Differences in Occupational, Transportation, Domestic, and Leisure-Time Physical Activities: Do Geographical Location and Socio-Cultural Status Matter?

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Background: Researchers have recently expressed their concern for the health of Francophones and rural dwellers in Canada. Their levels of physical activity may explain part of the observed differences. However, little is known about the physical activity levels of these 2 groups. The purpose of this study was to assess levels of physical activity among a sample of Francophones and rural dwellers. The study also assessed the associations of various types of physical activity to measures of health status. Methods: A quota-based convenience sample of 256 adults from Northern Ontario was surveyed using the IPAQ and the SF-12. Results: There were no significant differences in activity levels between language groups (P = .06) or geographical groups (P = .22) on the combined dependent variables based on MANOVA. Leisure-time physical activity scores were consistently associated to better physical component summary scores of the SF-12. Conclusions: Implications for practice include that leisure-time physical activities have been at the forefront of public health promotion, and our findings support this approach. Further, population specific interventions are indeed important, however, within this Canadian context when identifying target groups one must look beyond sociocultural status or geographical location.

Keywords: adult, Anglophone, Francophone, physical activity, rural, urban, IPAQ

Researchers have recently expressed their concern for the health of Francophones1,2 and rural dwellers in Canada.3 The health benefits of physical activity are numerous,4 and its modifiable nature makes for an attractive health promotion and prevention solution. Picard and Allaire reported that 21% of Francophones in Ontario were active (ie, expended >3 kcal/kg/day) during their leisure-time compared with 25% among Anglophones (P < .05). Desmeules et al3 also found some indication of lower levels of health practices among those living in rural areas and much of the literature suggests that physical activity is less prevalent among rural residents.5-8 Thus, it is possible that low physical activity levels may be a key part of the explanation for poor health outcomes among Francophones and rural Canadians. Picard and Allaire’s and Desmeules et al’s findings are helpful in guiding us to consider physical activity among these population, both as a potential contributor to health and a therapeutic intervention. However, their purpose was not to examine physical activity in detail, therefore their findings do have 2 main limitations in this regard. First, it is not clear that those in poor health are inactive. Second, the reports focused only on leisure-time physical activity.

Many studies have examined differing physical activity behaviors based on geographical location and sociocultural status. For instance, Martin et al found opposing physical activity trends when comparing persons residing in the Southern United States to those in the West.6 Bauman and colleagues reported regional variations when comparing those living near Australia’s ocean coast to inland residents.9 Ocean coast residents reported healthier levels of physical activity compared with their inland counterparts. Despite most researchers5-8 suggesting that rural dwellers are less active in their leisure-time, Brown et al did find that rural and remote women fared better with regards to all types of physical activity than those residing in urban areas.10 Beyond geographical location, Bryan et al11 looked at variations in physical activity levels among culturally distinct populations in Canada and found that the prevalence of physically active Canadian adults varied by ethnicity. The Report of the United States Surgeon General12 highlighted similar results; African-American women had the lowest leisure-time activity rates (63.3%), whereas White, non-Hispanic men had the highest rates of physical activity (74.7%).

Particularly relevant to the current paper, variations may also exist in the levels of physical activity among various sociocultural and geographically distinct groups when different ‘types’ of physical activity are considered (ie, occupational, domestic, transportation, and recreational activity categories). For example, Slattery et al13 found that Hispanics were more likely to report
domestic-related physical activities, such as housework and dependent care, than non-Hispanic whites. Non-Hispanic whites on the other hand were more likely to report sport-based activities. Similarly, Brownson et al found that whites reported higher frequencies of leisure-time physical activity, while Aboriginals and Hispanics reported greater amounts of work and chore related physical activities. Rural residents on the hand were more likely to be active in the home. More recently, Arnadottir et al reported greater amounts of work activity among older adults residing in rural communities than their urban counterparts. Thus, examining physical activities beyond ‘leisure-time’ within the boundaries of geographical location and sociocultural status among Francophones and rural Canadians indeed merits greater attention.

