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INVOLVEMENT IN SPORTS, HIPPOCAMPAL VOLUME, AND DEPRESSIVE SYMPTOMS IN PREADOLESCENT CHILDREN

Lisa Gorham

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Recent studies have found that higher levels of exercise are significantly associated with lower depression among young people. A few studies suggest that exercise may cause changes in hippocampal volume, but little research has been done in preadolescent children. To better understand the relationship between involvement in sports, hippocampal volume, and depressive symptoms in young children, we examined data from a nation-wide sample of 4,525 children ages 9-11 years who completed surveys, interviews, and an MRI scan for the Adolescent Brain and Cognitive Development Study. The parents of the children completed the Child Behavior Checklist, providing data about the child's depressive symptoms, and the Sports and Activities Questionnaire, which provided data about the child's participation in 23 sports. Children also took part in a structural MRI scan, providing us with measures of bilateral hippocampal volume. Analysis of the data showed that involvement in sports was negatively correlated with depressive symptoms in boys only ($p < 0.001$), but was positively correlated with hippocampal volume in both boys and girls ($p = 0.020$). Hippocampal volume was negatively correlated with depressive symptoms in boys only ($p = 0.026$), and served as a partial mediator for the relationship between involvement in sports and depressive symptoms in boys. Moreover, these relationships held even when correcting for SES, race, age, and total brain volume. Thus, these findings help illuminate a potential neural mechanism for the impact of exercise on the developing brain. More research is needed to understand the causal relationships between these variables and to help explain the difference in results between boys and girls, as this could have significant public health implications.