Catalogue no. 82-003-X
ISSN 1209-1367

Health Reports

Are adolescents who do physical activity with their parents more active and mentally healthier?

by Anaelle Cohen, Justin J. Lang, Stephanie A. Prince, Rachel C. Colley, Mark S. Tremblay, and Jean-Philippe Chaput

Release date: January 15, 2025

Statistics Canada Statistique Canada

Canada

How to obtain more information

For information about this product or the wide range of services and data available from Statistics Canada, visit our website, www.statcan.gc.ca.

You can also contact us by

Email at infostats@statcan.gc.ca

Telephone, from Monday to Friday, 8:30 a.m. to 4:30 p.m., at the following numbers:

- Statistical Information Service 1-800-263-1136
- National telecommunications device for the hearing impaired 1-800-363-7629
- Fax line 1-514-283-9350

Standards of service to the public

Statistics Canada is committed to serving its clients in a prompt, reliable and courteous manner. To this end, Statistics Canada has developed standards of service that its employees observe. To obtain a copy of these service standards, please contact Statistics Canada toll-free at 1-800-263-1136. The service standards are also published on www.statcan.gc.ca under "Contact us" > "Standards of service to the public."

Note of appreciation

Canada owes the success of its statistical system to a long-standing partnership between Statistics Canada, the citizens of Canada, its businesses, governments and other institutions. Accurate and timely statistical information could not be produced without their continued co-operation and goodwill.

Published by authority of the Minister responsible for Statistics Canada

An HTML version is also available.

Cette publication est aussi disponible en français.

Are adolescents who do physical activity with their parents more active and mentally healthier?

by Anaelle Cohen, Justin J. Lang, Stephanie A. Prince, Rachel C. Colley, Mark S. Tremblay, and Jean-Philippe Chaput

DOI: https://www.doi.org/10.25318/82−003−x202500100002−eng

ABSTRACT

Background

Adolescents who engage in physical activity experience positive mental health outcomes. However, the increasing prevalence of physical inactivity combined with high screen time use among adolescents is a growing concern. Parents play an important role in shaping adolescents' physical activity and screen time levels through active participation and involvement.

Data and methods

This nationally representative cross-sectional study used self-reported data from the 2019 Canadian Health Survey on Children and Youth. The frequency of family physical activity included five categories from "never" to "daily." Outcome measures included achieving the physical activity (60 minutes or more of moderate-to-vigorous physical activity per day) and recreational screen time (two hours or less per day) recommendations, as well as mental health indicators. Logistic regression analyses examined the associations between family physical activity frequency and adolescents' physical activity, screen time, and mental health, with adjustments for relevant covariates.

Results

In adjusted models, across all outcomes, results showed that a higher frequency of family physical activity was associated with better outcomes in a dose–response relationship when compared with never engaging in family physical activity. The strongest associations for daily frequency of family physical activity (compared with never engaging in it) were with high life satisfaction (odd ratio [OR]: 4.25, 95% confidence interval [CI]: 3.16 to 5.72) and with high perceived mental health (OR: 3.60, 95% CI: 2.62 to 4.96). Subgroup analyses stratified by gender were generally consistent with the main results.

Interpretation

A higher frequency of family physical activity was associated with a greater likelihood of adhering to the physical activity and recreational screen time recommendations and better mental health in Canadian adolescents. Family physical activity may be an important way to promote adolescents' physical activity and positively influence their mental health.

Keywords

family physical activity, adolescents, youth, screen time, anxiety, depression, life satisfaction, stress, public health

AUTHORS

Anaelle Cohen and Mark S. Tremblay are with Carleton University. Mark S. Tremblay is also with the Children's Hospital of Eastern Ontario Research Institute (CHEO RI) and the University of Ottawa. Justin J. Lang and Stephanie A. Prince are with the Public Health Agency of Canada and the University of Ottawa. Justin J. Lang is also with CHEO RI and the University of South Australia. Rachel C. Colley is with Statistics Canada. Jean-Philippe Chaput is with the University of Ottawa and CHEO RI.

What is already known on this subject?

- Adolescents who engage in 60 minutes or more of moderate-to-vigorous physical activity (MVPA) and limit their recreational screen time to two hours or less per day experience better mental and physical health outcomes.
- However, the increasing prevalence of physical inactivity combined with high screen time use among adolescents is a significant concern, contributing to negative mental health outcomes.
- Parents who serve as role models and offer support contribute to adolescents' MVPA levels.

What does this study add?

- Adolescents who participate in family physical activity have a higher prevalence of meeting the recommended 60 minutes or more of MVPA per day and two hours or less of recreational screen time per day.
- Adolescents who engage in physical activities with their parents more frequently have higher perceived mental health, lower anxiety and depressive symptoms, higher life satisfaction, and lower life stress.

Adolescence is a critical period for the development of physical and mental health.[1] Fostering positive mental health during this period is essential for promoting overall health and well-being, which has positive implications across the lifespan.[1] Approximately 14% of adolescents aged 10 to 19 years worldwide exhibit mental health issues, accounting for 13% of the worldwide burden of disease for this age group.[2] Mental health concerns among adolescents include emotional disorders such as anxiety and symptoms of depression. From 2011 to 2018, the prevalence of diagnosed mood disorders (including depression) among Canadian youth rose from 4.3% to 7.8%, while anxiety disorders increased from 6.0% to 12.9%.[3] These conditions can adversely influence adolescents' academic performance, lead to social isolation and loneliness, and in severe cases, depression may result in suicide.[2]

Physical activity has been linked to many positive effects on the mental health of adolescents.[4,5] For example, adolescents who engage in higher levels of physical activity experience reduced levels of depression.[5] Despite the positive relationship between physical activity and mental health, the prevalence of physical inactivity among adolescents is a concern. The World Health Organization recommends that children and adolescents aged 5 to 17 years engage in at least 60 minutes of moderate-to-vigorous physical activity (MVPA) per day on average.[6] However, research by Guthold et al.[7] revealed that 81% of adolescents worldwide are insufficiently active. In Canada, 35.6% of youth aged 12 to 17 years meet the MVPA recommendation.[8]

Alongside low physical activity levels, recreational screen time among adolescents has also been increasing, raising particular public health concerns.[9,10] The Canadian 24-hour Movement Guidelines recommend adolescents limit their recreational screen time to a daily maximum of two hours.[11] Meeting this recommendation has also been associated with better mental health in adolescents.[12,13] In 2018 to 2019, 30.9% of youth in Canada met the recreational screen time recommendation.[8] Research conducted by Maras et al.[14] showed that adolescents participating in screen-based sedentary behaviours, such as playing video games and computer use, are more likely to exhibit symptoms of depression, and higher anxiety symptoms were associated with video gaming.[14] Thus, the high level of physical inactivity coupled with screen-based sedentary behaviours are important contributing factors to consider when evaluating depressive and anxiety symptoms experienced by adolescents.

Families play an important role in influencing their children's attitudes, beliefs, and behaviours regarding physical activity and sedentary behaviour, and may influence their adolescents' physical activity patterns[15,16,17,18] and sedentary behaviours.[19] In addition to parent–child physical activity co-participation,[15] parents serve as role models, provide motivation, and offer support (e.g., financial, transportation) for healthy behaviours. A systematic review of cross-sectional studies discovered that parental modelling and support contributed to adolescents' levels of MVPA.[15] Furthermore, a positive association was observed between the reported physical activity of mothers and the physical activity levels of adolescents.[15] Similarly, children and adolescents have been shown to engage in higher levels of screen-based sedentary behaviours when their parents do so as well.[20,21]

While existing studies have provided evidence of parental influence and modelling on children's physical activity and screen time,[19,21,22] research exploring parents' active involvement in adolescents' physical activity—specifically when they participate together, rather than just serving as role models or providing support—is limited. Furthermore, studies regarding the association between family physical activity and the mental health of adolescents are lacking. A better understanding of the role of family physical activity during adolescence can help inform the development of interventions

aimed at improving adolescents' physical activity, screen time levels, and mental health. Therefore, this study examined the associations between family physical activity and adolescents' adherence to the MVPA and recreational screen time recommendations and their mental health using a large and nationally representative sample. It was hypothesized that a higher frequency of family physical activity would be associated with greater adherence to the MVPA and recreational screen time recommendations and better mental health-related outcomes among Canadian adolescents.

