Reliability and Validity of the Modified Chinese Version of the Children’s Leisure Activities Study Survey (CLASS) Questionnaire in Assessing Physical Activity Among Hong Kong Children

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This study aimed to examine the reliability and validity of the modified Children’s Leisure Activities Study Survey (CLASS) Chinese-version questionnaire in assessing physical activity among Hong Kong Chinese Children. Test-retest reliability was examined in 84 boys and 136 girls aged 9–12 years by comparing data from two administrations of the survey conducted one week apart. Validity was determined by comparing data from the second administration with accelerometer estimates. The results suggested that the questionnaire provided reliable and valid estimates in overall physical activity patterns in Hong Kong Chinese children. However, substantial overestimation was observed in vigorous activity.

Accurate assessment of regular physical activity is essential for discerning the link between physical activity and health outcomes, for monitoring of physical activity recommendations, and determining the effectiveness of promotion strategies in a variety of populations (36). However, obtaining reliable and valid estimates of habitual physical activity behavior remains to be the major challenge in research with children and adolescents. A number of methods of physical activity assessment have advantages and limitations in terms of cost, validity, and practical concerns in free-living situations (22). Self-report instruments continue to be the most commonly used methods for physical activity measures in large population studies because of the low cost and burden brought to the participants (23). Furthermore, self-report instruments may provide valuable information on multiple dimensions of physical activity, i.e., frequency, type, duration, and contexts in which the activity is performed that is not available from other methods.

A variety of self-report questionnaires have been developed specifically for children and adolescents in the last few decades. The instruments vary in the type of administration (self-completed, interviewer-administered, or computer-assisted), the period of recall (usual activity, weekly activity or 1- to 7-d recall),

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dimensions assessed (frequency, type, duration, intensity, and context), and measurement protocol (frequency and time in activity, activity-related energy expenditure, or physical activity score). Irrespective of the test-retest interval, most available instruments have demonstrated acceptable reliability in assessing physical activity in children and adolescents (5,6,21,28,30). Furthermore, higher reliability was generally found among questionnaires which involve a shorter period of recall, e.g., 1- to 3-d recall, compared with those assessed weekly, as well as the usual habits recall (22,23). Validation studies in children, however, typically reported low to moderate validity coefficients when comparing questionnaire measures with accelerometers (11,25,28,30) or a fitness test (6). The undesirable validity is likely due to the limited ability of children to accurately recall their physical activity over an extended period, and can also be attributable to the lack of consensus on a “gold standard” criterion method.

Most of the instruments were not designed to assess sedentary behaviors in addition to physical activity, mainly because TV viewing is regarded as the most prevalent leisure-time sedentary activity and has been the focus of the majority of the existing studies investigating youth sedentariness. However, it has been suggested that children’s sedentary pursuits is multifaceted and cannot be represented accurately by one single behavior. The Children’s Leisure Activities Study Survey (CLASS) questionnaire was developed to assess the type, frequency, and duration of physical activity and sedentary behaviors among Australian children (25). A checklist of 30 physical activities and 14 sedentary behaviors was included in the two identical questionnaires, i.e., the self-reported questionnaire for children aged 10–12 years and the proxy-reported questionnaire for children aged 5–6 and 10–12 years. The CLASS questionnaire is an easily administrated instrument and has been used to characterize physical activity and sedentary behaviors among large groups of Australian children despite of the undesirable validity (26). It has also been applied in studies examining the familial and environmental correlates of physical activity or TV viewing (24,27).

