

Dance/Cheer Participation, Self-Esteem, and Depressive Symptoms Among Physically Active Adolescent Girls

Sophia Xiao¹

¹ Mission San Jose High School, US

Correspondence: Sophia Xiao, Mission San Jose High School, US.

doi:10.63593/SSSPE.2026.04.08

Abstract

Physical activity is associated with adolescent mental wellness; however, these associations may vary by activity context. In this study, we examined whether dance/cheer participation was associated with depressive symptoms and self-esteem among physically active adolescent girls in comparison to participation in other sports. We analyzed Wave I public-use data from the National Longitudinal Study of Adolescent to Adult Health using survey-weighted linear regression. The analytic sample for each outcome included 1,029 participants (309 dance/cheer participants and 720 other-sport participants). We estimated models before and after adjustment for physical activity frequency and sociodemographic characteristics. In the fully adjusted models, dance/cheer participation was associated with a 0.84-point higher self-esteem score (95% CI [0.13, 1.55]), whereas the estimated 0.98-point lower depressive-symptom score was imprecise (95% CI [-2.08, 0.12]). Thus, these cross-sectional findings deliver modest evidence that self-esteem, but not depressive symptoms, differed between the two activity groups and support further longitudinal study of activity context.

Keywords: adolescent girls, dance and cheerleading, physical activity, self-esteem, depressive symptoms

1. Introduction

Regular physical exercise has been associated with psychological benefits during adolescence, including lower depressive symptoms and higher self-esteem, although findings vary across outcomes (Biddle & Asare, 2011; Rodriguez-Ayllon et al., 2019). More recent intervention evidence also suggests that physical activity can reduce depressive symptoms among children and adolescents (Recchia et al., 2023). Much of this research, however, categorizes physical activity broadly despite differences among the

social, competitive, and performance environments of individual activities. The psychological correlates of physical activity may therefore vary with activity context as well as activity frequency.

Dance represents a distinct activity context because it merges physical exertion with artistic performance, mental involvement, and social interaction. When assessing dance interventions with other types of physical activity, one particular systematic review and meta-analysis discovered loosely comparable effects on

depression and anxiety. Some evidence also indicated psychological and cognitive benefits (Fong Yan et al., 2024). However, because dance and other aesthetic performance activities may emphasize appearance, technical exactness, evaluation, and performance, they may contribute to negative self-image. Adolescent ballet dancers have communicated more critical perceptions of their physical bodies than nondancing peers on several dimensions (Bettle et al., 2001). Research among teen athletes has further identified performance pressure, perfectionism, body-image concerns, and controlling coaching environments as potential mental health hazards (Walton et al., 2024). These features distinguishing dance and similar performance activities from other sports may therefore represent both psychological assets and sources of stress.

Consistent with these competing possibilities, previous studies of dance participation and psychological outcomes have produced mixed findings. Ajtlibez et al. (2020) reported fewer psychological symptoms and higher self-esteem among dancers, although the self-esteem difference was not statistically significant. Among female students ages 9–15, Monteiro et al. (2014) found that dance participation was associated with lower body dissatisfaction but not significantly with self-esteem. Similarly, a systematic review found evidence of improvements in several aspects of psychological self-development following dance interventions, particularly body-related perceptions. At the same time, quantitative findings for self-esteem and self-efficacy remained inconsistent (Schwender et al., 2018).

It therefore remains unclear whether dance-related activities are associated with different psychological outcomes among adolescents who are already physically active. Current research has often analyzed physical activity broadly or compared dancers with nondancers, leaving limited evidence on differences between dance-related activities and other sports. Using National Longitudinal Study of Adolescent to Adult Health Wave I data (Add Health; Hummer et al., 2026), this study asked whether dance/cheer is correlated with depressive symptoms and self-esteem among active girls ages 12–18, relative to those participating in other sports. It was hypothesized that the two groups would differ in depressive-symptom and self-esteem scores. The analysis also assessed how the

estimated associations changed after adjustment for an available measure of physical activity frequency and selected sociodemographic characteristics. Because the physical activity measure included dancing as an example of vigorous exercise, this adjustment could not fully separate activity context versus activity frequency.

