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Title: Identifying general cognitive abilities involved in argument comprehension and evaluation.

Authors: Britt, M. A., Kopp, K., Durik, A. M., Blaum, D., & Hastings, P.

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Strand of work: Basic Studies

Abstract:

Individuals who lack the necessary skills for accurate argument evaluation will be at a significant disadvantage throughout their lives. Research has shown that simple tutorials are not effective for many students (about 30%). The current research examines how general abilities (e.g., vocabulary knowledge, reading comprehension, and analytical reasoning) predict learning to evaluate arguments. Study 1 showed that, although all three cognitive abilities predicted some aspects of argument comprehension and evaluation skills, vocabulary knowledge positively predicted both baseline argumentation skills and improvement from exposure to a tutorial. Study 2 found that this relationship between vocabulary knowledge and argument evaluation skill is partially mediated by general vocabulary ability and cannot be accounted for by knowledge of the meaning of the specific predicates used in the argument task. The results suggest that targeting skilled use of vocabulary knowledge and overall lexical quality may help students who do not learn from a simple tutorial.

Purpose and Questions Investigated, Assessments or Tools developed

Students who lack argument comprehension and evaluation skills will be at a significant disadvantage in many academic situations. We examined the extent to which three general cognitive skills (vocabulary skill, reading comprehension skill, and analytic reasoning skill) predict a student's ability to comprehend and evaluate the quality of simple informal arguments. We also examined whether these cognitive skills can be used to identify the students that need additional support in learning to evaluate argument quality from a simple tutor. Study 2 then examined whether the relationship between vocabulary knowledge and argument evaluation skill is partially mediated by one's range of diverse meanings of the target claim predicates (e.g., we should ban things that are harmful, unnecessary, not beneficial).

Research Context or Methodology

Setting and Participants: One hundred sixty-one undergraduates participated in Study 1 and sixty-four participated in Study 2.

Research Design, Data Collection, and Analysis: Participants read a set of authentic arguments and identified the main claim and then underlined the reasons that supported the main claim they identified. Then they completed the argument evaluation task (FJT) in which they read a set of claim-reason arguments to decide whether the arguments were structurally acceptable or flawed without considering their own opinion.

Then they completed a tutor designed to teach students how to evaluate arguments and performed the argument evaluation task again, with a new set of items. Finally, they completed tests of vocabulary knowledge (Nelson-Denny), reading comprehension skill (section of the Law school admission test), and analytic reasoning skill (a section of the LSAT). Study 2 included a predicate schema listing task which presented the verbs (e.g., “should ban”) used for the FJT and asked participants to list features of the thing that is acted upon (e.g., “things that are harmful”).

General statement of findings

The most important finding was that general vocabulary knowledge was a best predictor of performance on the argument evaluation and comprehension. Vocabulary knowledge was the strongest predictor of learning from the tutorial and was significant when controlling for reading and reasoning skill. In Study 2, we found that this vocabulary-evaluation relationship was mediated by individuals’ functional knowledge of the predicates. Those with less precise knowledge of predicates are less able to determine if the provided reason supports the claim, and therefore are also less able to correctly evaluate arguments.

Implications

Current models of argument processing do not explain how one determines that a reason supports a claim, which makes it challenging to design tutorials. The current studies are a small step in this direction. Those students with the greatest improvement from the tutorial were those that had the most vocabulary knowledge and knowledge of predicate schemas in particular. Thus, students could be taught schemas for classes of claim predicates and they could use them to guide the identification of argument elements, to systematically find weaknesses in an argument, to verify that an argument is warranted and to construct stronger, more complete, arguments. The importance of vocabulary for argument evaluation is consistent with the Lexical Quality hypothesis (Perfetti & Hart, 2002; Perfetti, 2007), which emphasizes the role of readers’ knowledge of and skill in integrating events described across sentences. Further work should more closely examine the progression of these skills within an individual student.

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