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Special Issue: Decision Neuroscience and Aging | Editorial

Introduction to special issue: decision neuroscience and aging

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Decision neuroscience has been an innovative interdisciplinary field since its inception, providing a novel mechanistic framework from which to examine the neural substrates and cognitive processes underlying decision-making, shaped by various contextual features such as expected value, uncertainty, and social reward (Glimcher & Fehr, 2014; Loewenstein et al., 2008; Smith & Huettel, 2010). Over the past two decades, an explosion of research has leveraged such formal models to glean important insight into how decision-making processes are altered throughout the adult lifespan (Lighthall, 2020; Mohr et al., 2010; Seaman et al., 2022). Inspired by compelling evidence illustrating how motivational and affective processes are maintained in older adulthood in contrast with the often-observed age-related decline in cognitive and neurobiological functions (Hess, 2014; Samanez-Larkin & Knutson, 2015; Strough & Bruine De Bruin, 2020), as well as the pressing need for a deeper and nuanced mechanistic understanding of older adult decision-making in real-world contexts (Löckenhoff, 2018), the Scientific Research Network on Decision Neuroscience and Aging (SRNDNA) was formed to foster opportunities for early-career researchers to fill these important gaps (Lighthall et al., 2026; Nielsen, 2026). This effort to bring together researchers at the intersection of decision neuroscience and aging has been largely successful (for example, two of the current action editors received pilot awards that enabled them to expand their research programs to investigate lifespan questions) and has transformed the field by challenging scientists to rethink and discover new ways to study mechanisms of healthy and pathological aging, which is highly relevant for our increasingly aging population as well as growing prevalence of Alzheimer's disease and related dementias in the United States and beyond.

To this end, we, as action editors and advisory board members of SRNDNA, developed this special issue to curate a collection of articles highlighting various ways in which aging is examined (e.g., via neuroimaging, computational modeling, and ecologically inspired paradigms) to provide richer insight into the underlying mechanisms associated with decision-making processes across the lifespan. We first highlight several behavioral studies demonstrating the importance of socioemotional, affective, and cognitive factors that bias decision-making, followed by several neuroscience studies identifying brain mechanisms and temporal dynamics associated with decision-making in healthy and pathological aging. Finally, we conclude by featuring ecologically valid paradigms of decision-making "in the field" (e.g., email phishing, advance care planning), a foundational step for translating mechanistic insights from the laboratory to better understand real-world decisions. Such work has highly significant translational value, given the pervasive financial exploitation and deception commonly observed in older adult populations (Grilli et al., 2021) as well as the physical and mental burden associated with caregiving (Schulz & Sherwood, 2008). Together, the papers in our special issue demonstrate multifaceted approaches to probing the mechanisms underlying *where, how*, and *when* decision-making processes are altered across adulthood. Optimistically, providing a more holistic, foundational understanding of decision-making across the adult lifespan can inspire a paradigmatic shift in how future researchers target and measure aging processes, allowing us to leverage scientific insights to better bridge the gap between basic mechanisms and translation in healthy and pathological aging.

Socioemotional, affective, perceptual, and cognitive mechanisms of aging

Several articles in this special issue examined the cognitive and socioemotional changes that occur over the adult lifespan and how these changes relate to decision-making abilities in later life. Our broad understanding of these age-related behavioral changes continues to evolve. As this subset of articles demonstrates, there is mounting evidence against the conventional narrative of 'age-related decline', in favor of a more nuanced picture of typical aging as a mix of losses, gains, and comparatively stable abilities (see Spreng & Turner, 2019, for a review).

Moreover, as briefly reviewed below, several of the reports in this issue highlight how environmental (e.g., perceptual clarity, time pressure) and contextual (e.g., stereotype threat, emotional valence) factors become increasingly important in shaping choice behaviors in older adulthood.

Atkin et al. (2026) investigated how the perceptual clarity of decision-making materials might interact with decision-making abilities in everyday tasks. They reported that older, but not younger, adult performance on two tasks designed to replicate real-world decision-making contexts was improved by increasing the perceptual clarity of the stimuli upon which decisions were based. This result was consistent with the information degradation hypothesis, which posits that in the context of degraded perceptual input, additional 'top-down' cognitive resources are necessary, resulting in lower task performance. In this context, impoverished perceptual inputs are particularly harmful for older adults, where such additional, compensatory resources may not be available. Based on their findings, the authors offer an important caution that cognitive impairments may be over-diagnosed in older adults with uncorrected sensory impairments. They also offer a strong endorsement of Craik's environmental support framework (Craik, 2022) for remediating age-related cognitive deficits, while particularly highlighting the day-to-day functional relevance of informational clarity for improving decision-making in later life.

