NEIGHBOURHOOD FACTORS IN CHILDREN’S OUTDOOR PLAY: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

This systematic review discusses 25 recent studies (from 2000 to 2019, 13 quantitative and 12 qualitative) on the associations between neighbourhood characteristics and outdoor play of children (7–14 years old). Both physical and social contexts are shown to influence outdoor play, though studies differ on which elements matter most. Play-friendly environments with informal and safe opportunities are more stimulating than formal playgrounds. Moreover, parents’ social safety concerns limit children’s independent outdoor play. Investigation of moderating factors is limited to age and gender differences and offers inconclusive evidence. Further research should collect evidence from both parents’ and children’s perspectives on how and for whom neighbourhood features matter.

Key words: children; outdoor play; urban areas; neighbourhoods; global north; literature review

INTRODUCTION

The amount of time children play independently outdoors has decreased over the last five decades in the global north (Karsten 2005; Skår & Krogh 2009; Holloway & Pimlott-Wilson 2014; Woolley & Griffin 2015). In the Netherlands, for example, 30 per cent rarely play outside (Jantje Beton 2018). This trend is detrimental: playing outside contributes to children’s physical health as well as to their social, cognitive and motor functions (Solomon-Moore et al. 2018). Moreover, it can promote social cohesion, social integration and community building (Bennet et al. 2012).

In an annotated bibliography, McKendrick (2000) identified several studies on playgrounds and play environments. Those conducted between 1970 and 2000 deal with themes like providing formal playgrounds or commercial play environments and engaging children in designing playgrounds. Most of these studies concern formal playgrounds rather than the neighbourhood context. Holloway and Valentine’s (2000) Children’s Geographies – Playing, Living, Learning considers informal opportunities but do not pay much attention to the neighbourhood context. Interest in that context – and neighbourhood effects – has since increased (Oakes et al. 2015).

The UN estimates that 60 per cent of the world’s children will live in cities by 2025 (Lilius 2014; Boterman & Karsten 2015). As noted by Randolph (2006, p. 5), however, ‘contemporary strategic planning has almost become child-blind, with the new higher density centres being built essentially for the childless in mind’. Thus, insights into factors that contribute to children’s outdoor play can be applied to city planning.

With rising anxiety about outdoor safety (Pain 2006; Veitch et al. 2006; Lee et al. 2015; Horton & Kraftl 2018), parents are reluctant...
to leave children unsupervised. Valentine and McKendrick (1997) already noted the ‘changing nature of childhood’; since then, play has become even more controlled, privatized and subject to adult supervision (Holt et al. 2008; Pynn et al. 2019). Children and parents have busy schedules, leaving less time for outdoor play and supervision by parents (Veitch et al. 2007; Witten et al. 2013). There is a concomitant shift towards indoor, screen-focused activities (Clements 2004; Witten et al. 2013).

The aim of this review is to discern which neighbourhood factors make outdoor play attractive. The findings might be used to encourage children to spend more time outdoors and thereby to promote the health and developmental benefits of outdoor play. Systematic reviews are considered a powerful form of research, primarily for evidence-based decision-making (Tranfield et al. 2003; Kraus et al. 2020). Where studies on the same topic can produce different results, a systematic review synthesizes their findings. Petticrew and Roberts (2006) liken an individual study to a single response in a quantitative survey. Only combining multiple responses can overcome biases and provide a reliable answer to the research question. Furthermore, collecting literature by standardized methods allows the reviewer to compile studies from different disciplines.

METHODS

PRISMA (Preferred Reporting Items for Systematic reviews and Meta- Analyses) guidelines were followed for this review (Liberati et al. 2009). These were developed in reaction to poor reporting and inadequate systematization and transparency, which made a review likely to be biased by the subjectivity of the author (Hodgkinson & Ford 2014). PRISMA guidelines consist of a 27-item checklist and a four-phase flow diagram. The checklist includes items deemed essential for transparent reporting of a systematic review.

A systematic search in Scopus was conducted in June and July 2019 using three sets of key words: children/young people (Child* OR ‘Young People’); neighbourhood environment (neighb*rhood OR ‘physical environment’ OR ‘social environment’ OR ‘public space’); and outdoor play (‘outdoor play’ OR ‘outside play’ OR ‘free play’). The search was limited to articles published in English after 2000. Only articles in peer-reviewed journals were included because they are widely accepted as higher-quality academic sources (Kraus et al. 2020). Furthermore, books and grey literature are difficult to incorporate in a transparent methodology.