The instruments for the measurement of physical activity have been extensively studied for Caucasian children and adolescents. Since considerable variability exists in the response of ethnically distinct groups to various measurement approaches, there is a growing need to examine the applicability of commonly used questionnaires among diverse cultural groups. A recent study by Moore et al. found that the widely used self-report instrument in white Canadian samples, The Physical Activity Questionnaire for Older Children (PAQ-C), performed poorly among African American youth even after minor revisions (18). Hong Kong is an ethnically homogenous area with about 95% of its 6.8 million residents being Chinese. It is also very densely populated at 6300 persons per square kilometer of the limited 1103 square kilometers of land area (Hong Kong Department of Health). The environment in Hong Kong is a particularly striking example of a dense urban development that has a significant impact on health-related physical activity (15). Due to the differences in physical, social, and cultural environments between Hong Kong and western countries, development of the instrument in assessing physical activity patterns in children should take these differences into consideration.

There is a paucity of studies examining the quality of physical activity questionnaires in Chinese children or the feasibility of applying the commonly used
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questionnaires for Caucasian children to their Chinese counterparts. A Chinese 7-day recall physical activity questionnaire has been developed and evaluated among 92 primary schoolchildren in Beijing, China (16). The questionnaire was found to be reliable (kappa 46–79%) in predicting the duration of weekly physical activity and activity-related energy expenditure. Acceptable validity between the questionnaire and Caltrac accelerometer was only found for boys. For Hong Kong Chinese adults, a physical activity questionnaire designed as an activity rating scale was adopted to describe physical activity levels (14). However, further information on type and duration of the habitual physical activity cannot be collected using rating scales. For secondary school students in Hong Kong, a questionnaire has also been used to evaluate physical activity levels (10). However, the results of the reliability and validity of the instrument used were not reported. So far, there is no commonly used physical activity questionnaire with established reliability and validity for Chinese children. Therefore, the purpose of the current study was to examine the test-retest reliability and validity of the modified CLASS questionnaire in assessing physical activity and sedentary behaviors among Hong Kong Chinese children.

Methods

Participants

Two hundred and twenty primary schoolchildren (84 boys and 136 girls) aged 9–12 years from 4 schools volunteered to participate in this study. A subsample of 139 children (49 boys and 90 girls) participated in the 7-day accelerometer protocol. The participants were recruited through written descriptions distributed to parents by school teachers. All the children were Chinese and in school years 4–6. Consent forms were sought from parents and participating children. The study was approved by the University Survey and Behavioral Research Ethics Committee.

Physical Activity Estimated by Questionnaire

The Chinese questionnaire used in the current study was translated and modified from the Children’s Leisure Activities Study Survey (CLASS). The validity and reliability of the original questionnaire has been reported elsewhere (25).

The CLASS questionnaire consisted of two parts, namely demographic items and habitual participation in various physical activities and sedentary activities. Demographic items asked about the participants’ gender, date of birth, grade, and the residence district of home and school. There is a checklist of 30 physical activities included in the original CLASS questionnaire, and some of the activities were excluded in the present modified Chinese CLASS questionnaire (CLASS-C) because of the cultural, social, and environmental differences between Hong Kong and Australia. For example, the item Travel by cycling to school was eliminated because cycling is not one of the transport options in Hong Kong. Furthermore, hiking, squash, badminton, and table tennis are popular activities among the local population and were therefore added in the CLASS-C questionnaire. The final version of the CLASS-C questionnaire consisted of 31 physical activities and 14
sedentary activities, which concerned all activities during leisure time, school physical education classes, and transportation-related activities. To make the concurrent estimates of the second administration of the CLASS-C questionnaire and accelerometer, participants were required to indicate whether they did that kind of physical activity during the last week in CLASS-C instead of the usual week in CLASS. For each of the physical activities in which they participated, separate questions were asked with respect to the frequency and duration of participation on weekdays (Monday to Friday) and weekends (Saturday and Sunday).

