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## **Moving Physical Activity Beyond the School Classroom: A Social-Ecological Insight for Teachers of The Facilitators and Barriers to Students' Non-Curricular Physical Activity**

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*Abstract: Non-curricular avenues such as active play during school breaks have been established as a major source for children's physical and cognitive development, yet there is little information for teachers on the influences affecting primary and secondary school students' non-curricular physical activity. During this study focus groups and drawing were used to explore the broader influences on primary (n=47) and secondary (n=29) school students' physical activity behaviour beyond the classroom. Barriers and facilitators to children's physical activity were categorised using a multi-level social-ecological framework incorporating intrapersonal, interpersonal, physical environment and policy factors. Based on the drawings, comparisons between students' existing play spaces and their perception of their ideal play space were made. Additionally, students depicted what features within a play space would encourage them to be active. The findings of the study indicate secondary school play spaces may need to incorporate more features to facilitate physical activity. The barriers and facilitators identified in this study provide information for teachers and school decision makers to consider when targeting children's physical activity beyond school classrooms.*

### **Introduction**

The promotion of physical activity in schools, homes and the community has become a major public health priority to improve health worldwide and prevent chronic disease, injury and other illness (WHO, 2007). Childhood lays the foundation for lifestyle behaviours that can track into adolescence and to some extent into adulthood. Increasing physical activity opportunities within a wide range of settings such as schools, home and community at an early age is therefore vital for public health (Dobbins, De Corby, Robeson, Husson, & Tirilis, 2009). Developing physical activity behaviour during childhood is important, with evidence suggesting that young people are now choosing to participate in sedentary activities even when options for physical activity are available (Vara & Epstein, 1993). Despite childhood being a crucial period for developing physical activity behaviours, there is limited understanding of the impact and influence of physical activity on the health of school children and adolescents (Trost & Loprinzi, 2008; WHO, 2007). Within the scope of this paper we will explore the importance of physical activity beyond the school classroom. In particular we focus on facilitators and barriers for physical activity in

school play spaces within the context of the social ecological model. This enables insight into Victorian primary and secondary school student's perceptions of their play spaces and to inform teacher education around the vital role of teacher supervision during school break time.

### **Importance of Promoting Physical Activity Beyond the School Classroom**

A gradual decline in children's fitness, a lack of physical activity opportunities (Hardman, 2008) and the rise of overweight and obese youth worldwide (Eisenmann, 2006) have highlighted schools as a crucial setting in which children can be active. With an increasing focus on schools to facilitate physical activity (WHO, 2007), there is more demand than ever for teachers to equip children with the necessary skills to be physically active (Lee, Burgeson, Fulton, & Spain, 2007). Despite this demand, recent research has identified a number of institutional and teacher-related barriers restricting the delivery of effective physical education (PE) in schools (Jenkinson & Benson, 2010). Institutional PE barriers have included a crowded curriculum, time, budget and sporting equipment constraints (Hardman, 2008; Le Masurier & Corbin, 2006; Morgan & Hansen, 2008). Although mainly within primary schools, teacher-related PE barriers have included low confidence to teach PE, declining teacher interest, negative past PE experiences, inability to plan lessons and insufficient levels of knowledge and expertise (De Corby, Halas, Dixon, Wintrup, & Janzen, 2005; Morgan & Bourke, 2005). Given the already busy nature of teachers' roles, it is important to recognise that there are other alternatives to developing children's physical activity. Rather than loading teachers up with increasingly more curricular responsibilities in an attempt to address all of society's ills, providing them with knowledge of how to promote physical activity during school break supervision is an important consideration (Huberty, Siahpush, Beighle, Fuhrmeister, Silva & Welk, 2011).

### **Understanding Children's School Physical Activity Beyond the Classroom**

Increasing understanding of the factors affecting students' enjoyment of their school play spaces will allow for the assessment and development of health promotion interventions targeting youth (Sirard & Pate, 2001). Health promotion theories suggest that to motivate children to be physically active, multiple influences on their behaviour must be identified and addressed (Salmon & King, 2010). These broader influences on physical activity behaviour are linked to application of the Social-Ecological Model, which emphasises that children's physical activity behaviour is influenced by multiple levels including intrapersonal, interpersonal, physical environment and policy factors (Salmon & King, 2010). Despite the importance of applying a social-ecological model to evaluate children's health behaviour at multiple levels, there is a paucity of literature applying the framework to examine the facilitators and barriers of children's physical activity (Moore, et al., 2010), especially within a school context.

No study we are aware of has provided an insight for teachers into the physical activity barriers and facilitators perceived by both primary and secondary school students', within the same study. Providing an understanding of students' perceptions could help teachers remove barriers that prevent students' activity within school play spaces and lead to increased physical activity levels among school students. Although school play spaces are acknowledged as a key setting for physical activity, it remains unclear which specific elements of school play spaces facilitate students' physical activity and which are potential barriers to physical activity.

## **Teacher's Roles in Providing Non-Curricular Physical Activity Opportunities**

Non-curricular opportunities, such as play during school breaks have the potential to enhance children's physical activity levels and social skills (Bundy, Lockett, Tranter, Naughton, Wyver & Ragen, 2009; Ridgers, Stratton, & McKenzie, 2010) by supplying up to 50% of children's recommended daily physical activity (Tudor-Locke, Lee, Morgan, Beighle, & Pangrazi, 2006). Within schools, children can engage in up to 600 school breaks per year (3 times a day, 5 days a week, 39 weeks per year) (Stratton, 2000), offering significant opportunity for them to be physically active. Teachers can play a major role in providing healthy school environments by interacting with children during recess supervision (Huberty et al., 2011) and contributing towards playground design (Tranter & Malone, 2004). Training of teaching staff with the knowledge and skills to actively supervise school breaks has been established as a strategy for promoting physical activity by enabling them to create a safe and enjoyable environment for children (Huberty et al., 2011). However, it is important that caution is exercised so that recess physical activity opportunities are not at the detriment of curriculum based physical education (Pate et al., 2006).

Childhood is a time for understanding the world through active play and, as children are directly affected by factors within the school environment that permit them to be physically active, their play spaces should be designed in such a way to maximise physical functioning and development (Davison & Lawson, 2006). Beyond the schoolyard and within the classroom, children may have limited access to physical activity opportunities. Teachers should therefore gain a greater awareness of school play spaces and ensure school decision makers design schoolyards in a manner to maximise children's opportunities to move and experience the enjoyment of being active (Willenberg et al., 2009).

## **The Role of the Physical Environment in Non-Curricular Physical Activity Opportunities**

Unstructured outdoor play during school breaks has been recognised as a powerful developmental and learning tool to complement or supplement the formal indoor curriculum (Malone & Tranter, 2003). There is a strong interest in improving characteristics of schoolyards to promote more and better quality physical activity opportunities in schools (Ridgers, Stratton, Fairclough, & Twisk, 2007). Governments worldwide (UK, Canada, USA, Sweden, Wales) have acknowledged the importance of children's school play spaces as outdoor classrooms, leading to widespread policies to improve school grounds to enhance the quality of children's play (Tranter & Malone, 2004). Movement via play has been described as one of the most natural and powerful avenues of childhood learning (Bilton, 2002) and has been associated with improvements in a wide range of physical, cognitive and social development (Malone & Tranter, 2003; Tranter & Malone, 2004). A number of studies have undertaken school environmental interventions by implementing playground markings (Ridgers et al., 2007; Loucaides, Jago & Charalambous, 2009), greening projects (Dyment & Bell, 2008), extra playground equipment (Lopes, Lopes & Pereira, 2009), sporting equipment (Verstraete, Cardon, De Clercq, & De Bourdeaudhuij, 2006) and household items (Bundy et al., 2009) that have increased children's physical activity during school breaks. These interventions challenge the role of traditional school playground design in developing children's non-curricular physical activity; providing extra motive to explore children's perceptions of the factors that influence non-curricular physical activity participation. This evidence is supported by recent research suggesting that enhancing school play spaces can also lead to improvements in social skills, creativity (Bundy, et al., 2009) and improved cognitive functioning (Pellegrini & Holmes, 2006).