Data and methods

Study design and participants

This cross-sectional study was based on data from Statistics Canada's 2019 Canadian Health Survey on Children and Youth (CHSCY). Data were collected from February 11 to August 2, 2019. Detailed information about the survey methodology is available elsewhere.[23] The target population for the 2019 CHSCY was children and adolescents aged 1 to 17 years residing in the 10 provinces and the three territories of Canada. The Canada Child Benefit was used to create the survey sampling frame. Excluded from the survey's coverage were children and adolescents living on First Nation reserves and other Indigenous settlements, children and adolescents living in foster homes, and the institutionalized population. Of the children and adolescents aged 1 to 17 years in Canada, approximately 98% in the provinces and 96% in the territories were included in the survey frame. The present study focuses on adolescents aged 12 to 17 years because the question about family physical activity was only asked to this age group. Adolescents completed survey questions directly through an online electronic questionnaire or via telephone interviews for follow-up on non-responses. For the mental health questions, only anxiety and depressive symptoms were assessed by the person most knowledgeable (typically one of the parents); all other questions were self-reported by the adolescents. The response rate was 41.3% for adolescents, yielding a sample of 11,077 participants. For the present analysis, respondents lacking information on family physical activity (n=46), dependent variables (n=2,062), or covariate data (n=756) were excluded, resulting in a final sample size of 8,213 participants. The descriptive characteristics of included and excluded participants are provided in Appendix Table A1. Statistics Canada secured the necessary approvals to conduct the CHSCY. Informed consent was obtained from participants before they joined the study.

Independent variable: Family physical activity

To assess family physical activity, adolescents were asked the following question: "How often do you do physical activities with your parents like playing sports or going for a walk or a hike?" The response options included "daily," "weekly," "monthly," "a few times a year," and "never." All five categories were used for the analysis.

Dependent variables

Sixty minutes or more of moderate-to-vigorous physical activity per day

Adolescents were asked to report the amount of physical activity they engaged in each day over the past seven days where they sweated at least a little or breathed harder. On the days they participated in physical activity, they had to indicate the duration to the nearest 15 minutes, with response options ranging from "no time" to "seven hours or more." Total MVPA time over the last seven days was determined, and daily average MVPA (minutes per day) was calculated. The prevalence of adolescents who obtained an average 60 minutes or more of MVPA per day was calculated.[6,11]

Two hours or less of recreational screen time per day

Participants were asked to report the time they spent in their free time over the past seven days using an electronic device, such as a mobile device, computer, tablet, video game console, or television, while sitting or lying down. Response options included "no time," "less than 3 hours," "3 hours to less than 7 hours," "7 hours to less than 14 hours," "14 hours to less than 21 hours," and "21 hours or more." Although not directly aligned, adherence to the recommendation (two hours or less of recreational screen time per day) was identified as those reporting "7 hours to less than 14 hours" per week or less.[11]

Indicators of mental health

Based on availability in the CHSCY, measures of positive mental health and mental ill-health (reflective of adaptive or maladaptive functioning) were included. These included youth-reported mental health, life satisfaction, and life stress. Parent-reported anxiety and depressive symptoms were also included. Perceived mental health is a valid and widely used indicator in population health surveys and has consistently been associated with multi-item measures of mental health, self-rated health, and health-related problems.[24] Perceived symptoms of anxiety and depression are widely used in national surveys, and the Washington Group / UNICEF Child Functioning Module has been shown to be valid for this population.[25,26,27] Perceived life satisfaction is routinely used as an indicator of well-being at the individual level, with many studies supporting its validity.[28,29,30] Finally, perceived life stress is another important factor affecting mental health, and single-item assessments have demonstrated comparability to more extensive questionnaires in capturing perceived general life stress.[31]

Perceived mental health was assessed using the following question: "In general, how is your mental health?" Response options were "excellent," "very good," "good," "fair," and "poor." Responses of "excellent" and "very good" were coded as having high perceived mental health, in accordance with the Positive Mental Health Surveillance Indicator Framework (PMHSIF).[32,33]

Anxiety and depressive symptoms were assessed by the person most knowledgeable, using questions from the Washington Group / UNICEF Child Functioning Module.[34] Anxiety symptoms were assessed with the question, "How often does this child seem very anxious, nervous or worried?" Depressive symptoms were assessed with the question, "How often does this child seem very sad or depressed?" Response options for both questions included "daily," "weekly," "monthly," "a few times a year," and "never." Responses of "a few times a year" and "never" were coded as having low anxiety or depressive symptoms.[34]

Life satisfaction was assessed with the question: "Using a scale of 0 to 10, where 0 means 'very dissatisfied' and 10 means 'very satisfied,' how do you feel about your life as a whole right now?" Life satisfaction was dichotomized as "very satisfied" (score of 9 or more) and "less than very satisfied" (score of less than 9), based on the PMHSIF.[32]

Perceived life stress was assessed with the question: "Thinking about the amount of stress in your life, how would you describe most of your days?" Response options included "not at all stressful," "not very stressful," "a bit stressful," "quite a bit stressful," and "extremely stressful." Responses of "not at all stressful," "not very stressful," and "a bit stressful" were coded as having a low level of life stress, in line with a 2017 study.[35]

Covariates

Age (years), gender (boy or girl), highest parental education (categorized as less than high school; high school with no postsecondary; and postsecondary certificate, diploma, or university degree), population groups (14 options from a list), sleep duration (hours per night) and body mass index (z-score) were used as covariates in the analyses based on their availability in the dataset and their known associations in the literature with the outcome measures.[1,2,3]

Statistical analysis

Descriptive characteristics of the included sample are presented as mean values or proportions (with 95% confidence intervals [CIs]). Dependent variables were compared across family physical activity groups and by gender using chi-square tests. Logistic regression analyses were conducted to examine associations between the frequency of family physical activity and outcome measures, with adjustment for covariates. Adjusted odds ratios (aORs) and 95% CIs are reported. Statistics Canada-derived sample weights were applied to adjust for the survey's complex sampling design and potential non-response bias to ensure that the findings remain representative of the Canadian adolescent population. To estimate the 95% CIs, bootstrap weights were utilized. All statistical analyses were conducted using SAS Enterprise Guide 7.1 (SAS Institute, Cary, North Carolina). A p-value of less than 0.05 was used as the threshold for statistical significance.

Results

Table 1 shows the descriptive characteristics of the sample. The majority of households had at least a postsecondary level of education (86.1%) and participants were generally from a White population group (66.5%). Among respondents, 11.4% met the MVPA recommendation (an average of 60 minutes or more per day) and 56.3% met the recreational screen time recommendation (two hours or less per day). The majority of adolescents reported high perceived mental health (66.6%), low anxiety symptoms (69.3%), low depressive symptoms (84.7%), and low life stress (79.4%). High life satisfaction was reported by just under half (45.4%) of Canadian adolescents. Boys were more likely than girls to engage in an average of 60 minutes or more of MVPA per day (13.1% versus. 9.5%), report high perceived mental health (73.9% versus 59.0%), high life satisfaction (48.4% versus 42.3%), and low anxiety (75.5% versus 62.7%) and depressive symptoms (88.8% versus 80.3%). In contrast, girls were more likely than boys to meet the recreational screen time recommendation (60.3% versus 52.5%).

