

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' reading comprehension—our findings show that if students don't have sufficient related knowledge, they'll probably have difficulties understanding text," says lead researcher Tenaha O'Reilly of Educational Testing Service (ETS)'s Center for Research on Human Capital in Education. "We also found that it's possible to measure students' knowledge quickly by using [natural language](#) processing techniques. If a [student](#) scores below the knowledge threshold, they'll probably have trouble comprehending the text."

Previous research has shown that students who lack sufficient reading skills, including decoding and vocabulary, fare poorly relative to their peers. But the research of O'Reilly and ETS colleagues Zuowei Wang and John Sabatini suggests that a knowledge threshold may also be an essential 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 of ecosystems, the students completed 34 items designed to measure how well they understood the texts. These comprehension items tapped into their ability to summarize what they had read, recognize opinions and incorrect information, and apply what they had read to reason more broadly about the content.

The researchers used a statistical technique called broken-line regression—often used to identify an inflection point in a data set—to analyze the students' performance.

The results revealed that a background-knowledge score of about 33.5, or about 59% correct, functioned as a performance threshold. Below this score, background knowledge and comprehension were not noticeably correlated; above the threshold score, students' comprehension appeared to increase as their background knowledge increased.

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

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

The findings underscore the importance of having reached a basic knowledge level to be able to read and comprehend texts across different subjects:

"Reading isn't just relevant to English Language Arts classes but also to reading in the content areas," says O'Reilly. "The Common Core State Standards highlight the increasing role of content area and disciplinary reading. We believe that the role of background knowledge in students' [comprehension](#) and learning might be more pronounced when reading texts in the subject areas."

The researchers plan to explore whether a similar kind of knowledge

threshold emerges in other topic areas and domains; they note that it will be important to extend the research by focusing on diverse measures and populations.

If the pattern holds, the findings could have important applications for classroom teaching, given the availability of knowledge assessments that 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..

More information: Tenaha O'Reilly et al, How Much Knowledge Is Too Little? When a Lack of Knowledge Becomes a Barrier to Comprehension, *Psychological Science* (2019). [DOI: 10.1177/0956797619862276](#)

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