

# The Effect of Social Support and School- and Community-based Sports on Youth Physical Activity

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## ABSTRACT

**Objective:** To examine how social support, participation in intramurals, varsity and community sports are associated with physical activity among Ontario secondary school students, and explore gender differences in the prevalence of physical activity and participation in school- and community-based sports.

**Methods:** Data from 25,416 students (grades 9-12) attending 76 Ontario secondary schools were collected using the School Health Action, Planning, and Evaluation System (SHAPES). Logistic regression analyses examined how social support and school- and community-based sports participation were associated with physical activity.

**Results:** Males and females with low social support for physical activity were less likely to be active than their lower-risk peers (males: OR 0.61; females: OR 0.72). Males and females were more likely to be active if they participated in intramural activities (males: OR 1.92; females: OR 1.55), varsity sports (males: OR 1.93; females: OR 1.77), or community sports (males: OR 2.84; females: OR 2.90).

**Conclusion:** Since students with low social support for physical activity were less likely to be active, interventions to increase support and engagement in physical activity should be targeted to these students. In addition, considering that participation in school- and community-based sports increases the likelihood that students were active, practitioners should seek to enhance opportunities for participation in and access to these programs in order to increase the level of activity obtained by students.

**Key words:** Social support; physical activity; sedentary behaviour; youth; school sports; schools; gender

La traduction du résumé se trouve à la fin de l'article.

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Participation in physical activity (PA) is an integral component of a healthy lifestyle as it is associated with a number of positive health benefits, such as reduced risk of several chronic diseases and improved cardiorespiratory fitness.<sup>1-5</sup> Given the decline in PA levels among youth populations, it is important to understand the factors that are associated with PA in order to inform the development of new prevention programs.<sup>6-8</sup>

Examining the relationship between the school environment and PA is important since school-based PA can account for up to 40% of the total activity among youth populations.<sup>9</sup> In the province of Ontario (Canada), all secondary schools offer health and physical education (HPE) classes as part of the school curriculum, however, after one mandatory HPE credit, it is not obligatory for students to enroll in these classes. This is an important limitation of the current policy as recent research has identified that there is a steep decline in enrollment in HPE between grades 9 and 12.<sup>10,11</sup> Schools can compensate for this limitation by offering students the opportunity to participate in other activities such as varsity and intramural teams; however, these programs are also plagued by low levels of enrolment.<sup>10</sup> As such, there is a need to better understand how participation in school-based activities are associated with PA in order to determine if practitioners need to develop new programs for schools or simply identify new mechanisms to help students take advantage of the existing opportunities.

Factors outside the school environment also affect youth PA. A recent review identified that social support from either family members or friends is associated with PA among youth.<sup>4</sup> This can be in the form of either direct/instrumental support (overt provision of assistance) or indirect support (encouragement and emotional support).<sup>12-15</sup> Research in tobacco control has identified

distinct high- and low-risk student populations as a function of the social support;<sup>16</sup> this concept has yet to be examined in the PA literature. Given the importance of social support in youth PA, such insight would be valuable for targeting programs to at-risk youth populations.

The purpose of the present study is to better understand the relationship between PA and social influences by a) examining how social influences, participation in intramurals, varsity and community sports are associated with PA, and b) examining gender differences in participation rates in school- and community-based sports and the PA levels of students.

## METHODS

### Design

This cross-sectional study used self-reported data collected in 2005-2006 from 25,416 grade 9 to 12 students attending a convenience sample of 76 secondary schools in Ontario, Canada. Data were col-

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**Table 1.** Sample Characteristics by Sex