2. Methods

2.1 Participants

We obtained data from Wave I of Add Health, a nationally representative longitudinal study of adolescents in the United States. The present study used the Wave I public-use dataset ($N = 6,504$). We included respondents who were recorded as female, were ages 12–18 at interview, and could be assigned to one of two mutually exclusive activity groups based on Wave I items assessing current or planned school-year involvement in extracurricular activities. The dance/cheer group marked dance or cheerleading (S44A14), while the other-sport group marked at least one sport in S44A18–S44A29 but did not mark dance/cheer. Respondents who reported neither or were not classified were completely excluded. These criteria then produced an eligible sample of 1,376. Primary analyses used complete cases for the outcome and all Model 3 covariates. The final analytic sample for each outcome included 1,029 participants: 309 dance/cheer participants and 720 other-sport participants (Supplementary Figure S1).

2.2 Measures

Dance/Cheer Participation—We defined the exposure using Wave I item S44A14, which asked whether the respondent participated in, or planned to participate in, dance or cheerleading that school year. We coded an affirmative response as dance/cheer participation. Respondents who reported at least one sport included in S44A18–S44A29 and did not report dance/cheer participation on S44A14 were classified as the other-sport comparison group. We could not analyze dance and cheerleading separately because the questionnaire assessed them as a single category.

Depressive Symptoms—We measured depressive symptoms with 19 Wave I items (H1FS1–H1FS19) asking how often respondents experienced specified feelings or behaviors during the past week. Items assessed affective, cognitive, interpersonal, and somatic symptoms,

including sadness, loneliness, difficulty concentrating, fatigue, poor appetite, and feelings of failure. Responses were coded from 0 (*never to rarely*) to 3 (*most or all of the time*). The four positively worded items were reverse-coded, and responses were summed; higher composite scores indicated more depressive symptoms.

Self-esteem—Self-esteem was assessed using seven Wave I items (H1PF30–H1PF36) evaluating positive self-perceptions, including perceptions of personal qualities, physical fitness, pride, self-acceptance, competence, social acceptance, and feeling loved and wanted. Participants rated their agreement with each statement using five-point Likert-type response options. Items were coded so that higher values represented greater self-esteem and summed to create a composite score ranging from 7 to 35, with higher scores indicating greater self-esteem.

Physical Activity—We measured physical activity frequency with two past-week items: active sport frequency (H1DA5) and vigorous-exercise frequency (H1DA6). Each item was coded from 0 (*not at all*) to 3 (*five or more times*), and we summed the two responses to create an overall physical activity score ranging from 0 to 6. Higher scores indicated more frequent physical activity. Because H1DA6 listed gymnastics and dancing among its examples, this covariate overlapped partly with the exposure. We included it to evaluate how the dance/cheer coefficient changed after adjustment for the available measure of overall activity frequency, not to estimate an activity-type association independent of all dance-related exercise.

Demographic and Socioeconomic Covariates—We calculated age at interview from participants' reported birth month and year and the month and year of the Wave I interview. We categorized race/ethnicity as White, Black/African American, Hispanic/Latino, Asian/Pacific Islander, American Indian/Native American, or other. Family income represented total family income before taxes during 1994 and was measured in thousands of U.S. dollars. Parental education represented the highest available educational attainment of either resident parent. It was categorized as less than high school, high school diploma or GED, some postsecondary education, or college graduate or higher.

2.3 Statistical Analysis

Analyses accounted for the complex Add Health

Wave I sampling design using the Wave I grand sample weight and sample clustering. We calculated survey-weighted descriptive statistics for the analytic sample and by activity group. Continuous variables were summarized using weighted means and standard deviations, and categorical variables were summarized using weighted percentages. We analyzed depressive-symptom and self-esteem scores as continuous outcomes.

