Abstract

Individuals may assess their memory performance and, in turn, rely on external aids to ensure that information remains accessible for future retrieval. For example, an individual might use a password manager if they consider a newly created password challenging to remember. However, perceived memory performance often differs from actual memory performance, making it challenging to predict when external assistance is cognitively necessary. Related research defines self-assessment of cognitive performance as metacognition (e.g., perceived memory performance) and the use of external resources to support cognitive functioning as cognitive offloading (e.g., using the password manager). Accordingly, the unpredictability of cognitive offloading based on perceived memory performance complicates understanding the mechanisms of metacognition involved in deciding whether to employ cognitive offloading. This dissertation introduced confidence in the previous assessment of perceived memory performance as a second-order metacognitive judgement (SOJ) to address this issue, considering the initial assessment as a first-order metacognitive judgement (FOJ). This research examined the following question: "How do individuals decide to employ cognitive offloading based on two-layer self-assessment in learning tasks?"

This research used 48 English paired associates (e.g., ABILITY-CAPABILITY) as learning tasks, incorporating a procedure with Learning, Retention, and Test sessions. In the Learning session, participants were instructed to learn each associate and then estimate their performance to recall the target item (e.g., CAPABILITY) when presented with the cue item (e.g., ABILITY) in a later test. Subsequently, their confidence in the correctness of FOJ was elicited as their SOJ during the trial. Afterwards, the participants chose a learning strategy for each associate: write it down on paper (employing cognitive offloading) or remember it mentally (not employing cognitive offloading). In the Retention session, the participants completed simple mathematical problems. In the Test session, participants were required to freely recall the target items for all paired associates (inputting via a keyboard) when presented with the cues. The learning tasks were administered online, with participants recruited remotely from the United States.

This research comprised three studies: Studies 1 and 2 served as pilot studies, and Study 3 was the main study. Study 1 verified the suitability of the procedure and learning materials for subsequent studies. Study 2 determined a scoring method for strategy choices to reduce the overuse of cognitive offloading. Study 3 provided evidence to address the research question, finding that (1) FOJs partially predict the selection of cognitive offloading and that (2) SOJs influence the regulation of cognitive offloading choices. The increased consistency with actual memory performance in metacognition may result from confidence regulating the strategy choice relative to the previous FOJ to the opposite option if the SOJ falls below a certain threshold. For example, shallow confidence may lead to switching from relying on memory to offloading information, even if the target was initially perceived as memorable.

This research initially explored how SOJs influence learning strategies, contributing to knowledge science by highlighting metaknowledge as a novel aspect of knowledge creation. On another note, this work provides insights into unresolved issues in cognitive offloading and related research fields that employ metacognitive judgements as a methodology. Additionally, this work has practical implications for educational contexts where individuals interact with information in their environment. Future research could expand on these findings by incorporating a broader range of learning strategies beyond cognitive offloading, exploring diverse methods for eliciting confidence levels, and extending the current findings with various alternative materials.

Keywords

Metacognition, memory, cognitive offloading, metacognitive judgement, monitoring, control