Characteristics	Males (n=11,381)		Females (n=11,017)		Chi-Square
	%	(n)†	%	(n)†	
Age (in years)					$\chi^2=51.77$ , $df=4$ , $p<0.0001$
	14	23.5	24.1	(2660)	
	15	27.0	27.4	(3013)	
	16	23.4	23.9	(2634)	
	17	18.6	19.4	(2188)	
	≥18	7.5	5.2	(572)	
Smoking Status					$\chi^2=3.33$ , $df=2$ , $p<0.190$
	Non-smoker	82.1	81.2	(8695)	
	Occasional smoker	8.8	9.5	(1011)	
	Daily smoker	9.1	9.3	(998)	
Physical Activity Level					$\chi^2=146.40$ , $df=1$ , $p<0.0001$
	Low active	11.3	17.0	(1870)	
	Active	88.7	83.0	(9147)	
BMI‡					$\chi^2=5.39$ , $df=2$ , $p<0.066$
	Normal weight	80.9	79.7	(8744)	
	Underweight	5.1	5.3	(576)	
	At risk of overweight	14.0	15.0	(1650)	
Social Support					$\chi^2=0.003$ , $df=1$ , $p<0.0001$
	Socially supported	94.3	94.3	(8278)	
	Low social support	5.7	5.7	(499)	
Intramural Activities					$\chi^2=289.32$ , $df=1$ , $p<0.0001$
	Does not participate	61.8	72.5	(7942)	
	Does participate	38.2	27.5	(3008)	
Varsity Sports					$\chi^2=127.42$ , $df=1$ , $p<0.0001$
	Does not participate	55.1	62.5	(6851)	
	Does participate	44.9	37.5	(4103)	
Community Sports Teams					$\chi^2=314.25$ , $df=1$ , $p<0.0001$
	Does not participate	44.9	56.8	(6226)	
	Does participate	55.1	43.2	(4729)	
Sedentary Behaviours					$\chi^2=312.03$ , $df=2$ , $p<0.0001$
	Low sedentary	8.1	12.4	(1358)	
	Moderate sedentary	55.4	61.2	(6691)	
	High sedentary	36.5	26.4	(2891)	

† Numbers may not add to total because of missing values

‡ BMI values have been adjusted for age and sex

lected using the Physical Activity Module (PA-M) of the School Health Action Planning, and Evaluation System (SHAPES); 76.7% response rate for the PA-M implementation. The University of Waterloo Office of Research Ethics and appropriate School Board Ethics committees approved all procedures. Additional details about this project, SHAPES, and the psychometric properties of our measures are available in print<sup>17</sup> or online ([www.shapes.uwaterloo.ca](http://www.shapes.uwaterloo.ca)).

## Measures

Kilocalories per kilogram of body weight per day (KKD) are used to measure respondents' PA. PA was measured by asking respondents how many minutes of vigorous physical activity (VPA) and moderate physical activity (MPA) they engaged in on each of the last seven days. The average KKD expended in VPA and MPA were calculated as:

$$\text{KKD} = [(\text{Hours of VPA} * 6\text{MET}) + (\text{Hours of MPA} * 3\text{MET})] / 7 \text{ days}^\dagger$$

Since youth tend to substantially over-report time spent doing PA in self-reports, the SHAPES measures are most valid for differentiating active and low active students.<sup>18,19</sup> Therefore, within our sample, students less than three KKD were classified as low active; students greater than three KKD were considered active.

Students were asked if they participate in intramural activities, varsity teams, and community sports teams. Students were also asked to report their parent(s)' or guardian(s)' encouragement level (indirect) and support (direct) of PA. If students reported that they were not encouraged or supported, they were classified as low social support. However, if they reported receiving encouragement and support, they were classified as being socially supported. Sedentary behaviour was measured by asking respondents to report the number of hours of "screen" time (e.g., watching TV, playing video games) for each day of the week. Students with less than one hour per day were classified as low sedentary, those with between one

and three hours were classified as moderate sedentary, and students with more than three hours per day were classified as high sedentary. Body mass index (BMI), adjusted for age and sex, was calculated using previously validated self-report measures of weight (kg) and height (m) ( $\text{BMI}=\text{kg}/\text{m}^2$ ).<sup>19</sup> Consistent with CDC guidelines, students within the lowest 5<sup>th</sup> percentile for BMI were classified as underweight, those within the highest 15<sup>th</sup> percentile were classified as at-risk of overweight (AR-O), and those within the 6<sup>th</sup> to 84<sup>th</sup> percentile were classified as normal weight.<sup>20</sup> The smoking stage categories used were consistent with existing research.<sup>16,21</sup>

## Analyses

We first examined sample characteristics to determine whether there were gender differences in PA levels or other variables using chi-squared analysis. Differences between low active and active by sex were then examined. Gender-specific logistic regression analyses were then performed to examine how social support, school-based activities, and community sports were associated with PA. Each logistic regression analysis used the *proc genmod* command in the statistical package SAS 8.02<sup>22</sup> with school as a class statement in order to control for the effect of clustering within schools.