We used survey-weighted linear regression analyses to examine associations between dance/cheer participation and each outcome, with other-sport participants as the reference group. We used a three-model sequence to assess the stability of the estimated association across adjustment levels. Model 1 estimated the unadjusted association between dance/cheer participation and each outcome. Model 2 additionally adjusted for the physical activity frequency index. Model 3 further adjusted for age, race/ethnicity, family income, and parental education. For each model, we estimated the dance/cheer regression coefficient (β), standard error, 95% confidence interval, and p-value. We evaluated statistical significance using a two-sided α level of 0.05.

We tabulated missingness for each outcome and covariate. Because family income had the most missing data, we descriptively compared respondents with and without family-income information on activity-group membership and both outcomes. We also conducted a supplementary analysis among respondents missing family income who had complete data for the other model variables ($n = 292$). For each outcome, we estimated an unadjusted model and a model adjusted for physical activity, age, race/ethnicity, and parental education; we could not include family income. We treated these estimates as exploratory because they described a smaller, selected subgroup.

3. Results

Of the 6,504 respondents in the Wave I public-use sample, 1,376 met the eligibility criteria. Complete-case samples yielded 1,029 participants for each outcome: 309 dance/cheer participants and 720 other-sport participants. The groups had similar weighted mean ages and physical activity scores, but their race/ethnicity, parental education, and family income distributions differed descriptively (Table 1). Among eligible respondents, family income had

the most missing data ($n = 315$, 22.9%); missingness was lower for parental education (3.5%), race/ethnicity (0.3%), depressive

symptoms (0.1%), and self-esteem (0.2%), and no participants were missing age or physical activity data.

Table 1. Survey-weighted Characteristics of the Analytic Sample by Activity Group

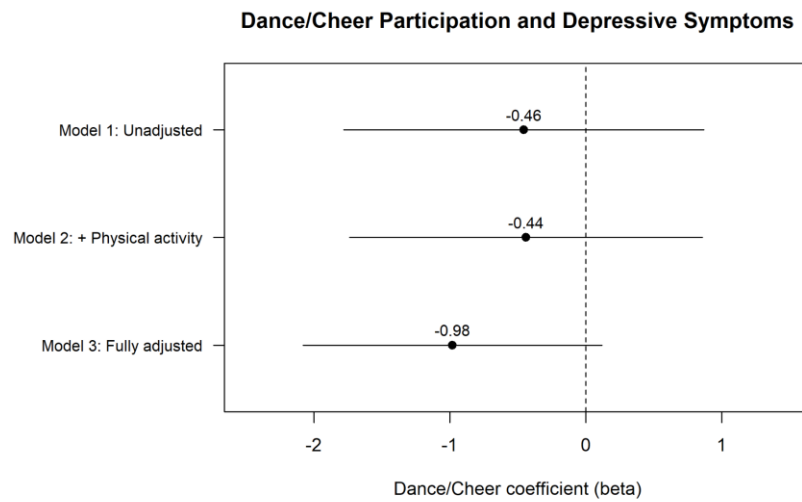
Characteristic	Other Sports (unweighted $n = 720$)	Dance/cheer (unweighted $n = 309$)
Age, years, weighted mean (SD)	14.96 (1.62)	15.00 (1.65)
Physical activity, weighted mean (SD)	3.19 (1.70)	3.22 (1.55)
Family income, \$1,000s, weighted mean (SD)	50.75 (47.60)	45.01 (32.41)
Race/ethnicity, weighted %		
American Indian/Native American	1.4	0.6
Asian/Pacific Islander	1.3	2.3
Black/African American	12.0	19.8
Hispanic/Latino	7.2	11.7
Other	0.4	2.0
White	77.7	63.7
Parental education, weighted %		
Less than high school	6.8	10.4
High school/GED	27.2	31.1
Some postsecondary	23.8	25.3
College graduate+	42.2	33.3

Note. Values are survey-weighted estimates which account for the Wave I grand sample weight and clustering. Family income is measured in thousands of 1994 U.S. dollars.

