

Cognitive Reflection Test

From Wikipedia, the free encyclopedia

The Cognitive Reflection Test (CRT) is a task designed to measure a person's tendency to override an incorrect "gut" response and engage in further reflection to find a correct answer. It was first described in 2005 by psychologist Shane Frederick. The CRT has a moderate positive correlation with measures of intelligence, such as the Intelligence Quotient test, and it correlates highly with various measures of mental heuristics.[1][2]

Later research showed that the CRT is a multifaceted construct: many start their response with the correct answer, while others fail to solve the test even if they reflect on their intuitive first answer. It has also been argued that suppression of the first answer is not the only factor behind the successful performance on the CRT: numeracy and reflectivity both account for performance.[3]

Contents [hide]

- 1 Basis of Test
- 2 Correlating Measures
- 3 Test Questions and Answers
- 4 Limitations and Alternatives
- 5 References

Basis of Test[edit]

According to Frederick, there are two general types of cognitive activity called "system 1" and "system 2." System 1 is executed quickly without reflection, while system 2 requires conscious thought and effort. The Cognitive Reflection Test has three questions that each have an obvious but incorrect response given by system 1. The correct response requires the activation of system 2. For system 2 to be activated, a person must note that their first answer is incorrect, which requires reflection on their own cognition.[1]

Correlating Measures[edit]

The test has been found to correlate with many measures of economic thinking, such as numeracy,[3] temporal discounting, risk preference, and gambling preference.[1] It has also been correlated with measures of mental heuristics, such as the gambler's fallacy, understanding of regression to the mean, the sunk cost fallacy, and others.[2]

Keith Stanovich found that cognitive ability is not strongly correlated with CRT scores because it will only lead to better CRT performance under certain conditions. First, the test-taker must recognize the need to override their system 1 response, and then they must have available cognitive resources to carry out the override. If the test-taker does not need to inhibit system 1 for the override, then the system 2 response immediately follows. Otherwise, they must have the capacity to sustain inhibition of system 1 in order to engage the system 2 response.[4]

Test Questions and Answers[edit]

The original test penned by Dr. Frederick contained only the three

following questions:[1]

A bat and a ball cost \$1.10 in total. The bat costs \$1.00 more than the ball. How much does the ball cost? _____ cents

If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? _____ minutes

In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? _____ days

The answers are: 5 cents, 5 minutes, and 47 days.

Limitations and Alternatives[edit]

Studies have estimated that between 44 and 51% of research participants have previously been exposed to the CRT.[5][6] Those participants that are familiar with the CRT tend to outscore those with no previous exposure, which raises questions about the validity of the measure in this population.[5][6] In an effort to combat limitations associated with familiarity, researchers have developed a variety of alternative measures of cognitive reflection.[7][8][9]

References[edit]

^ Jump up to: a b c d Frederick, Shane (2005). "Cognitive Reflection and Decision Making". *Journal of Economic Perspectives*. 19 (4): 25–42. doi:10.1257/089533005775196732. Retrieved 2015-12-01.

^ Jump up to: a b Toplak, Maggie (4 May 2011). "The Cognitive Reflection Test as a predictor of performance on heuristics-and-biases tasks" (PDF). *Memory and Cognition* (39): 1275–1289. doi:10.3758/s13421-011-0104-1. Retrieved 30 May 2014.

^ Jump up to: a b Szaszi, Barnabas (2017). "The cognitive reflection test revisited: exploring the ways individuals solve the test". *Thinking and Reasoning*.

Jump up ^ Stanovich, Keith E., & West, Richard F. (2008). "On the relative independence of thinking biases and cognitive ability." *Personality Processes and Individual Differences*, 94(4), 672–695. doi:10.1037/0022-3514.94.4.672 <http://psycnet.apa.org/journals/psp/94/4/672>

^ Jump up to: a b Haigh, Matthew. "Has the Standard Cognitive Reflection Test Become a Victim of Its Own Success?". *Advances in Cognitive Psychology*. 12 (3): 145–149. PMC 5225989 Freely accessible. PMID 28115997. doi:10.5709/acp-0193-5.

^ Jump up to: a b Stieger, Stefan; Reips, Ulf-Dietrich (2016-09-06). "A limitation of the Cognitive Reflection Test: familiarity". *PeerJ*. 4. ISSN 2167-8359. PMC 5018679 Freely accessible. PMID 27651989. doi:10.7717/peerj.2395.

Jump up ^ Primi, Caterina; Morsanyi, Kinga; Chiesi, Francesca; Donati, Maria Anna; Hamilton, Jayne (2016-12-01). "The Development and Testing of a New Version of the Cognitive Reflection Test Applying Item Response Theory (IRT)". *Journal of Behavioral Decision Making*. 29 (5): 453–469. ISSN 1099-0771. doi:10.1002/bdm.1883.

Jump up ^ Toplak, Maggie E.; West, Richard F.; Stanovich, Keith E. (2014-04-03). "Assessing miserly information processing: An expansion of the Cognitive Reflection Test". *Thinking & Reasoning*. 20 (2): 147–168. ISSN 1354-6783. doi:10.1080/13546783.2013.844729.

Jump up ^ "Investigating an alternate form of the cognitive reflection test". *Judgment and Decision Making*. 11: 99–113.