Children's perceptions of their home and neighborhood environments, and their association with objectively measured physical activity: a qualitative and quantitative study

C. Hume¹,², J. Salmon¹ and K. Ball¹

Abstract

Environmental factors may have an important influence on children's physical activity, yet children’s perspectives of their home and neighborhood environments have not been widely assessed. The aim of this study was to investigate children’s perceptions of their environments, and to examine associations between these perceptions and objectively measured physical activity. The sample consisted of 147, 10-year-old Australian children, who drew maps of their home and neighborhood environments. A subsample of children photographed places and things in these environments that were important to them. The maps were analyzed for themes, and for the frequency with which particular objects and locations appeared. Physical activity was objectively measured using accelerometers. Six themes emerged from the qualitative analysis of the maps and photographs: the family home; opportunities for physical activity and sedentary pursuits; food items and locations; green space and outside areas; the school and opportunities for social interaction. Of the 11 variables established from these themes, one home and two neighborhood factors were associated with children’s physical activity. These findings contribute to a broader understanding of children’s perceptions of their environment, and highlight the potential importance of the home and neighborhood environments for promoting physical activity behavior.

Introduction

Physical inactivity in childhood has been found to track into adolescence (Pate et al., 1999) and from adolescence into adulthood (Raitakari et al., 1994). Among adults, physical inactivity has been linked to a number of chronic health conditions including the development of overweight and obesity, cardiovascular disease, type 2 diabetes mellitus, and certain cancers (US Department of Health and Human Services, 1996). Therefore, decreasing levels of physical inactivity in childhood is an important public health strategy.

In order to reduce the prevalence of physical inactivity and associated conditions, it is important that the influences on children’s physical activity are better understood. An individual’s social environment (e.g. support and encouragement to be active from family and friends) has been found to influence adults’ participation in physical activity (Sallis et al., 1992). There is some evidence that the social environments of children and adolescents may also play a role in influencing these behaviors (Anderssen and Wold, 1992; Saunders et al., 1997).

Perceived and objectively measured physical environmental factors have also been implicated as potentially important correlates of physical activity among adults (Humpel et al., 2002), although the use of objective measures of the environment may warrant stronger conclusions about...
causality. Humpel et al. (Humpel et al., 2002) reported that accessibility of facilities, opportunities for physical activity and aesthetic characteristics of the local environment were all associated with physical activity among adults. The few studies examining this association in children have demonstrated that time spent outdoors was associated with observed physical activity (Klesges et al., 1990), while girls’ access to sporting equipment in the home was significantly correlated with objectively measured moderate-intensity activity (Trost et al., 1999). Sallis et al. (Sallis et al., 2001) demonstrated that school environments that promoted physical activity were positively associated with children’s activity levels. Similarly, an Australian study showed that an increased number of balls available to children significantly predicted their participation in physical activity (Zask et al., 2001). Within the broader neighborhood, environmental factors such as living in an apartment block with a courtyard, living near a park and the age of the neighborhood were positively associated with children’s independent mobility (Prezza et al., 2001). Safety of the neighborhood including traffic speed and density, along with ‘stranger danger’ concerns have also been suggested as potential limitations on children’s independent mobility, particularly affecting the school journey (Hillman, 1999; Tudor-Locke et al., 2001).

While these studies were mainly cross-sectional and, as such, do not allow causal inferences, it is reasonable to hypothesize that a child’s immediate surroundings, such as homes and communities or neighborhoods, may play a role in influencing their physical activity behaviors (Frank and Engelke, 2001). However, none of these studies evaluated children’s perceptions of their environment nor did they assess more than one setting or context. This is important as there is evidence to suggest that environmental perceptions may be equally predictive of physical activity as objectively measured environments (Giles-Corti and Donovan, 2002). Ecological Systems Theory (EST) proposes that behaviors such as physical activity participation should be considered within a broader context (Davison and Birch, 2001). Davison and Birch (Davison and Birch, 2001) suggest that behavior change cannot be explained or predicted without considering the context or ecological niche in which the individual exists (e.g. the home or family); this context, in turn, is situated within a broader context, such as the neighborhood and wider society. It is the interactions between and within these contexts that are argued to affect behavior. In keeping with the constructs proposed within EST, Study 1 aimed to qualitatively explore children’s perceptions of their home and neighborhood environments, while Study 2 aimed to quantitatively assess the association between these perceptions and participation in physical activity.