In an interesting parallel, Noh et al. (2026) investigated how decisions requiring multi-step inference were impacted, not by perceptual clarity, but rather by the clarity of mnemonic representations. They implemented a structural inference task in which older adults were asked to memorize a series of object pairs that could be inferentially linked by an implicit graph structure. They were then asked to judge 'distances' between the learned objects as well as recreate the underlying relational structure. Critically, all participants completed a mnemonic discrimination task to measure the precision of their memory encoding ability. In the first experiment, they report that while older adults performed worse than younger adults on the inference task, performance was better explained by memory precision than chronological age. In a second study, they demonstrated that optimal strategies to improve judgment abilities also depend on memory precision, with low-precision learners responding better to blocked association training and high-precision learners responding better to intermixed association training designs. These results show how memory precision influences the learning of association structures that ultimately sculpt the decision-making landscape. Taken together, both the Atkin and Noh studies demonstrate that clarity, whether of externally-based perceptual inputs or internally-based mnemonic representations, plays an important role in older adults' decision-making abilities.

The final two behavioral papers in this special issue shift from a focus on age-related cognitive changes to investigate how alterations in socioemotional functioning impact decision-making in later life. Frank and Seaman (2026) examined the influence of emotion versus reward prediction errors on social decision-making across the lifespan. Using the Ultimatum Game, the authors measured participants' experiences of their emotional valence and the offer reward value before (expected) and after (realized) an offer was revealed. Prediction errors were then used to predict future decisions to reject the offer (i.e., punishment decisions). Both emotion and reward prediction errors were larger for older adults. However, emotion prediction errors were more predictive of punishment decisions than reward prediction errors, and, unexpectedly, this pattern didn't differ with age. Finally, the authors observed that the larger emotion prediction errors observed with age were likely attributable to older adults' lower reward prediction accuracy; they overestimated how much their partners would share. These findings demonstrate that the influence of both emotion and reward prediction errors on future decisions is stable across the adult lifespan. However, older adults have greater expectations of fairness from others, which may distort their affective forecasting. While beyond the direct conclusions of the study, this observation raises the specter of greater vulnerability to deception and exploitation in later life.

In the last report of this subset, Lu et al. (2026) investigated the impact of social factors and age-related stereotype threat specifically on risky decision-making and related outcomes. They used the Balloon Analog Risk Task and an aging stereotype priming condition (positive, neutral, negative) to examine how stereotype threat impacted decision-making performance. While older adults showed more risk aversion following negative stereotype priming, their overall task performance didn't differ across threat conditions. The authors interpreted this lower risk-taking as an adaptive decision-making strategy in the context of social threat. In a follow-up analysis using computational modeling approaches, the authors further demonstrated that risk aversion following negative stereotype priming was attributable more to pessimistic prior beliefs than to fear of losses. The authors suggest that this latter finding may open new avenues for optimizing decision-making in older adulthood by promoting more positive aging stereotypes.

Similar to the parallels surrounding 'clarity' across the first two behavioral studies, these latter reports also share a common theme: the impact of belief structures on older adult decision-making. In the study by Frank and Seaman, it was belief in the actions of 'others,' whereas in the Lu et al. study, it was belief about one's own actions that led to sub-optimal decision-making strategies. These emergent themes offer important insights regarding the importance of considering informational clarity while overcoming negative aging stereotypes to enhance decision-making abilities—and outcomes—in later life.

Neural mechanisms of aging

Moving from behavior to neurobiology, a subset of articles in the special issue sought to reveal the neural mechanisms driving age-related changes in decision-making.

Focusing on the medial temporal lobe, Lempert et al. (2026) found that cortical thickness in Brodmann's area (BA) 35 was associated with the extent to which older adults leveraged their episodic memories to make adaptive approach/avoid decisions. Given that BA35 is an early target for Alzheimer's pathology, these data raise the intriguing possibility that subtle structural declines may foreshadow later decision-making deficits.

Hewan et al. (2026) took a more granular approach, using quantitative magnetic resonance imaging to measure magnetization transfer saturation (MTsat). MTsat is a measure of tissue microstructure primarily influenced by myelin density. In older adults,

microstructural integrity in orbitofrontal and frontopolar regions predicted their "exploitation bias" in foraging–the tendency to stay with familiar options rather than explore. MTsat even accounted for additional variance in behavior after controlling for cortical thickness in these regions. This study underscores the value of looking beyond macrostructure when exploring the neural underpinnings of choice.

Finally, while the three structural neuroimaging papers mapped the *where* of decision-making, two articles used event-related potentials (ERPs) to understand the *when*, focusing on age-related changes in how decision-making and feedback processing unfold in the brain. Fernandes et al. (2026) employed the monetary incentive delay task to look at different stages of the decision process: anticipating reward or punishment, motivating behavior to obtain reward or avoid punishment, and processing feedback. Older adults processed incentives differently from young and middle-aged adults (showing attenuated Cue-P3 and Target-P3 amplitudes), but these differences did not vary as a function of context (e.g., when outcomes benefited others).