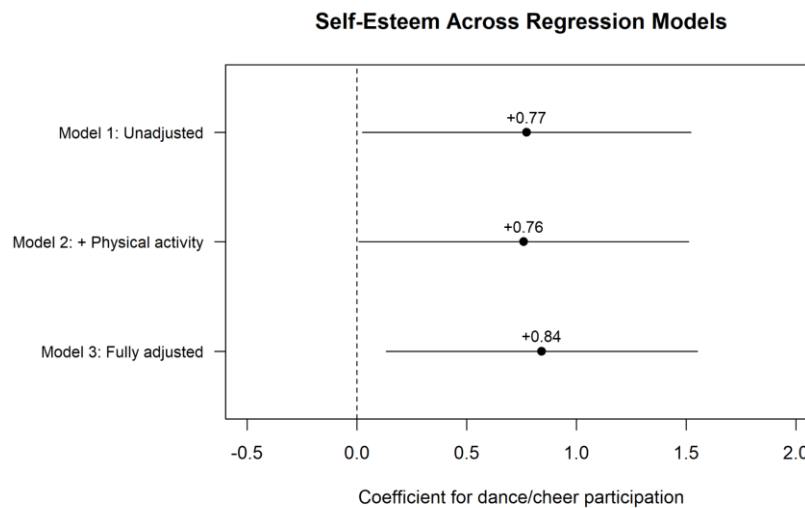
Mean depressive-symptom scores were 10.87 (SD = 7.40) among other-sport participants and 10.41 (SD = 7.28) among dance/cheer participants (Supplementary Figure S2A). The estimated difference was -0.46 points in Model 1 (95% CI [-1.78, 0.87], $p = 0.496$), -0.44 points after adjustment for overall physical activity in Model 2 (95% CI [-1.74, 0.86], $p = 0.503$), and -0.98 points after further adjustment for sociodemographic covariates in Model 3 (95% CI [-2.08, 0.12], $p = 0.080$). The fully adjusted point estimate was equivalent to 0.13 SD lower depressive-symptom scores among dance/cheer participants. However, the confidence interval ranged from a 2.08-point lower score to a 0.12-point higher score and included zero; therefore, the data were compatible with both a modest inverse association and little or no difference between the

activity groups (Figure 1A; Table 2).

Mean self-esteem scores were 28.15 (SD = 4.10) among other-sport participants and 28.92 (SD = 3.97) among dance/cheer participants (Supplementary Figure S2B). Dance/cheer participation was associated with 0.77-point higher self-esteem in Model 1 (95% CI [0.02, 1.52], $p = 0.043$), 0.76-point higher self-esteem in Model 2 (95% CI [0.01, 1.51], $p = 0.048$), and 0.84-point higher self-esteem in Model 3 (95% CI [0.13, 1.55], $p = 0.021$). The fully adjusted estimate corresponded to 0.21 SD of the overall self-esteem distribution. Thus, the estimated positive association between dance/cheer participation and self-esteem was stable across all three model specifications (Figure 1B; Table 2).



A. Depressive Symptoms



B. Self-esteem

Figure 1. Survey-Weighted Associations Between Dance/Cheer Participation and Mental Health Outcomes Across Regression Models

Note. Panel A presents associations with depressive symptoms, and Panel B presents associations with self-esteem. Points represent coefficients for dance/cheer participation relative to participation in other sports; horizontal lines represent 95% confidence intervals. Model 1 is unadjusted. Model 2 adjusts for physical activity. Model 3 additionally adjusts for age, race/ethnicity, family income, and parental education. The dashed vertical line represents no difference between activity groups.