Data were then summed to estimate the time spent on moderate- (MPA), vigorous-intensity (VPA), moderate-to-vigorous physical activities (MVPA), and sedentary behaviors during weekdays, weekends, and for one week. The intensity for each activity was classified according to a compendium of physical activities (1). No children reported participation in handball, baseball, golf, rugby, judo, karate, and Tae kwon do, and as a result, the above activities were excluded from the analyses. Finally, there were 14 activities in the modified questionnaire classified as moderate-intensity (3–5.9 METs), namely, dance, gymnastics, hiking, table tennis, badminton, bowling balls, volleyball, bike riding, children’s games, household chores, walk the dog, walk for exercise, physical education class, and travel by walking. Ten activities were classified as vigorous-intensity (>6 METs), including tennis, soccer, basketball, swimming for fun, swimming laps, squash, skipping rope, skating, martial art, and jogging or running.

Physical Activity Assessed by Actigraph Accelerometer

The GT1M Actigraph accelerometer (Manufacturing Technology, Inc., Fort Walton Beach, FL) was used to measure the physical activity of the children over a period of 7 days. The Actigraph is the most widely used activity monitor in characterizing physical activity behavior in children and adolescents because of its established reliability and validity (34). In the current study, 1-min epochs were selected. The Actigraph data were expressed as time (minutes) spent in moderate- or/and vigorous-intensity activity during weekdays and weekends, respectively. The age-specific count ranges (32) were used to determine the minutes in moderate- and vigorous-intensity physical activity: METs = 2.757 + (0.0015*counts·min⁻¹)−(0.08957*age)−(0.000038*counts·min⁻¹*age). Moderate physical activity was defined as ≥3 METs and < 6 METs. Vigorous physical activity was defined as ≥6 METs. For instance, the cut-off points for 3 and 6 METs correspond to 1017 and 3695 counts·min⁻¹ for 10-year old children. The cut-off of < 100 counts·min⁻¹, which has been used in both children (29) and adults (13), was chosen to clarify sedentary time. To ensure that the participants were wearing the accelerometer for 7 consecutive days, only those children who recorded more than 10,000 movement counts per day for a minimum of 4 days, which consisted of at least 3 weekdays and 1 weekend, were included in the final analyses (25).

Height and Weight

As weight status may be a confounder in children’s physical activity and thus influence the reliability and validity of the questionnaire, body weight and height
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were collected as a measure of body composition. Standing heights were measured to the nearest 0.1 cm using a portable stadiometer (Seca, Model 214, Hamburg, Germany). Body weights were measured to the nearest 0.1 kg on an electronic scale (TANITA Body Fat Monitor, Model TBF-531A, Tanita Corporation of America, Inc.). Body mass index (BMI) was then computed as kg·m⁻². Children were classified as being overweight or not based on the age- and gender-specific cut-off standard (7).

Procedures

Parental consent forms were distributed to children through school teachers, and those who returned the signed consent forms were considered eligible to participate in the study. The data collection was administrated at PE classes during school terms on two occasions, with approximately one week apart. On the first visit to each school, the investigators explained the study procedures and collected the anthropometric measures from all the participants. Afterward, participants were required to complete the CLASS-C questionnaire with the assistance of the investigators. The completion time was approximately 15 min. A preinitialized accelerometer was then distributed to each participant and attached to a flexible elastic belt which was fastened snugly around the child’s waist. All the participants were required to wear the accelerometers for 7 consecutive days and only detach the device during sleeping and water activities. This protocol was determined based on the recommendation for obtaining a valid and reliable measurement of usual physical activity levels (31), and the established compliance when accelerometers are used with children over a 7-day period (35). A physical activity diary was distributed to each participant to mark down the reasons and times when (s)he attached or detached the device. The purpose of the diary was only used to remind the children and maximize the compliance of wearing the monitor, and the results were not included in the final analysis. To maximize the compliance of consecutive attachment, investigators phoned every two days to remind each participant to wear the monitor during their waking hours, except during water activities. After 7 days, the investigators took back the accelerometers on the second visit to schools, during which all the participants were required to complete the same CLASS-C questionnaire again.

