

The Relationship Between Physical Activity and Mental Health Among U.S. High School Students: The Role of Social Connectedness



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Introduction

- Physical activity is often linked to better mental health and greater happiness, but the relationship may depend on how exercise shapes psychological states and social functioning (Babiss & Gangwisch, 2009).
- Prior research suggests that the benefits of physical activity may be shaped by psychological and social pathways rather than activity alone (Inoue et al., 2024), including attitudes toward exercise and sleep (Cheng et al., 2025).
- Research also suggests that exercise frequency may relate to well-being partly through social health, belonging, and stronger social ties (Bang et al., 2024), which is why this project examines school social connectedness alongside physical activity and suicide risk.

Methods

Sample

- Data were drawn from the 2021 Adolescent Behaviors and Experiences Survey (ABES).
- ABES is a nationally representative survey of U.S. students in grades 9-12.
- A total of **7,705 usable questionnaires** were available after data editing.
- Sample size varied somewhat across analyses because cases with missing data were excluded from the specific model being run.

Measures

- Physical activity was measured with the number of days students were physically active for at least 60 minutes in the past week (0-7 days).
- Suicide risk count was created by summing three mental health indicators: sadness/hopelessness, suicidal ideation, and suicide planning (0-3).
- School social connectedness was measured from students' reported sense of closeness to people at school and grouped into high, unsure, and low connectedness.

Research Questions

- Is greater physical activity associated with lower suicide risk among U.S. high school students?
- Does school social connectedness help clarify the relationship between physical activity and suicide risk?
- Does the relationship between physical activity and suicide risk differ across levels of school connectedness?

Results

Univariate

- Physical activity was measured on a **0-7 day scale**, with substantial variation across students.
- Suicide risk count ranged from **0 to 3**, with most students clustered at the lower end of the distribution.
- These variables provided enough spread to examine both overall trends and differences across connectedness groups.

Bivariate

- A simple linear regression showed that physical activity days were significantly and negatively associated with suicide risk count.
- Physical activity days (Beta = -0.053, $p < .001$) were associated with lower suicide risk.
- On average, each additional day of physical activity was associated with an expected 0.053 point decrease in suicide risk count.
- The relationship was statistically significant but modest ($R^2 = .017$).

Multivariate

- A multiple linear regression examined physical activity, school connectedness, and their interaction.
- Physical activity days (Beta = -0.051, $p < .001$) were significantly and negatively associated with suicide risk count for the high connectedness reference group.
- Low connectedness (Beta = 0.448, $p < .001$) was significantly associated with higher suicide risk count.
- Students with lower school connectedness were expected to have higher suicide risk than students with high connectedness, holding the other terms in the model fixed.
- The interaction between physical activity and the "Not sure" group was significant (Beta = 0.028, $p = .024$), suggesting that the negative relationship between activity and suicide risk was weaker in that group.