To increase comparability, we included articles based on the following criteria:

1. The main topic was ‘free outdoor play’, which we defined as unstructured, spontaneous, accessible and taking place in a child’s free time (Skår et al. 2016). Play in the context of the home/garden, school or out-of-school activities was excluded;
2. Independent variables included elements of the social and/or physical neighbourhood environment. Social neighbourhood environment comprises variables dealing with residents and their interactions. Physical neighbourhood environment comprises built elements (dwellings, public spaces, infrastructures). Studies dealing with the household or school environment without any relation to the neighbourhood were excluded;
3. The focus was on children 7–14 years old, or an overlapping age group. This range reflects the fact that children play independently from approximately seven years onwards (Soori & Bhopal 2002), while the nature of play shifts after age 14 towards ‘hanging out’ (Pyrry & Tani 2016);
4. Studies about children with physical or developmental disabilities or chronic diseases were excluded;
5. The research site was an urban or suburban environment;
6. The study concerned Europe, North America, Australia or New Zealand;
7. Intervention studies were excluded;
8. Review studies were excluded, but their literature lists were scanned for studies that could be included.

The initial search yielded 226 unique hits, 186 of which were excluded after screening the title and abstract. Most of these 186 did not focus on outdoor play, did not include neighbourhood variables, studied the wrong age group or only considered children with disabilities or...
chronic diseases. An additional 28 studies were excluded after more comprehensive screening using the same parameters but based on a full-text reading. Finally, the 12 meeting all criteria were included in the review.

The snowball method added 13 papers. These were selected by first skimming titles and publication dates in the reference lists of the original 12 papers. In case of hesitation, the abstracts were consulted and 26 papers were then read thoroughly. After this phase, 13 papers were excluded because they did not meet one or more criteria. Snowball sampling yielded only qualitative studies. The initial search captured quantitative studies but was less effective for qualitative studies. While quantitative studies explicitly state the aim to investigate the association between neighbourhood variables and outdoor play, this aim may be couched ‘between the lines’ in qualitative studies.

Overall, the search procedure yielded 25 studies that met all criteria (see Figure 1).

**RESULTS**

**Study descriptions** – The 25 papers included in this review differed widely (see Table 1). Thirteen studies were quantitative: of these, one was longitudinal (Cleland et al. 2010), one quasi-longitudinal (Handy et al. 2008) and the rest cross-sectional. Various methods were used, such as surveys, observations, accelerometry and GIS. All quantitative studies controlled for the possible impact of socio-demographic factors like gender, age and socio-economic status. The other 12 were qualitative: one was longitudinal (Karsten 2003), the rest cross-sectional. Interviews and observations were sometimes combined with visual methods such

![PRISMA flow diagram of study selection process.](image-url)
Table 1. Summary of reviewed studies.

<table>
<thead>
<tr>
<th>Study description</th>
<th>Physical factors</th>
<th>Social factors</th>
<th>Moderating factors</th>
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<tbody>
<tr>
<td></td>
<td>Presence and quality of playgrounds</td>
<td>Traffic safety</td>
<td>Social safety</td>
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<td><strong>Quantitative papers</strong></td>
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<td>Aarts et al. (2010)</td>
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<td>Handy et al. (2008)</td>
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<td>Faulkner et al. (2015)</td>
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<td>Loucaides and Tsangaridou (2017)</td>
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<td>Page et al. (2010)</td>
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<td>Reimers et al. (2018)</td>
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<td><strong>Veitch et al. (2010)</strong></td>
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<td>Australia, cross-sectional survey and accelerometry in a large city</td>
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<td><strong>Wilkie et al. (2018)</strong></td>
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<td>UK, cross-sectional survey in two districts including a small city</td>
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<td><strong>Yoon and Lee (2019)</strong></td>
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<td>USA, cross-sectional survey and GIS in a large city</td>
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<td><strong>Qualitative papers</strong></td>
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<td>UK, interviews in a medium-sized city</td>
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<td>Burke (2005)</td>
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<td>UK, photo-diary &amp; interviews in two neighbourhoods in a large city</td>
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<td>Castonguay and Jutras (2009)</td>
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<td>Canada, photographs &amp; interviews in a poor neighbourhood of a large city</td>
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<td>Ferré et al. (2006)</td>
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<td>Spain, observations &amp; interviews in two small cities</td>
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<td>Holt et al. (2008)</td>
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<td>Canada, mind-mapping in two neighbourhoods in a large city</td>
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<td>Horton and Kraftl (2018)</td>
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<tr>
<td>UK, cross-sectional survey &amp; mapping exercise in three wards in a large city</td>
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<th>Social factors</th>
<th>Moderating factors</th>
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<td>Karsten (2003) The Netherlands, longitudinal observations &amp; interviews in four neighbourhoods in a large city</td>
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<td>Veitch et al. (2006) Australia, interviews in three neighbourhoods in a large city</td>
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<td>Parent</td>
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<td>Veitch et al. (2007) Australia, focus groups in a large city</td>
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<td></td>
<td>Parent</td>
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<tr>
<td>Witten et al. (2013) New Zealand, focus groups in suburbs of large city</td>
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<td>x</td>
<td>Child</td>
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*The following ranges were used here: large city >500,000, medium-sized city 150,000–500,000 and small city <150,000. Unless otherwise mentioned the research took place city-wide.*
as mental mapping or photography. The full set of studies covered a wide range of national contexts: most were conducted in metropolitan regions in the UK (7, including 2 in Bristol by Brockman et al. 2011a, 2011b) and Australia (5, including 4 in Melbourne by Veitch et al. 2006, 2007, 2008, 2010); the remainder were conducted in the Netherlands (3, including 2 by Aarts et al. 2010, 2012), Canada (3), USA (2), Switzerland (1), Germany (1), Cyprus (1), Spain (1) and New Zealand (1).