Data Analysis

All data were analyzed using SPSS for Windows, version 11.0. Test-retest reliability was determined by comparing the results of the two administrations of the questionnaire in the self-reported time spent in physical activity and sedentary behavior. Intraclass correlation coefficients (ICCs) values were performed to indicate the reliability in different BMI groups. The criterion validity of the questionnaire was determined by comparing the self-reported time in physical activity from the second administration of the questionnaire with the Actigraph measures in different BMI groups. Spearman ranking correlations were performed to assess the correlations between CLASS-C questionnaire and Actigraph data. Bland-Altman plots (4) were used to assess measurement agreement between the self-report
questionnaire and Actigraph estimates of moderate- and vigorous-intensity activity.

Results

Of the total sample of 220 children, 3 boys and 1 girl were excluded from the reliability analyses due to the incomplete CLASS-C data. In addition, data from 2 girls were also removed from the analyses because of the extremely high values in the self-reported MVPA, i.e., higher than 12 hr per day. Consequently, the final sample for reliability analysis included 81 boys and 133 girls. Of a subsample of 139 children who participated in the 7-day accelerometer protocol, 37 children (26.6%) had problematic Actigraph data due to the device failure in download or noncompliance in data collection. This may be caused by the children not wearing the monitor for at least 3 weekdays and 1 weekend. Of the subgroup participants, one boy and two girls were excluded from the analyses because of the invalid questionnaire data. As a result, 33 boys and 66 girls were included in the final dataset for validity analysis. The average wearing time were 13.4 ± 1.1 hr. The descriptive statistics for the anthropometry measures are shown in Table 1. Among the 214 children, 38% were boys and the mean age was 10.9 years. Boys were older than girls (boys vs girls, mean ± SD: 11.0 ± 0.7 vs 10.8 ± 1.0, respectively, \( p < .05 \)). According to the BMI cut-off standard for children, 19 boys and 19 girls were classified as being overweight.

Test-Retest Reliability

Reliability of self-reported time spent in moderate- and vigorous-intensity physical activity during weekdays and weekends was assessed by comparing the two administrations of the CLASS-C (Table 2). The reliability coefficient for weekly

<table>
<thead>
<tr>
<th>Boys ((n = 81))</th>
<th>Girls ((n = 133))</th>
<th>All ((n = 214))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yr)*</td>
<td>11.0 ± 0.7</td>
<td>10.8 ± 1.0</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>143.2 ± 6.6</td>
<td>143.2 ± 8.4</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>38.2 ± 9.4</td>
<td>36.6 ± 9.3</td>
</tr>
<tr>
<td>BMI (kg·m(^{-2}))</td>
<td>18.4 ± 3.5</td>
<td>17.7 ± 3.2</td>
</tr>
<tr>
<td>Overweight (%)</td>
<td>23.5</td>
<td>14.3</td>
</tr>
<tr>
<td>MPA (min·d(^{-1}))</td>
<td>43.0 ± 34.9</td>
<td>45.2 ± 35.4</td>
</tr>
<tr>
<td>VPA (min·d(^{-1}))</td>
<td>22.4 ± 27.7</td>
<td>21.3 ± 28.8</td>
</tr>
<tr>
<td>MVPA (min·d(^{-1}))</td>
<td>65.4 ± 55.4</td>
<td>66.5 ± 55.5</td>
</tr>
<tr>
<td>Sedentary time (min·d(^{-1}))</td>
<td>222.6 ± 159.4</td>
<td>248.2 ± 175.0</td>
</tr>
</tbody>
</table>

BMI = body mass index; MPA = moderate physical activity; VPA = vigorous physical activity; MVPA = moderate-to-vigorous physical activity.

*Significant age-group effects \( (p < .05) \).
MVPA was substantial (ICC = 0.71), and were higher for VPA (ICC = 0.73) than that for MPA (ICC = 0.61). The ICC value for overweight children (ICC = 0.79) was higher than that for nonoverweight children (ICC = 0.68) in assessing weekly MVPA, whereas, similar coefficient correlations were found when sedentary time was concerned.

