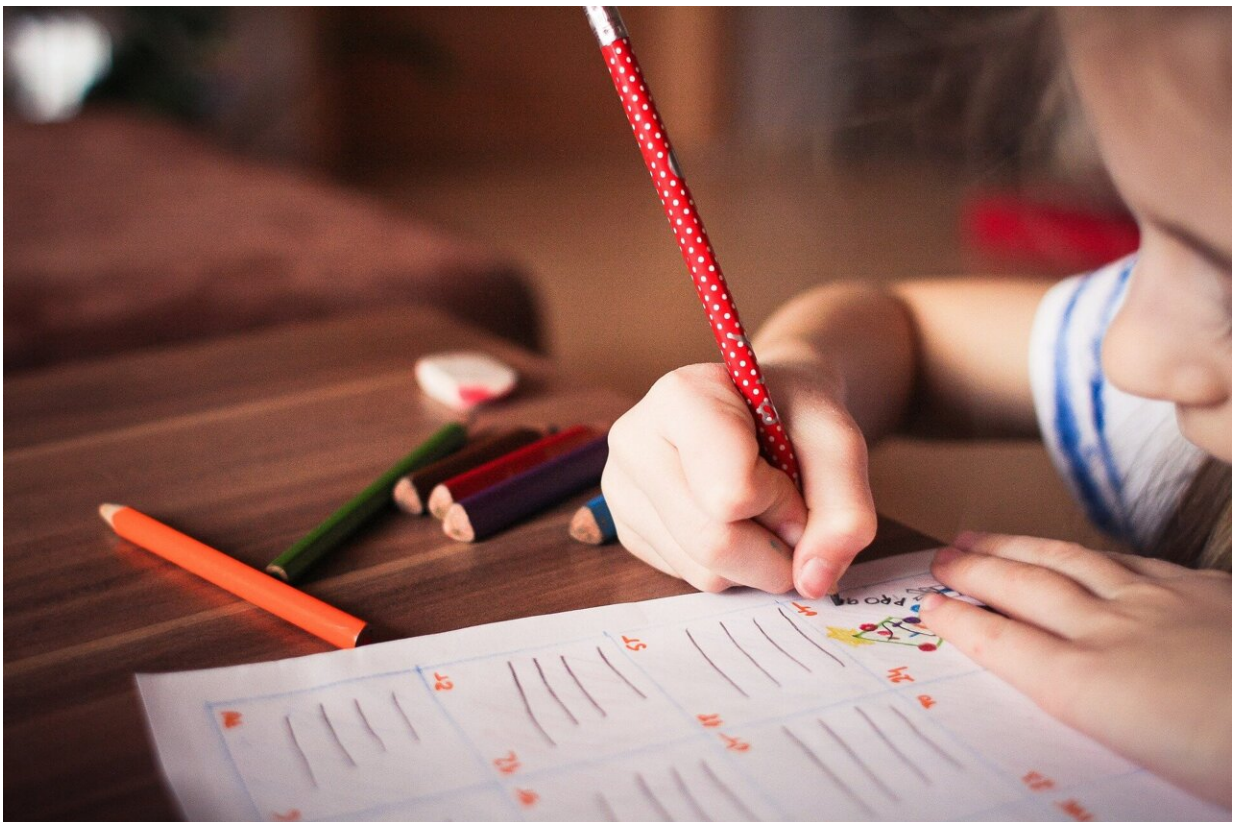


Study examines role of working memory, cognitive functions in English learners learning to write

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When a person attempts to express their thoughts in writing, they use a series of cognitive functions like working memory to access words and

ideas they want to convey, phonological awareness of concepts such as syntax and more. And that is in their native language.

A new study from the University of Kansas is among the first of its kind to examine cognitive functions and their role in teaching English learners to write in their [second language](#), which can help shed light on how students learn to write and how to help close the achievement gap in the growing Hispanic English learning population's writing abilities.

The study performed a battery of bilingual cognitive tests with nearly 500 elementary-age English learners and found the relationships between English writing performance and [cognitive skills](#) became stronger as grades increased. However, the relationships between English writing and Spanish cognitive and reading determinants were mixed, indicating working [memory capacity](#) was especially important in the population's performance in learning to write in their second language.

The findings not only shed light on how students learn to write, they could help lead to development of interventions to help English learners improve their writing abilities.

Researchers performed tests to determine a group of English learner students' aptitude in three cognitive and reading areas related to their native Spanish and English: phonological awareness, oral language development and working memory. They also tested their writing abilities in English as they progressed through first through third grades.

"We found working memory was the most significant predictor of writing ability. Within each test, there were multiple items that assessed the students' performance in the cognitive functions we were studying and their English writing," said Hui Wang of McKendree University, a recent KU doctoral graduate from the Department of Educational Psychology and lead author of the study.

"There are about 5 million English learners in the United States, and 3.8 million of them are Hispanic, but very little research has been done on how this population learns to write."

American education has focused largely on reading and math, both for English learners and as a whole in recent decades. Yet writing is frequently used to determine how well students understand a topic.

Michael Orosco, professor of educational psychology and one of the study authors, has long researched how English learners perform in schools and [the cognitive functions that take part in learning reading, math and other subjects](#). He and colleagues have recently studied the populations' reading writing and cognitive performance and how a lack of instruction in their [native language](#) hinders their learning to read in English.

"I told an assistant school superintendent of learning, 'We should pull out these kids and assess their writing abilities.' If we can't look at how they're developing, we're not going to be able to design interventions and practices to help them improve," Orosco said. "Children who are bilingual appear to have an enhanced working memory due to their bilingualism. While it's an underlying trait that isn't directly visible, it's crucial for retaining and retrieving information, especially during writing."

Working memory, phonological awareness and oral language development were measured in all students in both Spanish and English as they progressed through grades using a battery of bilingual assessments. Students' writing abilities were also regularly assessed. Students' performance in all of the cognitive skills, as well as writing performance, increased as they progressed among the grades. However, only working memory consistently predicted higher scores in writing.

Orosco said that this underscores the significance of working memory, particularly the ability to quickly recall vocabulary and concepts while writing. It also implies that without native language instruction in schools, students may not be enhancing their oral language development and phonological awareness skills, despite having innate strengths in their native language, he said.

The study, written with co-authors Anqi Peng, educational psychology doctoral candidate at KU; Haiying Long, professor of [educational psychology](#) at KU; Deborah Reed of the University of Tennessee; and H. Lee Swanson of the University of New Mexico, was published in the [Journal of Experimental Child Psychology](#).

Orosco, who is also director of the Center for Culturally Responsive Educational Neuroscience in KU's Achievement & Assessment Institute, said the findings emphasize the importance of understanding how students learn to write and also shed light on how the brain processes information, especially for bilingual learners.

"Neuroscience reveals that working memory is a complex cognitive function involving multiple regions. The [prefrontal cortex](#) is central to working memory, handling the retention and manipulation of short-term information. For bilingual individuals, this executive functioning region aids in merging linguistic structures and vocabulary from different languages, thereby boosting their bilingual working memory, which is vital for writing effectively," Orosco said.

"Our understanding of enhancing students' writing skills has deepened. By bolstering their oral language and phonological awareness, we also appear to boost their working [memory](#) capacity. This increased capacity to retain and manage information is invaluable in guiding students in writing."

More information: Hui Wang et al, The relation of bilingual cognitive skills to the second language writing performance of primary grade students, *Journal of Experimental Child Psychology* (2023). [DOI: 10.1016/j.jecp.2023.105776](https://doi.org/10.1016/j.jecp.2023.105776)

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