Table 2. Survey-Weighted Regression Estimates for Mental Health Outcomes Across Models

Outcome	Model	β (SE)	95% CI	p-value
Depressive symptoms	Model 1: Unadjusted	-0.46 (0.67)	[-1.78, 0.87]	0.496
	Model 2: + Physical activity	-0.44 (0.66)	[-1.74, 0.86]	0.503
	Model 3: Fully adjusted	-0.98 (0.56)	[-2.08, 0.12]	0.080

Self-esteem	Model 1: Unadjusted	+0.77 (0.38)	[0.02, 1.52]	0.043*
	Model 2: + Physical activity	+0.76 (0.38)	[0.01, 1.51]	0.048*
	Model 3: Fully adjusted	+0.84 (0.36)	[0.13, 1.55]	0.021*

Note. β represents the estimated difference in outcome score for dance/cheer participants relative to participants in other sports. In addition to physical activity, Model 3 adjusts for age, race/ethnicity, family income, and parental education. Analytic $n = 1,029$ for each outcome. All regression estimates account for the Add Health Wave I survey design. * $p < 0.05$.

Respondents with missing and available family-income data had similar survey-weighted rates of dance/cheer participation (31.20% vs. 29.90%, respectively). Those with missing income data had somewhat higher mean depressive-symptom scores (11.68 vs. 10.80) and slightly lower mean self-esteem scores (28.11 vs. 28.36). In the 292-person missing-income subgroup with complete data on the remaining model variables, estimates for both outcomes were imprecise, and their confidence intervals contained zero (Supplementary Table S1). These exploratory results did not resolve whether complete-case exclusion meaningfully affected the primary estimates.

4. Discussion

Among physically active adolescent girls, dance/cheer participation was associated with modestly higher self-esteem relative to participation in other sports. The fully adjusted difference was 0.84 points, or approximately 0.21 SD, and changed little across model specifications. By contrast, the depressive-symptom estimates were negative but imprecise, and each confidence interval included zero. The study therefore answered the central question differently for the two outcomes: the data supported a modest cross-sectional association with higher self-esteem but did not establish a difference in depressive symptoms.

The self-esteem coefficient changed little after adjustment for the available physical activity measure, suggesting that measured activity frequency alone did not explain the association. Tracy and Erkut (2002) found that physical well-being and school attachment mediated associations between sport participation and self-esteem, raising the possibility that competence, accomplishment, or social connection may influence sport settings. Dance and cheer may provide such experiences; however, the present study did not measure these potential mediators or participants' specific training settings. These factors remain possible explanations rather than

mechanisms demonstrated in this analysis.

The contrast among outcomes is in agreement with the hypothesis that self-esteem and depressive symptoms do not relate identically to activity participation. Dishman et al. (2006) identified indirect relationships between sport participation and depressive symptoms through physical self-concept and self-esteem among adolescent girls. Supportive experiences in dance or cheer could also coexist with performance, appearance, or evaluative pressures. However, because this analysis measured neither these pathways nor these contextual features, it cannot explain why the outcome patterns differed.

Missing family-income data are another ambiguity because complete-case analysis removed 315 otherwise eligible respondents, and those missing income reported somewhat higher depressive-symptom scores. Socioeconomic differences in adolescent mental health have been documented previously (Reiss, 2013), but the smaller missing-income subgroup produced inaccurate estimates. The analysis cannot determine whether the primary coefficients would have been similar had income been observed for all eligible respondents.

Still, several factors limit the conclusions. First, the cross-sectional design leaves the direction of the self-esteem association uncertain: dance/cheer experiences possibly support self-esteem, but adolescents with higher self-esteem might also be more likely to begin or continue participating. Second, the extracurricular-activity items did not verify actual participation or differentiate between current and intended involvement because they recorded activities that respondents were engaged in or intended to engage in later that school year. Because Add Health also combined dance and cheerleading, the observed association cannot be attributed to either activity separately. The lack of information on variables such as participation history, training intensity, competitive level, coaching environment, perceived competence, and social

belonging further prevents identification of which settings or experiences may underlie the association. Third, all activity and outcome measures were self-reported, and the seven-item self-esteem composite assessed several dimensions of positive self-perception rather than one established self-esteem scale; measurement error could therefore affect the magnitude of the coefficients. Fourth, the physical activity covariate included dancing and gymnastics among its examples. This coincidence implies that adjustment cannot effectively distinguish an activity-context link from variation in exercise frequency. Finally, complete-case exclusion for missing income may limit the representativeness of the analytic sample and leave both outcome estimates less certain.