In addition, understanding the health benefits of various types of physical activity are of equal importance. Recently, Church et al found a graded dose-response relationship among groups receiving exercise regimes of various intensities and their fitness outcomes. The authors reported that even relatively small doses of activity significantly improved fitness, while those receiving 150% of the public health recommended amounts of activity (ie, 8 kcal/kg per week) experienced the greatest benefits. Researchers have consistently postulated that leisure-time and transportation physical activities lead to better objective health outcomes, however, the positive association of occupational and domestic activities have been less convincing.

Objective health assessment methods have been widely used, but these measures are less feasible in larger samples and more costly to administer. Self-rated health measures are an efficient alternative and have been found to be correlated with objective health indicators. Thus, researchers have explored the association of physical activity to positive subjective health assessments. For instance, Gilmour found that physically active Canadians, when compared with their inactive counterparts, fared better on a number of subjective health measures, including self-reported health status (ie, active persons were more likely to report excellent or very good health). Kaleta et al also found in sample of 598 Polish adults that those who reported expending greater than 1000 kcal/week during their leisure-time were significantly less likely to report poor health on the EuroQol 5D, an international standardized quality of life questionnaire. Much like objective measures, most studies assessing the relationship of physical activity with self-perceived health status have supported the benefits of leisure-time activities with findings less evident for everyday activities. Given public recommendations of getting active “at home, at school, at work, at play, and the way,” further attention needs to be given to the health impacts of various types of physical activity.

Therefore, the primary intent of this study was to assess levels of physical activity (ie, occupational, domestic, transportation, and leisure-time physical activities) in a sample of Canadian Francophones and rural dwellers. Moreover, this study assessed the associations of various types of physical activity to measures of self-rated health status (ie, physical and mental health).

Methods

Three research questions were addressed in this study.

1. Do rates of physical activity differ between Anglophones and Francophones in Ontario?
2. Do rates of physical activity differ between rural and urban residents in Ontario?
3. To what extent does the type of physical activity influence self-rated health status?

Study Design and Sample

This study used a convenience sampling frame. A respondent quota-based on geographical location, gender, and age was applied to ensure proper representation within the respondent group. The intended sample was first stratified based on the percentage of Francophones within 5 designated geographical areas of the northeastern part of the province of Ontario (NEO). Even distribution across genders was sought and a minimum of 25% of respondents were required between the ages of 18–34, 35–50, and 51–69, respectively. The remaining 25% of respondents could fall anywhere between the ages of 18 and 69. It was estimated that approximately 224 respondents were needed in this study for group comparisons (power = 0.80, estimated effect size = 0.33, 1-tailed α = 0.05).

Due to the large geographical area, participants were recruited across Northeastern Ontario by 9 research assistants (RA). RAs were provided with specific procedural guidelines and underwent a 2-hour training session. Each RA received a respondent quota-based on the geographical location of their intended collection sites. They recruited participants at multiple locations, including shopping malls, grocery stores, recreation facilities and other public places to ensure that persons from various demographic backgrounds were included. The following inclusion criteria were applied: (a) first language learned as a child and still understood was either French or English, (b) age was 18 to 69 years, and (c) were a resident of a NEO community. Date, time, and location of collection, as well as the respondent’s relationship to the RA, if any, were recorded. Upon acceptance to participate, respondents were asked to read an information form and were asked to provide written consent. Research Ethics Board approval was obtained from the authors’ academic institution. The respondents then completed the survey and immediately returned it the RA.

Geographical and Socio-Cultural Context

Francophones represent only 4.8% (n = 582,855) of the total population of Ontario, however, 25% of them reside in northern regions. Northern Ontario is best recognized for its wilderness and rural areas. Northern Ontario covers nearly 90% of the province, but houses
only 6% of its total population. Northern Ontario’s population density (1 person per square kilometer) is less than 1% of Southern Ontario’s population density (115 persons per square kilometer). This area is comprised of 10 territorial districts, 5 of which where included in this study; they collectively encompass Northeastern Ontario—Algoma, Cochrane, Nipissing, Sudbury, and Timiskaming (see Figure 1). Northeastern Ontario is defined as a large geographical area that covers 7 of Northern Ontario’s territorial districts (excluding Thunder Bay, Rainy River and Kenora). One-third of the North’s population lives in rural areas (35%), 86% of the remaining two-thirds reside in 1 of its 5 major urban centers: Thunder Bay, Sault-Ste-Marie, Timmins, Sudbury, and North Bay. We surveyed respondents from 3 urban locations (Greater City of Sudbury, North Bay, and Timmins) and 5 rural locations (Hagar/Markstay/Warren, Sturgeon Falls/Verner, Elliott Lake, New Liskeard, and Kapuskasing). Rural was defined as communities with a population of less than 10,000 people.