## RESULTS

### Descriptive statistics

Sample characteristics are presented in Table 1. The sample was 50.8% male ( $n=11,381$ ) and 49.2% female ( $n=11,017$ ). The average BMI was 22.1 ( $\pm 3.53$ )  $\text{kg}/\text{m}^2$  among males and 21.6 ( $\pm 3.4$ )  $\text{kg}/\text{m}^2$  among females. The majority of students (94.3%) were classified as having social support for PA, and this was consistent across age groups and gender. Males were more likely than females to participate in intramural activities ( $\chi^2=289.32$ ,  $df=1$ ,  $p<0.001$ ), varsity sports ( $\chi^2=127.42$ ,  $df=1$ ,  $p<0.001$ ) and community sports ( $\chi^2=314.25$ ,  $df=1$ ,  $p<0.001$ ). Overall, 85.9% of students were considered active, and there were significant gender differences with respect to the prevalence of PA ( $\chi^2=146.04$ ,  $df=1$ ,  $p<0.001$ ).

† Assuming the standard metabolic equivalent (MET) for VPA is 6 and MPA is 3 as per CDC guidelines (<http://www.cdc.gov/nccdphp/dnpa/physical/terms>).

**Table 2.** Sex-specific Sample Characteristics by Physical Activity Level

Characteristics	Males				Chi-Square	Females				
	Low Active (n=1291)		Active (n=10,090)			Low Active (n=1870)		Active (n=9147)		
	%†	(n)‡	%†	(n)‡		%†	(n)‡	%†	(n)‡	
Age (in years)										
14	1.8	(201)	21.7	(2468)	$\chi^2=74.56$ , df=4, p<0.001	2.6	(291)	21.5	(2369)	$\chi^2=137.64$ , df=4, p<0.001
15	2.9	(335)	24.0	(2736)		4.4	(480)	23.0	(2533)	
16	2.8	(316)	20.6	(2349)		4.4	(484)	19.5	(2150)	
17	2.7	(308)	15.9	(1811)		4.4	(486)	15.0	(1652)	
≥18	1.2	(131)	6.4	(726)		1.2	(129)	4.0	(443)	
Smoking Status										
Non-smoker	8.9	(972)	73.2	(7986)	$\chi^2=12.27$ , df=2, p<0.01	13.5	(1440)	67.8	(7255)	$\chi^2=10.22$ , df=2 p<0.01
Occasional smoker	1.2	(116)	7.7	(842)		1.6	(167)	7.9	(844)	
Daily smoker	1.3	(144)	7.8	(853)		1.9	(205)	7.4	(793)	
BMI§										
Normal weight	8.6	(975)	72.3	(8191)	$\chi^2=46.21$ , df=2, p<0.001	13.3	(1453)	66.5	(7291)	$\chi^2=10.68$ , df=2, p<0.01
Underweight	1.0	(113)	4.1	(459)		1.2	(126)	4.1	(450)	
At risk of overweight	1.7	(195)	12.3	(1394)		2.5	(276)	12.5	(1374)	
Social Support										
Socially supported	7.8	(722)	86.6	(8036)	$\chi^2=168.69$ , df=1, p<0.001	13.1	(1152)	81.2	(7126)	$\chi^2=97.09$ , df=1, p<0.001
Low social support	1.4	(132)	4.2	(394)		1.7	(150)	4.0	(349)	
Intramural Activities										
Does not participate	10.0	(1120)	51.9	(5839)	$\chi^2=416.07$ , df=1, p<0.001	15.1	(1657)	57.4	(6285)	$\chi^2=306.66$ , df=1, p<0.001
Does participate	1.4	(153)	36.8	(4144)		1.9	(204)	25.6	(2804)	
Varsity Sports										
Does not participate	9.4	(1058)	45.7	(5147)	$\chi^2=459.01$ , df=1, p<0.001	13.9	(1523)	48.6	(5328)	$\chi^2=361.86$ , df=1, p<0.001
Does participate	1.9	(213)	43.0	(4846)		3.1	(334)	34.4	(3769)	
Community Sports Teams										
Does not participate	8.9	(999)	36.1	(4065)	$\chi^2=648.61$ , df=1, p<0.001	14.0	(1535)	42.8	(4691)	$\chi^2=597.84$ , df=1, p<0.001
Does participate	2.5	(276)	52.6	(5928)		3.0	(328)	40.2	(4401)	
Sedentary Behaviours										
Low sedentary	0.9	(95)	7.3	(817)	$\chi^2=153.89$ , df=2, p<0.001	2.0	(217)	10.4	(1141)	$\chi^2=28.29$ , df=2, p<0.001
Moderate sedentary	4.6	(514)	50.8	(5707)		9.6	(1048)	51.6	(5643)	
High sedentary	5.9	(663)	30.6	(3444)		5.3	(579)	21.1	(2312)	

† Presented as percent of total per variable by sex; may not add to 100% due to rounding

‡ Numbers may not add to total because of missing values

§ BMI values have been adjusted for age and sex

Gender-specific sample characteristics by PA are presented in Table 2. A considerable proportion of active males reported being socially supported (86.6%), a non-smoker (73.2%), and of normal weight status (72.3%). Similar patterns were found among active females (81.2%, 67.8%, and 66.5%, respectively). Results of the logistic regression analyses are presented in Table 3.