On the other hand, Santacroce et al. (2026) focused on *post*-decision processing: how do older adults compare to young adults in their processing of performance feedback? Previous studies have yielded mixed findings, motivating the authors to conduct a well-powered, pre-registered study examining three feedback-related ERP components during a time estimation task. Perhaps surprisingly, older adults were as sensitive to feedback as young adults were, casting doubt on the dopaminergic hypothesis of aging. In partial support of the socioemotional selectivity theory of aging, older adults were more sensitive to the valence and social content of feedback during early processing (P2), but not during subsequent processing stages (FRN, P300). These findings call for added nuance to existing theories of aging.

Together, these papers identified neural mechanisms through which aging may lead to less adaptive decision-making. They set the foundation for future studies to establish causality and to develop interventions.

Real-world applications of aging

Historically, research on decision-making in aging has leaned heavily on controlled laboratory paradigms that struggle to capture the complexity of real-world choices. It is therefore encouraging that several studies in this special issue tackle realistic decision scenarios, such as advanced care planning, phishing susceptibility, and deepfake detection.

One such bridge between the lab and the world is provided by Frei et al. (2026), who interrogated whether the social version of the Iowa Gambling Task (sIGT) could predict a person's ability to detect lies and deepfakes. In the sIGT, just as in the standard IGT, participants learn with experience to draw cards from advantageous decks (moderate gains, moderate losses) rather than disadvantageous decks (large gains, larger losses). However, they also receive social feedback, which is either supportive of adaptive decisions (i.e., trustworthy faces paired with advantageous deck choices) or misleading. Past research showed that older adults tended to be more biased by social feedback in the sIGT than young adults were. The authors found that performance on the sIGT predicted the ability to detect lying in an interpersonal lie task and the ability to detect digitally manipulated images (deepfakes) over real images. Critically, these relationships held across age groups, suggesting that cognitive mechanisms underlying fraud vulnerability may be consistent across the lifespan. Given that deepfakes and lies are often used to exploit older adults financially, this study suggests that a simple laboratory measure may be used to assess vulnerability to financial fraud.

While Frei and colleagues focused on interpersonal deception, Wang et al. (2026) pivoted to the digital frontier: email phishing. Participants completed an ecologically valid task in which they rated the suspiciousness of email subject lines. The authors then used a neural network modeling approach to predict performance based on both stimulus-level (e.g., perceived authority, urgency) and person-level (e.g., gender, age) attributes. Older adults regarded emails with more suspicion in general but were similar to young adults in their ability to discriminate between safe and phishing emails. The neural network model predicted task performance moderately well using only a few dimensions. This finding is particularly hopeful; it suggests that interventions to thwart fraud do not require complete personalization to be effective.

Finally, Chen and Löckenhoff (2026) addressed the critical underutilization of advanced care planning (ACP). ACP is a process through which individuals communicate their preferences for future medical care should they become unable to make decisions. Here, the authors explored whether gain vs. loss message framing could influence intentions to complete ACP across adulthood. Loss-framing (i.e., highlighting the potential losses from not completing ACP) was more effective than gain-framing (i.e., highlighting the benefits of ACP) in driving engagement with ACP. Surprisingly, older adults opted out of obtaining ACP information more often when messaging was framed through a "gain" lens. This work has practical implications for the design of health messaging to promote ACP.

Collectively, these studies advance the field beyond traditional laboratory paradigms by focusing on consequential real-world decisions. By using age-diverse samples, this work reveals that, while the stakes of fraud or medical planning may rise with age, the underlying predictors of decision-making in these domains may be mostly age-invariant.

Conclusion

This diverse set of articles in this special issue highlights how interdisciplinary approaches can provide key insights into how decision-making mechanisms are altered throughout the adult lifespan. Importantly, this issue provides novel, compelling evidence for moving beyond classical perspectives of cognitive-related and neural-related decline in aging, speaking to the rich and nuanced way in which age-related changes in socioemotional processing, motivation, and cognition reflect adaptive responses to our neurobiological changes as well as a rapidly evolving world (Gutchess & Samanez-Larkin, 2019). Beyond this collection, our hope as SRNDNA is to lay the groundwork for the next generation of scientists in aging neuroscience, inspiring innovative new directions in the understanding of the adaptive brain and body across the adult lifespan.

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Conflicts of interest

R.N.S. served as a coauthor in Hewan et al. (2026), and K.M.L. served as the first author in Lempert et al. (2026), which are included in the special issue; they were not involved in the review or decision for the articles. D.Y. has no conflicts to disclose.

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