**Measures**

The International Physical Activity Questionnaire (IPAQ) was used to assess physical activity patterns in this project. The IPAQ self-administered long-version assesses the frequency, duration, and intensity of activities during the previous 7 days. The questionnaire contains 31 items from the following domains: leisure-time, domestic, occupational, and transportation. The IPAQ provides the researcher with total activity scores expressed as metabolic equivalents (METs). These MET values were

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**Figure 1** — Geographical context. Note: Territorial districts 4, 5, 6, 7, and 8 were included in the study; these areas form most of Northeastern Ontario. Reprinted with the permission of the Ministry of Northern Development, Mines and Forestry. Source: http://www.mndm.gov.on.ca/nordev/documents/sector_profiles/northern_ontario_e.pdf
derived from physiological studies using calorimetry. The IPAQ results can also be categorized into 3 levels: low (less than 600 Met-min/week), moderate (at least 600 Met-min/week), and high (at least 3 days of vigorous activity with a total of 1500 Met-min/week or total activity of 3000 Met-min/week). The measurement properties of the IPAQ have been found to be acceptable.35

In 2000, the International Consensus Group for the Development of the International Physical Activity Questionnaire undertook an extensive reliability (p = 0.81, 95% CI 0.79–0.82) and validity (p = 0.33, 95% CI 0.26–0.39) study across 12 countries at 14 different sites.12 Their study confirmed that the measurement properties of the IPAQ “are at least as good” (p. 1388) as other more seasoned self-report measures of physical activity. More recently, Gauthier et al34 confirmed the results obtained in prior research when assessing the Canadian French version of the IPAQ Self-administered long-version (last 7 days). Intraclass correlation coefficients (ICC) revealed that the IPAQ-Canadian French results were stable between days and validity was confirmed when total activity scores were significantly related to pedometer step counts (Pearson r = .66 P < .01).

The Short Form 12 version 2 (SF-12) was used to assess health status in this project. The SF-12 contains 12 of the original items from the SF-36 survey.35 It measures both self-rated mental health and physical health. The SF-12 is a 1-page questionnaire that can be completed in approximately 2 minutes.36 There is an extensive literature confirming the measurement properties of the parent version (SF-36)35 and that evaluate the SF-12 in comparison with the SF-36.37 The reliability of the SF-12 was assessed using alternate forms reliability and internal consistency. Reliability coefficients ranged from 0.73 to 0.87 across the 8 subscales of the SF-12, while summary scores for physical and mental components were 0.89 and 0.86 respectively. The validity of the SF-12 was assessed by applying a construct validation method referred to as “know-groups” validity.37 Validity coefficients for the mental (RV = 0.92) and physical (RV = 0.81) summary scores revealed that they are likely to lead to similar conclusions as the original SF-36.37 The questionnaire is available in both English and Canadian French.

Statistical Analyses

Data were prepared and analyzed according to each questionnaire’s guidelines for data processing and analysis. For the IPAQ, cases with missing data and ‘unreasonably high’ values (reports of activity in excess of 16-hours/day considered implausible) were identified and excluded from the study.38 Total activity scores were calculated, in addition to scores across individual activity domains (Occupational, Transportation, Domestic, and Leisure-Time). Further, frequencies within activity categories (Low, Moderate, and High) were tabulated. SF-12 scores were calculated by using a statistical software package specifically designed for this tool. The software was obtained from Quality Metric: Health Outcome Solutions (www.qualitymetric.com). The summary scores for both the Physical Component Score (PCS) and Mental Component Score (MCS) were used in this study. The Statistical Package for the Social Sciences (SPSS for Windows 14.0, SPSS Inc., Chicago, IL) was used for all data analyses.