Future longitudinal studies should assess dance and cheer separately and measure participation history, training environment, and proposed social and psychological pathways. Such designs could establish whether participation precedes changes in self-esteem and identify which activity features are associated with those changes. In the present study, dance/cheer participants exhibited modestly higher self-esteem than other-sport participants after adjustment for the available activity and sociodemographic measures. However, the data did not provide sufficient evidence of a corresponding difference in depressive symptoms.

References

- Ajtlbez, L., Babić, D., Franjić, D., Barać, K., Martinac, M., & Haxhibeqiri, S. S. (2020). Psychic symptoms and self-esteem in dancers. *Psychiatria Danubina*, 32(Suppl. 2), 244–253.
- Bettle, N., Bettle, O., Neumärker, U., & Neumärker, K. J. (2001). Body image and self-esteem in adolescent ballet dancers. *Perceptual and Motor Skills*, 93(1), 297–309. <https://doi.org/10.2466/pms.2001.93.1.297>
- Biddle, S. J. H., & Asare, M. (2011). Physical activity and mental health in children and adolescents: A review of reviews. *British Journal of Sports Medicine*, 45(11), 886–895. <https://doi.org/10.1136/bjsports-2011-090185>
- Dishman, R. K., Hales, D. P., Pfeiffer, K. A., Felton, G. A., Saunders, R., Ward, D. S., Dowda, M., & Pate, R. R. (2006). Physical self-concept and self-esteem mediate cross-sectional relations of physical activity and sport participation with depression symptoms among adolescent girls. *Health Psychology*, 25(3), 396–407. <https://doi.org/10.1037/0278-6133.25.3.396>
- Fong Yan, A., Nicholson, L. L., Ward, R. E., Hiller, C. E., Dovey, K., Parker, H. M., Low, L.-F., Moyle, G., & Chan, C. (2024). The effectiveness of dance interventions on psychological and cognitive health outcomes compared with other forms of physical activity: A systematic review with meta-analysis. *Sports Medicine*, 54(5), 1179–1205. <https://doi.org/10.1007/s40279-023-01990-2>
- Hummer, R. A., Aiello, A. E., Harris, K. M., & Udry, J. R. (2026). National Longitudinal Study of Adolescent to Adult Health (Add Health), 1994–2025: Public-use data (Version 26) [Data set]. Inter-university Consortium for Political and Social Research. <https://doi.org/10.3886/ICPSR21600.v26>
- Monteiro, L. A., Novaes, J. S., Santos, M. L., & Fernandes, H. M. (2014). Body dissatisfaction and self-esteem in female students aged 9-15: The effects of age, family income, body mass index levels and dance practice. *Journal of Human Kinetics*, 43(1), 25–32. <https://doi.org/10.2478/hukin-2014-0086>
- Recchia, F., Bernal, J. D. K., Fong, D. Y., Wong, S. H. S., Chung, P.-K., Chan, D. K. C., Capio, C. M., Yu, C. C. W., Wong, S. W. S., Sit, C. H. P., Chen, Y.-J., Thompson, W. R., & Siu, P. M. (2023). Physical activity interventions to alleviate depressive symptoms in children and adolescents. *JAMA Pediatrics*, 177(2), 132–140. <https://doi.org/10.1001/jamapediatrics.2022.5090>
- Reiss, F. (2013). Socioeconomic inequalities and mental health problems in children and adolescents: A systematic review. *Social Science & Medicine*, 90, 24–31. <https://doi.org/10.1016/j.socscimed.2013.04.026>
- Rodriguez-Ayllon, M., Cadenas-Sánchez, C., Estévez-López, F., Muñoz, N. E., Mora-Gonzalez, J., Migueles, J. H., Molina-García, P., Henriksson, H., Mena-Molina, A., Martínez-Vizcaíno, V., Catena, A., Löf, M., Erickson, K. I., Lubans, D. R., Ortega, F. B., & Esteban-Cornejo, I. (2019). Role of physical activity and sedentary behavior in the mental health of preschoolers, children and

adolescents: A systematic review and meta-analysis. *Sports Medicine*, 49(9), 1383–1410. <https://doi.org/10.1007/s40279-019-01099-5>