Table 2 shows the proportion of Canadian adolescents with an average of 60 minutes or more of MVPA per day and an average of two hours or less of recreational screen time per day, high perceived mental health, low anxiety or depressive symptoms, high life satisfaction, and low life stress across the frequencies of family physical activity. In the full sample (boys and girls combined), engaging in daily family physical activity was associated with the highest prevalence of adolescents meeting the MVPA (22.5%) and recreational screen time (72.7%) recommendations. It was also associated with the highest prevalence of high perceived mental health (81.0%), low anxiety symptoms (73.2%), low depressive symptoms (88.9%), high life satisfaction (67.3%), and low life stress (85.8%). Significant differences were noted between boys and girls for all outcome measures.

Table 3 shows results of the logistic regression analyses for the associations between family physical activity frequency and the outcomes in the full sample (boys and girls combined). In the adjusted models, results showed that engaging in daily family physical activity was most strongly associated with desirable physical activity, recreational screen time, and mental health outcomes among Canadian adolescents. For example, the strongest associations for daily frequency of family physical activity (compared with never engaging in it) were with high life satisfaction (aOR: 4.25, 95% CI: 3.16 to 5.72) and with high perceived mental health (aOR: 3.60, 95% CI: 2.62 to 4.96). Associations tended to show a dose–response relationship, whereby a daily frequency of family physical activity was the category most strongly associated with better outcome measures. Subgroup analyses stratified by gender were generally consistent with the main results (see Appendix tables A2 and A3). A key difference between boys and girls was observed in anxiety and depressive symptoms. More frequent family physical activity was linked to lower levels of anxiety and depressive symptoms in girls, while this association was not

Table 1
Descriptive characteristics of adolescents aged 12 to 17 years, Canada, 2019

	Boys (n=4,036)			Girls (n=4,177)			Total (n=8,213)		
		95% confidence interval			95% confidence interval			95% confidence interval	
Characteristics	%	from	to	%	from	to	%	from	to
MVPA—60 minutes or more per day	13.1	11.8	14.5	9.5	8.2	10.8	11.4	10.4	12.3
Screen time—two hours or less per day	52.5	50.5	54.5	60.3	58.2	62.4	56.3	54.8	57.8
High perceived mental health	73.9	72.2	75.7	59.0	57.0	61.0	66.6	65.4	68.0
Low anxiety symptoms	75.5	73.8	77.2	62.7	60.8	64.7	69.3	68.0	70.6
Low depressive symptoms	88.8	87.5	90.1	80.3	78.7	81.9	84.7	83.6	85.7
High life satisfaction	48.4	46.3	50.4	42.3	40.2	44.3	45.4	43.9	46.9
Low life stress	85.8	84.4	87.2	72.6	70.8	74.5	79.4	78.2	80.6
Age (years)	14.4	14.4	14.5	14.5	14.4	14.6	14.6	14.4	14.5
Highest parental education									
Less than high school	3.2	2.5	4.0	3.4	2.6	4.2	3.3	2.7	3.9
High school with no postsecondary	9.7	8.6	10.9	11.4	10.1	12.8	10.6	9.7	11.5
Postsecondary certificate, diploma, or university degree	87.0	85.6	88.4	85.1	83.7	86.6	86.1	85.1	87.1
Population groups									
Indigenous (First Nations people, Métis, and Inuit)	4.4	3.7	5.1	4.5	3.7	5.3	4.5	3.9	5.0
Non-Indigenous									
White	67.4	65.5	69.3	65.5	63.6	67.4	66.5	65.1	67.8
Black	3.9	3.0	4.7	4.4	3.5	5.4	4.1	3.5	4.8
East or Southeast Asian	10.9	9.7	12.2	11.3	10.1	12.5	11.1	10.2	12.0
South Asian	7.4	6.4	8.4	8.1	7.0	9.1	7.7	7.0	8.5
Arab or West Asian	2.9	2.2	3.6	3.5	2.6	4.3	3.2	2.6	3.7
Latin American	1.1 ††	0.6	1.7	1.0 ††	0.5	1.4	1.1 ††	0.7	1.4
Other or multiple origins	2.0	1.4	2.5	1.8 ††	1.2	2.3	1.9	1.5	2.3
Sleep duration (hours per night)	8.8	8.7	8.8	8.7	8.6	8.7	8.7	8.7	8.7
Body mass index (kg/m^2)	21.6	21.4	21.8	21.6	21.4	21.8	21.6	21.4	21.7

†† Coefficient of variation between 0.15 and 0.25 is considered of marginal quality.

Notes: MVPA = moderate-to-vigorous physical activity. Adolescents reporting non-binary gender identity were excluded from analysis because of lack of power (n < 40).

Source: Statistics Canada, Canadian Health Survey on Children and Youth, 2019.

found in boys. Additionally, the study found that a higher proportion of boys met the MVPA recommendation when participating in family physical activity; however, this association was not observed in girls. Also, further adjustment for meeting physical activity and recreational screen time recommendations in the mental health models slightly attenuated the estimates, but the results were consistent with the main analyses (see Appendix Table A4).

Discussion

This study investigated the association between the frequency of engaging in physical activities as a family and Canadian adolescents' adherence to the physical activity (60 minutes or more of MVPA per day on average) and screen time (two hours or less per day) recommendations and their mental health. Despite an extensive review of the existing literature on the association between parental modelling and support and adolescents' physical activity levels,[15,16,17,36] there is a clear gap in examining the association between family physical activity participation and adolescents' physical activity levels, screen time levels, and mental health. The findings revealed that more frequent family participation in physical activity was associated with a higher prevalence of adolescents engaging in 60 minutes or more of MVPA per day and two hours or less of recreational screen time per day. Adolescents who engaged in more family physical activity also showed a higher prevalence of high perceived mental health and life satisfaction, and lower symptoms of anxiety, depression, and life stress. A dose–response relationship was observed between family physical activity frequency and the outcomes, with more favourable outcomes associated with a higher frequency.

The association between family physical activity and higher prevalence of adolescents meeting the recommended MVPA levels aligns with previous research that demonstrates a positive association between parents' involvement in physical activities and children and adolescent MVPA levels.[37] This association may be observed because participating in physical activities

with parents enhances self-efficacy in overcoming challenges and results in more enjoyment for the parents and the adolescents.[37] By actively participating in physical activities with their children, parents help motivate their children to engage in physical activities and provide a direct form of parental modelling.[38] A higher frequency of family physical activity may also reduce recreational screen time in adolescents by providing structured, engaging alternatives to sedentary activities like watching TV or playing video games. Families that prioritize and engage in physical activities together foster a more active lifestyle and reduce the time available for screens.[41] This positive influence can also shape healthier habits and routines that discourage excessive screen use. Additionally, parental engagement may positively affect adolescents' mental health by strengthening the parent–adolescent relationship.

The present study's findings are consistent with other research examining the association between parental modelling and support and children's physical activity levels.[39] Fuemmeler et al.[40] found an association between parents' and children's MVPA levels: children with active parents demonstrated higher MVPA levels than those with less active parents. Systematic reviews provide further evidence that parental support, including encouragement, participation in activities, and providing transportation, is positively associated with higher levels of adolescent physical activity.[41] Moreover, Canadian research using the 2007 to 2013 Canadian Health Measures Survey (CHMS) found that for every additional 20 minutes of physical activity by a parent, an additional 5 minutes of physical activity was observed in their child.[21] Additional research using the CHMS also found an association between parents' physical fitness and the level of physical activity and fitness of their children.[42]

Table 2

Weighted proportions of adolescents aged 12 to 17 meeting physical activity and screen time recommendations and indicators of mental health according to the frequency of family physical activity, Canada, 2019