## **School Play Environments**

Although a well-designed school environment can facilitate physical activity, recent national trends suggest a number of schools have removed play spaces or play equipment, possess crowded play spaces or implement restrictive policies limiting the use of play spaces that result in reduced opportunities for students' active play (Evans & Pellegrini, 1997). Whilst healthy school environments are often key components of school health programs, the design of the school environment is often over-looked as a strategy to develop children's physical activity behavior (Dyment & Bell, 2008). Additionally, teachers and school decision makers rarely consult children when planning and designing school play spaces, instead approaching this process from an adult perspective of what they think students want and enjoy (Knowles-Yanez, 2005; Sener, 2006; Tranter & Malone, 2004). The sole reliance on adults in the design and planning of children's spaces could lead to overly restrictive play spaces that can have long term consequences for children's social and emotional development (Tranter & Malone, 2004). In addition, children may believe they have little influence on their own school environments. If school environments are to be optimised as a source of active play, children's preferences and abilities must be catered for (Dyment & Bell, 2008). Children's perceptions of the school environment for physical activity is something that teachers should also consider in planning school play environments.

## **Students' Perceptions Of School Physical Activity Beyond The Classroom**

As children are the main users of school play spaces it may be beneficial to also obtain their perceptions, rather than just those of the teachers whose main purpose within a schoolyard is in a supervisory capacity only, when designing play areas. There are limited investigations of children's perceptions of school play spaces. A recent study across five Turkish schools (Ozdemir & Yilmaz, 2008) found that many students enjoyed active games, spending recess in the schoolyard and having an area to produce food. Almost half of the students believed their schoolyards were too small in size and lacked activity opportunities, trees and greenery. In another study, the influences on students' schoolyard physical activity choices were assessed via a photo ordering technique during a focus group format (Willenberg, et al., 2009). A number of themes were identified, including a need for greater provision of equipment, increased variety of playground equipment and access to fixed equipment for 'older' primary students. Students also had preferences for coloured bitumen markings with minimal lines, grassed areas to run and play games on. These findings identified schoolyard features students perceived would facilitate school-based physical activity, however a limitation of these studies is that they only examined perceived influences on students' physical activity within a primary school context. In addition, little is understood about adolescent perceptions of their secondary schoolyards for physical activity. A recent study aimed to identify the physical activity barriers and facilitators of urban and rural children grade six to eight (mean age= 12.6 years) via discussions in focus groups (Moore et al., 2010). The study investigated general influences on children's physical activity rather than specific to a school context, however the researchers identified school physical activity policies as a major barrier to children's physical activity. The main facilitators for youth physical activity were identified as social interaction and available facilities. This research highlights a need to identify specific social factors and facilities within the physical environment that would encourage students to be active within a school setting.

The important research in this paper therefore addresses a number of gaps within the literature relating to physical activity within schools. It is based on a mixed methods case

study design using focus groups and map drawing to achieve four objectives, which aimed to provide an insight for primary and secondary school teachers of the: (i) social-ecological components of school play spaces that influence primary and secondary school students' physical activity, (ii) barriers and facilitators of physical activity between primary and secondary school students, (iii) young people's perceptions of their existing and ideal school play spaces for physical activity (iv) suggestions from both primary and secondary school students for increasing school physical activity in the future.

## **Method**

### **Participants**

The Principals of four government schools (two primary and two secondary) in the western region of Victoria were randomly selected and approached by researchers during Winter, Term 2 of 2009. All schools from the western region were consecutively numbered, and a random number generator was used to select the four schools. Three schools approved the invitation and participated in the study (two secondary and one primary). Due to the difficulty of obtaining one more primary school in the western region, a government primary school in regional outer Eastern Melbourne with a low Socio Economic Index for Areas (SEIFA) was purposely approached. This ensured two schools from low SES (lower SEIFA tertile areas) and two schools from mid SES (middle SEIFA tertile) with a primary and secondary for each SES category were included in the study.

Initially, primary school students (all Year 5 and 6 students) and secondary school students (all Year 7 and 8 students) were invited to participate via a letter and consent form distributed in June and July of 2009. Year 5 and 6 primary school students were targeted as children over 10 years are more capable of accurately and reliably self-reporting their own health behaviour (Riley, 2004). In order to compare the influences on physical activity between primary and secondary students, year seven and eight secondary school students were targeted.

All students interested in participating were instructed to obtain parental consent, return the signed consent forms to the general office of their school and attend the scheduled focus group and/or map drawing session. During this study, 78 students from all four schools aged 10 to 13 years (50% females; 50% males) returned their consent forms by the due date and all students who volunteered participated in the study (Year 5= 29; Year 6= 20; Year 7= 29). The focus group discussions consisted of 54 students (32 primary and 22 secondary) and the map drawing sessions included 24 students (17 primary and 7 secondary).

### **Focus Group Discussions**

Seven focus groups (four primary school and three secondary school) were conducted for students who agreed to participate. The six to ten students in each focus group were asked a series of questions using a semi-structured interview schedule in relation to the play spaces in their schoolyard. The focus group discussions were conducted for 30-60 minutes in a quiet room separate to where the map drawing exercise took place simultaneously to prevent the discussion influencing the drawings. All focus group discussions were audio recorded and detailed comments were taken of students' focus group answers and body language noted during each session to aid transcription.

During the discussions, the students were asked to raise their hand when they wished to speak and each wore a name tag to assist the facilitator to ensure each participant had the opportunity to respond to every question. As part of the discussion, the students were also asked to state their name, sex, age and school year level. Focus groups were conducted until

saturation of themes was reached. The focus groups were conducted by a trained facilitator who was part of the research team, using questions formulated based on the social-ecological model and previous research evaluating students' perceptions of the environment for physical activity (Hume, Salmon, & Ball, 2005; Moore, et al., 2010; Veitch, Salmon, & Ball, 2008). A sample of questions utilised, to demonstrate the application of the social-ecological model, is presented in Table 1.