Schwender, T. M., Spengler, S., Oedl, C., & Mess, F. (2018). Effects of dance interventions on aspects of the participants' self: A systematic review. *Frontiers in Psychology*, 9, Article 1130.

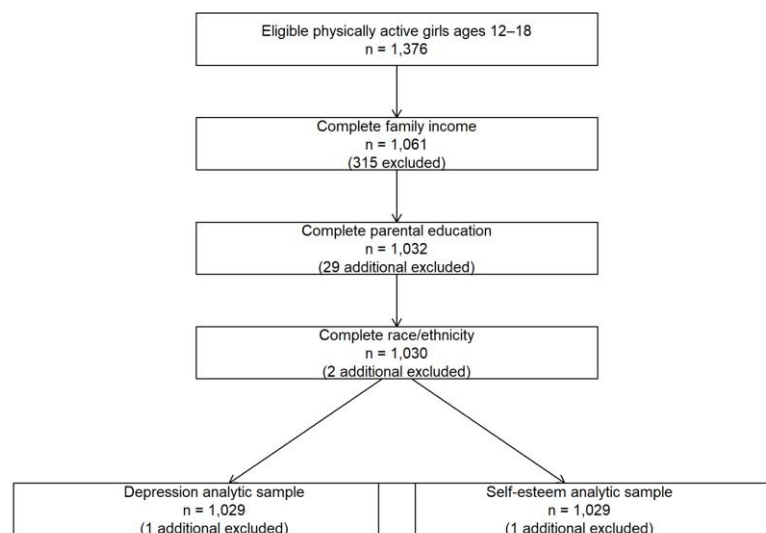
<https://doi.org/10.3389/fpsyg.2018.01130>

Tracy, A. J., & Erkut, S. (2002). Gender and race patterns in the pathways from sports

participation to self-esteem. *Sociological Perspectives*, 45(4), 445–466. <https://doi.org/10.1525/sop.2002.45.4.445>

Walton, C. C., Purcell, R., Henderson, J. L., Kim, J., Kerr, G., Frost, J., Gwyther, K., Pilkington, V., Rice, S., & Tamminen, K. A. (2024). Mental health among elite youth athletes: A narrative overview to advance research and practice. *Sports Health*, 16(2), 166–176. <https://doi.org/10.1177/19417381231219230>

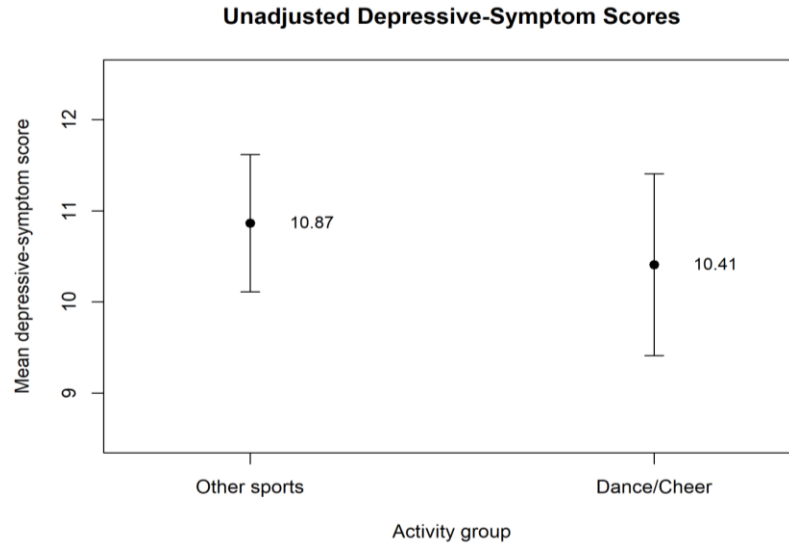
Supplementary Materials



Age and physical activity had no missing values among eligible participants.