Study 1

Methods

Participants

Children aged 10 years (10.1 ± 0.4 years) within three Victorian metropolitan primary schools participated in this study (n = 147). The ‘All Victorian Schools-Region Listing’ was used to locate all primary schools located in metropolitan Melbourne.

The SEIFA index of relative disadvantage for each area was used to determine low socioeconomic status (SES) areas (Australian Bureau of Statistics, 1998). These areas were specifically targeted due to the increased likelihood of physical inactivity and related conditions that occur in people residing in these areas (US Department of Health and Human Services, 1996).

Schools were recruited to participate in a randomized controlled trial, which aimed to prevent unhealthy weight gain among children and which was delivered as part of the schools’ curriculum. A convenience sample of three schools that met the inclusion criteria for participation (government funded coeducational primary schools, more than 500 students enrolled, and facilities adequate for fundamental motor skill lessons and physical education) were approached and consented to the intervention. The intervention consisted in part of
a classroom-based behavior modification program, which aimed to reduce time spent in sedentary pastimes and replace them with more physically active behaviors. A letter explaining the objectives and procedures of the study was provided to parents, and consent for their child’s participation in testing was sought. Children were not required to give written consent and were free to withdraw from participating in any aspect of testing. Ethical approval for all aspects of the study was obtained from the Deakin University Human Research Ethics Committee and the Education Department of Victoria. The intervention was conducted over the course of 19 lessons and two of these lessons were devoted to the present study. The intervention group was selected since the mapping activity was incorporated into the intervention and may have contaminated the ‘no treatment’ control group.

**Mapping instruments**

Cognitive mapping techniques have been suggested as useful alternatives to survey methods for exploring children’s awareness and knowledge of their environment (Morrow, 2001). There are a number of mapping methods that have been developed, including drawing (Morrow, 2001) and photographing the physical environment (Orellana, 1999). These techniques have been shown to be useful tools for exploring children’s perceptions and thoughts about their environments, as they provide the child with the opportunity to interpret and actively record their experiences (Dell Clark, 1999). These two qualitative methods were used in the present study.

**Map drawing**

The map drawing lessons were 1 week apart, with the home map completed in the first week and the neighborhood map completed the following week. On both occasions, the purpose of the drawings and the procedure for drawing the maps was explained to the children. It was explained that the map should include the places and things in their home and neighborhood that were important to them. One sheet of A3 paper was provided to each child, and children were encouraged to use pens, pencils, felt-tip pens and crayons on their maps.

Children were provided with a definition of the word ‘home’ as the ‘house, flat or unit that you live in most of the time’. The boundaries of home, including the yard up to the front, side and back fences, were also specified. The word ‘environment’ was explained as ‘our surroundings, the places and things that are around us’. Children were asked to draw their front and back yards, as well as the inside of their house. If the child lived in a flat or unit, they were asked to only draw the inside, and those with two-storey houses were told to draw each floor separately, as well as their yard.

When drawing the map of their local neighborhood, the area was explained as ‘places and things you could easily walk or ride your bike to’. To clarify children’s understanding, a basic map of a neighborhood environment was drawn on the class blackboard as an example.

**Photographic mapping**

A random subsample of participants \((n = 44)\) were provided with a disposable camera, and instructed to take approximately eight photographs of places and things in their home and neighborhood environment that were important to them. The children were not given any further instructions regarding the subject matter in their photographs. One week after the cameras were distributed, they were collected and the films processed. Each child’s photographs were developed and returned for viewing, and children provided a brief written explanation of each photograph.

**Data management**

Qualitative assessment was performed separately for the photographs and the maps. All features (e.g. objects or locations) depicted in the photograph were recorded, along with the quotes provided by the child, explaining the reason why they took the photograph. Each feature was identified as a theme and was grouped into categories with similar themes (e.g. a bicycle was grouped with a basketball ring and a television was grouped with a computer). Analysis of the home and neighborhood maps was performed using a similar procedure. Six themes were identified and are listed in Table I, along with some quotes as examples of each theme.
Results: themes emerging from qualitative assessment

A total of six themes were identified from the drawings, photographs and quotes. One-hundred and fifty photographs were taken and a total of 147 maps were drawn.

