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# Enhancing critical thinking instruction through assessment of students' cognitive reflection

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Introduction: Teaching critical thinking is essential for improvement of students understanding of psychology. The present study explored cognitive reflection as a critical thinking skill among senior high school psychology students by means of a Cognitive Reflection Test (CRT). Cognitive reflection is the ability to override an initial, intuitive response (System 1 thinking) and engage in deliberate, analytical reasoning (System 2 thinking) to arrive at a correct answer. This study also examined how cognitive reflection is related to individual differences in students' time preference for receiving a reward. Taken together, the study demonstrated how measurement of cognitive reflection can be utilized to teach critical thinking skills effectively.
Methods: Eighty-six senior high school psychology students completed the Cognitive Reflection Test (CRT). The CRT assesses whether individuals rely on System 1 or System 2 thinking to solve problems, including the water lilies problem and the bat-and-ball problem. The participants also completed a time preference task to measure preference for small immediate reward or larger future reward.
Results: Less than half (43.5%) answered the water lilies problem correctly, and only 22% correctly solved the bat-and-ball problem. Nearly half (47.1%) failed to answer any CRT problems correctly. A crosstab analysis showed that students who responded correctly to one or both CRT problems had a time preference of a large reward later rather than a small reward now.
Discussion: The results suggest that the CRT is sufficiently challenging to distinguish between students with low and high levels of cognitive reflection, and that cognitive reflection is related to time preference. The study highlights the educational value of using the CRT as a hands-on teaching tool. By actively participating in reflective problem-solving, students experience cognitive processes firsthand, rather than merely learning theoretical concepts. This approach enhances their understanding of critical and scientific thinking.

## Is the first author also the speaker?

Yes

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## Please indicate up to five keywords regarding the content of your contribution

cognitive reflection, critical thinking, psychology education, cognitive reflection test (CRT), time preference

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