Three separate MANOVA measured for differences between groups (ie, a) language (Francophones and Anglophones), b) geographical location (rural and urban), and c) gender) on the composite dependent variable (ie, Leisure-time, Occupational, Transportation, and Domestic physical activity). Multiple analyses of variance were adjusted for age and gender as confounding variables when appropriate. Correlation matrices quantified the associations between physical activity and health status scores (PCS and MCS) according to language, geography and gender.

Results

A total of 256 respondents consented to participate in this study. The sample included 157 Francophones (61.3%) and 99 Anglophones (38.7%). About 51% of the sample was women and 47% lived in rural areas. The mean age for Francophones was 39.1 years (range of 18–66) and the mean age for Anglophones was 39.9 years (range of 18–67). From this group, 29 participants reported implausible levels of physical activity, and were excluded from further analyses.38 An additional 4 participants were excluded due to missing data on the SF-12. The final sample included 225 participants. Geographical representation across the northern part of the province according to the respondent quotas was confirmed (see Tables 1 and 2). A more detailed demographic description of the final sample is provided in Table 3.

Descriptive statistics of physical activity measures obtained from the IPAQ and the SF-12 are provided in Table 4. The sample was relatively active; only 10.2% of respondents were classified as ‘Inactive,’ while 63.1% were classified as ‘Active.’ Further, overall mean health scores were in the average range with a PCS of 51.95 and a MCS of 49.39 [norms-based scores are calibrated and standarize to a mean 50 (SD: 10)].

The multivariate analyses examined differences in mean physical activity scores (Occupational, Transportation, Domestic, and Leisure-time) obtained from the IPAQ according to language, geography, and gender. Multiple linear regression modeling were also run and yielded very similar findings. When comparing groups, the parametric assumption of equal variance was not met for a number of variables, therefore a more conservative alpha level was set for these variables (P < .025).39 There were no statistically significant differences between the language groups on the combined dependent variables (F = 2.32; P = .06; partial η² = 0.04). There was no significant difference between geographical locations on the combined dependent measures (F = 1.46; P = .22; partial η² = 0.03). There was a statistically significant difference between men and women on the combined dependent variables (F = 4.20; P = .003; partial η² = 0.07). Men reported a
higher level of physical activity under the ‘occupational’ \((F = 9.66; P = .002; \text{ partial } \eta^2 = 0.04)\) and ‘leisure-time’ \((F = 5.95; P = .02; \text{ partial } \eta^2 = 0.03)\) activity domains. According to Cohen’s guidelines, these differences are of small (ie, .01) to medium (ie, .06) effect size when data involve group comparisons are considered.

Correlation matrices examined the strength and direction of the various measures of physical activity (Total Activity, Occupational, Transportation, Domestic, and Leisure-time,) and measures of self-rated health (Physical Component Summary and Mental Component Summary). Parametric assumptions of linearity and homoscedasticity were assessed using scatter plot analyses. These were not met and consequently Spearman’s Rho correlations were used, and showed that among all subpopulations studied, leisure-time physical activity was the only type of activity to be consistently associated with better physical health scores. The positive correlations are approximately of medium strength (40). In general, associations with mental health were unclear. More specific details by language, geography, and gender are provided in Tables 5 and 6.

### Discussion

The findings from this study indicate that activity levels in this sample were relatively high. Among all subgroups, mean Total IPAQ scores surpassed the high active cut-point (>3000 Met-minutes/week). Further, combined analyses found that more than three-fourths of this respondent group was classified as at least ‘moderately active.’ Recent population data suggests nearly half (48%) of the Canadian population over the age of 12 report less than ‘moderate’ (ie, >1.5 kcal/kg/day) levels of physical activity during their leisure-time. The prevalence of persons reporting sufficient levels of daily physical activity appears somewhat inflated in this study, however, Bauman et al recently suggested that comparisons should not be made between IPAQ results and such ‘public health recommended’ amounts of physical activity as it is relatively low if all daily physical activities are assessed.