The family home

It was evident in both the maps and photographs that areas in the child’s home that were important to them were ‘shared’ areas or areas where their family could be together. The explanations were often not specific to a particular feature within the house, but rather to an area or room, e.g. the family or living room. One theme that recurred in the explanation of four photographs of the outside of the house was of the family home offering safety and warmth: ‘It is my home, I feel safe in it’ [Girl]; ‘It’s a warming and safe environment to live in’ [Boy]; ‘It gives me shelter and warmth’ [Boy].

Opportunities for physical activities and sedentary pursuits

The children drew and photographed a number of opportunities for physical activity and sedentary pursuits. At home, opportunities such as a bicycle, pool, trampoline and basketball ring were identified, as were televisions, computers and electronic games. Twenty-eight photographs and 37 maps depicted at least one individual piece of equipment for active play, usually located in the backyard (see photograph in Figure 1).

Food items and locations, at home and in the neighborhood

Items associated with food and eating appeared frequently in both the home and neighborhood maps. Children included items such as cooking appliances in the kitchen space and 51 children drew the family dining table. In the community maps, 53 fast food outlets and restaurants were drawn. While some

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### Table 1. Themes identified in the qualitative assessment and example quotes from photographs expanding on these themes

<table>
<thead>
<tr>
<th>Themes identified</th>
<th>Examples</th>
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</thead>
<tbody>
<tr>
<td>The family home</td>
<td>‘My family can sit together at night’ [Girl]</td>
</tr>
<tr>
<td>Opportunities for physical activity and sedentary pursuits</td>
<td>‘Trampolining is my passion’ [Boy]</td>
</tr>
<tr>
<td></td>
<td>‘I play my computer a lot’ [Boy]</td>
</tr>
<tr>
<td></td>
<td>‘It’s the best bike ever’ [Boy]</td>
</tr>
<tr>
<td>Food items and locations, at home and in the neighborhood</td>
<td>‘It helps me survive’ [Girl]</td>
</tr>
<tr>
<td>Green space and outside areas, at home and in the neighborhood</td>
<td>‘I play here after school’ [Boy]</td>
</tr>
<tr>
<td>The school</td>
<td>‘There is always space to play games’ [Boy]</td>
</tr>
<tr>
<td>Opportunities for social interaction</td>
<td>‘This is where I learn and have fun’ [Girl]</td>
</tr>
<tr>
<td></td>
<td>‘My cousin’s house because I have fun there’ [Girl]</td>
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</tbody>
</table>
neighborhood maps did not include a large number of destinations, often the local milk bar (corner shop) was drawn (37 times).

**Green space and outside areas, at home and in the neighborhood**

Analysis of the home environment maps showed that many children did not draw their front and back yards at all, or with little detail, while other children included a great deal of detail in their representations of these areas (Figure 2).

Backyards were also frequently photographed. Accompanying quotes included: ‘I play there with my brother’ [Girl]; ‘It is where I chill out’ [Boy]. Additionally, several children drew and photographed plants and trees in the front and back yards: ‘This is my China Doll plant. I water it all the time’ [Girl].

Parks and other types of open spaces were represented in 60 maps, and the local park and playground appeared in seven photographs: ‘I play in this park after school. Every morning the people come and mow and water it’ [Girl].

**The school**

Of the children who photographed their school environment, many took more than one photograph to demonstrate a particular point. Five children photographed the front entrance to the school or the sign visible from the street: ‘This is where I get a good education’ [Girl]; ‘School is important because [you] learn there’ [Girl]. These statements indicate positive perceptions of the school environment. There were no negative comments evident about the child’s school, although one boy was unsure: ‘I learn there and it’s kind of fun’ [Boy]. Photographs of the child’s classroom further demonstrated this positive perspective of school and the social opportunities offered there: ‘There is always someone to play in the classroom with’ [Boy]; ‘It’s where I made my friends’ [Girl].

