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The predictive value and potential pathways of a polygenic score for rhythm ability

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ABSTRACT: Genetics play a role in the etiology of music skills; however, still little is understood about the genetic architecture of music-related skills and traits. To further our understanding of the genetic underpinnings of music skills, we explored associations between a polygenic score for self-reported rhythm ability (PGS_{rhythm}) and objectively measured rhythm ability, as well as other validated music-related skills and traits. Utilizing family data, we could further explore potential pathways of direct genetic, indirect genetic (through passive gene-environment correlation) and confounding effects (such as assortative mating). In a genetically informative sample of 5,648 Swedish twins, we found the PGS_{rhythm} to predict not only rhythm ability, but also other music skills (betas ranging between .12 and .14, $p < .001$), as well as music-related outcomes (betas between -.03 and .10, $p < .05$). Associations did not deteriorate within families, implying that indirect genetic or confounding effects did not inflate the effect of the PGS_{rhythm} . In contrast, PGS_{rhythm} was not associated with any of the investigated control phenotypes not immediately related to music skills, such as general intelligence and sport practice. A small but significant correlation ($r = .05$, $p < .001$) between the level of musical enrichment of the family childhood environment and individuals' PGS_{rhythm} , provides evidence for gene-environment correlation for music-related traits. Furthermore, the PGS_{rhythm} correlation between dizygotic twin members ($r = .54$, CI .50-.58) was somewhat higher than expected, suggesting assortative mating. We conclude that the PGS_{rhythm} reflects individuals' more general musicality propensity, affecting music behavior essentially through direct genetic effects.

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