Do Kids Move It, Move It? Exploring Grade and Sex Influences on Movement Behaviour During Balanced School Day Nutrition Breaks

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BACKGROUND

- The Canadian 24-Hour Movement Guidelines for Children and Youth[1] recommend daily minimum physical activity (PA) and sedentary behaviour (SB) amounts for 5- to-17 year olds (Figure 1).

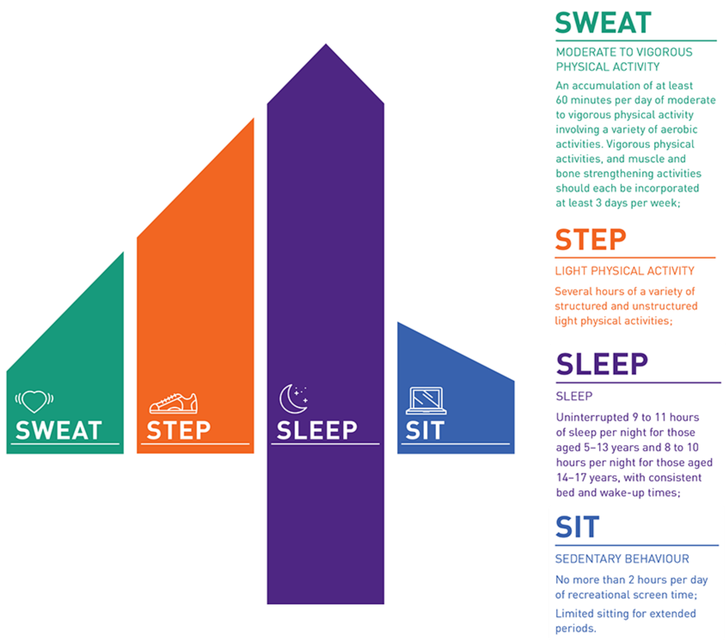

Figure 1. Canadian 24-Hour Movement Guidelines for Children and Youth
Source: CSEP, 2018

- In Canada, 7% of children and youth meet the daily MVPA recommendation on at least 6 out of 7 days, and 33% meet the MVPA recommendation on a weekly average[2]. Further, 55% of Canadian 5- to-17-year-olds do not meet SB guidelines[3].
- Schools represent an ideal setting for recalibrating health behaviours as children spend approximately one third of their waking hours at school[4]. In particular, non-curricular approaches, such as nutritional breaks, have potential for increasing school day PA[5-7].
- There is limited literature investigating primary and junior students' PA patterns during the balanced school day (BSD) schedule (Table 1), more specifically exploring students' movement behaviours during nutritional breaks in the context of the Canadian 24-hour movement guidelines[1].

PURPOSE

- To examine primary (grades 1-3) and junior (grades 4-6) students' PA in the context of the Canadian 24-hour movement guidelines[1]; specifically, their time spent 'sweating', 'stepping', and 'sitting' during school day nutrition breaks.

Table 1. Sample balanced school day schedule.

Balanced School Day Schedule	
100 minutes	Instructional Block 1
40 minutes	**Nutrition/Activity Break 1**
100 minutes	Instructional Block 2
40 minutes	**Nutrition/Activity Break 2**
100 minutes	Instructional Block 3

Note. A typical balanced school day schedule includes two 40-minute nutritional breaks separated by three 100-minute instructional blocks. During each nutrition break, children are given 20 minutes to eat and 20 minutes of outdoor leisure time.

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METHODS

Participants

- Children (n = 159; 52% F; M_{age} = 9.03 years, SD = 1.663) from two Northern Ontario elementary schools following the BSD schedule.

Measures and Procedures

- Participants wore an omni-directional accelerometer (Philips Respironics ActiCal; sampling rate 2 sec) for 5 consecutive school days between March and June 2017.
- To be included in the analysis, participants must have had at least 4 out of 5 days of wear time, and an average wear time of 4 hours per day (based on a 5 day average).
- Pre-determined cut-points[8] (Table 2) were used to calculate the amount of time spent in MVPA, LPA, and SB during the 40-minute nutrition/activity breaks.

Table 2. PA Intensity cut-points for Actical Accelerometers.

Intensity	Counts per Minute
SB	< 100
LPA	100 to < 1500
MPA	1500 to < 6500
VPA	> 6500

Source: Colley et al., 2011

RESULTS

Division and Gender Effects

- We conducted a 2(Division) x 2(Sex) MANOVA and found main effects for Division and Sex, as illustrated in Figures 2 and 3, but no significant interactions.

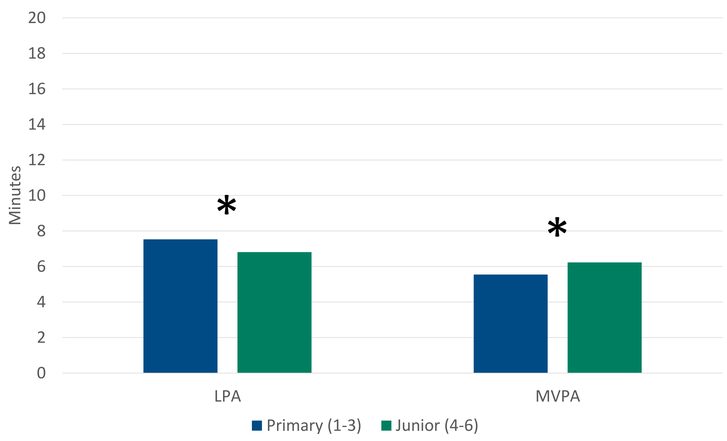

Figure 2. Accumulated LPA and MVPA minutes during average 40-minute nutrition/activity break.
Students in the primary grades spent significantly more time in LPA than those in junior grades (F (1, 155) = 7.14, * p < .05, η^2 = .04), and junior grade students spent significantly more time in MVPA than primary (F (1, 155) = 3.98, * p < 0.05, η^2 = 0.02).