	Frequency of family physical activity														
	Never (n=925)			A few times a year (n=2,033)			Monthly (n=2,213)			Weekly (n=2,381)			Daily (n=661)		
		95% confidence interval			95% confidence interval			95% confidence interval			95% confidence interval			95% confidence interval	
	%	from	to	%	from	to	%	from	to	%	from	to	%	from	to
MVPA—60 minutes or more per day															
Total	10.8	7.7	13.9	7.2	5.8	8.7	10.4	8.7	12.1	13.3	11.4	15.1	22.5 †	18.3	26.6
Boys	10.9	6.8	15.0	8.5	6.4	10.7	10.6	8.4	12.7	15.7	12.8	18.5	31.7 †	25.1	38.2
Girls	10.6	6.0	15.2	6.0	4.0	7.9	10.3	7.6	12.9	10.6 ‡	8.4	12.8	13.6 ‡	8.7	18.6
Screen time—two hours or less per day															
Total	44.8	40.2	49.3	48.4	45.5	51.4	54.8	52.1	57.5	65.4	62.8	67.9	72.7 †	68.2	77.3
Boys	40.9	34.8	47.0	42.5	38.5	46.4	52.3	48.2	56.3	62.2	58.6	65.8	69.8 †	63.6	76.1
Girls	49.7	43.2	56.2	54.2 ‡	50.1	58.4	57.3	53.6	61.0	69.0 ‡	65.3	72.7	75.6 †	69.4	81.8
High perceived mental health															
Total	46.4	42.1	50.8	62.8	60.1	65.5	67.2	64.7	69.7	74.5	72.2	76.8	81.0 †	77.2	84.8
Boys	57.7	52.0	63.5	72.5	69.2	75.9	74.7	71.3	78.1	79.2	76.3	82.1	85.2 †	80.3	90.0
Girls	31.8 ‡	25.8	37.8	53.1 ‡	48.9	57.2	59.9 ‡	56.2	63.6	69.4 ‡	65.9	72.9	76.9 †	71.1	82.7
Low anxiety symptoms															
Total	66.3	62.6	70.1	69.5	66.8	72.2	68.3	65.8	70.9	70.2	67.6	72.7	73.2	68.9	77.6
Boys	74.9	70.2	79.6	75.2	71.7	78.7	75.4	72.0	78.8	76.0	72.7	79.3	76.0	70.0	82.0
Girls	55.3 ‡	49.4	61.2	63.8 ‡	59.8	67.8	61.5 ‡	57.8	65.3	63.7 ‡	60.1	67.4	70.6	64.2	77.0
Low depressive symptoms															
Total	79.4	76.1	82.8	84.1	82.0	86.3	85.1	83.2	86.9	85.9	84.0	87.8	88.9 †	86.0	91.7
Boys	86.0	82.2	89.8	87.9	85.3	90.6	90.4	88.3	92.5	89.3	86.8	91.7	89.1	84.9	93.4
Girls	71.0 ‡	65.5	76.4	80.3 ‡	77.0	83.7	79.8 ‡	76.8	82.9	82.1 ‡	79.1	85.1	88.6 †	84.8	92.4
High life satisfaction															
Total	26.3	22.5	30.1	36.7	33.8	39.7	44.0	41.2	46.9	56.8	54.0	59.6	67.3 †	62.6	72.0
Boys	32.4	27.0	37.9	39.1	35.0	43.1	48.0	44.0	52.0	59.0	55.2	62.8	68.1 †	61.5	74.7
Girls	18.4 ‡	13.5	23.3	34.3	30.1	38.5	40.2 ‡	36.4	44.1	54.5	50.6	58.4	66.6 †	59.9	73.3
Low life stress															
Total	67.0	63.1	70.9	75.2	72.7	77.7	80.4	78.2	82.5	85.8	83.8	87.7	85.8 †	82.1	89.5
Boys	76.0	71.2	80.8	84.5	81.6	87.4	87.3	84.9	89.6	89.8	87.3	92.2	87.2 †	82.3	92.1
Girls	55.5 ‡	49.2	61.8	66.0 ‡	62.0	70.0	73.7 ‡	70.3	77.0	81.4 ‡	78.3	84.4	84.4 †	79.0	89.8

† significant within-group difference for family physical activity ($p < 0.05$)

‡ significantly different from corresponding estimate for boys ($p < 0.05$)

Notes: MVPA = moderate-to-vigorous physical activity.

Source: Statistics Canada, Canadian Health Survey on Children and Youth, 2019.

Table 3
Associations between family physical activity frequency with adherence to physical activity or recreational screen time recommendations and indicators of mental health among adolescents aged 12 to 17 years, Canada, 2019

	Unadjusted			Adjusted		
		95% confidence interval			95% confidence interval	
Outcomes	Odds ratio	from	to	Odds ratio	from	to
MVPA—60 minutes or more per day						
Frequency of family physical activity						
Daily	2.40 §	1.61	3.57	2.40 §	1.59	3.62
Weekly	1.27	0.88	1.82	1.16	0.80	1.68
Monthly	0.96	0.66	1.39	0.90	0.62	1.30
A few times a year	0.65 §	0.43	0.96	0.61 §	0.41	0.92
Never	1.00	…	…	1.00	…	…
Screen time—two hour or less per day						
Frequency of family physical activity						
Daily	3.30 §	2.46	4.42	2.72 §	2.00	3.70
Weekly	2.33 §	1.88	2.90	2.07 §	1.65	2.60
Monthly	1.50 §	1.21	1.86	1.39 §	1.11	1.74
A few times a year	1.16	0.93	1.45	1.12	0.89	1.40
Never	1.00	…	…	1.00	…	…
High perceived mental health						
Frequency of family physical activity						
Daily	4.92 §	3.62	6.67	3.60 §	2.62	4.96
Weekly	3.38 §	2.72	4.19	2.63 §	2.09	3.32
Monthly	2.37 §	1.92	2.92	2.16 §	1.72	2.70
A few times a year	1.95 §	1.57	2.42	1.92 §	1.54	2.40
Never	1.00	…	…	1.00	…	…
Low anxiety symptoms						
Frequency of family physical activity						
Daily	1.39 §	1.05	1.84	1.49 §	1.10	2.01
Weekly	1.19	0.97	1.46	1.28 §	1.03	1.60
Monthly	1.10	0.89	1.35	1.21	0.97	1.51
A few times a year	1.16	0.94	1.42	1.25 §	1.01	1.56
Never	1.00	…	…	1.00	…	…
Low depressive symptoms						
Frequency of family physical activity						
Daily	2.06 §	1.45	2.95	1.83 §	1.26	2.64
Weekly	1.57 §	1.22	2.03	1.42 §	1.08	1.85
Monthly	1.47 §	1.13	1.89	1.42 §	1.10	1.85
A few times a year	1.37 §	1.07	1.77	1.35 §	1.04	1.74
Never	1.00	…	…	1.00	…	…
High life satisfaction						
Frequency of family physical activity						
Daily	5.78 §	4.36	7.68	4.25 §	3.16	5.72
Weekly	3.69 §	2.94	4.63	2.86 §	2.25	3.64
Monthly	2.20 §	1.76	2.79	1.93 §	1.52	2.45
A few times a year	1.63 §	1.28	2.07	1.53 §	1.20	1.95
Never	1.00	…	…	1.00	…	…
Low life stress						
Frequency of family physical activity						
Daily	4.44 §	2.99	6.59	2.01 §	1.39	2.89
Weekly	3.00 §	2.22	4.04	2.18 §	1.69	2.79
Monthly	1.92 §	1.43	2.59	1.77 §	1.41	2.23
A few times a year	1.34	0.99	1.79	1.43 §	1.14	1.79
Never	1.00	…	…	1.00	…	…

… not applicable

§ significantly different from "never" ($p < 0.05$)

Notes: MVPA = moderate-to-vigorous physical activity. Logistic regression models were used to examine the associations between the frequency of family physical activity and the outcomes. Models were adjusted for age, gender, highest parental education, population groups, sleep duration, and body mass index z-score.

Source: Statistics Canada, Canadian Health Survey on Children and Youth, 2019.