Criterion Validity

Validity of the CLASS-C questionnaire was evaluated by comparing the self-reported time spent in different intensities of physical activity through accelerometry. The results were presented in Table 3. Correlations between the questionnaire and Actigraph in the estimates of the total time in moderate-to-vigorous intensity physical activity was moderate and significant for girls ($r = .48$, $p < .05$) but not boys ($r = .27$, $p > .05$). Similarly, the correlation between the two methods in assessing sedentary time was significant for girls ($r = .25$, $p < .05$). When examined separately for weekdays and weekends, moderate correlations were observed in MVPA and VPA on weekdays among girls. Body composition did not affect the correlations.

Bland-Altman plots illustrate the agreement between the CLASS-C questionnaire and Actigraph estimates on the time spent in moderate-to-vigorous physical activity (Figure 1). CLASS-C questionnaire estimates were slightly lower than accelerometer estimates with the negative mean difference of 6.2 min·d$^{-1}$, whereas tended to overestimate the time when average totals were higher than 100 min. Separate plots for moderate- and vigorous-intensity physical activity showed the tendency of the questionnaire to underestimate moderate-intensity activity. The mean difference was −18.9 min·d$^{-1}$, and the limits of agreement were −89.3 and 51.5 min·d$^{-1}$ (Figure 2). The plot for vigorous activity showed a systematic bias as shown in Figure 3. For the majority of the participants, the CLASS-C questionnaire estimates were consistently higher than accelerometer data estimates, and the difference between the two methods became progressively larger with the increasing minutes of self-reported vigorous activity. The mean difference was 12.6 min·d$^{-1}$, and the limits of agreement were −34.8 and 60.0 min·d$^{-1}$.
Table 3  Validity Correlations for Physical Activities Duration Comparing CLASS-C With Actigraph Accelerometer

<table>
<thead>
<tr>
<th></th>
<th>Weekdays</th>
<th></th>
<th>Weekends</th>
<th></th>
<th>One week</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys</td>
<td>Girls</td>
<td>Boys</td>
<td>Girls</td>
<td>Boys</td>
<td>Girls</td>
</tr>
<tr>
<td></td>
<td>(n = 33)</td>
<td>(n = 66)</td>
<td>(n = 33)</td>
<td>(n = 66)</td>
<td>(n = 33)</td>
<td>(n = 66)</td>
</tr>
<tr>
<td>MPA</td>
<td>.21</td>
<td>.19</td>
<td>.32</td>
<td>.22</td>
<td>.33</td>
<td>.29</td>
</tr>
<tr>
<td>VPA</td>
<td>.35</td>
<td>.48*</td>
<td>.33</td>
<td>.19</td>
<td>.29</td>
<td>.43*</td>
</tr>
<tr>
<td>MVPA</td>
<td>.21</td>
<td>.44*</td>
<td>.13</td>
<td>.19</td>
<td>.27</td>
<td>.48*</td>
</tr>
<tr>
<td>Sedentary time</td>
<td>.09</td>
<td>.19</td>
<td>-.16</td>
<td>.18</td>
<td>.06</td>
<td>.25*</td>
</tr>
</tbody>
</table>

Note. MPA = moderate physical activity; VPA = vigorous physical activity; MVPA = moderate-to-vigorous physical activity.

*p < .05
Discussion

This study examined the test-retest reliability and the criterion validity of the CLASS-C questionnaire in Hong Kong Chinese children age 9–12 years. The results suggested that the questionnaire provided reliable estimates of weekly moderate-to-vigorous physical activity in the target group. The validity of the questionnaire was acceptable as far as the weekly time in MVPA was concerned. The results were slightly different from the CLASS study, in which it was the proxy-report version but not the self-report version of the questionnaire that provided reliable estimates of physical activity among children age 5–6 years and 10–12 years (25).

