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The mediating role of reading-related endophenotypes in the association between genes and reading skills.

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ABSTRACT:

Reading is a fundamental skill for academic achievement. However, up to 20% of school-aged children have reading difficulties that affect their school functioning (Écalle et Magnan, 2015). Reading skills have already been associated with candidate genes and reading-related endophenotypes (Lervag et Hulme, 2009; Mascheretti et al., 2018). Nonetheless, processes explaining the relationship between candidate genes and reading remain poorly studied (Mascherreti, 2018). It has been suggested that endophenotypes could be mediators between genes and reading skills (Mascheretti et al., 2020). The aim of the study was to examine the mediating role of reading-related endophenotypes in the association between genes and reading skills, in a population-based twin sample (Quebec Newborn Twin Study). Reading skills (decoding and comprehension), endophenotypes and DNA were measured when children were 8 years old (*n = 253*). Four endophenotypes (i.e., phonological awareness (PA), rapid automatized naming (RAN), rapid bimodal temporal processing (RTP) and rapid auditory processing (RAP)), as well as 14 markers spanning five reading-related candidate genes (i.e., DYX1C1, DCDC2, KIAA0319, ROBO1 and GRIN2B) using a structural equation modeling were tested. Results showed that PA and RAN were mediators in the pathway from DYX1C-rs3743205 and GRIN2B-rs2192973 to reading, respectively. Specifically, the minor allele (T/T) of DYX1C-rs3743205 predicted higher scores in PA, which, in turn, predicted higher decoding skills; and the minor allele (A/A) of GRIN2B-rs2192973 predicted higher score in RAN, which, in turn, predicted poorer comprehension skills. Our results support the use of endophenotypes in the explanation of the complex pathways between genes and reading.

References

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