The current study was conceptualized on the basis that sociocultural status and geographical location appear to impact health and that levels of physical activity may
Table 4  Descriptive Statistics of IPAQ and SF-12 Mean Scores (n = 225)

<table>
<thead>
<tr>
<th>Language groups</th>
<th>Gender</th>
<th>Geographical location</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Francophone mean (SD)</td>
<td>Anglophone mean (SD)</td>
</tr>
<tr>
<td>Total IPAQ MET-min/week</td>
<td>4650.11 (3786.13)</td>
<td>5210.40 (4839.20)</td>
</tr>
<tr>
<td>Occupation MET-min/week</td>
<td>1068.04 (2422.84)</td>
<td>2059.16 (3407.39)</td>
</tr>
<tr>
<td>Transportation MET-min/week</td>
<td>453.65 (732.27)</td>
<td>367.67 (584.80)</td>
</tr>
<tr>
<td>Domestic MET-min/week</td>
<td>1384.84 (1767.38)</td>
<td>1412.76 (1660.57)</td>
</tr>
<tr>
<td>Leisure-time MET-min/week</td>
<td>1743.73 (1829.66)</td>
<td>1373.10 (1694.62)</td>
</tr>
<tr>
<td>“Active”</td>
<td>65.2%</td>
<td>59.8%</td>
</tr>
<tr>
<td>“Moderately Active”</td>
<td>24.6%</td>
<td>29.9%</td>
</tr>
<tr>
<td>“Inactive”</td>
<td>10.2%</td>
<td>10.3%</td>
</tr>
<tr>
<td>SF-12 PCS</td>
<td>52.32 (8.31)</td>
<td>51.36 (7.86)</td>
</tr>
<tr>
<td>SF-12 MCS</td>
<td>49.37 (8.95)</td>
<td>49.43 (8.19)</td>
</tr>
</tbody>
</table>

Abbreviations: SD, standard deviation; PCS, Physical Component Summary; MCS, Mental Component Summary.

Note. METs are multiples of the resting metabolic rate and a MET-min/week is computed by multiplying the MET score of an activity by the minutes performed over a 7-day period (see http://www.ipaq.ki.se/ipaq.htm for additional information). Categories are defined as such: Active = >3000 MET-min/week and Inactive = <600 MET-min/week.
be an important contributor. Further, there is evidence to support that disparities in levels of physical activity exist among culturally and geographically distinct populations. However, our findings were not as convincing. Only gender differences in levels of physical activity were found in this study. Specifically, men reported higher mean scores for occupational and leisure-time physical activity. In addition, leisure-time physical activity was the only ‘mode’ of energy expenditure consistently related to better physical health outcomes. Consequently, these findings will be further discussed.

Several researchers have reported differences in physical activity levels between sociocultural subgroups. It has been said that throughout Canadian history its sociolinguistic dualism is its most salient cultural distinction. With that said, researchers have also found longstanding disparities in other health behaviors when Anglophones and Francophones in Canada are compared. Nevertheless, our data suggest that despite the obvious cultural differences between these 2 language groups, and that sociocultural status alone has been reported by others as an important predictor of physical activity, Francophone and Anglophone physical activity patterns are quite similar.

As well, there were no significant differences in activity patterns among respondents based on geographical locations within Northern Ontario. Most researchers have suggested that rural dwellers are less active in their leisure-time than those residing in urban areas, and that the prevalence of various modes of daily physical activity have also been diverse based on the geographical location. More recently, Gauvin et al suggested population density and dispersion of amenities were important determinants of utilitarian walking, something that is more commonly found in larger metropolitan areas. There is also the generally held view that active occupations (eg, forestry, farming) and physically demanding chores (eg, chopping and carrying firewood) are more prevalent in rural and isolated locations. Thus, we suspected that by examining levels of physical activity of multiple domains based on geographical location alone, interesting differences would be identified. However, our findings suggest there is no difference in patterns of physical activity in a sample of rural and urban Canadians. Therefore, data

Table 5  Spearman’s Rho Correlations Between Physical Activity Scores (IPAQ) and Physical Component Summary Scores (SF-12) (n = 225)

