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**Long-term characteristics of analogical processing in high-school students with high fluid intelligence: an fMRI study.**

ZDM, Int. J. Math. Educ. 42, No. 6, 635-647 (2010).

Summary: Intelligence is known to predict scholastic achievement and enables high performance in cognitive tasks. Fluid intelligence is strongly related to analogical reasoning abilities, which are fundamental to mathematical thinking. Geometric analogical reasoning is a prototypical measure of fluid intelligence. However, the cerebral correlates of geometric analogical reasoning and their developmental modulation over time are still rarely investigated. We report a 1-year follow-up functional magnetic resonance imaging study of a geometric analogical reasoning task in high fluid intelligence high-school students. This study was designed to characterise the cerebral correlates of geometric analogical reasoning and to improve our knowledge about the impact of general cognitive development on behavioural performance and on cerebral mechanisms underlying geometric analogical reasoning in adolescents. Our data indicate that a fronto-parietal network comprising the left and right parietal lobes and the left middle frontal gyrus was equally modulated by task difficulty at both measuring time points. At the behavioural level, however, participants showed improvements in performance at the second measuring time point. The behavioural improvements point to a more efficient task processing. As this is not accompanied by differential recruitment of fronto-parietal brain regions, the data suggest an increase in neural efficiency for these brain regions.

*Classification:* C30 C80 M60 G20
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