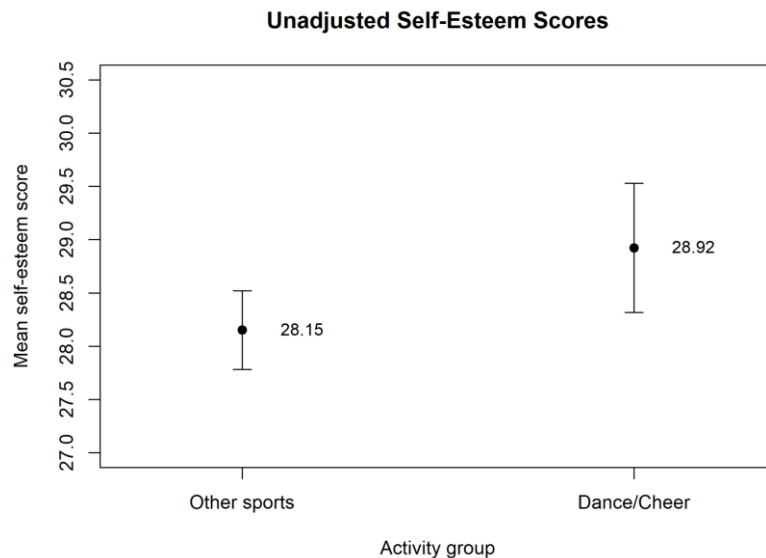
Figure S1. Participant Flow from Eligibility to the Final Analytic Samples

Note. The eligible sample included 1,376 physically active girls aged 12–18 years. Participants were sequentially excluded for missing family income ($n = 315$), parental education ($n = 29$ additional), and race/ethnicity ($n = 2$ additional). We excluded one additional participant for missing outcome data in each analysis, resulting in final analytic samples of 1,029 participants for each outcome. Age and physical activity had no missing values among eligible participants.



A. Depressive Symptoms

Note. Mean depressive-symptom scores were 10.87 (95% CI [10.11, 11.62]) among participants in other sports and 10.41 (95% CI [9.41, 11.41]) among dance/cheer participants. Error bars represent 95% confidence intervals. In the unadjusted survey-weighted regression model, dance/cheer participation was associated with a 0.46-point lower depressive-symptom score ($\beta = -0.46$, 95% CI [-1.78, 0.87], $p = 0.496$).



B. Self-esteem

Note. Mean self-esteem scores were 28.15 (95% CI [27.78, 28.52]) among participants in other sports and 28.92 (95% CI [28.32, 29.53]) among dance/cheer participants. Error bars represent 95% confidence intervals. In the unadjusted survey-weighted regression model, dance/cheer participation was associated with a 0.77-point higher self-esteem score ($\beta = 0.77$, 95% CI [0.02, 1.52], $p = 0.043$).

Figure S2. Survey-Weighted Mean Mental-Health Scores by Activity Group

Table S1. Sensitivity Analysis for Missing Family Income (n = 292)

Outcome	Model	β (SE)	95% CI	p-value
Depressive symptoms	Unadjusted	-0.11 (1.19)	[-2.47, 2.25]	.925

Self-esteem	Adjusted*	-0.46 (1.22)	[-2.89, 1.98]	.711
	Unadjusted	+0.51 (0.62)	[-0.71, 1.74]	.408
	Adjusted*	+0.24 (0.62)	[-1.00, 1.47]	.702

Note. Adjusted models included 292 of the 315 eligible participants with missing family-income data who had complete data for physical activity, age, race/ethnicity, and parental education.