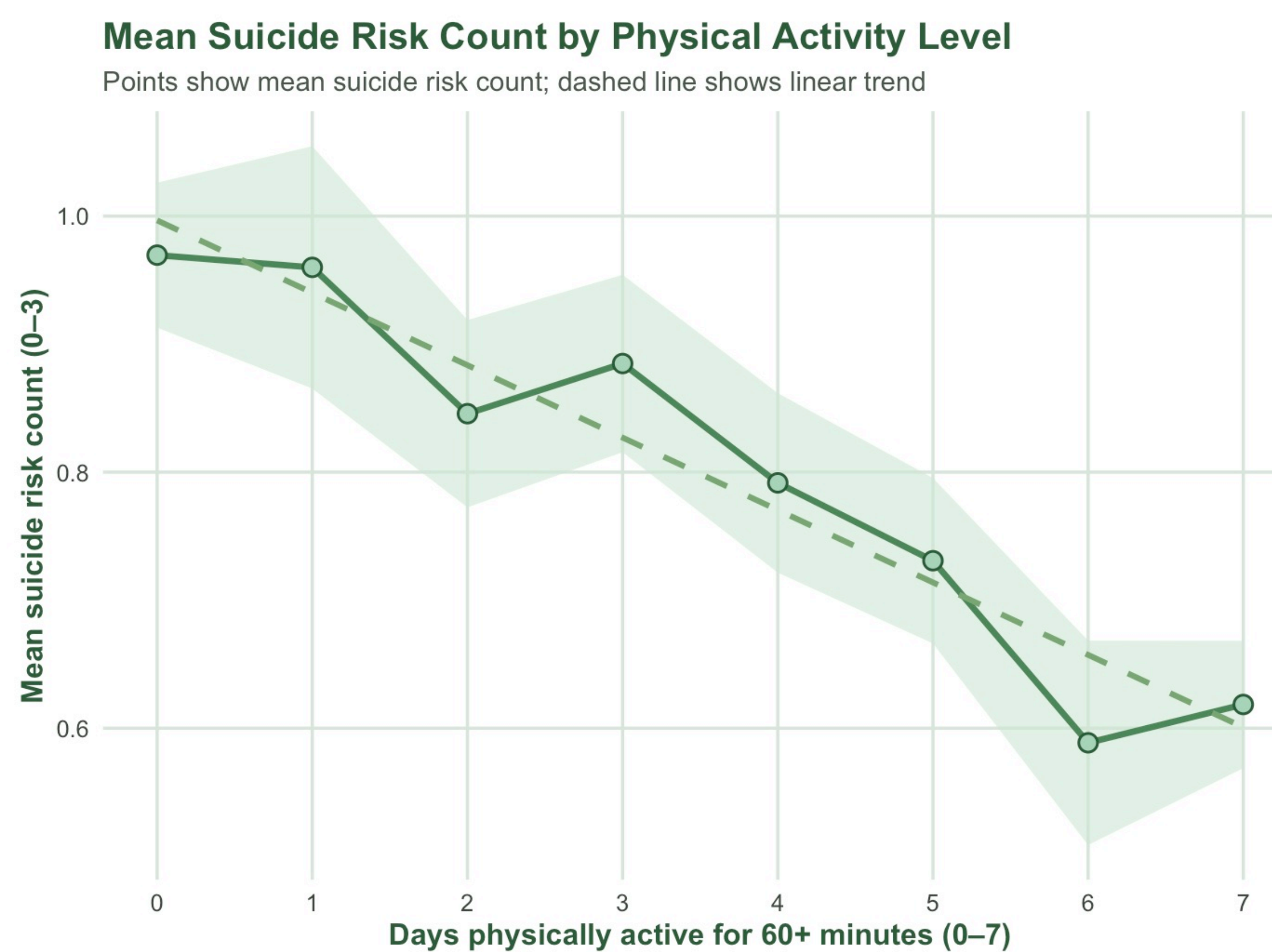


Figure 1. Mean Suicide Risk Count by Physical Activity Level

Multivariate (cont.)

- The interaction for the low connectedness group was not significant (Beta = 0.019, $p = .103$).

