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Engaging reflective thinking during an exam: Slowing students down on multiple choice questions increases performance

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Dual processing theory asserts that there are two modes of thinking: A fast, reflexive "system 1"mdash;which provides unconscious, intuitive judgementsmdash;and a slower, more reflective "system 2"mdash;which involves deliberate and conscious effort. We examine the implications of this theory in the context of multiple-choice questions on physics exams by including an "Explain your answer" box for certain problems on the exams in a large-scale calculus-based introductory physics course. Our hypothesis is that slowing students down by asking them to write an explanation may trigger system 2, resulting in increased performance on the question. The propensity of students to engage system 2 was measured using the Cognitive Reflection Test (CRT), and a pre/post concept inventory measured both incoming knowledge and learning through the semester. Preliminary results indicate that an "Explain your answer" box results in a statistically significant increase in the odds of a student answering the corresponding question correctly and that the CRT was a strong predictor of exam performance. Implications for exam design will be discussed.

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