**Opportunities for social interaction**

Within the local neighborhood, the number of friends’ houses the children had drawn, as well as access to parks, ovals, school and other common meeting places, suggested a range of opportunities for social interaction that were viewed as important (Figure 3). Destinations such as fast food outlets and shopping centers where children can meet their friends were also included in 79 maps.

**Study 2**

Study 2 assessed the association between the qualitative maps drawn in Study 1 and objectively
Methods
Measurement of physical activity
Physical activity was objectively assessed using accelerometers. Accelerometers have been shown to be a valid and reliable measure of children’s physical activity and physical activity related energy expenditure (Trost et al., 1998; Puyau et al., 2002). In the present study, children were fitted with a Manufacturing Technology Inc. (MTI) Actigraph Model AM7164-2.2C accelerometer. The MTI accelerometer was worn on the right hip and measured children’s movement in the vertical plane. Children were asked to wear the accelerometers for 8 consecutive days (excluding time spent in water) and data were collected in 1-min epochs. The children wore the accelerometers approximately 6 weeks prior to completing the maps and taking the photographs, and all children who had parental consent for the testing procedure, agreed to wear the accelerometers. Children wore the accelerometers during March/April of 2002, which is autumn in Australia.

When analyzing these data, only children who wore the accelerometer for 3 days or more were included in the analysis, in order to give an accurate representation of the average physical activity performed by the child in that week (Janz et al., 1995). Data from days 1 and 8 were excluded as incomplete data from days involving fitting and collection of the accelerometers. Additionally, only children with more than 10,000 counts/day were included, as lower counts than this suggests the accelerometer may have only been worn for part of that day (Telford et al., 2004). Twenty children had incomplete accelerometry data either because they forgot or were unwilling to continue wearing the device, or because it malfunctioned. Therefore the final sample, whose data were used in the present analyses, consisted of 127 children. All children received individualized feedback about their physical activity participation in the form of a brief report and were
given compensation (e.g. sports drink bottle, balls, frisbees) for participating in the study.

The MTI data were expressed as time spent being sedentary (min/week), or in low, moderate or vigorous intensity activity, as determined by applying the age-specific energy expenditure prediction equation: METs = 2.757 + (0.0015 counts/min) - (0.08957 age [years]) - (0.000038 counts/min age [years]) (Dowda et al., 1997). For 10-year-old children, time spent being sedentary was defined as <50 counts/min (<1.5 METs), low intensity activity was defined as 51–1016 counts/min (1.5–2.9 METs), moderate intensity activity as 1017–3695 counts/min (3–5.9 METs) and vigorous activity was classified as ≥3696 counts/min (≥6 METs) (Telford et al., 2004). Participation (min/day) was determined for each level of intensity and the average time spent in all intensities of physical activity was calculated for each child.

Data management

In order for comparisons to be made with objectively measured physical activity, data from the drawn maps were quantified. Data from the photographs were excluded from this analysis due to the small sample size. The quantification was performed according to the frequency with which particular objects or locations appeared (e.g. one skateboard and one bicycle drawn on a map was equivalent to two opportunities for physical activity in the home). From the six qualitative themes, a total of 11 variables were derived for quantitative analysis. Places and items for physical activity and sedentary pursuits represented opportunities for these behaviors, and were analyzed...
separately: physical activity opportunities in the home (Variable 1), opportunities for sedentary pastimes in the home (Variable 2) and opportunities for physical activity in the neighborhood (Variable 3). A drawing of a dog was included as an opportunity for physical activity in the home (Variable 4), the presence of a television set in the child’s bedroom was included as an opportunity for sedentary pastimes within the home (Variable 5) and the presence of a park, green space or outside area was counted as an opportunity for physical activity in the neighborhood (Variable 6). Places and items for food and eating were also analyzed separately for the home (Variable 7) and the neighborhood (Variable 8). Qualitative data suggested that the child’s school may be an important source of social interaction for these children, and this setting was included along with any friends’ or relatives’ houses and other common meeting places (Variable 9). Additionally, in order to assess the child’s awareness and knowledge of their neighborhood environment, the number of streets (Variable 10) and the number of destinations drawn were counted (Variable 11).

