A Lack of Background Knowledge Can Hinder Reading Comprehension

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The purpose of going to school is to learn, but students may find certain topics difficult to understand if they don't have the necessary background knowledge. This is one of the conclusions of a research article published in Psychological Science, a journal of the Association for Psychological Science.

"Background knowledge plays a key role in students' readingcomprehension — our findings show that if students don't have sufficientrelated knowledge, they'll probably have difficulties understanding text," sayslead researcher Tenaha O'Reilly of Educational Testing Service (ETS)'s Centerfor Research on Human Capital in Education. "We also found that it's possibleto measure students' knowledge quickly by using natural language processingtechniques. If a student scores below the knowledge threshold, they'll probablyhave trouble comprehending the text."

Previous research has shown that students who lacksufficient reading skills, including decoding and vocabulary, fare poorlyrelative to their peers. But the research of O'Reilly and ETS colleagues ZuoweiWang and John Sabatini suggests that a knowledge threshold may also be anessential component of reading comprehension.

The researchers examined data from 3,534 high-school students at 37 schools in the United States. The students completed a test that measured their background knowledge on ecosystems. For the topical vocabulary section of the test, the students saw a list of 44 words and had to decide which were related to the topic of ecosystems. They also completed a multiple-choice section that was designed to measure their factual knowledge.

Then, after reading a series of texts on the topic ofecosystems, the students completed 34 items designed to measure how well theyunderstood the texts. These comprehension items tapped into their ability tosummarize what they had read, recognize opinions and incorrect information, andapply what they had read to reason more broadly about the content.

The researchers used a statistical technique calledbroken-line regression — often used to identify an inflection point in a dataset — to analyze the students' performance.

The results revealed that a background-knowledge score ofabout 33.5, or about 59% correct, functioned as a performance threshold. Belowthis score, background knowledge and comprehension were not noticeablycorrelated; above the threshold score, students' comprehension appeared toincrease as their background knowledge increased.

Additional results indicated that the pattern could not be fullyexplained by the level of students' knowledge on a different topic — whatmattered was their background knowledge of ecosystems.

The researchers found that students' ability to identify specifickeywords was a fairly strong predictor whether they would perform above orbelow the threshold. That is, correctly identifying *ecosystems*, *habitat*, and *species* as topically relevant was morestrongly linked with students' comprehension than was identifying *bioremediation*, *densities*, and *fauna*.

The findings underscore the importance of having reached abasic knowledge level to be able to read and comprehend texts across differentsubjects:

"Reading isn't just relevant to English Language Artsclasses but also to reading in the content areas," says O'Reilly. "The CommonCore State Standards highlight the increasing role of content area anddisciplinary reading. We believe that the role of background knowledge instudents' comprehension and learning might be more pronounced when readingtexts in the subject areas."

The researchers plan to explore whether a similar kind ofknowledge threshold emerges in other topic areas and domains; they note that itwill be important to extend the research by focusing on diverse measures and populations.

If the pattern holds, the findings could have importantapplications for classroom teaching, given the availability of knowledge assessmentsthat can be administered without taking valuable time away from instruction.

"If we can identify whether a given student does not have sufficient knowledge to comprehend a text, then teachers can provide background material — for example, knowledge maps — so that students have a context for the texts they are about to read," O'Reilly concludes.

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For moreinformation about this study, please contact: Kristen Lacaillade, Educational Testing Service(ETS), at 609-524-8172 or klacaillade@ets.org