

# Children's math and reading skills are linked to genetics

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Why do children differ in their ability to read, to use language, or to understand mathematics? Decades of research makes it clear that genetics play a surprisingly large part in both learning abilities and learning disabilities.

What throws a quirk in an otherwise fixed set of abilities is the environment. In order to distinguish the impact of genes and the environment on cognitive abilities researchers use "multivariate genetic analysis," which essentially estimates the extent to which genetic and environmental factors that affect one ability (e.g. reading) also affect another ability (e.g. mathematics).

Yulia Kovas and Robert Plomin, both professors at the Social, Genetic, and Developmental Psychiatry Centre at King's College London, review recent findings

Psychologists call genes that affect more than one trait "generalist" genes, in order to highlight the general effect of the genes. Genetic correlations among learning abilities and disabilities are substantial, which suggest that what they have in common is largely genetic in origin. However, the correlations are not perfect, which means that genes also contribute to making children better at some abilities than others. These are termed "specialist" genes and they influence some abilities but not others.

Genetic research distinguishes two types of environmental influences. Those that make family members similar are called shared environment. The rest, those that do not contribute to resemblance among family members, are called non-shared environments. Kovas points out that the shared environment influences have generalist effects on learning and cognitive abilities.

Initial research on non-shared environments shows that children may differ in learning abilities as a result of the peer group. Siblings, even twins, often have different friends, which may contribute to any differences in learning abilities.