Opinion

Responsible Remembering

How Metacognition Impacts Adaptive Selective Memory

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We are often exposed to far more information than can be remembered. For example, students are often overwhelmed when studying for an exam, the internet provides endless amounts of information, and distracted people may forget where they parked their car or where they put their cell phone. However, we can overcome these challenges by prioritizing attention toward high-value information to maximize the likelihood that this information will be remembered (Ariel et al., 2009; Castel et al., 2012). One's knowledge about these selective memory processes may be a form of metamemory that allows for the efficient use of memory in a variety of contexts.

Judgments of Learning and Failures of Fluency

Metacognitive measures often involve monitoring and making judgments regarding one's learning. Judgments of learning (JOLs) are metacognitive self-assessments of how likely one is to later remember information on a test (Rhodes, 2016). These judgments are often related to the difficulty of initial learning and later recall (e.g., Hertzog & Dunlosky, 2011) and can involve the effortful and strategic incorporation of multiple cues (e.g., Undorf & Bröder, 2019). However, there are instances where JOLs are based on erroneous beliefs about memory and ease of processing that can result in a weak relationship between metamemory and performance (Besken & Mulligan, 2013; Kornell et al., 2011; Mueller & Dunlosky, 2016). This can lead to the illusion that more easily perceived items (e.g., words in a large font vs. a small font) are more likely to be remembered (Rhodes & Castel, 2008).

Accurately predicting recall is a sign of good metacognition but people often have difficulty anticipating future forgetting (Koriat et al., 2004; Kornell et al., 2011). Most of us have had experiences where we expected to remember important information but forgot it at an inopportune time and had to deal with the consequences. When we forget names, to take medication, or to pick up a child from school, there are clear consequences. In some extreme cases, the consequences for inaccurate metacognition can be dire and disastrous, such as distracted parents forgetting infants in the back seats of hot parked cars (Fantz, 2015) – something that seems unfathomable to many who have not experienced it.

Responsible Remembering

We introduce the notion of *responsible remembering* as it captures how our memory allows for the strategic allocation of attention toward important information to avoid undesirable outcomes, and even tragic consequences. When JOLs fail to accurately indicate recall performance (poor resolution), participants' allocation of cognitive resources may be ineffectively used leading to insufficient learning and failure to recall the information on a subsequent test (e.g., Hargis & Castel, 2019; Rhodes & Castel, 2009). Thus, in circumstances with negative consequences for poor metacognition and memory retrieval, people should engage in responsible remembering to prioritize important information and increase resolution by remembering the things they expect to remember and also be aware of what is less likely to be remembered.

To engage reward-based learning and consequences for misguided metacognition in a memory task, McGillivray and Castel (2011) had participants study words paired with point values. If participants "bet" on and later remembered the word, they would receive the points but would lose the points if they forgot the word, thus there were negative consequences for inaccurate metacognition. Results indicated that metacognition and learning outcomes were enhanced in both younger and older learners, suggesting that failing to consider the consequences of inaccurate metacognition and forgetting could explain many instances of faulty JOLs. Thus, people may learn to be responsible rememberers when considering the costs and benefits of remembering information of varying importance.

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Older Adults as Responsible Rememberers?

People sometimes feel like they have forgotten something and these feelings of forgetting are often related to one's memory failures (e.g., Halamish et al., 2011). This awareness of how much/often one forgets may lead to older adults to engage in responsible remembering. For example, when remembering allergy information or information about medications, older adults may be responsible in remembering by focusing only on what is most critical, perhaps to compensate for declines in memory (Friedman et al., 2015; Hargis & Castel, 2018; Middlebrooks et al., 2016). With increased task experience, older adults may engage in responsible remembering by systematically shifting their attention toward items of importance and also updating this information. Additionally, older adults' responsible remembering may reflect a selective and strategic information search in the context of decision making – searching less exhaustively or using fewer pieces of information but also focusing on the more diagnostic information (e.g., Mata et al., 2007; Queen et al., 2012).

Summary

Inaccurate metacognitive judgments can lead to illusions of learning but awareness of the consequences of forgetting may inform metacognition. Responsible remembering captures how the strategic allocation of attention toward important information can help avoid undesirable outcomes and unexpected forgetting by enhancing metacognition and learning outcomes in both younger and older learners. Learners of all ages should strive to be responsible rememberers as accumulated memory challenges and awareness of forgetting over the lifespan may enhance metacognition.