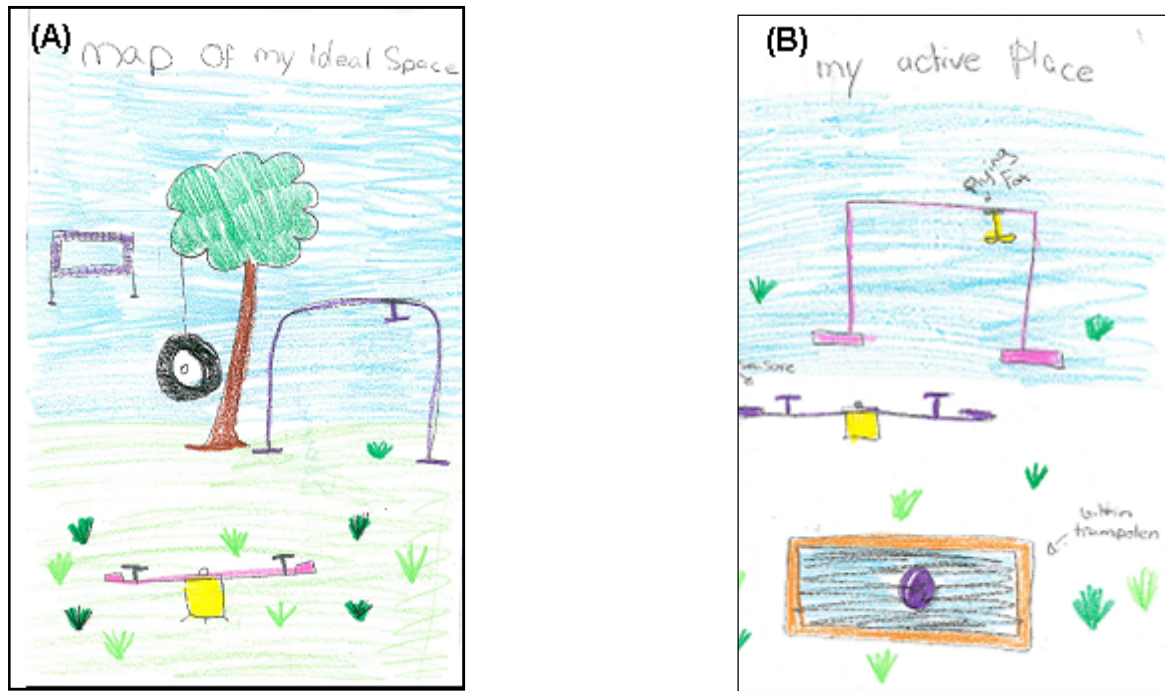
<b>Social-ecological model component</b>	<b>Sample question</b>
Intrapersonal (Individual)	<ul style="list-style-type: none"> <li>• Do you think a safe play space is fun?</li> <li>• Do you think a safe play space is boring?</li> </ul>
Interpersonal (Social)	<ul style="list-style-type: none"> <li>• How many people would you design a play space for, to keep you active?</li> </ul>
Physical Environment	<ul style="list-style-type: none"> <li>• What parts of your existing play space encourage you to be physically active?</li> <li>• If you were to design a play space for you to be active, what would you include?</li> </ul>
Policy	<ul style="list-style-type: none"> <li>• Do you think there should be a play space for each year level to ensure you are physically active?</li> <li>• How supervised is your school play space?</li> </ul>

**Table 1: Sample focus group questions applying a social-ecological model**

### Map Drawing

Map drawing has been suggested as a useful alternative to survey methods for exploring children's awareness and knowledge of their environment (Hume, et al., 2005) and has been used to explore children's perceptions and thoughts about their environments by providing them with the opportunity to interpret and actively record their own experiences (Veitch, et al., 2008). Applying the use of map drawing, in addition to focus group discussions, aimed to provide a more complete, contextual insight into children's perceptions (Hume, et al., 2005) of the children's school physical activity environments. Sheets of A3 sized paper were distributed to students including an instruction sheet with the description of each mapping task that asked students to draw their: (1) existing school play space; (2) ideal school play space and (3) ideal play space for physical activity. At the completion of the mapping task, students were invited to explain their maps to the researcher at which time they were video recorded. This ensured that map features were correctly interpreted to avoid misunderstanding and to clarify each child's perspective of their drawings. For each focus group and map drawing session, an investigator and classroom teacher were in attendance to provide assistance if required. Students were positioned in quiet, separate areas during the drawing exercise to avoid distraction and to ensure that their

perspective of their existing and ideal play spaces was not influenced by peers. An example of a student's map drawing is given in Figure 1.



**Figure 1: Two maps of a primary school student's ideal (A) and active school play space environment (B), including multiple items to facilitate physical activity**

## Data Management

All focus group data was de-identified and individuals referred to by pseudonym. Data collected from focus group sessions was transcribed verbatim and analysed using the NVivo version 8 software package (QSR International, 2009). All audio recorded focus group and video recorded mapping sessions were transcribed by a trained transcriptionist. The analysis of the transcriptions was based upon the social-ecological model to identify emerging themes, similarities and differences within and between the primary and secondary school groups using the NVivo feature 'nodes most frequently coded'. The information provided in the focus groups was used to determine features that students included which would either facilitate or act as a barrier to physical activity.

Final analyses included a review using the NVivo feature of 'nodes most frequently coded' for each focus group, to ensure themes frequently coded were included. In order to gain further insight into these features, responses for both physical activity facilitator and barrier items were categorised using a social-ecological model (Salmon & King, 2010). Using a quantitative audit, the frequency with which particular objects and locations appeared was noted within the mapping analysis for both primary and secondary school students. Percentages of item frequencies were calculated for each item/location within primary and secondary school students' existing, ideal and physical activity play space maps.

## Results

The social-ecological model provides a multi-level framework for teachers to examine the range of factors that can influence the physical activity participation of primary and



secondary school students during school breaks. Themes from the focus group discussions based upon this framework allowed comparisons to be made between primary and secondary school students' perceived physical activity barriers and facilitators as shown in tables 2 and 3.

### **Intrapersonal (Individual) Factors**

The two main themes that emerged from the focus group discussions in relation to intrapersonal factors were outcome goals (e.g. health and social benefits) and task goals (e.g. focus on improvement or skill). A common outcome goal for both primary and secondary students to facilitate their physical activity was 'fun', and fun was often described when participating in activities with friends or when an activity gave the students a thrill. This outcome goal was also mentioned after students had reported a task goal such as 'taking a risk'; "*In every bit of enjoyment there is a certain amount of risk*" (Primary student); "*...it's fun taking risks and stuff...change is always good*" (Secondary student); 'learning a skill'; "*...if you are on the monkey bars you can learn how to go across and skip bars it's really fun*" (Primary student) or 'undertaking an exciting activity'; "*...all the running and tackling and stuff, chasing after a ball and tiggy...just running away from the other person, it's great*" (Primary Student); "*...have lots of tunnels...the teachers would have a really hard time trying to get them (students), it would be really fun*"(Primary student); Table 3. In contrast, the outcome goals of 'safety' and 'relaxation' were occasionally perceived to act as a barrier for secondary students to be physically active, "*...fun spaces aren't in schools...the safer ones (spaces) have to be in schools* (Primary student); "*...you don't have fun when you get hurt*" (Primary student); "*...safe play spaces are pretty boring, yeah*" (Secondary student); "*I hang out at the student lounge because it's a nice place to relax*" (Secondary student);Table 2.

<b>Social-ecological model component/ Themes (Barriers)</b>	<b>Primary school groups (n=4 groups)</b>	<b>Secondary school groups (n=3 groups)</b>
<b>Intrapersonal (Individual)</b>	<p><b>Task Goal*</b>            “Sometimes you are playing on the bars and want to do a new trick and might fall off” (Male, Year 5).</p> <p><b>Outcome Goal#</b>            “fun spaces aren’t in schools...the safer ones (spaces) have to be in schools, because it’s the teacher’s responsibility” (Female, Year 6).</p>	<p><b>Outcome Goal#</b>            “I hang out at the student lounge because it’s a nice place to relax” (Male, Year 7).</p> <p>“...safe play spaces are pretty boring, yeah” (Male, Year 7).</p> <p>“Some things that are fun aren’t always safe” (Female, Year 7).</p>
<b>Interpersonal (Social)</b>	<p><b>Peers</b>            “Sometimes the boys bring footballs on the playground and it’s really annoying” (Female, Year 6).</p> <p>“Sometimes year levels don’t mix...there is bullying” (Female, Year 6).</p>	<p><b>Peers</b>            “The only reason you wouldn’t feel safe is because the older kids are in the big area and you wouldn’t want to go there” (Female, Year 7).</p>
<b>Physical Environment</b>	<p><b>Built Environment</b>            “...the basketball nets... people hang off them so they break and have to buy a new one” (Male, Year 5).</p> <p>“I’d say the 5-6 area, a little bit more equipment, because we are like over it...played on it about a 100 times” (Female, Year 6).</p> <p><b>Safe Surfaces and Structures</b>            “Rocky, bumpy, really hurts when you fall. And when you fall you have cuts,” (Male, Year 6).</p>	<p><b>Built Environment</b>            “We always hang out in the student lounge...the student lounge is cool because there is a plasma tv and you watch all the music videos and stuff” (Male, Year 7).</p> <p>“...we wouldn’t really have a playground because we are too old for that” (Female, Year 7).</p>