Children were allocated a score for each of the variables, with scores ranging from 0 (no object related to that variable present) to 26 (26 objects relating to a single variable present). Associations between these scores and physical activity were examined.

### Statistical analysis

Statistical analysis was performed using SPSS for Windows version 11.5. Descriptive statistics (means, SDs, percentages) were firstly calculated to describe and summarize the variables identified from the maps. Independent *t*-tests and bivariate linear regression analyses were also performed to investigate the associations between each environmental variable and time spent in different intensities of physical activity for boys and girls. Highest level of maternal education has been shown to be inversely related to children’s physical activity (Gordon-Larsen et al., 2000) and therefore it was assessed for any association with physical activity; however, it was found not to be related to any outcome variables in this sample and was subsequently not included in any analyses.

### Results

Table II displays demographic information and the physical activity participation of children in the sample. Boys performed significantly more moderate [$t$(125) = 3.51, *P* = 0.001] and vigorous intensity activity [$t$(125) = 4.86, *P* < 0.0001] than did girls.

#### The association between the perceived environment and children’s physical activity

The proportions of children drawing objects relating to each theme are shown in Table II. The *χ*² analyses showed no significant differences between boys and girls for any of these variables. The environmental variables with only two response categories (e.g. dog in home maps; TV in bedroom) were analyzed separately to determine their individual associations with physical activity.

### Table II. Demographic characteristics and participants’ participation in physical activity

<table>
<thead>
<tr>
<th></th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>n</em></td>
<td>77</td>
<td>70</td>
</tr>
<tr>
<td>Sex (%)</td>
<td>52.4</td>
<td>47.6</td>
</tr>
<tr>
<td>Age (mean, SD)</td>
<td>10.08 (± 0.40)</td>
<td>9.99 (± 0.21)</td>
</tr>
<tr>
<td>High level of maternal education (%)</td>
<td>37.2</td>
<td>25.6</td>
</tr>
<tr>
<td>Physical activity (min; hours/day) (mean, SD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sedentary</td>
<td>342.7 (± 114.55); (5.7)</td>
<td>341.8 (± 101.38); (5.7)</td>
</tr>
<tr>
<td>low</td>
<td>336.5 (± 69.51); (5.6)</td>
<td>355.8 (± 73.0); (5.9)</td>
</tr>
<tr>
<td>moderate^a</td>
<td>134.1 (± 36.59); (2.2)</td>
<td>113.5 (± 28.91); (1.9)</td>
</tr>
<tr>
<td>vigorous^b</td>
<td>23.2 (± 14.11); (0.39)</td>
<td>13.15 (± 8.33); (0.22)</td>
</tr>
</tbody>
</table>

^a*P* ≤ 0.001; ^b*P* ≤ 0.0001.
Results of independent t-tests showed girls who drew a dog in their maps, did more moderate intensity activity (mean = 132.4 ± 33.55 min/day) compared to other girls [mean = 109.8 ± 28.80 min/day; \( t(51) = -2.00, P = 0.05 \)]. There were no associations between drawing a dog in the home maps and boys’ participation in physical activity.

Those boys who drew a television set in their bedrooms participated in significantly more moderate [mean = 160.7 ± 21.59 min/day; \( t(60) = -2.28, P = 0.03 \)] and vigorous activity [mean = 37.4 ± 16.59 min/day] compared to other boys. There were no associations between drawing a television set in the home maps and boys’ participation in physical activity.
min/day; \( t(60) = -3.22, P = 0.002 \) compared to those who did not draw a TV in their room (mean = 129.7 ± 37.31 min/day and mean = 21.0 ± 12.94 respectively). No associations between presence of a TV in the bedroom and physical activity were apparent among girls.

Results of the bivariate regression analyses of associations between each predictor variable and physical activity for boys and girls are presented in Table IV. Only those variables that were significantly associated with physical activity (or approaching significance) are reported.