The results of the study also show a higher proportion of boys meeting the MVPA recommendation when engaging in family physical activity, compared with girls. Adolescent girls may exhibit lower levels of physical activity compared with boys because of gender norms that may affect their participation in physical activity.[43] Boys and girls also may spend their time differently. While girls may allocate more time to socializing, boys may tend to spend their time participating in various sports.[43] In addition to differences in preferences, research has suggested that parental support may affect boys and girls differently. For example, Telford et al.[44] found that boys were more active than girls when they received greater parental support. Family physical activity may be associated with higher activity levels in boys than girls because of traditional gender norms and socialization, which often encourage boys to engage in sports and physical play more than girls, who may face different societal expectations or opportunities. In contrast, findings from Laird et al.[45] show that support and encouragement from families serve as factors in motivating girls to engage in physical activities. As well, parental modelling, through active participation and demonstrating positive attitudes toward physical activity, plays an important role in encouraging girls to participate in physical activity by shaping their behaviour and attitudes.[45]

The *Consensus Statement on the Role of the Family in the Physical Activity, Sedentary, and Sleep Behaviours of Children and Youth* includes a conceptual model that helps explain the observed association between family physical activity and adolescents' MVPA and screen-time levels.[41] The conceptual model demonstrates that youth's physical activity and sedentary screen time behaviours are interconnected with and influenced by family dynamics. Various factors, such as parental practices (e.g., support, modelling, and active engagement), beliefs, and styles, have a direct influence on youth's adoption of healthy behaviours.[41] These factors are shaped by family members (including parents and siblings), family structures (e.g., one-parent-family households, couple family households), and family functioning (e.g., cohesion and warmth).[41] External factors that influence the family dynamic and youth's healthy behaviours include elements of the community environment (e.g., the availability of green spaces), social influences (e.g., interactions with peers), and media and policies (e.g., child-directed advertising).[41]

In the present study, findings also indicated an association between a higher frequency of family physical activity and lower anxiety and depression symptoms in adolescents. This also aligns with previous studies that found that physically active adolescents report fewer depression and anxiety symptoms[46,47] and better overall well-being.[47] Stratified analyses showed that the findings were especially true for girls, but not for boys. Higher levels of family physical activity may be more associated with lower anxiety and depressive symptoms in adolescent girls because girls often place greater importance on social bonding and emotional support, which can be strengthened through family activities. Additionally, physical activity may help girls regulate stress and mood more effectively, given gender differences in emotional processing and coping strategies.

Parental engagement in adolescents' physical activity plays a significant role in supporting their mental health. Parents who actively participate or encourage physical activity can foster stronger emotional bonds and provide adolescents with a sense of support and security.[41] This involvement can reduce feelings of isolation, boost self-esteem, and create a positive environment for emotional regulation.[41] Moreover, shared physical activities may enhance communication between parents and adolescents, further strengthening the relationship and improving mental well-being.[41] Through these mechanisms, parental engagement can help protect adolescents from anxiety, depression, and other mental health challenges. Future studies should also examine gender differences in parental engagement in physical activity and whether it affects mental health outcomes differently.

Strengths and limitations

The strengths of this study include the use of a large, nationally representative sample and the inclusion of psychometrically valid mental health questions. To the authors' knowledge, this is the first study to directly examine the association between family physical activity and adolescents' levels of physical activity and screen time. Previous research did not directly explore whether parents and adolescents participated in physical activity together; instead, it made assumptions about their joint participation. However, given the cross-sectional nature of the study design, causal and directional inferences cannot be made. Parents with good mental health are more likely to be physically active and encourage their adolescents to engage in physical activity. Because parental mental health is also linked to children's mental health, this study is potentially limited by not controlling for that potential confounding factor. MVPA was collected through self-report, which may have been influenced by recall and social desirability biases. Anxiety and depressive symptoms were assessed by the person most knowledgeable, and sometimes there is a discrepancy between parent and adolescent responses. Also, 18.6% of adolescents in the sample were excluded because of missing data for the outcome measures. However, the effect on the generalizability of the results is likely minimal given the similarities between included and excluded participants across the study variables (Appendix Table A1). Specific family characteristics and the types of physical activities adolescents and families engaged in also remain unknown. Future studies should incorporate a more comprehensive assessment that considers family income and wealth and family structure (e.g., presence of siblings, one-parent family versus couple family, presence of grandparents); the types (e.g., structured versus unstructured), duration, and context of physical activities; and device-measured MVPA. Furthermore, future studies should consider other types of parental support (e.g., role modelling, verbal support) in the statistical models, as they are likely to be correlated with parental co-participation in physical activity. Finally, in

addition to family physical activity, future studies should examine family screen time and whether it affects outcome measures.

Conclusion

Findings from this study suggest a significant positive association between a higher frequency of adolescent physical activity with their parents and higher physical activity levels, lower recreational screen time, and improved mental health outcomes. A dose–response relationship was observed, whereby higher frequency of family physical activity was associated with more favourable mental health outcomes. These findings provide support for the importance of promoting family physical activity during adolescence. Future research should explore longitudinal associations with device-based measures and employ intervention designs, such as family-based programs, to demonstrate cause-and-effect associations between family physical activity and adolescent mental health.

Appendix Table A1
Sensitivity analysis comparing sociodemographic and mental health indicators for participant records with non-missing (included) and missing (excluded) information

	Included (n=8,213)			Excluded (n=2,818)			
		95% confidence interval			95% confidence interval		
Characteristics	%	from	to	%	from	to	p-value
Physical activity with parents							
Daily	7.6	6.8	8.3	8.4	7.0	9.8	0.0610
Weekly	28.1	26.9	29.4	26.0	23.9	28.2	0.0610
Monthly	26.9	25.6	28.2	24.7	22.5	27.0	0.0610
A few times a year	25.3	23.9	26.6	26.5	24.2	28.8	0.0610
Never	12.1	11.1	13.1	14.4	12.4	16.3	0.0610
Age (years)	14.5	14.4	14.5	14.3	14.2	14.4	0.0108
Gender							
Boys	51.2	50.4	52.0	51.3	49.2	53.5	0.6694
Girls	48.8	48.0	49.6	47.7	45.5	49.9	0.6694
Non-binary	…	…	…	1.0 ††	0.6	1.4	0.6694
Highest parental education							
Less than high school	3.3	2.8	3.9	3.6	2.6	4.6	0.3746
High school with no post-secondary	10.6	9.7	11.5	11.8	10.2	13.4	0.3746
Postsecondary certificate, diploma, or university degree	86.1	85.1	87.1	84.6	82.8	86.4	0.3746
Population groups							
Indigenous (First Nation, Métis, and Inuit)	4.5	3.9	5.0	5.4	4.4	6.3	0.0021
Non-Indigenous							
White	66.4	65.1	67.7	64.9	62.4	67.3	0.0021
Black	4.2	3.5	4.8	6.5	5.2	7.9	0.0021
East or Southeast Asian	11.1	10.3	12.0	9.0	7.6	10.3	0.0021
South Asian	7.7	7.0	8.5	7.8	6.6	9.1	0.0021
Arab or West Asian	3.2	2.6	3.7	3.1 ††	2.1	4.1	0.0021
Latin American	1.1 ††	0.7	1.4	1.4	0.8	2.0	0.0021
Other or multiple origins	1.9	1.5	2.3	1.9 ††	1.1	2.7	0.0021
Sleep duration (hours per night)	8.7	8.7	8.7	8.8	8.7	8.9	0.0492
Body mass index (kg/m^2)	21.6	21.4	21.7	21.5	21.2	21.7	0.4409
MVPA—60 minutes or more per day	11.4	10.4	12.3	8.0	5.4	10.5	0.0282
Screen time—two hours or less per day	56.3	54.9	57.8	58.5	56.0	61.0	0.1211
High perceived mental health	66.7	65.4	68.0	64.9	62.6	67.3	0.2315
Low anxiety symptoms	69.3	67.9	70.6	69.8	67.5	72.2	0.7031
Low depressive symptoms	84.7	83.6	85.7	82.7	80.8	84.7	0.0822
High life satisfaction	45.5	44.0	46.9	44.0	41.5	46.6	0.4482
Low life stress	79.4	78.2	80.6	80.0	78.0	82.1	0.2803

… not applicable
†† Coefficient of variation between 0.15 and 0.25 is considered of marginal quality.
Notes: MVPA = moderate-to-vigorous physical activity.
Source: Statistics Canada, Canadian Health Survey on Children and Youth, 2019.