<b>Policy</b>	<p><b>Supervision</b> “... normally all the teachers are down at the little kids areas” (Male, Year 6).</p> <p><b>Safety Rules</b> “You have enclosed areas and you have rules and certain regulations in certain areas. Like on the concrete areas you can’t run” (Male, Year 5).</p> <p>“On the grass areas you can’t kick balls around” (Female, Year 5).</p> <p><b>Access to Sports Equipment/Play Area Access</b> I’d say more sports equipment, cause it gets lost a lot and include more sporty areas, not like 3-4 areas and 5-6 areas” (Female, Year 5).</p>	<p><b>Supervision</b> “It’s not really supervised, the only time there are teachers is when they walk through the corridor...” (Female, Year 7).</p> <p>“If there was too many teachers around you wouldn’t be able to do anything, so it would be boring” (Male, Year 7).</p> <p><b>Access to Sports Equipment</b> “The teacher lends you stuff, but you’ve gotta be down there in like 5 minutes, because he only does it for 5 minutes or else he’s gone... if you’re not there in 5 minutes you can’t borrow sports equipment” (Male, Year 7).</p>
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<b>Social-ecological model component/ Themes (Facilitators)</b>	<b>Primary school groups (n=4 groups)</b>	<b>Secondary school groups (n=3 groups)</b>
<b>Intrapersonal (Individual)</b>	<p><b>Task Goal*</b> “...on the monkey bars you can learn how to go across and skip bars it’s really fun” (Female, Year 6).</p> <p>“have lots of tunnels... teachers would have a really hard time trying to get them (students), it would be really fun...” (Female, Year 6).</p> <p><b>Outcome Goal#</b> “A playground needs to be fairly safe but a lot of fun for kids to be active...if they don’t enjoy lunchtime they are not going to want to learn” (Female, Year 6).</p>	<p><b>Task Goal*</b> “...it’s fun taking risks and stuff....change is always good” (Male, Year 7).</p> <p><b>Outcome Goal#</b> “You should have fun, but be safe at the same time” (Female, Year 7).</p>

\*Task goal= focus on task and/or personal improvement; #Outcome goal= focus on rewards and/or comparing self to others

**Table 2: A social-ecological model of the barriers for children to participate in non-curricular physical activity**

<b>Interpersonal (Social)</b>	<p><b>Peers</b> “Probably my friends are the biggest influence on me being active, we usually just hang around and run around practically” (Female, Year 6).</p> <p><b>Teacher Role Models</b> “Some of the teachers could hold activities for play lunch and lunch ... some teachers might teach you to go around on the bike or something” (Male, Year 5).</p>	<p><b>Peers</b> “I’d have as many people that can that can fit in my play space, 40 or 50 people” (Male, Year 7).</p> <p>“People have more fun when they are talking with their friends, cause lunchtime and recess are the only times for that” (Female, Year 7).</p>
<b>Physical Environment</b>	<p><b>Built Environment</b> “I think mazes would be nice and you have to find a way out ... that would be cool... you can run around.” (Female, Year 5).</p> <p><b>Natural Environment</b> “a vege garden would be good...but no one maintains it do they?” (Female, Year 6).</p> <p><b>Safe Surfaces and Structures</b> “On the tennis courts they really grip, you can’t really slip on the tennis courts. It grips to any type of shoe really” (Male, Year 5).</p>	<p><b>Built Environment</b> “I’d have a massive trampoline...then a massive sandpit” (Male, Year 7).</p> <p><b>Natural Environment</b> “In our space (oval) there is heaps of room, so you can run around and do what you want” (Female, Year 7).</p> <p>“The footy oval is like ten metres away, so if you’ve got a footy you just play footy...” (Male, Year 7).</p>
<b>Policy</b>	<p><b>Play Area Access</b> “I would actually make it so that there’s a grade 6 playground, instead of a 5/6 playground so that there is more room to play” (Female, Year 6).</p> <p>“I think have just a year level playground, because you can’t have little preppies running around...you might knock them over...” (Male, Year 6).</p> <p><b>Supervision</b> “I do believe at this school most of the playgrounds are pretty safe, because there is always a teacher walking around” (Female, Year 6).</p>	<p><b>Play Area Access</b> “I’d like to hang out in the gym, because they don’t let us hang out in the gym. Like on rainy days we could come in and play basketball...” (Female, Year 7).</p> <p>“The year twelves have a place where they can hang out, the year sevens could have one of these” (Female, Year 7).</p> <p><b>Supervision</b> “... there’s always teachers out the front, so if anything happens they will be there to give help” (Female, Year 7).</p>

\*Task goal= focus on task and/or personal improvement; # Outcome goal= focus on rewards and/or comparing self to others

**Table 3: A social-ecological model of the facilitators for children to participate in non-curricular physical activity**

## Interpersonal (Social) Factors

The interpersonal factors that were mentioned were peers and teacher role models. The influence of peers was the most influential factor reported and it was often perceived that hanging around with friends provided a reason for students to be active in the schoolyard, *"...in the tennis courts you usually just play with all your friends...on the oval we just play with everyone on the whole oval mucking around"* (Primary student); *"...the more people the merrier is great...a massive basketball game is fun, because there is more people to pass to"* (Primary student); *"I'd have as many people that could fit into my play space, 40 or 50 people"* (Secondary student); Table 3.

However, the influence of older students was also mentioned as a barrier to physical activity due to 'territorial' issues, *"...the only reason you wouldn't feel safe is because the year 12's are in the big area and you wouldn't want to go there"* (Secondary student); Table 2. Some students also did not feel safe when in the same play area as older students or boys with sports equipment, *"...sometimes year levels don't mix...there is bullying"* (Primary student). *"Sometimes the boys bring footballs on the playground and it's really annoying"* (Primary student); *"Well, a couple of people don't like me, but they wouldn't touch me"* (Secondary student); Table 2.

In the secondary school groups, many students reported that they would rather just chat with friends during school breaks rather than be physically active *"People have more fun when they are talking with their friends, cause lunchtime and recess are the only times for that"* (Secondary student); *"Me and my friends hang out under the stairs...because it's near our lockers and nice and quiet so we can talk to each other"* (Secondary student); Table 2. Teacher role models were also mentioned as a facilitating influence on physical activity, with students suggesting teachers could run lunchtime activities, *"Some of the teachers could hold activities for like play lunch and lunch...some teachers might teach you to go around on the bike or something"* (Primary student); Table 3.

## Physical Environmental Factors

A number of themes were identified within the physical environment component regarding students' physical activity participation. The built environment was a common theme, with many students perceiving that sporting facilities, adventure type equipment and playground equipment would facilitate their participation in physical activity, *"An awesome playground that would be just a bit higher...some really good monkey bars, handles...a tyre swing"* (Primary student); *"...my space to make you active would be a better football field instead of some parts muddy and some parts really hard"*(Secondary student); *"I'd have a massive trampoline and then a massive foam pit"* (Secondary student); Table 3.