Many age categories were used. One study included children from 0 to 18 years (Karsten 2003), another from 0 to 16 (Handy et al. 2008). The rest focused on specific ages within the 4–14 range, though these limits differed widely. All but one study focused on a general population, the exception being Yoon and Lee (2019) whose sample was 69.3 per cent Hispanic.

How is children’s outdoor play measured? – The studies measured outdoor play in various ways (see Table 1). Of the quantitative studies, 11 recorded outdoor play in minutes per day, hours per week or number of activities. Two (Loucaides & Tsangaridou 2017; Reimers et al. 2018) determined the physical activity level using an accelerometer or observations. Finally, four registered play locations and how these were being used (type of equipment, level of independence etc.). The qualitative studies combined different perspectives on outdoor play by considering where children played, e.g. location and situational context (neighbourhood), but also how and why certain playgrounds were used, e.g. in terms of type equipment and design or in terms of the presence of peers and friends.

Nine studies (6 quantitative and 3 qualitative) examined the impact of neighbourhood characteristics from only the parent perspective, 10 (3 quantitative and 7 qualitative) only used child perspectives, and four (2 quantitative and 2 qualitative) included both parent and child perspectives. One study only used researcher observations (Reimers et al. 2018) and one (Aarts et al. 2012) combined researcher observations with parent perceptions.

Which neighbourhood factors matter? – According to Boxberger and Reimers (2019), the neighbourhood environment could be considered ‘a key setting for outdoor play’. Neighbourhoods have an independent effect on outdoor play over and above individual characteristics; therefore, environmental factors are central to this review. Two kinds of environmental factors, physical and social, are studied in a variety of ways. Physical factors include the amount of green space, the walkability and traffic safety of the neighbourhood, and the presence and quality of play facilities. Social factors include social safety, social environment (social cohesion and social capital) and the presence of friends.

Physical factors – Green space – Six quantitative studies focused on access to green spaces in the neighbourhood. Bringolf-Isler et al. (2010) and Handy et al. (2008) found an association between availability of parks and children’s outdoor play; Aarts and colleagues (2010, 2012), on the other hand, found no effect. Veitch et al. found no association between distance to green spaces and use of playgrounds in their 2008 study, but their 2010 study showed that children use playgrounds more often when parents take them to the park at least once a week.