**Factors associated with physical activity – Males**

There was a decreased likelihood of being active if the student had low social support (OR 0.61, 95% CI 0.48-0.77). There were positive associations between being active and moderate sedentary behaviours (OR 1.69, 95% CI 1.27-2.25), as well as intramural activities (OR 1.92, 95% CI 1.51-2.42), varsity sports (OR 1.93, 95% CI 1.55-2.39), and community sports teams (OR 2.84, 95% CI 2.37-3.39).

**Factors associated with physical activity – Females**

There was a decreased likelihood of being active if the student had low social support (OR 0.72, 95% CI 0.58-0.89). Positive associations were also found between being active and participation in intramural activities (OR 1.55, 95% CI 1.26-1.90), varsity sports (OR 1.77, 95% CI 1.48-2.11) and community sports teams (OR 2.90, 95% CI 2.49-3.38).

**DISCUSSION**

Our results suggest that a lack of social support and participation in school- and community-based sports are associated with the amount of PA youth engage in. Consistent with previous research, we found that students who participated in community sports were more active compared to their non-participating counterparts.<sup>4</sup> This relationship was consistent across genders, though males and

females differed in their levels of participation. It is possible that those students who play on community teams also participate on varsity or intramural teams of the same sport, thus contributing a significant portion to their overall activity level. It is uncertain why females are less likely to participate in community sports; however, they appear to be missing out on opportunities to significantly increase their levels of activity.

Students with low levels of social support for PA were more likely to be considered low active. However, the cross-sectional design of this study precludes examination of the temporal relationship between social support and PA. For instance, it would be illuminating to know how family PA patterns influence the number of opportunities a young person has to be active, and how the availability of different PA opportunities in the school may mediate such influences. Longitudinal data are required to address such questions. Despite this limitation, our finding remains important. Even though this population of high-risk students only represents 6% of the student population, this distinct population may require prevention programs tailored to their unique social support needs. As such, research evaluating the effectiveness of non-tailored PA prevention programming should consider including and excluding this high-risk group within the analyses; the benefit of this approach has previously been demonstrated in tobacco control.<sup>23</sup>

The association between sedentary behaviours and PA in males and females appears to be different. Males were more likely to be active if they reported moderate sedentary behaviours, while no association was found in females. Previous research indicates that sedentary behaviours such as screen time are distinct from PA and do not necessarily replace time spent being active.<sup>24</sup> It may be that those males who spend more time being active tend to spend their

**Table 3.** Logistic Regression Multivariate Analyses Examining Physical Activity as a Function of Social Support, Participation in Intramurals, Varsity Sports, and Community Sports, Weight Status, Sedentary Activity, and Smoking Status

Characteristics		Adjusted Odds Ratio (95% CI)	
		Males Active vs. Low Active†	Females Active vs. Low Active‡
Social Support	Socially supported	1.00	1.00
	Low social support	0.61 (0.48, 0.77)***	0.71 (0.58, 0.89)**
Age§ Grade	Each year	1.12 (0.95, 1.32)	1.14 (0.98, 1.32)
	9	1.00	1.00
BMI	10	0.63 (0.48, 0.82)***	0.59 (0.47, 0.74)***
	11	0.60 (0.40, 0.88)**	0.47 (0.33, 0.66)***
	12	0.42 (0.24, 0.71)**	0.32 (0.20, 0.52)***
Intramural Activities	Normal weight	1.00	1.00
	Underweight	0.64 (0.48, 0.85)**	0.76 (0.59, 0.99)*
Varsity Sports	At risk of overweight	0.97 (0.79, 1.20)	1.09 (0.92, 1.30)
	Does not participate	1.00	1.00
Community Sports Teams	Does participate	1.92 (1.51, 2.42)***	1.55 (1.26, 1.90)***
	Does not participate	1.00	1.00
Sedentary Behaviours	Does participate	1.93 (1.55, 2.39)***	1.77 (1.48, 2.11)***
	Does not participate	1.00	1.00
Sedentary Behaviours	Does participate	2.84 (2.37, 3.39)***	2.90 (2.49, 3.38)***
	Low sedentary	1.00	1.00
	Moderate sedentary	1.69 (1.27, 2.25)***	0.96 (0.77, 1.17)
	High sedentary	0.88 (0.66, 1.16)	0.81 (0.65, 1.00)