The built environment was also a major barrier to physical activity with many secondary students mentioning that their existing play spaces possess multiple food locations and a number of sedentary rather than physical activity opportunities such as televisions, lounges, picnic tables and multiple food locations, *"...it's like a couch type of thing... different groups that sit at the different ones. There's a huge one that all the year 12's sit at and then there's one next to the tv, which is the one we always sit at..."* (Secondary student); *"...we always hang out in the student lounge...because there is a plasma tv and you watch all the music videos and stuff"* (Secondary student); Table 2.

Primary students suggested an absence of new playground equipment could be a barrier to physical activity, *"...sometimes the old playgrounds can get boring after you have played on them heaps, new playgrounds are not boring"* (Primary student); *"...we are like over it, we've already played on it about a 100 times"* (Primary student); Table 2.

The natural environment was also mentioned and students suggested spacious play areas with trees, grass and rocks would encourage them to be physically active, *“In our space there is heaps of room, so you can run around and do what you want”* (Secondary student); *“...on the oval we play footy, you’ve got heaps of space and you don’t have to be aware of where you are kicking the ball”* (Primary student); Table 3.

Students regularly identified that safe surfaces and structures were important for continued physical activity participation. Many primary students stated that they would prefer a modified area to where they had become injured due to lack of safety, *“...an indoor basketball court, that doesn’t have all the concrete and stuff so you don’t hurt yourselves that much”* (Primary student); *“...the basketball court being so bumpy and rips everyone open, I’d prefer one with a roof on it with a floor like the indoor stadium...so we won’t slip and hurt ourselves”* (Primary student); *“...the platforms, because they’re square, maybe make the edges round and...provide access to knee or elbow pads”* (Primary student); Table 3.

### **Policy Factors**

Supervision, safety rules, access to sports equipment and accessing play areas were the key policy factors highlighted from the focus group discussions. Students identified that supervision was an important aspect in the play spaces to ensure they felt safe when participating in physical activity, *“...at school, equipment is much safer because the teachers are in charge of you”* (Primary student); *“I always know there’s a teacher watching out if me or my friend is in trouble”* (Primary student); *“...there’s always teachers out the front so if anything happens they will be there to give help”* (Secondary student); Table 3, however a lack of, or too many, supervising teachers could restrict physical activity, *“...normally all the teachers are down at the little kids areas”* (Primary student); *“...if there were too many teachers around, you wouldn’t be able to do anything, so it would be boring”* (Secondary student); Table 2.

Some students saw the school safety rules as a barrier to running *“...on the concrete areas you can’t run”* (Primary student) and playing with sports equipment *“...on the grassy areas you can’t kick balls around”* (Primary student); Table 2. Accessing sports equipment was seen as important for some students to be active and restrictive borrowing policies made this difficult for them *“...if you’re not there in five minutes you can’t borrow sports equipment”* (Secondary student); Table 2.

Access to certain areas of the school (e.g. gym, year level spaces) was also seen as important to encourage students’ physical activity *“...you should have an area for yourself, like year 7 and year 8, but then you should have a mixed area, because I’ve got friends in year 8..”* (Secondary Student); *“...they don’t let us hang out in the gym. Like on rainy days we could come in and play basketball. You could like work out in the gym”* (Secondary student); Table 3.

### **Map Drawing Exercise Primary School Students**

The map drawing exercise (Table 4) indicates that in general primary school students:

- Possessed a higher proportion of playground features on their existing play space maps in comparison to their ideal and physical activity play spaces.
- Consistently drew multiple features that facilitated physical activity.
- Had minimal opportunities for sedentary behavior.
- Did not include food items/locations.
- Focused on drawing of features within the natural and built environment.

- Features relating to the social environment were minimal.
- Regularly drew sporting equipment items/locations in physically active play space maps.
- Regularly drew playground equipment items/locations in ideal play space maps.
- Included a high proportion of natural environment items/locations in physically active play spaces.

### *Secondary School Students*

In contrast to the primary students, the map drawing exercise (Table 4) indicates that in general secondary school students:

- Had a high proportion of students that had an existing play space without features to encourage physical activity.
- Drew multiple opportunities to be sedentary in their existing play spaces.
- Drew multiple food items/locations in their existing play spaces.
- Despite having minimal features to encourage physical activity, drew a high proportion of features with a sporting and playground focus in their ideal and physically active play spaces.
- Despite minimal natural environment features in their existing play space maps, drew a high proportion of natural environment features within their ideal and physically active play space maps.

	Existing School Play Space		Ideal School Play Space		School Play Space to Facilitate Physical Activity	
	Primary School (n=15)	Secondary School (n=7)	Primary School (n=15)	Secondary School (n=7)	Primary School (n=15)	Secondary School (n=7)
<b>Number of opportunities for physical activity</b>						
0	1 (7%)	4 (57%)	7 (47%)	2 (29%)	5 (33%)	1 (14%)
1	4 (27%)	2 (29%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
>2	10 (67%)	1 (14%)	8 (53%)	5 (71%)	10 (67%)	6 (86%)
<b>Number of opportunities for sedentary behaviour</b>						
0	13 (87%)	2 (29%)	14 (93%)	5 (71%)	15 (100%)	6 (86%)
1	2 (13%)	1 (14%)	1 (7%)	0 (0%)	0 (0%)	1 (14%)
>2	0 (0%)	4 (57%)	0 (0%)	2 (29%)	0 (0%)	0 (0%)
<b>Number of items/locations to purchase food</b>						
0	15 (100%)	3 (43%)	15 (100%)	6 (86%)	15 (100%)	7 (100%)
1	0 (0%)	2 (29%)	0 (0%)	1 (14%)	0 (0%)	0 (0%)
>2	0 (0%)	2 (29%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
<b>Number of opportunities for social interaction</b>						
0	10 (67%)	7 (100%)	14 (93%)	6 (86%)	13 (86%)	7 (100%)
1	2 (13%)	0 (0%)	1 (7%)	0 (0%)	1 (7%)	0 (0%)
>2	3 (20%)	0 (0%)	0 (0%)	1 (14%)	1 (7%)	0 (0%)
<b>Number of playground items/locations identified in the school play space maps</b>						
0	2 (13%)	7 (100%)	10 (67%)	4 (57%)	9 (60%)	5 (71%)
1	3 (20%)	0 (0%)	0 (0%)	1 (14%)	0 (0%)	0 (0%)
>2	10 (67%)	0 (0%)	5 (33%)	2 (29%)	6 (40%)	2 (29%)
<b>Number of sporting items/locations</b>						



<b>identified in the school play space</b>						
<b>maps</b>	7 (47%)	6 (86%)	11 (74%)	2 (29%)	6 (40%)	3 (43%)
<b>0</b>	3 (20%)	1 (14%)	2 (13%)	1 (14%)	2 (13%)	0 (0%)
<b>1</b>	5 (33%)	0 (0%)	2 (13%)	4 (57%)	7 (47%)	4 (57%)
<b>&gt;2</b>						
<b>Number of natural environment</b>						
<b>items/locations identified in the school</b>						
<b>play space maps</b>						
<b>0</b>	7 (47%)	6 (86%)	11 (74%)	3 (43%)	6 (40%)	3 (43%)
<b>1</b>	3 (20%)	1 (14%)	2 (13%)	1 (14%)	2 (13%)	0 (0%)
<b>&gt;2</b>	5 (33%)	0 (0%)	2 (13%)	3 (43%)	7 (47%)	4 (57%)

**Table 4: Frequencies and percentages with which items within play spaces appeared in the students' map drawing**

## Suggestions for Future Physical Activity Facilities Within Schools

The focus group discussions provided some insight into what primary and secondary school students' perceived would help facilitate physical activity within their school play spaces (Table 5). The secondary school students generally thought facilities with a sporting and adventure oriented focus would encourage physical activity, whereas the majority of primary school students' suggestions implied a playground oriented focus. The suggestions were categorised into 'smaller scale items' (items that require a relatively small surface area) and 'larger scale items' (items that require a large surface area).