The reliability of the CLASS-C questionnaire appears to be comparable with existing instruments that assess weekly physical activity levels or activity-related energy expenditure in children that reported reliability coefficients ranging from 0.30 to 0.91 (6,28,30,37). Gender difference was not found for reliability correlations in assessing weekly MVPA (Boys vs girls: 0.73 vs 0.69), but ICC values were higher in overweight than in nonoverweight children (0.79 vs 0.68). Few studies, if any, have examined the reliability of self-reported instrument in different BMI subgroups. For adults, it was validity but not the reproducibility correlation that has been found to be higher in lower BMI than in the higher BMI group (20). Furthermore, higher reliability observed for vigorous activity (ICC = 0.73) than mod-

Figure 1 — Bland-Altman plot showing error scores (CLASS-C-Accelerometer) plotted against the average of CLASS-C and Accelerometer estimates of moderate-to-vigorous physical activity (MVPA) during the one-week period. Mean error scores (solid horizontal line) and 95% confidence interval (dashed horizontal lines) are shown in the plot.
erate activity (ICC = 0.61) in the current study was consistent with the previous studies in adults which reported that vigorous-intensity activities are usually more structured and easier to recall than moderate-intensity activities (23). In children, it has also been found that organized activity was more memorable and had higher repeatability than free-time activity (37). It is important to note that the self-reported time in physical activity may reflect not only the characteristics of the CLASS-C questionnaire but the inherent variability in the children’s habitual activity. Although the administrations of the survey were conducted during the school terms exclusive of any public and school holidays, the inherent variability may still exit in children’s free-living physical activity from week to week. Considering this, the moderate reliability coefficients in this study are thus reasonable (37).

The validity of the CLASS-C questionnaire was evaluated by comparing it with the Actigraph accelerometer. Moderate correlations were observed between CLASS-C questionnaire and Actigraph estimates of moderate physical activity (MPA) only for girls ($r = 0.48$). The weak and nonsignificant correlations for boys ($r = 0.27$) may be partly due to the relatively small sample size compared with that obtained for girls. Similar to previous studies in adolescents (9), associations between self-reported and accelerometer-determined physical activity were not affected by body fat. The validity correlations in the current study are higher than the original CLASS questionnaire. Both the proxy-reported and self-reported versions of the original CLASS questionnaire showed low correlations compared with MTI Actigraph accelerometer ($r = -0.06–0.24$). It is important to note, however, that chil-

![Bland-Altman plot showing error scores (CLASS-C-Accelerometer) plotted against the average of CLASS-C and Accelerometer estimates of moderate physical activity (MPA) during the one-week period. Mean error scores (solid horizontal line) and 95% confidence interval (dashed horizontal lines) are shown in the plot.](image-url)
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Children were asked to report the time spent in physical activity during the last week in the modified CLASS-C questionnaire instead of the ‘typical week’ in the original CLASS questionnaire. The higher validity correlations are likely attributable to the concurrent estimates by the second administration of CLASS-C and accelerometer. The validity results in the current study are comparable with other self-reported or interviewer-administered instruments compared with accelerometer. Welk et al. reported the validity coefficient of 0.24 for the Youth Media Campaign Longitudinal Survey (YMCLS) in estimates of the weekly sessions of physical activity (37). For the 1-day recall instrument, The Previous Day Physical Activity Recall (PDPAR), the correlations were found to be above 0.50 in sixth-grade children. The correlations between the CLASS-C questionnaire and accelerometer in assessing sedentary time were lower than those for MVPA. Accelerometer actually quantified the total amount of the time spent in very low activities including sitting, reclining or lying, while questionnaire only estimated a limited number of sedentary pursuits. Objectively quantified amount of sedentary time by accelerometer has been found to be as twice as that derived from self-reported media use (17). As a result, it is plausible that the comparison between the two methods should focus on the correlation rather than the absolute sedentary time. The cut points of < 100 counts·min⁻¹ was based on the calibration study in adolescent girls (29). It is important to acknowledge that the estimates in physical activity and sedentary time are dependent on the cut-off criteria applied to the accelerometer data.

