

# Study shows key role environment plays in developing reading skills

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While genetics play a key role in children's initial reading skills, a new study of twins is the first to demonstrate that environment plays an important role in reading growth over time.

The results give further evidence that children can make gains in reading during their early school years, above and beyond the important [genetic factors](#) that influence differences in reading, said Stephen Petrill, lead author of the study and professor of human development and family science at Ohio State University.

"We certainly have to take more seriously genetic influences on learning, but children who come into school with poor reading skills can make strides with proper instruction," Petrill said.

"The findings support the need for sustained efforts to promote reading development in children that take both genetic and environmental influences into account"

While other studies have shown that both genetics and environment influence reading skills, this is the first to show their relative roles in how quickly or slowly children's reading skills improve over time.

The study appears online in the [Journal of Child Psychology and Psychiatry](#).

The study participants were 314 Ohio twins participating in the Western Reserve Reading Project. This study included 135 identical twins and 179 same-sex fraternal twins.

The twins began the study when they were in kindergarten or first grade and were assessed in their homes when they enrolled, and annually for the next two years.

At each home visit, the twins were given a 90-minute battery of reading-based measures. Among other things, the tests measured word and

letter identification, the ability to sound out words, and the speed at which children could name a series of letters.

The researchers compared how twins scored on the tests and then used a [statistical analysis](#) to determine how much growth in their performance could be explained by genetics and how much by environmental factors.

Environmental factors include everything the children experience - how they are cared for by their parents, how much they are read to, the neighborhood they live in, nutrition and their instruction in schools, among other factors.

The findings showed that when children start out reading, both genetics and environment play a role in readings skills, depending on the skills assessed. For word and letter identification, genetics explained about one-third of the test results, while environment explained two-thirds. For vocabulary and sound awareness, it was equally split between genetics and environment. For the speed tests, it was three-quarters genetic.

But when the researchers measured growth in reading skills, environment became much more important, Petrill said.

For reading skills that are taught, such as words and letters, the environment is almost completely responsible for growth. For awareness of sounds in reading, about 80 percent of growth was explained by the environment. Speed measures were the only ones where genetics still played a large role.

"Regardless of where children start as far as reading skills, and the impact that genetics and environment had on their initial skills, we found that their environment had an impact in how fast or how slowly those reading skills developed," Petrill said.

Petrill emphasized that a child's environment is

much more than just the instruction he or she receives in school. However, instruction is likely a key part of how reading skills grow over time.

Petrill said much more research needs to be done examining the roles of genetics and the environment in shaping how children learn to read.

"We believe that both factors play a role in reading, which is very similar to what researchers find in health issues such as [heart disease](#) and obesity," Petrill said. "But we know a lot more about the relative impacts of genetics and environment on the biological systems that influence heart disease than we do in reading."

For example, people can change their environment to help lower their risk of heart disease, no matter their genetic susceptibility to the disease, he said.

Petrill said he hopes we can do the same to help [children](#) improve their reading.

"Understanding the causes of why kids differ in reading skills, and the roles of genetics and environment, could help us understand how to teach them better," he said.

Provided by Ohio State University

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