Type of facility	Primary school groups	Secondary school groups
<b>Smaller scale items</b>	<ul style="list-style-type: none"> <li>• Playground flying fox</li> <li>• Monkey bars</li> <li>• Pool table</li> <li>• Modified see saw</li> <li>• Spinning playground platform</li> <li>• Swings</li> <li>• Playground markings</li> <li>• Spider web playground climber</li> <li>• Vegetable garden</li> </ul>	<ul style="list-style-type: none"> <li>• A slide with vertical drop to the ground</li> <li>• Cricket pitch</li> <li>• Gymnastics equipment</li> <li>• Trampoline floor</li> <li>• Playground</li> <li>• Ample sports equipment</li> <li>• Rock climbing wall</li> <li>• Large Television or televisions with Nintendo Wii Sports</li> <li>• Trampoline</li> </ul>
<b>Larger scale items</b>	<ul style="list-style-type: none"> <li>• Low ropes course</li> <li>• Tunnels</li> <li>• Mazes</li> <li>• Obstacle course</li> <li>• Vertical play pen</li> <li>• Jumping pillow</li> <li>• Running track</li> <li>• Moving baggage carousel</li> <li>• High playground</li> <li>• Tennis court</li> <li>• Indoor basketball stadium</li> </ul>	<ul style="list-style-type: none"> <li>• Football oval</li> <li>• Tunnels</li> <li>• Basketball court</li> <li>• Horse riding area</li> <li>• Waterslide</li> <li>• Skate-park</li> <li>• Foam Pit</li> <li>• Adventure flying fox</li> <li>• Swimming pool</li> <li>• Race car track</li> <li>• Jumping castle</li> <li>• Adventure swings</li> </ul>

**Table 5: Primary and secondary school students' suggestions for future physical activity facilities**

## Discussion

This study provides greater understanding for teachers of the multiple levels of facilitators and barriers that influence both late primary and early secondary school students' perceptions of physical activity within the school environment, which can be used by teachers

and those responsible for decision making to inform school-based physical activity interventions and planning. The findings provide new knowledge for teachers to ensure school play spaces complement or supplement physical education and classroom activities by providing an environment inclusive for all physical activity levels and interests.

The social-ecological model of health was used in this study to identify a range of factors across multiple levels that influence students' participation in non-curricular physical activity. There have been limited investigations employing the key components of the social-ecological model of health in youth (Allender, Cowburn, & Foster, 2006), especially within a school context. With the provision of quality physical education declining (Jenkinson & Benson, 2009), the results of this study provide teachers with in-depth qualitative evidence of the intrapersonal, interpersonal, physical environment and policy factors influencing primary and secondary students' non-curricular physical activity. Highlighting the factors influencing non-curricular school physical activity may increase teachers' awareness of school play spaces to ensure physical activity is facilitated if and when opportunities arise. Additionally, the findings could influence teachers' philosophies regarding supervision during school breaks as an opportunity to facilitate children's physical activity and learning beyond the classroom rather than supervision only being a passive experience.

Despite year seven students only being one to two years older than the primary students, there were distinct differences between the primary and secondary school students' perspectives in relation to the social-ecological model. Adolescents who have just commenced secondary school are suggested to be particularly susceptible to low physical activity levels because they begin to undergo body image and self esteem changes (intrapersonal), changes to friendship groups and support structures (interpersonal) and their school environment (physical environment) changes (Garcia, Pender, Antonakos, & Ronis, 1998).

It was evident from students' perceptions of their existing school play spaces that there are a different set of environmental priorities between primary and secondary schools. Within the existing play space maps drawn by primary school students, playground structures and sporting facilities were abundant in contrast to the secondary school students' existing play spaces that possessed a high proportion of sedentary features and locations to purchase food. The environmental effects on each group's social norms were evident in the focus groups; with primary school students consistently stating that they would be active during school breaks. In contrast, many secondary school students stated they were sedentary within the canteen or lounge and talked to friends or would seek quiet areas to relax. This is despite many of the secondary school students incorporating multiple features to facilitate physical activity within their ideal play space maps.

Many secondary school students also suggested a number of avenues to facilitate physical activity in contrast to their existing play spaces via both the focus groups and map drawing, suggesting that reform could be necessary in secondary school to encourage more physical activity participation. Teachers should be aware of the environmental disconnect between primary and secondary play spaces and the fact that the vast difference in play spaces may be contributing to the decline in physical activity during the transition between primary and secondary school (Brady, 2004; Dollman, Norton, & Norton, 2005; Pate et al., 2007). The lack of connection from primary to secondary school environments to facilitate physical activity is supported by a recent study conducted by Haug and colleagues (2008) who discovered that children's physical activity peaked in grade six, followed by a significant decline in year seven for females and in year eight for males. The study suggested that a lack of facilities in secondary schools could explain the significant reduction in physical activity of secondary students during school time. Secondary students were also found to be three times more likely to be physically active if schools introduced more facilities. In our study, the barriers for secondary students to be physically active in their existing settings provide

emphasis for teachers to overcome and lead changes in play space planning, organisation and facilitation within secondary school environments

Our study is consistent with previous research that suggests there is an increased lure of sedentary opportunities and an increased focus on competitive sport activities for secondary school students which could be negatively influencing adolescents' mood, energy, motivation, interest and desire for physical activity (Allison, Dwyer, & Makin, 1999; Kohl & Hobbs, 1998). The winning and losing associated with structured competition could be turning some secondary students' away from physical activity. In addition, the increased amount of sedentary opportunities at secondary school could also be influencing adolescents' desire to socialise more (Bauer, Yang, & Austin, 2004; Blatchford, Baines, & Pellegrini, 2003) as students are less focused on moving around the play spaces and more focused on talking to friends.

A number of social-ecological model influences on students' non-curricular physical activity were identified in this study. For teachers to better understand children's physical activity behaviour, social-ecological models suggest it is necessary to consider multiple factors (Intrapersonal, Interpersonal, Physical Environment and Policy) (Salmon & King, 2010). An interesting finding in our study was the high proportion of primary school students who suggested playground items should be included within ideal play spaces (Physical Environment). This could be due to primary school students enjoying the lower level of motor skills required for school play equipment (Okely, Booth, & Patterson, 2001) or that school playground items allow for unstructured, imaginative play.

Many of the playground items mentioned by the primary school students to facilitate physical activity contrasted with their existing playground items. Findings from the present study suggest that primary school students' desire for new playground items could be due to interest in existing playground items wearing-off over time. Physical activity interventions may be necessary to continue to stimulate children's interest in school playground physical activity. The positive impact of implementing school playground interventions on primary school children's physical activity has been well documented (Bundy, et al., 2009; Stratton, 2000; Stratton & Mullan, 2005; Verstraete et al., 2006). In contrast, sports and adventurous activities seemed to appeal more to secondary school students, and this could be due to this age group enjoying the challenges associated with higher levels of motor skill development (Okely, et al., 2001) and more structured physical activities are suggested to increase with age (Malone & Tranter, 2003).

