

The Association Between Physical Activity and Emotional Problems, Peer Problems, and Prosocial Behaviours in Adolescents is Affected by Genetic and Familial Factors

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Purpose: Adolescents participating in physical activity (PA) during their leisure time report lower symptoms of overall lower mental health outcomes. Although this topic is well-studied, few studies account for genetic and familial confounding factors when investigating these relationships. This study examined how frequency and type of leisure-time PA relate to mental health outcomes in adolescents and whether these associations remain after adjusting for familial confounding using a twin design.

Methods: Data were drawn from the population-based Swedish Twin Registry, including 14,109 15-year-olds. PA frequency and type were self-reported and categorised by frequency (times/week) and team vs individual participation. Mental health outcomes – emotional problems, peer problems, and prosocial behaviour – were assessed using the Strengths and Difficulties Questionnaire. Analyses were conducted separately for girls and boys using generalised estimating equations (GEE) in the full cohort and within-twin pair analyses (dizygotic and monozygotic twins separately) to account for shared genetic and familial factors. Models were adjusted for baseline mental health at age nine, BMI, and birth year.

Results: Higher PA frequency was associated with more favourable scores on all three sub-scales in both girls and boys in a dose–response pattern. These associations remained significant for emotional problems in within-twin comparisons, indicating robustness to genetic and familial confounding. However, associations with peer problems and prosocial behaviour became non-significant in within-twin models, suggesting shared environmental or genetic factors may explain these relationships. Regarding PA type, participation in team, individual, or a combination of team and individual sports was associated with favourable scores on all three sub-scales compared to not participating in any sport. However, only the association for the emotional scale in girls remained significant in the within-twin analysis, indicating familial confounding explaining most associations.

Conclusion: Frequent leisure-time PA is associated with better emotional health in adolescents, even after accounting for genetic and shared familial factors. While participation in organised sports (individual and team) shows robust favourable associations with emotional problems only in girls. The findings highlight the potential of habitual and frequent leisure-time PA in supporting adolescent emotional wellbeing and underline the importance of considering genetic and familial influences in behavioural health research.