Appendix Table A2

Associations between family physical activity frequency with adherence to physical activity or recreational screen time recommendations and indicators of mental health among adolescent boys aged 12 to 17 years, Canada, 2019

	Unadjusted			Adjusted		
		95% confidence interval			95% confidence interval	
Outcomes	Odds ratio	from	to	Odds ratio	from	to
MVPA—60 minutes or more per day						
Frequency of family physical activity						
Daily	3.78 §	2.27	6.32	3.80 §	2.32	6.22
Weekly	1.52	0.94	2.46	1.44	0.92	2.25
Monthly	0.97	0.59	1.57	0.95	0.60	1.50
A few times a year	0.76	0.46	1.27	0.75	0.46	1.21
Never	1.00	…	…	1.00	…	…
Screen time—two hours or less per day						
Frequency of family physical activity						
Daily	3.34 §	2.25	4.95	2.92 §	1.93	4.42
Weekly	2.38 §	1.77	3.20	2.20 §	1.62	2.98
Monthly	1.58 §	1.17	2.15	1.54 §	1.13	2.11
A few times a year	1.07	0.78	1.46	1.07	0.80	1.48
Never	1.00	…	…	1.00	…	…
High perceived mental health						
Frequency of family physical activity						
Daily	4.21 §	2.64	6.71	3.05 §	1.86	5.00
Weekly	2.78 §	2.09	3.71	2.13 §	1.56	2.92
Monthly	2.16 §	1.60	2.92	1.89 §	1.38	2.61
A few times a year	1.93 §	1.44	2.60	1.82 §	1.34	2.48
Never	1.00	…	…	1.00	…	…
Low anxiety symptoms						
Frequency of family physical activity						
Daily	1.06	0.70	1.60	1.34	0.87	2.08
Weekly	1.06	0.78	1.44	1.37	0.99	1.89
Monthly	1.03	0.75	1.40	1.25	0.90	1.73
A few times a year	1.02	0.74	1.39	1.15	0.83	1.58
Never	1.00	…	…	1.00	…	…
Low depressive symptoms						
Frequency of family physical activity						
Daily	1.34	0.76	2.34	1.32	0.73	2.36
Weekly	1.35	0.91	2.00	1.37	0.90	2.08
Monthly	1.54 §	1.03	2.31	1.57 §	1.03	2.40
A few times a year	1.19	0.80	1.76	1.20	0.80	1.79
Never	1.00	…	…	1.00	…	…
High life satisfaction						
Frequency of family physical activity						
Daily	4.47 §	3.01	6.64	3.53 §	2.32	5.39
Weekly	3.02 §	2.24	4.07	2.50 §	1.82	3.44
Monthly	1.95 §	1.45	2.63	1.76 §	1.29	2.39
A few times a year	1.35 §	1.01	1.81	1.28	0.95	1.73
Never	1.00	…	…	1.00	…	…
Low life stress						
Frequency of family physical activity						
Daily	2.15 §	1.29	3.59	1.40	0.82	2.39
Weekly	2.77 §	1.89	4.05	1.94 §	1.31	2.88
Monthly	2.16 §	1.54	3.05	1.76 §	1.23	2.51
A few times a year	1.73 §	1.23	2.43	1.54 §	1.09	2.18
Never	1.00	…	…	1.00	…	…

… not applicable

§ significantly different from "never" ($p < 0.05$)

Notes: MVPA = moderate-to-vigorous physical activity. Logistic regression models were used to examine the associations between the frequency of family physical activity and the outcomes. Models were adjusted for age, highest parental education, population groups, sleep duration, and body mass index z-score.

Source: Statistics Canada, Canadian Health Survey on Children and Youth, 2019.

Appendix Table A3

Associations between family physical activity frequency with adherence to physical activity and recreational screen time recommendations and indicators of mental health among adolescent girls aged 12 to 17 years, Canada, 2019

	Unadjusted			Adjusted		
		95% confidence interval			95% confidence interval	
Outcomes	Odds ratio	from	to	Odds ratio	from	to
MVPA—60 minutes or more per day						
Frequency of family physical activity						
Daily	1.33	0.69	2.56	1.24	0.60	2.55
Weekly	1.00	0.58	1.70	0.89	0.49	1.60
Monthly	0.97	0.55	1.70	0.83	0.46	1.48
A few times a year	0.53 §	0.28	0.99	0.47 §	0.25	0.90
Never	1.00	…	…	1.00	…	…
Screen time—two hours or less per day						
Frequency of family physical activity						
Daily	3.13 §	2.05	4.78	2.57 §	1.64	4.00
Weekly	2.24 §	1.64	3.05	1.97 §	1.41	2.76
Monthly	1.36 §	1.01	1.82	1.27	0.93	1.73
A few times a year	1.20	0.89	1.62	1.18	0.86	1.63
Never	1.00	…	…	1.00	…	…
High perceived mental health						
Frequency of family physical activity						
Daily	7.15 §	4.66	10.97	4.62 §	2.96	7.22
Weekly	4.86 §	3.51	6.72	3.53 §	2.52	4.94
Monthly	3.20 §	2.34	4.38	2.66 §	1.90	3.71
A few times a year	2.43 §	1.75	3.36	2.24 §	1.60	3.14
Never	1.00	…	…	1.00	…	…
Low anxiety symptoms						
Frequency of family physical activity						
Daily	1.94 §	1.30	2.89	1.67 §	1.09	2.66
Weekly	1.42 §	1.07	1.88	1.28	0.94	1.74
Monthly	1.29	0.96	1.73	1.24	0.90	1.70
A few times a year	1.43 §	1.07	1.91	1.40 §	1.03	1.89
Never	1.00	…	…	1.00	…	…
Low depressive symptoms						
Frequency of family physical activity						
Daily	3.17 §	2.00	5.09	2.46 §	1.50	4.05
Weekly	1.87 §	1.34	2.60	1.52 §	1.06	2.18
Monthly	1.62 §	1.18	2.22	1.39	0.99	1.95
A few times a year	1.66 §	1.18	2.34	1.52 §	1.07	2.16
Never	1.00	…	…	1.00	…	…
High life satisfaction						
Frequency of family physical activity						
Daily	8.87 §	5.68	13.86	5.86 §	3.66	9.40
Weekly	5.30 §	3.70	7.62	3.82 §	2.56	5.69
Monthly	2.99 §	2.08	4.30	2.45 §	1.65	3.63
A few times a year	2.32 §	1.58	3.40	2.13 §	1.42	3.19
Never	1.00	…	…	1.00	…	…
Low life stress						
Frequency of family physical activity						
Daily	4.34 §	2.67	7.05	2.66 §	1.61	4.40
Weekly	3.50 §	2.54	4.84	2.39 §	1.71	3.35
Monthly	2.24 §	1.65	3.05	1.80 §	1.31	2.49
A few times a year	1.56 §	1.14	2.12	1.38 §	1.00	1.89
Never	1.00	…	…	1.00	…	…

… not applicable

§ significantly different from "never" ($p < 0.05$)

Notes: MVPA = moderate-to-vigorous physical activity. Logistic regression models were used to examine the associations between the frequency of family physical activity and the outcomes. Models were adjusted for age, highest parental education, population groups, sleep duration, and body mass index z-score.

Source: Statistics Canada, Canadian Health Survey on Children and Youth, 2019.