<table>
<thead>
<tr>
<th></th>
<th>Francophones</th>
<th>Anglophones</th>
<th>Men</th>
<th>Women</th>
<th>Rural</th>
<th>Urban</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Activity Score MET-min/week</td>
<td>0.06</td>
<td>0.09</td>
<td>0.08</td>
<td>0.10</td>
<td>0.02</td>
<td>0.12</td>
</tr>
<tr>
<td>Occupation MET-min/week</td>
<td>0.03</td>
<td>–0.04</td>
<td>0.00</td>
<td>–0.01</td>
<td>–0.03</td>
<td>–0.10</td>
</tr>
<tr>
<td>Transportation MET-min/week</td>
<td>–0.10</td>
<td>0.14</td>
<td>–0.04</td>
<td>0.03</td>
<td>–0.02</td>
<td>0.03</td>
</tr>
<tr>
<td>Domestic MET-min/week</td>
<td>–0.04</td>
<td>–0.003</td>
<td>–0.02</td>
<td>–0.03</td>
<td>0.02</td>
<td>–0.07</td>
</tr>
<tr>
<td>Leisure-time MET-min/week</td>
<td>0.23**</td>
<td>0.36**</td>
<td>0.36**</td>
<td>0.21*</td>
<td>0.26**</td>
<td>0.34**</td>
</tr>
</tbody>
</table>

Abbreviations: PCS, Physical Component Summary.
Note. METs are multiples of the resting metabolic rate and a MET-min/week is computed by multiplying the MET score of an activity by the minutes performed over a 7-day period (see http://www.ipaq.ki.se/ipaq.htm for additional information).
* Significant at P < .05.

Table 6  Spearman’s Rho Correlations Between Physical Activity Scores (IPAQ) and Mental Component Summary Scores (SF-12) (n = 225)

<table>
<thead>
<tr>
<th></th>
<th>Francophones</th>
<th>Anglophones</th>
<th>Men</th>
<th>Women</th>
<th>Rural</th>
<th>Urban</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Activity Score MET-min/week</td>
<td>.29**</td>
<td>.13</td>
<td>.16</td>
<td>.26**</td>
<td>.14</td>
<td>.29**</td>
</tr>
<tr>
<td>Occupation MET-min/week</td>
<td>.09</td>
<td>.03</td>
<td>.04</td>
<td>.05</td>
<td>.01</td>
<td>.10</td>
</tr>
<tr>
<td>Transportation MET-min/week</td>
<td>.16</td>
<td>.07</td>
<td>.11</td>
<td>.13</td>
<td>.05</td>
<td>.19*</td>
</tr>
<tr>
<td>Domestic MET-min/week</td>
<td>.20*</td>
<td>.10</td>
<td>.12</td>
<td>.18</td>
<td>.09</td>
<td>.21*</td>
</tr>
<tr>
<td>Leisure-time MET-min/week</td>
<td>.14</td>
<td>.12</td>
<td>.13</td>
<td>.13</td>
<td>–.08</td>
<td>.33**</td>
</tr>
</tbody>
</table>

Abbreviations: MCS, Mental Component Summary.
Note. METs are multiples of the resting metabolic rate and a MET-min/week is computed by multiplying the MET score of an activity by the minutes performed over a 7-day period (see http://www.ipaq.ki/se/ipaq.htm for additional information).
* Significant at P < .05.
from this study do not support that geography alone impacts levels of physical activity, even when multiple domains of physical activity are considered.

In this study, geographical location and sociocultural status offered little insight into levels of physical activity. However, our sample was not entirely homogenous. Specifically, men self-reported greater amounts of work related and leisure-time physical activity. In general, women typically do not fare as well as men when physical activity levels are considered. Thus, our findings are consistent with those previously reported in the literature. From a practical perspective, opportunities to increase occupational physical activities are limited. Thus, this finding provides little avenue for public health intervention. More relevant, women generally hold different views as it relates to leisure time activity. As such, while opportunities for recreational activities clearly exist, these may not appeal or be readily available to all. Understanding more specifically the determinants of active leisure in this context and ways of alleviating the typical barriers (ie, time, child care, social support) women may face in an attempt to being active during leisure-time are essential.

