

Assessment Title

Army Critical Thinking Test (ACTT)

Assessment Description

Critical thinking is how people think skillfully and effortfully about information to solve a problem. The ACTT measures an individual's critical thinking skills and metacognitive attributes. These two factors interact to influence a leader's actions. Specifically, metacognition—when one is aware of how they think and use that insight to intentionally direct their thought process—enables a leader's performance by enhancing their ability to think critically.

Who is the Army audience?

The ACTT is appropriate for all Army leaders. Army personnel who lead others, to include junior and senior officers, warrant officers, and enlisted and civilian leaders, can use the ACTT to understand their cognitive tendencies. The ACTT is included in the Athena Cognitive area.

How does the Army benefit?

The ACTT provides an assessment of critical thinking skills and metacognition. The ACTT is administered online through the Army Enterprise Assessment System (AEAS).

The ACTT assesses one's evaluating information, reasoning, weighing options, and integration skills as well as knowledge of their mental abilities and awareness of how they think. Metacognition is the awareness and control of personal thought processes. When engaging in a task that requires critical thinking, metacognition allows an individual to control their attention, think of new ways to do things, control responses to stress, and leverage emotions to guide thinking. For example, a leader gauges their understanding of a situation and determines that awareness is sufficient so they can figure out what they need to do next. The ACTT can be used to assess current strengths and weaknesses in order to identify methods to improve critical thinking and metacognitive skills. This can help students improve their self-awareness and identify specific ways to practice and develop their critical thinking skills, focus, cognitive flexibility, and emotional regulation. Improving both critical thinking skills and metacognition can positively influence leader decision-making, which benefits individual Army leaders and the Army as a whole.

What kind of feedback do students receive?

Immediately after completing the ACTT, students will receive a detailed feedback report and resource weblinks to improve critical thinking. This feedback report provides students with percentile rankings for four critical thinking components, which allows them to see how they rank in comparison to others who have completed this assessment.

The majority of leaders in BOLC who took the ACTT found it to be useful. Specifically, 65% reported that it helped them identify their strengths, 66% reported that it helped them identify developmental needs, and 61% felt it was relevant to their development as a leader.

Why can the Army rely on this assessment?

The ACTT is based on research conducted by the Center for Army Leadership starting in 2008 and a steady approach to iterative test development with Army leaders. The assessment was created by the Army to anticipate critical thinking and metacognitive requirements of Army leaders. The benefits of using a test that contains military-relevant items include enhanced motivation to perform on the test and perceptions of utility, relevance, and validity of the test. The use of the ACTT is accompanied with documentation detailing its reliability and validity.

For test reliability (i.e., how consistently a construct is measured by an assessment), the ACTT produces results considered good to excellent for both critical thinking and metacognition.

For test validity (i.e., the degree to which the assessment measures what it was designed to measure), the ACTT has exhibited strong relationships with other metacognition and cognitive ability tests. Given that critical thinking has been identified as a sub-ability of cognitive ability, the critical thinking portion of the ACTT was compared to a test of cognitive ability and a strong relationship was identified with the evaluating information, reasoning, weighing options, and integration scores of the ACTT. When compared to tests of metacognitive attributes, a strong relationship was identified with the focus, cognitive flexibility, and emotional regulation scores of the ACTT.

Fact Sheet Sources and Supporting Information

Psychometrics—Test Reliability

Reliabilities were acceptable for both the critical thinking and metacognition scales.

ACTT	Evaluating Information	Reasoning	Weighing Options	Integration	Metacognition
Kuder-Richardson ^A	0.25-0.51	0.24-0.66	0.42-0.74	0.12-0.54	--
Cronbach's Alpha ^B	--	--	--	--	0.70

Psychometrics—Item Analysis

Item Response Theory (IRT; Embretson & Reise, 2000) was used to evaluate the overall model fit of the 4 critical thinking factors on the ACTT as well as the item-level parameters (i.e., difficulty, discrimination, guessing) for each scored item. A 3-parameter logistic (3-PL) model was the best fitting IRT model (RMSEA <.05, SRMSR >.90, TLI >.90, and CLI >.90) and all scored items fit this model.

For the Alpha version (below company echelon test-takers), pilot testing indicated an average item difficulty of 67% correct responses. For the Bravo version (company and above test-takers), pilot testing indicated an average item difficulty of 46% correct responses. Item discrimination (i.e., how well items discriminate between people with different abilities) ranged between 0.80 and 2.5, and item guessing (i.e., the likelihood that low-ability individuals get the answer correct through guessing) was not above 0.35.

Psychometrics—Convergent Validity

It is important that two measures designed to assess the same or similar constructs are related to each other. Convergent validity refers to the relationship between two measures that should be positively related to each other.

Metacognition. When compared to Attention Control Scores (Derryberry & Reed, 2002), an excellent correlation was identified with the focus scores of the ACTT. When compared to Cognitive Flexibility Inventory Scores (Dennis & Vander Wal, 2010) and the Emotional Regulation Questionnaire (Gross & John, 2003), strong correlations were identified with the cognitive flexibility and emotional regulation scores of the ACTT. All three scales had weak relationships with a social desirability scale, indicating lack of measurement error.

ACTT	Validation Scale	Validity ^C
Focus	Attention Control Scale	0.69
Cognitive Flexibility	Cognitive Flexibility Inventory	0.58
Emotional Regulation	Emotional Regulation Questionnaire	0.42

Notes

A: Reliability Metric—Kuder-Richardson 20: Values range from 0-1 with reasonable reliability at the midpoint of the scale (between 0.4-0.6).

B: Reliability Metric—Cronbach's Alpha: Poor (0.5–0.6), Questionable (0.6–0.7), Acceptable (0.7–0.8), Good (0.8–0.9), and Excellent (> 0.9)

C: Validity Metric—Correlation Categories: Poor ($r < 0.10$), Acceptable ($r = 0.11–0.30$), and Excellent ($r = 0.31–1.0$)

References

- Derryberry, D., & Reed, M.A. (2002). Anxiety-related attentional biases and their regulation by attentional control. *Journal of Abnormal Psychology*, 111, 225–236.
- Dennis, J. P. & Vander Wal, J. S. (2010). The cognitive flexibility inventory: Instrument development and estimates of reliability and validity. *Cognitive Therapy and Research*, 34, 241–253.
- Embretson, S. E., & Reise, S. P. (2000). *Item response theory*. Psychology Press.
- Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, 85, 348–362.