References

Ariel, R., Dunlosky, J., & Bailey, H. (2009). Agenda-based regulation of study-time allocation: When agendas override item-based monitoring. *Journal of Experimental Psychology: General, 138*(3), 432–447. https://doi.org/10.1037/a0015928

Besken, M., & Mulligan, N. W. (2013). Easily perceived, easily remembered? Perceptual interference produces a double dissociation between metamemory and memory performance. *Memory & Cognition, 41*(6), 897–903. https://doi.org/10.3758/s13421-013-0307-8

Castel, A. D., McGillivray, S., & Friedman, M. C. (2012). Metamemory and memory efficiency in older adults: Learning about the benefits of priority processing and value-directed remembering. In M. Naveh-Benjamin & N. Ohta (Eds.), *Memory and aging: Current issues and future directions* (pp. 245–270). Psychology Press.

Fantz, A. (2015, January). *After leaving a child in the car, "that pain never goes away"*. CNN. https://www.cnn.com/2014/07/03/us/hot-car-deaths/index.html

Friedman, M. C., McGillivray, S., Murayama, K., & Castel, A. D. (2015). Memory for medication side effects in younger and older adults: The role of subjective and objective importance. *Memory & Cognition, 43*(2), 206–215. https://doi.org/10.3758/s13421-014-0476-0

Halamish, V., McGillivray, S., & Castel, A. D. (2011). Monitoring one's own forgetting in younger and older adults. *Psychology and Aging, 26*(3), 631–635. https://doi.org/10.1037/a0022852

Hargis, M. B., & Castel, A. D. (2018). Younger and older adults' associative memory for medication interactions of varying severity. *Memory, 26*(8), 1151–1158. https://doi.org/10.1080/09658211.2018.1441423

Hargis, M. B., & Castel, A. D. (2019). Knowing what others know: Younger and older adults' perspective-taking and memory for medication information. *Journal of Applied Research in Memory and Cognition, 8*(8), 481–493. https://doi.org/10.1016/j.jarmac.2019.09.004

Hertzog, C., & Dunlosky, J. (2011). Metacognition in later adulthood: Spared monitoring can benefit older adults' self-regulation. *Current Directions in Psychological Science, 20*(3), 167–173. https://doi.org/10.1177/0963721411409026

Koriat, A., Bjork, R. A., Sheffer, L., & Bar, S. K. (2004). Predicting one's own forgetting: The role of experience-based and theory-based processes. *Journal of Experimental Psychology: General, 133*(4), 643–656. https://doi.org/10.1037/0096-3445.133.4.643

Kornell, N., Rhodes, M. G., Castel, A. D., & Tauber, S. K. (2011). The ease of processing heuristic and the stability bias: Dissociating memory, memory beliefs, and memory judgments. *Psychological Science, 22*(6), 787–794. https://doi.org/10.1177/0956797611407929

Mata, R., Schooler, L. J., & Rieskamp, J. (2007). The aging decision maker: Cognitive aging and the adaptive selection of decision strategies. *Psychology and Aging, 22*(4), 796–810. https://doi.org/10.1037/0882-7974.22.4.796

McGillivray, S., & Castel, A. D. (2011). Betting on memory leads to metacognitive improvement in younger and older adults. *Psychology and Aging, 26*(1), 137–142. https://doi.org/10.1037/a0022681

Middlebrooks, C. D., McGillivray, S., Murayama, K., & Castel, A. D. (2016). Memory for allergies and health foods: How younger and older adults strategically remember critical health information. *Journal of Gerontology: Psychological Sciences, 71*(3), 389–399. https://doi.org/10.1093/geronb/gbv032

Mueller, M. L., & Dunlosky, J. (2016). How beliefs can impact judgments of learning: Evaluating analytic processing theory with beliefs about fluency. *Journal of Memory and Language, 93*, 245–258. https://doi.org/10.1016/j.jml.2016.10.008

Queen, T. L., Hess, T. M., Ennis, G. E., Dowd, K., & Grühn, D. (2012). Information search and decision making: Effects of age and complexity on strategy use. *Psychology and Aging, 27*(4), 817–824. https://doi.org/10.1037/a0028744

Rhodes, M. G. (2016). Judgments of learning. In J. Dunlosky & S. K. Tauber (Eds.), *The Oxford handbook of metamemory* (pp. 65–80). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199336746.013.4

Rhodes, M. G., & Castel, A. D. (2008). Memory predictions are influenced by perceptual information: Evidence for metacognitive illusions. *Journal of Experimental Psychology: General, 137*(4), 615–625. https://doi.org/10.1037/a0013684

Rhodes, M. G., & Castel, A. D. (2009). Metacognitive illusions for auditory information: Effects on monitoring and control. *Psychonomic Bulletin & Review, 16*(3), 550–554. https://doi.org/10.3758/PBR.16.3.550

Undorf, M., & Bröder, A. (2019). Cue integration in metamemory judgments is strategic. *The Quarterly Journal of Experimental Psychology, 73*(4), 629–642. https://doi.org/10.1177/1747021819882308

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