Outcome goals such as 'having fun' and 'enjoyment' were perceived to facilitate students being physically active (Intrapersonal). Students stated they were able to have fun due to interaction with friends (Interpersonal), taking risks and activities that gave them a thrill such as jumping, climbing, dropping, moving quickly and spinning. Primary school students consistently suggested playground items (Physical Environment) that included these thrills would be fun (Intrapersonal). The secondary school students were a little more adventurous and suggested more extreme facilities such as a horse riding stable, racing track, adventure swings and skate parks (Physical Environment). However, given the current finding, supervision and legal implications of some of these suggestions may not be plausible to implement. Providing units of study within teacher training programs to develop teachers' awareness of the environmental factors that facilitate physical activity could encourage the future planning, provision and promotion of children's physical activity during school breaks.

All groups of students identified the task goal of risk taking was necessary to have fun and that having minimal risk could be boring (Intrapersonal). Risk taking is suggested to increase children's confidence in themselves and develop learning paths and dispositions (Maynard & Waters, 2007) which are important educational considerations for enhancing and embracing the challenges of learning in any context. However, students mentioned that unsafe surfaces and structures (Physical Environment) could act as a barrier to their physical activity participation. This suggests that higher levels of perceived injury risk or past experiences of

injury could be a barrier to physical activity in certain play areas (Caine, Maffuli, & Caine, 2008). In addition, the level of access children had to sports equipment, play areas, supervision and rules (Policy) had an influence on the physical activity behaviour of both primary and secondary students. It is vital teachers develop policies that are supportive of students being active. Physical activity policies are known to be unique to each school (Commonwealth of Australia, 2009) and large discrepancies between written physical activity policies and implementation exist within schools (Hardman, 2008; Jenkinson & Benson, 2009).

The methodology used in this study was innovative and to our knowledge this is the first case study to employ a combination of focus group discussions with map drawing to examine students' perceptions of the influences on their non-curricular physical activity at school. The equal gender distribution and ability to obtain information from students about their actual and ideal school play environments were strengths of this study. However, it should be acknowledged that the mapping task may have been cognitively challenging for some of the younger students aged 10-13 years. Two previous studies have also undertaken mapping techniques with students aged 10-15 years (Hume et al, 2005; Veitch et al, 2008) suggesting that this method was suited to students' cognitive capabilities. Nonetheless, the validity of these findings is reliant on students being able to understand the tasks and accurately report their responses. Having staff available to assist students when required, helped to minimise potential problems such as distractions from other students and confusion of interview questions and map instructions.

It is also important to acknowledge that the findings from this study are not generalisable to wider populations as they are only representative of the perceptions of groups of students from two primary and two secondary schools in two regional areas of Victoria. Nonetheless, being the gate-keepers to children's non-curricular physical activity, this study provides teachers with an insight into factors that could affect the future provision of children's physical activity beyond school classrooms, a key developmental setting often over-looked by schools (Dyment & Bell, 2008).

### **Practical Implications for Teacher Education**

The multi-level social-ecological model provides a way for teachers to obtain crucial information to enable children's perceptions to be taken into consideration when negotiating with school decision makers during planning processes to ensure play spaces can compliment or supplement physical education and classroom activity by providing an environment to cater for all physical activity levels. Teacher training programs should provide units of study that develop pre-service teachers' awareness of the factors influencing children's non curricular physical activity and provide the skills to be able to plan, provide and promote play space physical activity during school breaks. This should enable primary and secondary teachers to understand and critically reflect on the facilitators and barriers that are encountered by children during school breaks to develop strategies to overcome these barriers and lead changes in school play space planning, organisation and facilitation. Findings from this study could be used to influence teachers' philosophies regarding scheduled schoolyard supervision, to perceive it as an opportunity to facilitate children's physical activity and learning beyond the classroom rather than viewing supervision as having little impact on student learning and development.

### **Conclusion**

This research showed that students had a desire for new features in their school play spaces that could facilitate physical activity. However, these suggestions often contrasted the features of their existing school play spaces. In contrast to primary school students the secondary school students' perceptions of their existing play spaces promoted mostly sedentary behaviour, despite many secondary school students desiring school play space features to facilitate physical activity. This study suggests that there are a lack of facilities and play spaces conducive to active play during the transition from primary to secondary school, despite adolescence being such a crucial time for students to participate in, and develop lifelong physical activity habits.

The identification of facilitators and barriers to students' perceived physical activity has the potential to inform the development of future school based physical activity interventions. Currently, many school play spaces are designed by adults. Listening to students' perspectives of the factors that encourage them to be physically active may assist in reducing the time students spend engaged in sedentary behavior and promote healthy, active school play spaces.

## References

- Allender, S., Cowburn, G., & Foster, C. (2006). Understanding participation in sport and physical activity among children and adults: a review of qualitative studies. *Health Educ Res*, 21(6), 826-835.
- Allison, K. R., Dwyer, J. J., & Makin, S. (1999). Perceived barriers to physical activity among high school students. *Prev Med*, 28(6), 608-615.
- Bauer, K. W., Yang, Y. W., & Austin, S. B. (2004). "How can we stay healthy when you're throwing all of this in front of us?" Findings from focus groups and interviews in middle schools on environmental influences on nutrition and physical activity. *Health Educ Behav*, 31(1), 34-46.
- Bilton, H. (2002). *Outdoor play in the early years*. London: David Fulton.
- Blatchford, P., Baines, E., & Pellegrini, A. (2003). The social context of school playground games: Sex and ethnic differences, and changes over time after entry to junior school. *Br J Dev Psychol*, 21(4), 481-505.
- Brady, F. (2004). Children's organized sports: A developmental perspective. *J Phys Ed Rec Dance*, 75(2), 35-41.
- Bundy, A., Lockett, T., Tranter, P., Naughton, G., Wyver, S., & Ragen, J. (2009). The risk is that there is 'no risk': a simple, innovative intervention to increase children's activity levels. *Int J Early Years Educ*, 17(1), 33-45.
- Caine, D., Maffuli, N., & Caine, C. (2008). Epidemiology of injury in child and adolescent sports: Injury rates, risk factors, and prevention. *Clin Sports Med*, 27(1), 19-50.
- Commonwealth of Australia (2009) *The Independent Sport Panel Report (Crawford Report)*. Canberra: Commonwealth of Australia.
- Davison, K. K., & Lawson, C. T. (2006). Do attributes in the physical environment influence children's physical activity? A review of the literature. *Int J Behav Nutr Phys Act*, 3(1), 19.
- De Corby, K., Halas, J., Dixon, S., Wintrup, L., & Janzen, H. (2005). Classroom teachers and the challenges of delivery quality physical education. *J Educ Res*, 98(4), 208-220.
- Dobbins, M., De Corby, K., Robeson, P., Husson, H., & Tirilis, D. (2009). School-based physical activity programs for promoting physical activity and fitness in children and adolescents aged 6-18. *Cochrane Database Syst Rev*(1), CD007651.
- Dollman, J., Norton, K., & Norton, L. (2005). Evidence for secular trends in children's physical activity behaviour. *Br J Sports Med*, 39(12), 892-897.
- Dyment, J. E., & Bell, A. C. (2007). Grounds for movement: Green school grounds as sites for promoting physical activity. *Health Educ Res*, 23 (6), 952-962.