Odds ratios adjusted for age, grade, sex, smoking status, and all other variables in the table

† 1 = Active (n=8164), 0 = Low active (n=816)

‡ 1 = Active (n=7327), 0 = Low active (n=1264)

§ Age as continuous variable

|| BMI values have been adjusted for age and sex

\* p<0.05 \*\*p<0.01 \*\*\*p<0.001

leisure time using the computer, promoting social behaviour as previously suggested.<sup>25,26</sup> Given the complex relationship between sedentary behaviours and PA,<sup>27</sup> and from our findings of the association between sedentary risk level and PA, it may be just as important to encourage students to be active as it is to discourage inactivity. Research is required to test this hypothesis and to evaluate the differential impact such interventions may have across genders.

Participation rates in intramurals and varsity sports seen here are higher than previously reported.<sup>10</sup> This is important considering that those individuals who participated in these activities were almost twice as likely to be considered PA. Therefore, while perhaps not the most important contributor to youth PA, participation in intramurals and varsity sports can add significantly to a student's overall activity level. Consistent with previous research, we also found that males were more likely to participate in intramural activities and varsity sports than females.<sup>2,4,11-13,27,28</sup> Given that participation in school-based activities declines as grade level increases, it is prudent then to make these programs as appealing as possible to all students in order to increase enrolment.<sup>9,11</sup> Schools and school boards could look for creative options to increase funding and supervision to overcome barriers to providing these programs, and seek to improve student access to activities by offering a variety of sports and available times from which the students can choose.<sup>10,29</sup>

### Limitations

Since no data are available on ethnicity, we are unable to determine the relative influence it may play and the potential interaction with social influence. Examining sedentary behaviours as a composite of "screen" time inhibited investigating other types of non-PA leisure activities. Data were collected cross-sectionally and therefore causal relationships cannot be inferred. Finally, as data were collected via self-report, the validity of the responses can be chal-

lenged, although the tools and measures have previously been demonstrated to be both reliable and valid.<sup>19</sup>

### CONCLUSION

Considering that students receiving low support for PA are less likely to be active than their peers who receive support, interventions to increase support and engagement in PA may be more successful if directed at this high-risk group. Moreover, participation in school- and community-based sports increased the likelihood that students are more active. Females were less likely to participate in these activities, thus missing out on opportunities to considerably add to their level of activity. Practitioners should seek to enhance participation and access to these programs, especially among females.

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## RÉSUMÉ

**Objectif :** Examiner en quoi le soutien social et la participation aux sports intra-muros, universitaires et communautaires sont associés à l'activité physique chez les élèves du secondaire de l'Ontario et étudier les sexospécificités dans la prévalence de l'activité physique et la participation aux activités sportives en milieu scolaire et communautaire.

**Méthode :** Nous avons recueilli des données sur 25 416 élèves (9<sup>e</sup> à 12<sup>e</sup> année) fréquentant 76 écoles secondaires de l'Ontario à l'aide du Système d'intervention, de planification et d'évaluation de la santé dans les écoles (SIPÉSÉ). Au moyen d'analyses de régression logistique, nous avons examiné l'association entre le soutien social et la participation sportive en milieu scolaire et communautaire, d'une part, et l'activité physique d'autre part.

**Résultats :** Les garçons et les filles peu encouragés à faire de l'activité physique dans leur milieu social étaient moins susceptibles d'être actifs que leurs pairs moins à risque (garçons : rapport de cotes [RC] = 0,61; filles : RC = 0,72). Garçons et filles étaient plus susceptibles d'être actifs s'ils participaient à des sports intra-muros (garçons : RC = 1,92; filles : RC = 1,55), universitaires (garçons : RC = 1,93; filles : RC = 1,77) ou communautaires (garçons : RC = 2,84; filles : RC = 2,90).

**Conclusion :** Étant donné que les élèves recevant peu de soutien social à l'activité physique sont moins susceptibles d'être actifs, les interventions visant à accroître le soutien et le goût pour l'activité physique devraient cibler ces élèves. De plus, comme la participation aux sports scolaires et communautaires augmente la probabilité que les élèves soient actifs, les praticiens devraient chercher à améliorer les occasions de participation et l'accès à de tels programmes afin d'accroître le niveau d'activité des élèves.

**Mots clés :** soutien social; activité physique; comportement sédentaire; jeunes; sport scolaire; écoles; sexospécificités