There were no associations between perceived environmental variables and low or moderate intensity activity among boys. Opportunities for sedentary behaviors drawn at home showed a significant positive association with vigorous activity \( [F(1, 60) = 4.06, P = 0.05, r^2 = 0.06] \) and an inverse association with time spent being sedentary \( [F(1, 60) = 3.65, P = 0.06, r^2 = 0.06] \). Among girls, physical activity opportunities in the neighborhood was positively associated with low intensity activity \( [F(1, 51) = 5.29, P = 0.03, r^2 = 0.09] \). Food locations drawn within the neighborhood showed a significant positive association with moderate intensity activity \( [F(1, 48) = 4.16, P = 0.05, r^2 = 0.08] \). Sedentary and vigorous intensity activity was not associated with any environmental variables among girls.

**Discussion**

This study aimed to better understand children’s perceptions of their environment, and to investigate associations between these perceptions and physical activity. These findings suggest that children’s perceptions of certain aspects of home and neighborhood environments may be significantly associated with their participation in different intensities of physical activity. However, given the number of non-significant findings, further research is necessary to confirm this. The integration of qualitative mapping with quantitative methods is unique, and few, if any, studies have employed this combination of techniques to examine the relationship between the environment and children’s objectively measured physical activity.

The themes that emerged from the qualitative summaries of the maps and photographs suggest that shared or social space within the family home play an important role in the lives of children at this age. The photographs and comments referring to the child’s home as a place offering security, warmth and safety indicate that children feel the home is a ‘haven’ from outside influences. The number of children that photographed their home suggests that this is probably the center of a child’s life at this age.

Opportunities for physical activity and sedentary pursuits within the home also emerged as an important theme. One previous study supporting this finding suggested that children who had limited physical environments at home also demonstrated low levels of activity, with over 80% of time at home spent lying, sitting or standing (Johns and Ha, 1999; Trost et al., 1999). Given many parents’ concerns about children playing outside the home (Sallis et al., 1997) and previous research suggesting that the

<table>
<thead>
<tr>
<th>Boys</th>
<th>Sedentary min/day (no. sedentary opportunities at home)</th>
<th>-19.90 (-40.73, 0.93)</th>
<th>-0.24</th>
<th>3.65</th>
<th>0.06</th>
<th>0.06</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vigorous min/day (no. sedentary opportunities at home)</td>
<td>2.60 (0.02, 5.18)</td>
<td>0.25</td>
<td>4.06</td>
<td>0.06</td>
<td>0.05</td>
</tr>
<tr>
<td>Girls</td>
<td>Low min/day (PA opportunities in neighborhood)</td>
<td>14.32 (1.82, 26.82)</td>
<td>0.31</td>
<td>5.29</td>
<td>0.09</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>Moderate min/day (no. food locations in neighborhood)</td>
<td>6.65 (0.10, 13.20)</td>
<td>0.28</td>
<td>4.16</td>
<td>0.08</td>
<td>0.05</td>
</tr>
</tbody>
</table>

*aConfidence interval.*
amount of time children spend outdoors is positively correlated with their physical activity levels (Sallis et al., 1993), the home environment may be an important setting in which to target physical activity behaviors.

Another interesting finding was that less than half the children drew any physical activity opportunities at home, while approximately two-thirds of children drew at least one sedentary opportunity. Of course, absence of these respective features in the children’s maps does not necessarily mean that they did not have these opportunities at home, but that the child may not have perceived their importance and therefore did not draw them. Nevertheless, when examined quantitatively, boys who reported more opportunities for all types of sedentary behaviors at home, were more vigorously active and spent less time being sedentary. While these findings may appear to be counter-intuitive, the notion that participation in physical activity and in sedentary behaviors can co-exist has been proposed previously, and has been supported by research among Australian adults (Salmon et al., 2003) and American youth (Marshall et al., 2002). As this was particularly apparent among those boys who reported having a TV in their bedroom, who were more moderately and vigorously active, one possible explanation is that a TV in the bedroom may be indicative of a higher socioeconomic background, which has been associated with a higher likelihood of being physically active.