Appendix Table A4

Associations between family physical activity frequency with adherence to physical activity or recreational screen time recommendations and indicators of mental health among adolescents aged 12 to 17 years, Canada, 2019

	Total adjusted			Boys adjusted			Girls adjusted		
		95% confidence interval			95% confidence interval			95% confidence interval	
Outcomes	Odds ratio	from	to	Odds ratio	from	to	Odds ratio	from	to
High perceived mental health									
Frequency of family physical activity									
Daily	3.32 §	2.41	4.58	2.70 §	1.64	4.45	4.32 §	2.76	6.74
Weekly	2.53 §	2.00	3.19	2.05 §	1.49	2.83	3.37 §	2.40	4.73
Monthly	2.13 §	1.70	2.67	1.89 §	1.36	2.61	2.62 §	1.88	3.66
A few times a year	1.95 §	1.55	2.44	1.85 §	1.35	2.52	2.24 §	1.60	3.14
Never	1.00	…	…	1.00	…	…	1.00	…	…
Low anxiety symptoms									
Frequency of family physical activity									
Daily	1.41 §	1.03	1.91	1.27	0.81	2.00	1.57 §	1.02	2.42
Weekly	1.25	0.99	1.56	1.35	0.97	1.88	1.22	0.89	1.67
Monthly	1.20	0.96	1.50	1.24	0.89	1.73	1.22	0.89	1.67
A few times a year	1.26 §	1.01	1.56	1.15	0.83	1.60	1.39 §	1.02	1.89
Never	1.00	…	…	1.00	…	…	1.00	…	…
Low depressive symptoms									
Frequency of family physical activity									
Daily	1.69 §	1.16	2.47	1.24	0.69	2.25	2.28 §	1.39	3.75
Weekly	1.35 §	1.03	1.78	1.33	0.87	2.05	1.44 §	1.00	2.08
Monthly	1.40 §	1.08	1.82	1.56 §	1.02	2.34	1.37	0.98	1.92
A few times a year	1.35 §	1.05	1.74	1.20	0.81	1.80	1.53 §	1.08	2.17
Never	1.00	…	…	1.00	…	…	1.00	…	…
High life satisfaction									
Frequency of family physical activity									
Daily	3.78 §	2.81	5.11	2.92 §	1.89	4.49	5.51 §	3.44	8.83
Weekly	2.70 §	2.12	3.45	2.31 §	1.67	3.20	3.67 §	2.45	5.48
Monthly	1.90 §	1.49	2.41	1.71 §	1.25	2.35	2.43 §	1.63	3.61
A few times a year	1.54 §	1.20	1.97	1.30	0.95	1.76	2.14 §	1.42	3.22
Never	1.00	…	…	1.00	…	…	1.00	…	…
Low life stress									
Frequency of family physical activity									
Daily	1.92 §	1.33	2.77	1.33	0.77	2.29	2.53 §	1.52	4.20
Weekly	2.09 §	1.63	2.68	1.86 §	1.25	2.78	2.29 §	1.63	3.20
Monthly	1.74 §	1.38	2.18	1.72 §	1.20	2.46	1.77 §	1.29	2.44
A few times a year	1.42 §	1.13	1.77	1.54 §	1.09	2.19	1.35	0.98	1.86
Never	1.00	…	…	1.00	…	…	1.00	…	…

… not applicable

§ significantly different from "never" ($p < 0.05$)

Notes: MVPA = moderate-to-vigorous physical activity. Logistic regression models were used to examine the associations between the frequency of family physical activity and the outcomes. Models were adjusted for age, gender (when applicable), highest parental education, population groups, sleep duration, body mass index z-score, and meeting physical activity and screen time recommendations.

Source: Statistics Canada, Canadian Health Survey on Children and Youth, 2019.

References

1. 2022 National Healthcare Quality and Disparities Report. Child and Adolescent Mental Health. [Internet]. Rockville (MD); Agency for Healthcare Research and Quality (US). 2022 Oct. [cited 2024 Jun 25]. Available at: https://www.ncbi.nlm.nih.gov/books/NBK587174/
2. World Health Organization. Mental health of adolescents [Internet]. World Health Organization. World Health Organization; 2021. [cited 2024 Jun 25] Available at: https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health
3. Wiens K, Bhattarai A, Pedram P, et al. A growing need for youth mental health services in Canada: Examining trends in youth mental health from 2011 to 2018. *Epidemiology and Psychiatric Sciences* 2020; 29: e115. doi: 10.1017/S2045796020000281.
4. Hale GE, Colquhoun L, Lancastle D, et al. Review: Physical activity interventions for the mental health and well-being of adolescents – a systematic review. *Child and Adolescent Mental Health* 2021; 26(4): 357-368. doi: 10.1111/camh.12485.
5. Rodriguez-Ayllon M, Cadenas-Sánchez C, Estévez-López F, et al. Role of physical activity and sedentary behavior in the mental health of preschoolers, children and adolescents: A systematic review and meta-analysis. *Sports Medicine* 2019; 49(9): 1383-1410. doi: 10.1007/s40279-019-01099-5.
6. Bull FC, Al-Ansari SS, Biddle S, et al. World Health Organization 2020 guidelines on physical activity and sedentary behavior. *British Journal of Sports Medicine* 2020; 54(24): 1451-1462. doi: 10.1136/bjsports-2020-102955.
7. Guthold R, Stevens GA, Riley LM, Bull FC. Global trends in insufficient physical activity among adolescents: a pooled analysis of 298 population-based survey with 1.6 million participants. *The Lancet Child & Adolescent Health* 2019; 4(1): 23-35. doi: 10.1016/S2352-4642(19)30323-2.
8. Public Health Agency of Canada. Physical Activity, Sedentary Behaviour and Sleep (PASS) Indicators, 2023 Edition. [Internet]. Ottawa (ON): Public Health Agency of Canada; 2023 [cited 2024 Jun 25]. Available at: https://health-infobase.canada.ca/pass/data-tool?index=1997
9. Brodersen NH, Steptoe A, Boniface DR, Wardle J. Trends in physical activity and sedentary behavior in adolescence: ethnic and socioeconomic differences. *British Journal of Sports Medicine* 2007; 41(3): 140-144. doi: 10.1136/bjsm.2006.031138.
10. Prince SA, Melvin A, Roberts KC, et al. Sedentary behaviour surveillance in Canada: trends, challenges and lessons learned. *International Journal of Behavioral Nutrition and Physical Activity* 2020; 17(1): 34. doi: 10.1186/s12966-020-00925-8.
11. Tremblay MS, Carson V, Chaput JP, et al. Canadian 24-hour movement guidelines for children and youth: An integration of physical activity, sedentary behaviour, and sleep. *Applied Physiology, Nutrition, and Metabolism* 2016; 41(6 Suppl 3): S311-327. doi: 10.1139/apnm-2016-0151.
12. Janssen I, Roberts KC, Thompson W. Is adherence to the Canadian 24-hour movement behaviour guidelines for children and youth associated with improved indicators of physical, mental and social health? *Applied Physiology, Nutrition, and Metabolism* 2017; 42(7): 725-731. doi: 10.1139/apnm-2016-0681.
13. Bang F, Roberts KC, Chaput JP, et al. Physical activity, screen time and sleep duration: combined associations with psychosocial health among Canadian children and youth. *Health Reports* 2020; 31(5): 9-16. doi: 10.25318/82-003-x202000500002-eng.
14. Maras D, Flament MF, Murray M, et al. Screen time is associated with depression and anxiety in Canadian youth. *Preventive Medicine* 2015; 73: 133-138. doi: 10.1016/j.ypmed.2015.01.029.
15. Edwardson CL, Gorely T. Parental influences on different types and intensities of physical activity in youth: A systemic review. *Psychology of Sport and Exercice* [Internet] 2010 [cited 2024 Jun 25]; 11(6): 522-535. Available at: https://doi.org/10.1016/j.psychsport.2010.05.001
16. Su DL, Tang TC, Chung JS, et al. Parental influences on child and adolescents physical activity level: A meta-analysis. *International Journal of Environmental Research and Public Health* 2022; 19(24): 16861. doi: 10.3390/ijerph192416861.
17. Raudsepp L. The relationship between socio-economic status, parental support and adolescent physical activity. *Acta Paediatrica* 2006; 95(1): 93-98. doi: 10.1080/08035250500323772.
18. Bauer KW, Nelson MC, Boutelle KN, Neumark-Sztainer D. Parental influenced on adolescents' physical activity and sedentary behavior: longitudinal findings from Project EAT-II. *International Journal of Behavioral Nutrition and Physical Activity* 2008; 5:12. doi: 10.1186/1479-5868-5-12.
19. Xu H, Wen LM, Rissel C. Associations of parental influences with physical activity and screen time among young children: a systematic review. *Journal of Obesity* 2015; 2015: 546925. doi: 10.1155/2015/546925.
20. Christofaro DG, Turi-Lynch BC, Lynch KR, et al. Parent' lifestyle, sedentary behavior, and physical activity in their children: A cross-sectional study in Brazil. *Journal of Physical Activity and Health* 2019; 16(8): 631-636. doi: 10.1123/jpah.2018-0173.
21. Garriguet D, Colley R, Bushnik T. Parent-child association in physical activity and sedentary behaviour. *Health Reports* 2017; 28(6): 3-11 [Internet]. Statistics Canada; 2017 June 21. [cited 2024 Jun 25]. Available at: https://www150.statcan.gc.ca/n1/en/pub/82-003-x/2017006/article/14827-eng.pdf?st=C1FgTj5X
22. Mitchell J, Skouteris H, McCabe M, et al. Physical activity in young children: a systematic review of parental influences. *Early Child Development and Care* 2011; 182(11): 1411-1437. doi:10.1080/03004430.2011.619658
23. Statistics Canada. Canadian health survey on children and youth (CHSCY). [Internet]. Ottawa (ON): Statistics Canada. 2019 [cited 2024 Jun 25]. Available at: https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&Id=1215270

