor's office) [83] and are thought to be supported by cortical regions implicated in gist [84]. Finally, work on expertise and cognitive processing further suggests that when dealing with familiar scenarios and environments, often the most relevant information can be gleaned from the gist of an experience [85–87]. In sum, with older age may come an increased motivation to pursue what is familiar, opening multiple paths through which encoding and retrieving shifts toward the gist.

Aging leads to new social goals for remembering

A large body of research indicates that older age is associated with another relevant motivational shift: self-transcendence, a state of mind that promotes reflecting on world or societal knowledge [88–90]. This raises the possibility that older adults are motivated by different socially oriented goals than young adults when they retrieve and share past events [67], and we propose that the goals of older adults align with gist-oriented thinking. This proposal follows several studies suggesting that in social situations, older adults may be motivated by goals that promote sharing meaning more than young adults. For instance, self-report data indicate that although older age is associated with a decline in seeking out social relationships that involve new topics (i.e., 'information seeking'), the desire to find social interactions that will involve reflecting on values, mutual understanding, and life meaning subtly increases with older age [91]. Relatedly, researchers [92], using a mobile device to unobtrusively capture the acoustics of daily interactions, found that older adults often share memories to teach and reflect on their identity, and to connect with or entertain others. Importantly, these are social and self functions linked to a prioritization of the conceptual meaning or storytelling quality of memories, and not typically the specific details [18,93]. Putting these findings together, the fact that older adults are inherently motivated by social goals that promote meaning may influence how events in the laboratory and everyday autobiographical episodes are encoded and retrieved.

Aging promotes a gist frame of mind

The above-described ideas suggest that older adults are processing and remembering their experiences through something akin to a gist frame of mind. This is intriguing because recent research has shown that how a memory is retrieved is strongly linked to a person's current mode of thinking [94–97]. According to this induction-based research, retrieval prompts a feedback loop in which constructing specific memories of any event temporarily primes a person to engage an 'episodic detail mode' of retrieval on a range of cognitive tasks that call on memory. Although not the focus of this induction-based work (although see [95]), it stands to reason that retrieving gist-based representations of memories similarly primes a 'gist mode' of thinking during direct and indirect attempts at memory retrieval. To this point, work across subfields of memory, decision making, and perception has shown that older adults do use cognitive strategies guided by generalities and prior knowledge more than younger adults, which may partly reflect that older adults were primed to process the gist [77,98,99]. Relatedly, and as

alluded to by the results of [58], a gist mode of thinking may operate at encoding as well as retrieval. Although encoding is challenging to study in autobiographical memory, recent work using laboratory events in young adults suggests that a gist mode may in fact alter encoding [100]. In other words, some aftereffects of a gist mode of thinking may not be temporary; rather, they could have a permanent shaping of new memory formation. Thus, although older adults' reliance on gist might initially arise for multiple reasons, both decline and nondecline in manner, natural retrieval aftereffects may come to contribute to a long-term exacerbation of a gist focus.

Concluding remarks

Researchers are beginning to ask how cognitive functions that are preserved with older age [72] and age-related differences in motivation [101] influence the way older adults remember. The perspective that we have outlined in this opinion extends this movement in scientific thinking and casts a spotlight on gist memories as a key factor. In sum, there is growing evidence that autobiographical event memories include specific and gist details, and cognitive aging brings on decline and preservation with respect to these representations. More so, emerging work indicates that in older adulthood, the gist of an event may be increasingly important to older adults' use of memory in daily life, and possibly adaptive to rely on in light of age-related changes in motivated behavior. The prioritization and increased reliance on gist representations for event memories may explain why recent studies using so-called naturalistic stimuli, examining memory in more realistic contexts, or asking individuals to remember in a more gistlike way, are finding subtle or no age effects [12,102] or are reporting older adult advantages [17,103]. This casts a new light on how we interpret normative age differences in event remembering and raises several avenues for future work (see [Outstanding questions](#)).

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Declaration of interests

The authors have no conflicts of interest to declare.

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Outstanding questions

How can we measure the gist of autobiographical event memories? Although most research directly examining gist has focused on nonpersonal stimuli, methods could be adapted to directly assess the gist of autobiographical events as well.

What are the roles of encoding and retrieval in a shift toward gist? There is reason to think both are involved, but their relative contributions remain uncertain.

When in the adult lifespan does gist reliance emerge? Because cognitive aging research typically compares young and older adults, we have a limited understanding of when in the adult lifespan a dependence and preference for gist memory begins to take shape or how it evolves in typical aging.

Does a preference for gist, once it emerges, equally affect remote and recent memories? Does this shift develop over time for a memory [i.e., with (re)consolidation], or is it evident, to a degree, upon initial formation/re-retrieval?

Is a preference for gist only evident in older adults with declining episodic memory and associated neural mechanisms? The answer to this question is a critical test of the idea that a shift toward gist is not entirely driven by cognitive and brain decline.

What is the neural signature of a specific-to-gist shift? In the text, we consider several ways in which this shift may be evident within regions and networks.

Are nondecline causes of a shift toward gist automatic, strategic, or both? The degree to which a shift toward gist is under the control of older adults is unclear.

Under what circumstances is a shift toward gist adaptive? Relying on the gist likely aids and hinders the functionality of memory. The adaptive consequences, and whether they vary by age group, is an important direction for future work.

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Do youth-favored experimental settings bias older adults to gist memory? Future work should determine how the typical setting in which university-based research is conducted affects how age cohorts describe autobiographical events.

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