- Eisenmann, J. C. (2006). Insight into the causes of the recent secular trend in pediatric obesity: Common sense does not always prevail for complex, multi-factorial phenotypes. *Prev Med*, 42(5), 329-335.
- Evans, J., & Pellegrini, A. D. (1997). Surplus energy theory: An enduring but inadequate justification for school break time. *Educ Rev*, 49(3), 229-236.
- Garcia, A.W., Pender, N.J., Antonakos, C.L., & Ronis, D.L. (1998). Changes in Physical Activity Beliefs and Behaviors of Boys and Girls Across the Transition to Junior High School. *J Adol Health*, 22(5), 394-402.
- Hardman, K. (2008). Physical education in schools: a global perspective. *Kinesiology*, 40(1), 5-28.
- Haug, E., Torsheim, T., & Samdal, O. (2008). Physical environmental characteristics and individual interests as correlates of physical activity in Norwegian secondary schools: The health behaviour in school-aged children study. *Int J Behav Nutr Phys Act*, 5(1), 47-56.
- Huberty, J., Siahpush, M., Beighle, A., Fuhrmeister, E., Silva, P. & Welk, G. (2011). Ready for recess: A pilot study to increase physical activity in elementary school children. *J School Health*, 81 (5), 251-257.
- Hume, C., Salmon, J., & Ball, K. (2005). Children's perceptions of their home and neighborhood environments, and their association with objectively measured physical activity: a qualitative and quantitative study. *Health Educ Res*, 20(1), 1-13.
- Jenkinson, K., & Benson, A.C. (2009). Physical education, sport education and physical activity policies: Teacher knowledge and implementation in their Victorian state secondary school *Euro Phys Ed Rev*, 15(3), 365-388.
- Jenkinson, K., & Benson, A.C. (2010). Barriers to Providing Physical Education and Physical Activity in Victorian State Secondary Schools. *Aus J Teach Ed*, 35(8), 1-17.
- Knowles-Yanez, K. (2005). Children's participation in planning processes. *J Plan Lit*, 20(1), 3-14.
- Kohl, H. W., 3rd, & Hobbs, K. E. (1998). Development of physical activity behaviors among children and adolescents. *Pediatrics*, 101(3 Pt 2), 549-554.
- Le Masurier, G., & Corbin, C.B. (2006). Top 10 reasons for quality physical education. *J Phys Ed Rec Dance*, 77(6), 44-53.
- Lee, S. M., Burgeson, C. R., Fulton, J. E., & Spain, C. G. (2007). Physical education and physical activity: results from the School Health Policies and Programs Study 2006. *J Sch Health*, 77(8), 435-463.
- Lopes, L., Lopes, V., & Pereira, B. (2009). Physical activity levels in normal weight and overweight Portuguese children: an intervention study during an elementary school recess. *Int Elec J Health Educ*, 12, 175-184.
- Loucaides, C.A., Jago, R., & Charalambous, I. (2009). Promoting physical activity during school break times: Piloting a simple, low cost intervention. *Prev Med*, 48 (4), 332-334.
- Malone, K., & Tranter, P.J. (2003). School grounds as sites for learning: Making the most of environmental opportunities. *Enviro Educ Res*, 9(3), 283-303.
- Maynard, T., & Waters, J. (2007). Learning in the outdoor environment: a missed opportunity? *Early Years*, 27(3), 255-265.
- Moore, J. B., Jilcott, S. B., Shores, K. A., Evenson, K. R., Brownson, R. C., & Novick, L. F. (2010). A qualitative examination of perceived barriers and facilitators of physical activity for urban and rural youth. *Health Educ Res*, 25(2), 355-367.
- Morgan, P. J., & Bourke, S.F. (2005). An investigation of pre-service and primary school teachers' perspectives of PE teaching confidence and PE teacher education. *ACHPER Healthy Lifestyle J*, 52(1), 7-13.
- Morgan, P. J., & Hansen, V. (2008). Classroom teachers' perceptions of the impact of barriers to teaching physical education on the quality of physical education programs. *Res Q Exerc Sport*, 79(4), 506-516.

- Okely, A.D., Booth, M., & Patterson, J.W. (2001). Relationship of physical activity to fundamental movement skills among adolescents. *Med Sci Sports Exerc*, 3, 1899-1904.
- Ozdemir, A., & Yilmaz, O. (2008). Assessment of outdoor school environments and physical activity in Ankara's primary schools. *J Environ Psych*, 28(3), 287-300.
- Pate, R. R., Saunders, R., Dishman, R. K., Addy, C., Dowda, M., & Ward, D. S. (2007). Long-term effects of a physical activity intervention in high school girls. *Am J Prev Med*, 33(4), 276-280.
- Pellegrini, A. D., & Holmes, R. (2006). The role of recess in primary school. In D. Singer, R. Golinkoff & K Hirsh-Pasek (Eds.), *Play=learning: How play motivates and enhances children's cognitive and social-emotional growth*. Oxford, UK: Oxford.
- Ridgers, N. D., Stratton, G., & Fairclough, S. J. (2006). Physical activity levels of children during school playtime. *Sports Med*, 36(4), 359-371.
- Ridgers, N. D., Stratton, G., Fairclough, S. J., & Twisk, J. W. (2007). Long-term effects of a playground markings and physical structures on children's recess physical activity levels. *Prev Med*, 44(5), 393-397.
- Ridgers, N. D., Stratton, G., & McKenzie, T. L. (2010). Reliability and validity of the System for Observing Children's Activity and Relationships during Play (SOCARP). *J Phys Act Health*, 7(1), 17-25.
- Riley, A.W. (2004). Evidence that school-age children can self-report on their health. *Amb Ped*, 4(4), 374-376.
- Salmon, J., & King, A. C. (2010). Population approaches to increasing physical activity and reducing sedentary behavior among children and adults. In D. Crawford, R. W. Jeffery, K. Ball & J. Brug (Eds.), *Obesity epidemiology: from aetiology to public health* (2nd ed.). New York, N.Y.: Oxford University Press.
- Sener, T. (2006). The Children and Architecture Project in Turkey. *Child Youth Environ*, 16(2), 191-206.
- Sirard, J. R., & Pate, R. R. (2001). Physical activity assessment in children and adolescents. *Sports Med*, 31(6), 439-454.
- Stratton, G. (2000). Promoting children's physical activity in primary school: an intervention study using playground markings. *Ergonomics*, 43(10), 1538-1546.
- Stratton, G., & Mullan, E. (2005). The effect of multicolor playground markings on children's physical activity level during recess. *Prev Med*, 41(5-6), 828-833.
- Tranter, P.J., & Malone, K. (2004). Geographies of environmental learning: an exploration of children's use of school grounds. *Child Geog*, 2(1), 131-155.
- Trost, S. G., & Loprinzi, P. D. (2008). Exercise-Promoting healthy lifestyles in children and adolescents. *J Clin Lipidol*, 2(3), 162-168.
- Tudor-Locke, C., Lee, S. M., Morgan, C. F., Beighle, A., & Pangrazi, R. P. (2006). Children's pedometer-determined physical activity during the segmented school day. *Med Sci Sports Exerc*, 38(10), 1732-1738.
- Vara, L. S., & Epstein, L. H. (1993). Laboratory assessment of choice between exercise or sedentary behaviors. *Res Q Exerc Sport*, 64(3), 356-360.
- Veitch, J., Salmon, J., & Ball, K. (2008). Children's active free play in local neighborhoods: a behavioral mapping study. *Health Educ Res*, 23(5), 870-879.
- Verstraete, S. J., Cardon, G. M., De Clercq, D. L., & De Bourdeaudhuij, I. M. (2006). Increasing children's physical activity levels during recess periods in elementary schools: the effects of providing game equipment. *Eur J Public Health*, 16(4), 415-419.
- WHO. (2007). Move for health: Sedentary lifestyle: A global public health problem, from [http://www.who.int/moveforhealth/advocacy/information\\_sheets/sedentary/en/index.html](http://www.who.int/moveforhealth/advocacy/information_sheets/sedentary/en/index.html)
- Willenberg, L. J., Ashbolt, R., Holland, D., Gibbs, L., MacDougall, C., & Garrard, J. (2009). Increasing school playground physical activity: a mixed methods study combining environmental measures and children's perspectives. *J Sci Med Sport*, 13(2), 210-216.



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