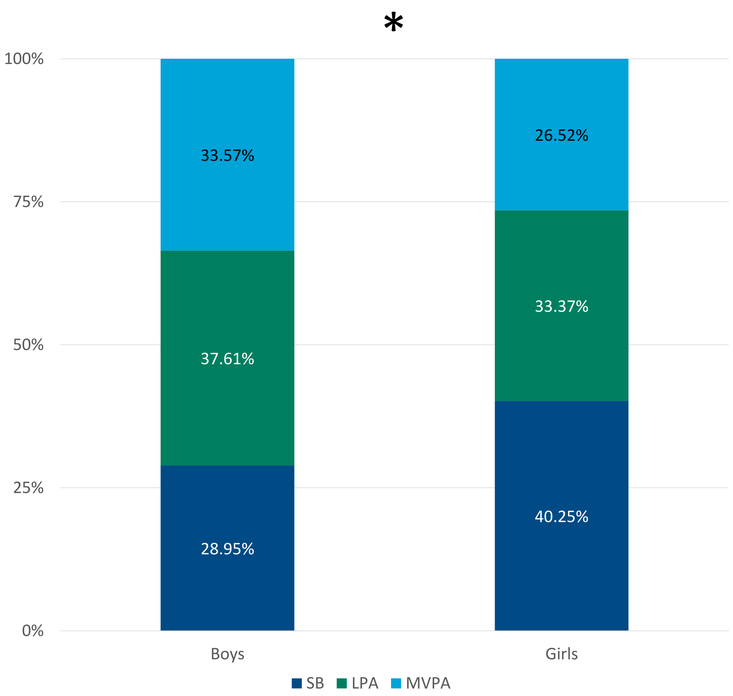

Figure 3. Children's movement patterns during average 20-minute activity break.
Boys displayed significantly more LPA and MVPA and less SB than girls (* ps < .05, η^2=.07-.14).

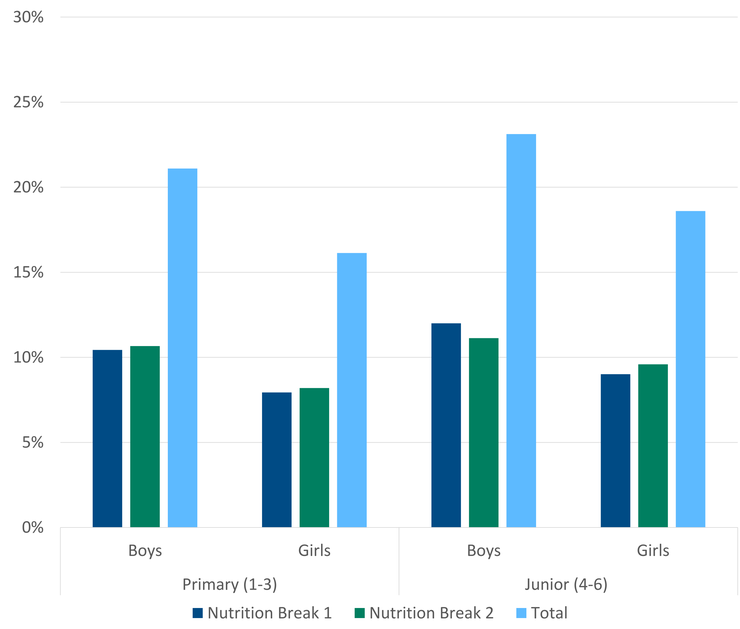

Figure 4. Accumulated percent towards daily MVPA recommendation.
Boys and girls in the primary grades accumulated a total of 21% and 16% towards the recommended 60-minutes of daily MVPA, respectively, and boys and girls in the junior grades accumulated a total of 23% and 19% of the daily MVPA recommendations, respectively.
There were main effects for sex, although there were no sex by division interactions.

CONCLUSION

- Findings align with previous studies of children aged 6-11 that suggest boys engage in more MVPA[9-13] and are more active[6,14] than girls during activity breaks, and girls engage in more SB than boys during school activity breaks[11].
- Findings contrast studies of children aged 8-11 that suggest girls engage in more MVPA than boys during activity breaks[15], as well as studies that suggest no difference between boys and girls in regards to activity break PA[16] and SB[12].
- The results of this study show that as children progress into the junior grades, an upward trend was seen for the amount of MVPA accumulated during activity break times.
- It is important to explore the variations in play activities and patterns within the school context to identify opportunities to tailor PA interventions to girls and younger children[17]. However, a reasonable goal of increasing MVPA to 50% (10 minutes) per break in all children is suggested, as the results of this study show that on average, children participated in MVPA for 26% to 34% of each activity break.
- Children accumulated between 16% and 23% towards daily MVPA recommendations despite total daily activity breaks accounting for only 10.5% of the school day. Thus, school activity breaks remain a good opportunity for children to accumulate PA[6,11,15-16].
- Although activity breaks remain an important school-day contributor to children's PA, strategies that aim to increase DPA policy[18] compliance, as well as active transportation to school may help maximize school-day PA contributions.
- Further research is required to better understand children's choice of activities during unstructured play-time to develop strategies that decrease SB during those times. This point is reinforced given the important associations between physical literacy and adherence to Canadian PA and SB guidelines[19].

***A list of all reference information and a copy of the poster are available by the QR code, or by contacting:**

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