Language is in our biology

A good working memory is perhaps the brain’s most important system when it comes to learning a new language. But it appears that working memory is first and foremost determined by our genes.

Whether you struggle to learn a new language, or find it relatively easy to learn, may be largely determined by “nature.”

That’s the conclusion of researchers from the Norwegian University of Science and Technology (NTNU), who have studied language skills in Norwegian elementary school students.

Tested on ten-year-old students

Mila Vulchanova, a professor at NTNU’s Department of Modern Foreign Languages, led a study of approximately one hundred ten-year-old elementary school students from Norway. Her research suggests that a good working memory is a decisive factor in developing good language skills and competency.

“Our results show a clear statistical correlation between a high level of language competence and a good working memory in the students we tested,” she says.

While Vulchanova is a linguist, her team included colleagues and students from the university’s Department of Psychology and the Department of Scandinavian Studies and Comparative Literature to help with the research.

The ten-year-olds in the study came from both a rural school and an urban school, but all had Norwegian as their first language.

They were tested on both their Norwegian and English language skills, as well as on working memory skills. All tests were administered orally in order to prevent a variation in literacy skills from affecting the test results.

“The correlation between good language skills and a good working memory was clear. This was true for all of the individual sub-tests conducted in this research, as well as the overall scores on the Norwegian language test,” says Vulchanova.

Contradicts conventional assumptions

Vulchanova’s results run contrary to some conventional assumptions in both linguistics and cognitive sciences.

Quite often it is believed that children acquire languages regardless of their cognitive abilities, such as perception, spatial understanding, and working memory. In other words, children don’t need to learn
language per se. It just comes on its own. The results from Vulchanova’s research contradict this idea.

“Working memory affects our ability to learn language and our linguistic skills to a great extent,” she says.

“Not only is working memory important in learning new words, it is also important in our general language competence, in areas such as grammar skills. Working memory is connected to our ability to gather information and work with it, and to store and manipulate linguistic inputs as well as other inputs in the brain.”

The results suggest that working memory is likely to be one of the most important biological factors in language development among children.

**Brain training can help**

When we learn a new language, information that is stored in the brain’s memory storage space must be constantly maintained. The brain does this by taking in new linguistic information in the form of new words and auditory strings, and then integrating this with information that is already stored in the “mental lexicon.”

This might not sound like good news for people who struggle with their working memory, but Vulchanova says not to give up hope.

“It is possible to train the working memory system, but it is not easy – especially since the capacity of our working memory is inherited. Mind exercises such as word games or practicing saying numbers in the opposite direction are useful and simple ways to train your working memory,” she says.

**First language vs. second language**

Not only did the researchers find out that there is a close relationship between language competence in the first language and working memory, but that language competence in the mother tongue correlated highly with skills in a foreign language.

“We have found evidence that there is a link between language development and the capacity of our working memory, and that there are common cognitive mechanisms that support the ability to learn both your mother tongue and a second language,” Vulchanova says.

“This is important, because it has been the tradition in linguistics to maintain that learning your native language is qualitatively different from learning a foreign language,” she says.

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The ability to learn a new language is determined by our genes. (Photo: Colourbox) [7]
Mila Vulchanova. (Photo: NTNU info/Thor Nielsen) [8]
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