Title: What is working memory for? An ethological approach to modeling memory use in children and adults

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In 1960, in their seminal book *Plans and the Structure of Behavior*, Miller, Galanter, and Pribram gave us what is still to this day the consensus, theory-neutral definition of working memory: “the maintenance and manipulation of information over short periods of time to guide adaptive behavior” (Miller et al., 1960). Since then, there has been extensive study of the maintenance and manipulation of information, but less attention paid to the second half of the definition, the *guiding of adaptive behavior*.

In this poster presentation, we outline the limitations of mainstream approaches to the study of visual working memory and propose an alternative, *ethological* approach that re-centers the role of the agent’s goals and asks: “What is working memory *for*?”. Most work in the last 60 years on visual working memory has used a classic psychophysical setup: well-informed, well-motivated participants are instructed to remember, then recall, a set of items. This traditional approach minimizes the role of cognitive control: effort is maximal, goals are impoverished, and strategies are constrained. Like studying a city’s traffic by measuring the top speed of its cars, it centers edge cases. If we are to work toward an integrative theory of working memory, we need an approach that accounts for the fact that real-world goals are complex, performance is rarely best-case, and agents strategically exploit internal *and* external memory resources (Kristjánsson & Draschkow, 2021; Van der Stigchel, 2020). In our *ethological approach*, the dynamic relationships between the agent and the environment are best understood in light of an agent’s goals (Gibson, 1979; Kingstone et al., 2008). This means a shift in emphasis from how target mechanisms *perform* (“Remember all the cued items!”) to how mechanisms are *used* in pursuit of a naturalistic goal (“Make a sandwich!” (see e.g., Land and Hayhoe (2001)).

We present a dynamic feedback model of our ‘resource-rational’ (Lieder & Griffiths, 2019) *sampling-remembering trade-off*, where internal and external resources are strategically exploited in order to reach one’s goals with minimum overall subjective cost (Blaser & Kaldy, 2025). Here we argue that the individual weighs the subjective costs of accessing external information vs. those of maintaining it in memory – using insights from existing cognitive control models based on economic principles (Kool & Botvinick, 2018). Within this sampling-remembering framework, we highlight two special cases: one where external memory resources are ubiquitous (active, online visual memory), and one where they are insufficient (and thus lead to the creation of external resources: cognitive offloading).

Of course, as developmental psychologists, our focus is on understanding the developmental trajectory of the mechanisms and abilities underlying the sampling-remembering trade-off (Liang et al., 2025; Koolhaas et al., under review). As we will discuss in this presentation, the trade-off is particularly interesting to study in children, as the optimal use of internal resources is even more crucial when limited (Persaud et al., 2020), and the ability to recognize the utility of external resources, and to create them when needed (Armitage et al., 2020), is just emerging.

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