Finally, the findings associated with the physical ramifications of leisure-time physical activity among all subgroups were well supported. Leisure-time physical activities generally come with the intent to be active and consequently also provide the greatest opportunities of public health intervention. Our findings are similar to those of others who reported that leisure-time physical activities play a significant role in the self-perception of health status. In addition, our findings are similar to those of Kaleta et al who found that transportation, occupation, and domestic related activities were not significantly associated to subjective measures of health.

In general, researchers have also supported the mental health benefits of physical activity, including reducing symptoms of depression and anxiety. The findings within this study were not as easily interpretable. There were no clear patterns of association to better mental health for any of the physical activity measures. Our findings do contradict those of Vuillemin et al who reported that subjects meeting public health recommended amounts of leisure-time physical activity were more likely to have better mental health component scores on the SF-36. Our findings may not support the self-perceived mental health benefits of physical activity, however, they do support that not all kinds of physical activity lead to similar health outcomes.

### Limitations

The concept of a perfect design is somewhat utopian and any design will have some aspects that are not as strong as others. To facilitate the interpretation of our results, certain limitations merit further discussion. Specifically, selection, social desirability, recall, and seasonal effect biases will be discussed. First, a convenience sample was used to efficiently collect data from respondents who were readily available. Respondent quotas were established in an effort to obtain a representative sample. A total of 256 respondents accepted to participate, however, there may very well be ‘an active respondent’ effect in this study. In other words, active persons may have been out in public spaces and been more willing to participate. Therefore, the results found among this sample may not hold true among those who were eligible to participate, but chose not to or were not out on the days of collection; thus resulting in selection bias.

Second, it is commonly understood that measures of physical activity by way of self-report present some challenges. Particularly, social desirability bias can lead to over-reporting of physical activity, as well, difficulties recalling activities may affect data accuracy. The International Physical Activity Questionnaire possesses a number of positive attributes. However, given the opportunity to provide responses to activities of multiples types, respondents may innately feel the need to complete all subdomains. Further, respondents are asked to recall activities down to the number of minutes over the past 7 days. Doing so does present itself as a difficult cognitive task. Such bias may indeed explain the relatively high levels of physical activity that were found within this study. Social desirability needs to be considered in the interpretation of our findings. Given that our results do in part differ from those previously reported, one could suggest this limitation influenced our results. Specifically, it remains unknown if social desirability unveils itself differently by people of varying sociocultural status or locations of residence. This may have been controlled if a larger random sample was used.

Third, data were collected during the months of February and March of 2009, when it is near the end of the winter season in Northeastern Ontario. Physical activity patterns are subject to seasonal variations. Therefore, types and amounts of physical activity reported were likely to a certain degree influenced by the time of the year in which the data were collected. Further, data were collected solely within the northern part of the province of Ontario. Future studies should consider comparisons among a broader range of locations.

### Conclusion

This paper presents a detailed description of the activity patterns in a sample of Canadians based on self-report. First, our findings provide important evidence as it relates to types of physical activity and their associated health outcomes. While occupational and domestic activities were prevalent within this study, their association to better self-rated health were questionable. Leisure-time physical activities have generally been at the forefront of public health promotion initiatives, and our findings
support this approach. Second, this study suggests that when population subgroups are considered, levels of physical activity do not vary significantly by sociocultural status or by geographical location. Therefore, geographical location and sociocultural status alone may indeed not be important determinants of physical activity. As such, the homogeneity found within this study, with the exception of gender, suggests that other variables are more cogent predictors of observed disparities in physical activity. Future directions include assessing the influence of other known determinants of physical and how these might differ according to the specific type of physical activity reported. Population specific interventions are indeed important, and within this Canadian context, when identifying target groups one must look beyond isolating sociocultural status or geographical location.

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References

27. Public Health Agency of Canada. (2008). Health living unit: be active, your way, every day for life!—Age is no barrier. [updated 2003 October 8, 2009; cited 2010 February]