Outside of the home, the child’s school featured often in the maps and photographs. School playgrounds provide children with an important source of physical activity and recreational opportunities (Sallis et al., 2001) and the presence of appropriate play equipment appears to be vital to their enjoyment of the school environment (Sallis et al., 2001). There may also be important social connections made at school that may encourage children’s perceptions of this environment as important and enjoyable. In addition to the social experiences gained at school, opportunities for social interaction in the child’s neighborhood also appeared to be important to them. This has been suggested in previous qualitative research, where friends’ houses, routes taken to friends’ houses and places to meet up with friends were photographed or drawn (Morrow, 2001). Similarly, open areas and green space also emerged as important features in a child’s environment. Several children portrayed great detail in these areas, not only for physical activity, but also for social interactions that may occur there, such as around BBQ areas.

The importance of food locations within the neighborhood was also suggested, with approximately 70% of children including at least one food outlet in their maps. Among girls, food locations in the neighborhood were positively associated with moderate intensity activity. One possible explanation for this is that girls who are walking to destinations in their local neighborhood may have a greater knowledge of the destinations in these areas than those girls who are more sedentary. In addition, having food outlets available in their local neighborhoods may be associated with higher participation in moderate intensity physical activity as they provide a destination to walk to.

The unique aspects of this study include the integration of quantitative and qualitative research methods, to provide a more complete, contextual insight into children’s perceptions of their home and neighborhood environments, and their association with objectively assessed physical activity. The use of cognitive mapping as a tool provides children with an opportunity to portray their environments in a way that is particularly meaningful to them (Dell Clark, 1999). The use of objective measures of physical activity is a further strength of this study design.

This study was limited by a small sample size, which may have reduced the statistical power and contributed to the lack of significant associations found. In addition, due to the large number of statistical tests conducted, the possibility that one or several of the significant findings may have been due to chance alone should be acknowledged. This may be an alternative explanation to the counter-intuitive findings obtained (e.g. boys’ televisions and physical activity). There was no opportunity to interview the children in depth after they drew their maps, which may have enabled the relative importance of
particular locations or objects that were present or absent in the maps to be established. A further limitation of this study was that because these children were participating in a larger study of physical activity, they may have had greater awareness of factors such as locations, destinations or opportunities for physical activity and sedentary behaviors. In addition, there may not have been sufficient heterogeneity in the environment (as only three schools participated) to detect environmental differences.

To our knowledge, only one previous study has used map-drawing methods to assess physical activity environments among children. Therefore, we can only speculate on the reasons for this lack of sensitivity in terms of associations with physical activity. Possibly, reasons for this lack of sensitivity may be that the instructions did not focus specifically on physical activity and sedentary related perceptions, so it may not have occurred to children to draw or photograph these, even if they use them regularly. An alternative explanation for the lack of sensitivity is that particular aspects of the environment may be more likely to be related to specific physical activity behaviors (e.g. walking or cycling in neighborhood). Because physical activity behavior is varied and environments are also varied, it is not surprising that when a total index of physical activity is derived, as in the present study, relationships with certain environmental aspects are not observed.

Children’s perceptions of their environments and how they relate to physical activity are not well understood. Future studies that assess children’s physical activity as well as their environments, and considering qualitative maps in the context of information gained from interviews and discussions would enhance our understanding of the environmental determinants of children’s physical activity and sedentary behaviors. Additionally, comparisons between children’s perceptions and objectively measured environments would make a valuable contribution to our knowledge of children’s physical activity and the influence of the environment.

The combination of qualitative and quantitative methodologies used in this study is one way of exploring a child’s perspective of their environment. This information is important for informing future research or practice as it provides details about the context in which behaviors occur, while suggesting environments of potential importance, such as the home and neighborhood, when considering intervening to increase children’s physical activity.

Acknowledgements

The authors would particularly like to thank the children who participated in the project. Thanks also to Gayle Shaw for her assistance in the classroom during the lessons, and to Verity Cleland for her advice on the management and interpretation of the data. C. H. is funded by a VicHealth PhD Scholarship, J. S. by a VicHealth Public Health Research Fellowship and K. B. by an NHMRC/NHF Career Development Award. The Victorian Health Promotion Foundation is gratefully acknowledged for their funding for this study.

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Received on December 15, 2003; accepted on March 16, 2004