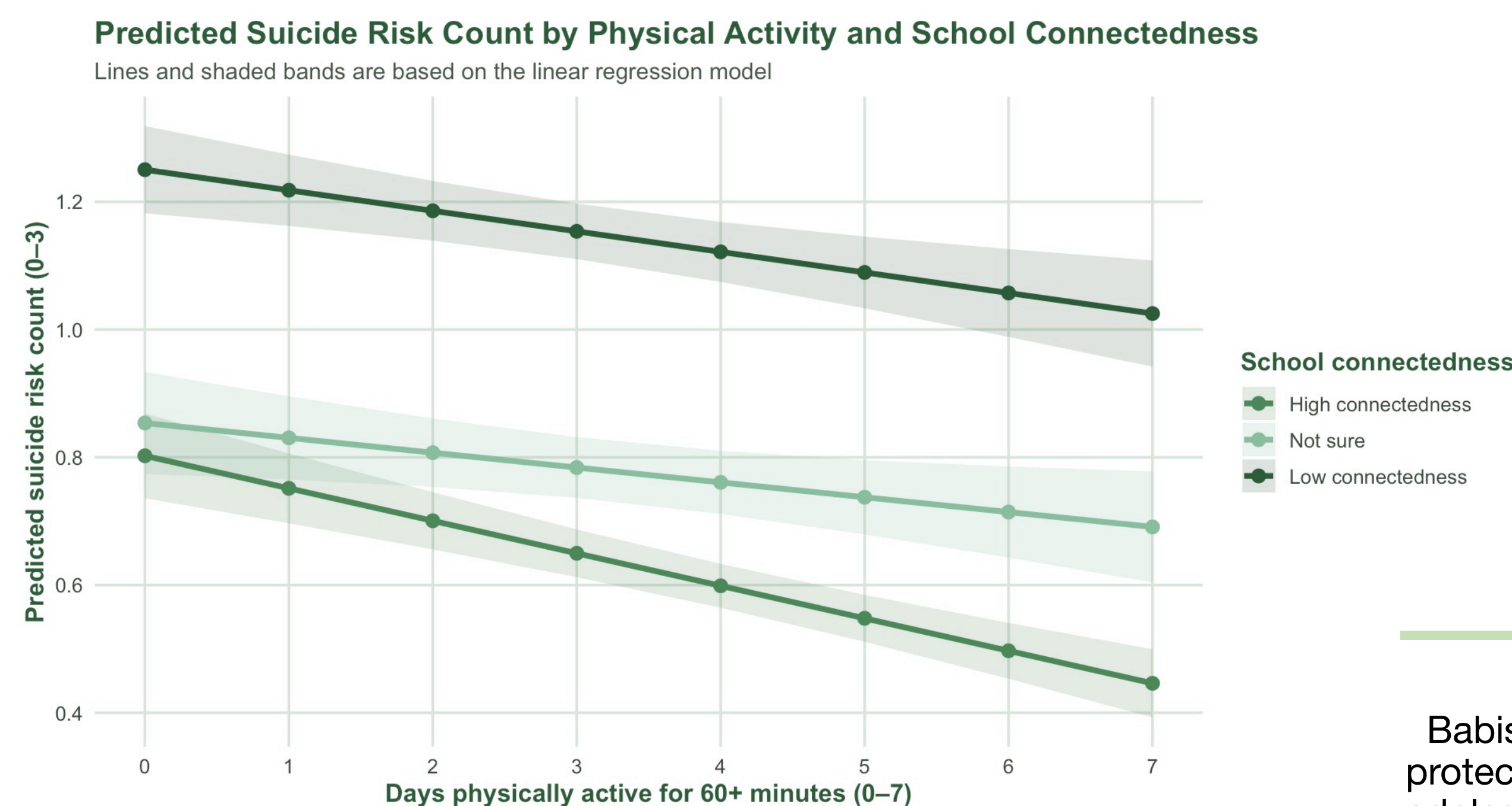


Figure 2: Predicted Suicide Risk Count by Physical Activity and School Connectedness

- The full model was statistically significant and explained a modest amount of variance in suicide risk count ($R^2 = .062$).
- The regression plot showed that all three groups had generally negative slopes, but the low connectedness group remained highest across activity levels.
- Across activity levels, the low connectedness group had the highest predicted suicide risk.

Discussion

- Greater physical activity was associated with lower suicide risk overall.
- School connectedness also mattered: students with lower connectedness had higher predicted suicide risk across activity levels.
- This suggests that physical activity may relate to mental health partly within a broader social environment rather than operating alone.
- Even though the effects were statistically significant, the model explained a modest amount of variance, which suggests that other factors also contribute to adolescent mental health outcomes.
- These findings suggest that physical activity and school social context should be considered together when studying adolescent mental health.

Babiss, L. A., & Gangwisch, J. E. (2009). Sports participation as a protective factor against depression and suicidal ideation in adolescents as mediated by self-esteem and social support. *Journal of Developmental & Behavioral Pediatrics, 30*(5).

Bang, H., Chang, M., & Kim, S. (2024). Team and individual sport participation, school belonging, and gender differences in adolescent depression. *Children and Youth Services Review, 159*.

Centers for Disease Control and Prevention. (2021). Adolescent Behaviors and Experiences Survey (ABES): 2021 Data User's Guide. U.S. Department of Health and Human Services.

Cheng, R., Yang, L., & Kang, S.-J. (2025). A study on the relationship between high school students' sleep quality, physical exercise, academic stress, and subjective well-being. *National Library of Medicine*.

Inoue, Y., Lock, D., Sato, M., Aizawa, K., Mikura, A., Kohno, N., & Ogasawara, E. (2024). What explains the well-being benefits of physical activity? A mixed-methods analysis of the roles of participation frequency and social identification. *Social Science & Medicine, 340*.