University of Chicago research has shown that children’s intellectual potential is influenced much more by their learning environment than has been previously realized.

“Environmental Input and Cognitive Growth: A Study Using Time Period Comparisons,” published in the August issue of the journal Child Development, the researchers challenge contentions by other scholars that the ability to learn is mostly influenced by inherent ability and grows at a fixed rate during a person’s lifetime. “The study shows a substantial connection between the environment and intellectual growth in ways that have not been revealed by other studies,” said Janellen Huttenlocher, the William S. Gray Professor of Psychology at the University of Chicago and an author of the article. The other authors are Susan Levine, Professor of Psychology at the University of Chicago, and Jack Vevea, Professor of Psychology at the University of North Carolina, Chapel Hill.

The article makes an important contribution toward better understanding the valuable role of nurture over nature in the continuing debate about influences on child development. The study has drawn praise from other scholars who read advanced copies of the article.

“This new work adds significantly to what we know about the value of the learning environment for children. By looking at ways an interruption of schooling caused by summer vacations slows growth in the development of learning ability, the team was able to demonstrate that the environment has a profound effect that was not previously realized,” said Adele Gottfried, Professor of Educational Psychology, California State University, Northridge, and a member of the Board of Editors for Child Development.

Nora Newcombe, Professor of Psychology at Temple University, said, “Subsequent work can then be done to identify the ‘active ingredients’ in the environment, so that they can be augmented. In this way, cognitive development can reach its full potential.” Previously, researchers had difficulty separating the differences between a child’s genetic heritage and influence of other factors on growth, such as mental stimulation in the home. Parents with high IQs, for instance, may provide enriched experiences for their children. Similarly, parents with lower IQs may not provide a great number of learning experiences at home for their children.

To make sure that the IQs of parents did not influence the study, the researchers decided to examine growth in the same groups of children over time periods that vary in environmental input. They tested the students at four times, each six months apart: October and April of their kindergarten year and October and April of first grade. For the October through April period, children are in school. From April to October, they are largely out of school. The sample sizes in the different testing periods ranged from 1,652 to 2,387 students.

The researchers looked at four areas of intellectual functioning: language, spatial operations (for example, ability to understand information represented in maps and charts), concepts (ability to comprehend how objects are related) and memory.

The team was particularly interested in whether growth in language and spatial operations is influenced by the learning environment. It is frequently
claimed that skills in these areas reflect ability as opposed to achievement.

The research team found that regardless of the students’ backgrounds or schools, there was a slowing in the rate of growth in learning abilities during the six months between April and October, when they were largely out of school. In the area of language, growth was much less during the April to October period than during the October to April period.

Language learning includes both vocabulary growth and syntax development, the ability to organize thoughts into coherent, complex sentences. Some scholars contend that syntax development is an innate ability that is not heavily influenced by the amount of intellectual input a child receives.

The new study finds for the first time, however, that growth in syntax as well as growth in vocabulary are influenced greatly by environmental factors.

The new study was the first to look at the influence of school experiences on the growth of spatial skills in children, which researchers also found grew much faster during the school year than during the April to October period.

"Not only does the finding of substantial school effects provide convincing evidence that spatial growth is input-sensitive, it also suggests the critical input may consist of such activities that are more likely to occur at school than at home, such as geometric instruction," Huttenlocher said.

Students also showed much greater conceptual growth during the school year than they did during the period from April to October. Researchers expected there would be a school effect on this learning, but did not expect to find the effect to be as large.

For the memory portion of the study, researchers used tests that measured two associative memory tasks (sound-object associations and location-object associations). The researchers found that the growth in memory does not differ between school and non-school periods.

Huttenlocher and Levine are researchers with the Early Childhood Initiative, which is funded through a two-year grant from the Robert R. McCormick Tribune Foundation.

http://www-uchicago.edu

About: University of Chicago
The University of Chicago was founded in 1890 by the American Baptist Education Society and oil magnate John D. Rockefeller. The land for the new university, in the recently annexed suburb of Hyde Park, was donated by Marshall Field, owner of the Chicago department store that bears his name.

In 1929, Robert Hutchins became the University's fifth president. During his tenure, Hutchins established many of the undergraduate curricular innovations that the University is known for today. These included a curriculum dedicated specifically to interdisciplinary education, comprehensive examinations instead of course grades, courses focused on the study of original documents and classic works, and an emphasis on discussion, rather than lectures.

During the late 1950s and early 1960s, the University began to add modern buildings to the formerly all-Gothic campus.

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