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Cognitive load, cues, and task selection in learning probability calculus

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Abstract

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Cognitive load, cues, and task selection in learning probability calculus

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A society in which learners must be ready to develop new knowledge and skills throughout life underlines the importance of teaching learners how to select suitable learning tasks. In a randomized controlled experiment, we studied task selection accuracy when learning conditional probability. We hypothesized that having students self-rate their performance and/or mental effort would provide them with cues to reflect on their cognitive processing in relation to task characteristics (e.g., task difficulty) and so improve subsequent task selection.

Eighty bachelor psychology students participated (5-10 minutes, in Qualtrics). Each condition presented the same probability problem to be solved in five steps, followed by the question what kind of task the participant would select next – easier, more difficult, or a task of the same difficulty level – and intrinsic/extraneous cognitive load (ICL: $\alpha = 0.850$; ECL: $\alpha = 0.813$; ICL-ECL: $r = 0.169$) imposed by the completed task (Leppink et al., 2014, *Learning and Instruction*, 30, 32-43). Depending on the condition, self-rated performance, self-rated mental effort, none of these (control condition) or both cues guided the task selection question.

Task selection was virtually unrelated to experimental condition or actual performance. However, ICL did correlate substantially with self-rated performance ($r = -0.358$) and mental effort ($r = 0.664$), and ICL and ECL together explained about 30% of differences in task selection.

Thus, although this experiment provides no evidence that prompting students to self-rate performance or mental effort affects task selection, self-rated performance and mental effort responses correlate with ICL, and the latter explains task selection to some extent. Further, the mismatch between task selection and actual performance may be due to the fact that participants received no feedback on actual task performance. A replication of this experiment with performance feedback (yes/no) as additional factor could shed new light on this question.