Figure 3 — Bland-Altman plot showing error scores (CLASS-C-Accelerometer) plotted against the average of CLASS-C and Accelerometer estimates of vigorous physical activity (VPA) during the one-week period. Mean error scores (solid horizontal line) and 95% confidence interval (dashed horizontal lines) are shown in the plot.
Bland-Altman plots further indicate that the CLASS-C questionnaire provided reasonable estimates of daily MVPA in this population. However, questionnaire-accelerometer discrepancy was observed for the estimated time in moderate-intensity physical activity, but especially for vigorous-intensity activity. Similar to the findings by Anderson et al. (2) and Gao et al. (11), the self-reported time in vigorous activity was substantially higher than the accelerometer estimates. In consideration of the fact that there was underestimation of self-reported moderate-intensity physical activity compared with accelerometer-measured estimates, a possible explanation is that moderate activity has been systematically misclassified as vigorous. Several factors are likely attributable to this misclassification. Firstly, children in this age group do not engage in sustained physical activity, but typically accumulate activity in intermittent bouts (3). Consequently, the self-reported duration in vigorous activity would likely be over-reported. For example, children may regard the 60-min skipping rope, which is classified as vigorous activity according to the compendium, as continuous, although the majority of the time period was most likely to be less than strenuous. Furthermore, the 1-min epochs used in this study may have underestimated the amount of time children spent in vigorous-intensity activity. Epochs less than 1-min may be necessary to ensure that shorter bouts of vigorous activity can be captured (19). Secondly, the Actigraph accelerometer worn on the hip is not capable of detecting some kinds of vigorous activities, such as cycling and climbing stairs. In addition, children were not required to wear the monitor during water activities in the current study although the Actigraph monitor is waterproof. The protocol was applied due to the consideration that a wet belt during the water activities may lead to nonwearing of the monitor thereafter. Finally, the Freedson equation, which was developed based on treadmill walking and running in laboratory setting, may result in incorrectly classifying the objectively assessed activity in free-living condition (34).

Several limitations should be considered when interpreting the findings. The activities listed in CLASS-C questionnaire were classified into either moderate- or vigorous-intensity based on the compendium of physical activity developed specifically for adults (1). Children were found to have higher resting energy expenditure than adults, and a MET defined as equivalent to resting oxygen uptake, i.e., 3.5 mL·kg\(^{-1}\)·min\(^{-1}\) or 1 kcal·kg\(^{-1}\)·h\(^{-1}\) may not be suitable for children. When age-adjusted metabolic equivalents which were determined by dividing the measured VO\(_2\) of observed activity by resting VO\(_2\) were used to evaluate the relative intensity, similar values were found to the defined MET for children (12). Thus, the compendium of physical activity may be useful to act as a reference to classify the relative activity intensity in children and has been used in previous studies to assess children’s activity level (6,25). Another challenge was the interpretation of the original counts recorded by the accelerometer (32). Counts were usually converted into the time spent on moderate- and vigorous-intensity activity by cut-off counts, or energy expenditure using a prediction equation. The age-specific Freedson cut-off points (8,33) used in the current study were initially generated on laboratory activities on treadmill and may be limited in predicting the free-playing activity. Since there has been no consensus so far in interpreting accelerometer data, the validation of questionnaires using accelerometer measures is most likely to be influenced by the evaluation protocol.
In summary, the findings suggest that the CLASS-C questionnaire had acceptable test-retest reliability for assessing weekly physical activity and sedentary time among Hong Kong Chinese children aged 9–12 years, although acceptable validity was only found in girls. Questionnaire measures may have limited applicability in quantifying physical activity participation in different intensity levels. Nevertheless, the CLASS-C questionnaire was comparable in repeatability and validity with the other self-reported instruments for children. It could thus be used as an easily administrated tool to identify various aspects of physical activity among Chinese children.

References