24. Mawani FN, Gilmour H. Validation of self-rated mental health. *Health Reports* 2010; 21(3): 61-75.

25. Loeb M, Mont D, Cappa C, et al. The development and testing of a module on child functioning for identifying children with disabilities on surveys. I: Background. *Disability and Health Journal* 2018; 11(4): 495-501. doi: 10.1016/j.dhjo.2018.06.005.

26. Massey M. The development and testing of a module on child functioning for identifying children with disabilities on surveys. II: Question development and pretesting. *Disability and Health Journal* 2018; 11(4): 502-509. doi: 10.1016/j.dhjo.2018.06.006.

27. Cappa C, Mont D, Loeb M, et al. The development and testing of a module on child functioning for identifying children with disabilities on surveys. III. Field testing. *Disability and Health Journal* 2018; 11(4): 510-518. doi: 10.1016/j.dhjo.2018.06.004.

28. Diener E, Inglehard R, Tay L. Theory and Validity of Life Satisfaction Scales. *Social Indicators Research* [Internet]. 2013 [cited 2024 Jun 25]; 112: 497-527. Available at: https://doi.org/10.1007/s11205-012-0076-y

29. OECD. OECD guidelines on measuring subjective well-being. [Internet]. OECD Publishing; 2013 [cited 2024 Jun 25]. Available at: https://doi.org/10.1787/9789264191655-en

30. Lombardo P, Jones W, Wang L, et al. The fundamental association between mental health and life satisfaction: results from successive waves of a Canadian national survey. *BMC Public Health* 2018; 18(1): 342. doi: 10.1186/s12889-018-5235-x.

31. Littman AJ, White E, Satia JA, et al. Reliability and validity of 2 single-item measures of psychosocial stress. *Epidemiology* 2006; 17(4): 398-403. doi: 10.1097/01.ede.0000219721.89552.51.

32. Government of Canada. Positive mental health surveillance indicator framework. [Internet]. 2023 [cited 2024 Jun 25]. Available at: https://health-infobase.canada.ca/positive-mental-health/

33. Varin M, Palladino E, Lary T, Baker M. An update on positive mental health among youth in Canada. *Health Promotion and Chronic Disease Prevention in Canada: Research, Policy and Practice* 2020; 40(3): 81-85. doi: 10.24095/hpcdp.40.3.03.

34. Loeb M, Cappa C, Crialesi R, de Palma E. Measuring child functioning: the UNICEF/Washington Group Module. *Salud Pública de México* 2017; 59(4):485-487. doi: 10.21149/8962.

35. Skinner R, Irvine B, Willams G, et al. A contextual analysis of the suicide surveillance indicators. *Health Promotion and Chronic Disease Prevention in Canada: Research, Policy and Practice* 2017; 37(8): 257-260. doi: 10.24095/hpcdp.37.8.05.

36. Trost SG, Sallis JF, Pate RR, et al. Evaluating a model of parental influence on youth physical activity. *American Journal of Preventive Medicine* 2003; 25(4): 277-282. doi: 10.1016/s0749-3797(03)00217-4.

37. Hong JT, Chen ST, Tang Y, et al. Association between various kinds of parental support and physical activity among children and adolescents in Shanghai China: gender and age differences. *BMC Public Health* 2020; 20(1): 1161. doi: 10.1186/s12889-020-09254-8.

38. Matos R, Monteiro D, Amaro N, et al. Parents' and children's (6-12 years old) physical activity associations: A systematic review from 2001 to 2020. *International Journal of Environmental Research and Public Health* 2021; 18(23): 12651. doi: 10.3390/ijerph182312651.

39. Trost SG, Loprinzi PD. Parental influences on physical activity behavior in children and adolescents: A brief review. *American Journal of Lifestyle Medicine* 2011; 5(2): 171-181. doi: 10.1177/1559827610387236

40. Fuemmeler BF, Anderson CB, Mâsse LC. Parent-child relationship of directly measured physical activity. *International Journal of Behavioral Nutrition and Physical Activity* 2011; 8: 17. doi: 10.1186/1479-5868-8-17.

41. Rhodes RE, Guerrero MD, Vanderloo LM, et al. Development of a consensus statement on the role of the family in the physical activity, sedentary, and sleep behaviours of children and youth. *International Journal of Behavioral Nutrition and Physical Activity* 2020; 17(1): 74. doi: 10.1186/s12966-020-00973-0.

42. Colley RC, Clarke J, Doyon CY, et al. Do fit kids have fit parents? *Health Reports* 2021; 32(1): 3-12. doi: 10.25318/82-003-x202100100001-eng.

43. Spencer RA, Rehman L, Kirk SF. Understanding gender norms, nutrition, and physical activity in adolescent girls: a scoping review. *International Journal of Behavioral Nutrition and Physical Activity* 2015; 12: 6. doi: 10.1186/s12966-015-0166-8.

44. Telford RM, Telford RD, Olive LS, et al. Why are girls less physically active than boys? Findings from the LOOK longitudinal study. *PLoS One* 2016; 11(3): e0150041. doi: 10.1371/journal.pone.0150041.

45. Laird Y, Fawkner S, Niven A. A grounded theory of how social support influences physical activity in adolescent girls. *International Journal of Qualitative Studies on Health and Well-being* 2018; 13(1): 1435099. doi: 10.1080/17482631.2018.1435099.

46. He JP, Paksarian D, Merikangas KR. Physical activity and mental disorder among adolescents in the United States. *Journal of Adolescent Health* 2018; 63(5): 628-635. doi: 10.1016/j.jadohealth.2018.05.030.

47. McMahon EM, Corcoran P, O'Regan G, et al. Physical activity in European adolescents and associations with anxiety, depression and well-being. *European Child & Adolescent Psychiatry* 2017; 26(1): 111-122. doi: 10.1007/s00787-016-0875-9.