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Physical activity as both predictor and outcome of emotional distress trajectories in middle childhood

Project Summary

We assessed the reciprocal relationship between physical activity, including sport participation, and depressive and anxiety symptoms, conceptualized as emotional distress, in 690 boys and 748 girls from ages 5 to 12 years. For boys, participation in physical activity in early childhood was associated with better subsequent emotional adjustment during the school years. Better emotional adjustment was also positively associated with subsequent physical activity in early adolescence.

Research Methods

Participants are from the Quebec Longitudinal Study of Child Development (n=1438), a prospective-longitudinal birth cohort. Trajectories of emotional distress symptoms from ages 6 to 10 years, assessed by teachers, were generated using latent class analysis. Multinomial logistic regression analyses examined sport participation at age 5 years, measured by parents, as a predictor of emotional distress trajectory outcomes. Analyses of covariance compared physical activity, measured by children at age 12 years, across different trajectories of emotional distress. Our analyses controlled for several pre-existing individual and family factors.

Research Results

We identified three emotional distress trajectories: 'Low' (77%), 'Increasing' (12%), 'Declining' (11%). Boys who never participated in sport at age 5 years were more likely to be in the 'Increasing' (adjusted OR = 1.63, 95% CI = 1.01-2.63) or 'Declining' (adjusted OR = 2.19, 95% CI = 1.28-3.75) emotional distress trajectories compared to boys who participated in any sporting activity. That is, they were more likely to look unhappy and tired, show difficulty having fun, cry a lot, and appear fearful or worried between ages 6 and 10 years. Boys who engage in sport during their preschool years might benefit from physical activity contexts that provide

opportunities for developing life skills (e.g., initiative, teamwork, self-control) and supportive relationships with prosocial peers and adult coaches and instructors. Furthermore, boys in the 'Low' emotional distress trajectory demonstrated a higher level of physical activity at age 12 years ($F(2, 1438) = 6.04, p < .05$). That is, boys who exhibited lower levels of depressive and anxious symptoms during middle childhood were subsequently more physically active in early adolescence, as reported by children themselves. Depressive and anxious symptoms during middle childhood might be more frequently associated with social isolation, decreased energy, and lower feelings of competence, which could in turn negatively influence engagement in physical activity in early adolescence. Boys who are sad, fearful, or easily distressed may seek to avoid the social demands of specific venues, such as team activities or sport. Their parents may refrain from enrolling them in activities to protect them from stress, failure, or the ultimate pressures of competition. We did not find any significant observational associations in girls. Depression and anxiety risks and protective factors are likely operating differently for girls.

The validity of these findings is limited by several factors. First, correlational studies like this one preclude definitive statements about causal mechanisms, especially when they involve developmental trajectories in living humans. As a result, we cannot determine whether the association between physical activity and emotional distress is causal. Second, measures of participation in physical activity were derived from self-reported data with few details. Self-reported measures tend to be less reliable than objective measures because they may overestimate or underestimate actual physical activity levels. Nevertheless, such discrepancies between the true and estimated values are assumed to be distributed along a normal curve. Moreover, subjective measures are often used in epidemiological studies and are generally well accepted by the scientific and medical communities. Third, we did not measure all types of depressive and anxious symptoms during childhood. Omitted symptoms (e.g., panic, phobias) may show a different course and relations to physical activity than those included in the present study.

Policy and Program Implications

Being physically unfit and mentally distressed are leading causes of disability and morbidity worldwide. Consistent with past literature, our study suggests that early childhood participation in physical activity may represent a valuable strategy to promote both physical and mental health in youth, especially for boys. Prevention of depressive and anxious symptoms in adolescence and adulthood may be achieved by encouraging physical activity at a young age. This study supports the relevance of enhancing current public health strategies to understand and promote physical activity and emotional adjustment in early childhood to achieve better a more active lifestyle and overall health across development. For example, it may be beneficial for schools to provide a variety of extracurricular team sport and structured physical activities from entry to kindergarten. Parents also represent essential investors and allies in promoting physical activity and sport participation among youth. Indeed, it is suggested that interventions aimed at increasing children's physical activity levels should target the whole family. By acting

as role models and being directly involved in their children's activities, parents have the potential to positively influence their activity level. In general, interventions targeting the whole family should be tailored to the family context, taking account of ethnicity, level of motivation and time constraints. The combination of strengthening techniques and those geared toward goal setting have been shown to increase the motivation level of families, thereby improving their level of physical activity. In addition, the psycho-social environment of the family (e.g. interpersonal relationships, quality of time spent together) is an important aspect to consider when implementing interventions aimed at increasing the level of physical activity of the child and his family. Finally, our study suggests that public health efforts need to promote emotional adjustment in youth to encourage participation in physical activity in the long term, especially since depressive and anxious symptoms represent relatively malleable factors, but tend to persist through development if left unaddressed. Another interesting avenue that promotes physical activity and emotional adjustment in youth would be to offer specific training to sport coaches and instructors so that they can intervene competently with youth in their sport teams, both individually and in groups. Developed in Canada, the SCORE Project (Sport COnnect and REspect), represents an example of such a training program which could be inspire other approaches with similar missions (<https://www.projectscore.ca/en/>). The SCORE Project was designed to intentionally integrate strategies for developing life skills into the practices of coaches (e.g. confidence, competence, character), which can then be taught to children and adolescents. Its focus is on four main objectives of sport development: confidence, competence, connection, and character. Coaches and instructors can also be taught basic youth counselling skills to help strengthen the support systems around the child.

Next Steps

A qualitative analysis that explores the middle childhood sporting experience from the youth and parent perspective, for both boys and girls, would be ideal for developing more solid interpretations of why boys seem to benefit compared to boys that did not engage in sport. The use of an experimental design to assess the effects of a physical activity intervention on emotional distress would be relevant. This type of design is generally considered the gold standard for estimating the causal effects of a treatment.

Knowledge Translation

This research article is currently in press at the *Journal of Developmental and Behavioral Pediatrics*. We have informed the journal that we will be preparing an international bilingual press release with our university press office. In addition, I administered a continuing education workshop on physical activity for at-risk youth (in October 2020) for the *Ordre des Psychoéducateurs et Psychoéducatrices du Québec*. I plan on continuing to disseminate the workshops for professionals in allied disciplines.

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