Eight qualitative studies included green space as an important factor (Burke 2005; Veitch et al. 2006, 2007; Holt et al. 2008; Castonguay & Jutras 2009; Brockman et al. 2011a, 2011b; Horton & Kraftl 2018). Many children and parents affirmed its importance. They liked features of the natural environment such as being able to hide in the bushes, climb trees and play with their pets. Natural materials also supported imaginative play, as grass or branches could be used for building and construction (Burke 2005; Veitch et al. 2007). Moreover, open spaces allowed children to play with balls, ride bikes etc. (Veitch et al. 2007). Green spaces were described as ‘lovely’, ‘restful’ and having a ‘good atmosphere’ for play (Horton & Kraftl 2018). However, in certain neighbourhoods – often with a low socio-economic status – green space was scarce (Castonguay & Jutras 2009) or considered unsafe, for example, because of teenagers hanging around (Veitch et al. 2006).
Traffic safety – Eight quantitative studies included a variable related to traffic safety: either perceptions of traffic safety, or attributes such as walkability or living on a cul-de-sac. A positive association was found between outdoor play and perceived traffic safety (Bringolf-Isler et al. 2010; Veitch et al. 2010; Faulkner et al. 2015) and living on a cul-de-sac (Handy et al. 2008; Veitch et al. 2010). The studies of Aarts et al. (2010, 2012), on the other hand, found no association between traffic volume and speed and outdoor play for most of their age-gender subgroups. Their 2012 study, however, had mixed results for various elements of the built environment (e.g. roundabouts, sidewalks, intersections), as those mattered differently for the subgroups. Differences between groups also emerged in two other studies. Wilkie et al. (2018) found a negative association between traffic-related concerns and after-school time outdoors among boys but not among girls. Yoon and Lee (2019) found that density of traffic accidents led to less play only for white children and that density of intersections led to less play only for Hispanic children. Walkability of the neighbourhood was not found to be associated with outdoor play (Aarts et al. 2010; Faulkner et al. 2015; Yoon & Lee 2019).

Children and parents were worried about traffic safety in the neighbourhood, as mentioned in eight of the qualitative studies (Ferré et al. 2006; Veitch et al. 2006; Holt et al. 2008; Castonguay & Jutras 2009; Brockman et al. 2011b; Witten et al. 2013; Horton & Kraftl 2018; Solomon-Moore et al. 2018). Parental concerns impeded children’s independent outdoor play and were widely internalized by their children. Interestingly, Witten et al. (2013) shows that traffic volume and speed were the primary concerns among parents in middle-income areas, while parents in low-income areas expressed people-related fears regarding strangers, gangs and drunken youths. Cul-de-sacs were frequently mentioned as a destination for play shielded from traffic (Veitch et al. 2006; Holt et al. 2008; Brockman et al. 2011b). This was particularly the case for younger children, while older children used areas further from home (Holt et al. 2008).

Presence and quality of play facilities – Seven studies focused on the presence and quality of formal outdoor play facilities, which resulted in rather surprising outcomes. Yoon and Lee (2019) found an association between minutes play per day and number of playgrounds for white but not for Hispanic children. Aarts et al. (2010), Bringolf-Isler et al. (2010), Reimers et al. (2018) and Veitch et al. (2008), however, found no associations between the presence or quality of these facilities and outdoor play. According to Veitch et al. (2010), parents’ satisfaction with playgrounds was associated with more play there, but only in the weekend. Finally, contrary to expectations, Aarts et al. (2012) found that the presence of formal play areas was negatively associated with outdoor play and that the quality of such areas was unrelated to outdoor play. The authors, however, indicate that the used indicator (number of play facilities per km²) ignores the size and quality of play facilities as a possible important factor in relation to children’s outdoor play.

While the quantitative studies indicated limited influence of formal playgrounds on children’s outdoor play, the quality and accessibility of playgrounds was discussed in eight of the qualitative studies (Karsten 2003; Burke 2005; Ferré et al. 2006; Veitch et al. 2006, 2007; Castonguay & Jutras 2009; Brockman et al. 2011a; Horton & Kraftl 2018). Parents’ and children’s accounts revealed several characteristics that facilitated outdoor play. First of all, high levels of maintenance and renovation of equipment were deemed important to keep children interested (Karsten 2003; Veitch et al. 2006; Ferré et al. 2006; Castonguay & Jutras 2009; Horton & Kraftl 2018). Negative aspects like litter, broken equipment, dog waste, graffiti and deferred conservation of natural areas discouraged parents and children from using certain playgrounds. Interestingly, the design of the ideal playground differed between children and adults. Parents prioritized safety and hygiene, while children desired enjoyment and risk (Ferré et al. 2006; Veitch et al. 2006; Horton & Kraftl 2018). Second, the playground should appeal to different age groups or genders. Horton and Kraftl (2018) found that children valued equipment that was ‘fun to play with’ for all members of the family. Besides play equipment, parents expressed a desire for bike paths, picnic facilities, clean toilets, shade...
and open space (Veitch et al. 2006). What was considered 'fun' differed. Veitch et al. (2006, 2007), Burke (2005) and Ferré et al. (2006) reported that play equipment was often suited to younger children and boring to older children. In the study of Veitch et al. (2007), children noted a lack of variety for different age groups, pointing out that the same equipment was found in other parks. The same study also showed that older children from schools with a low socio-economic status were not concerned about elaborate equipment or facilities as long as they could play with their friends and be independent from adults and/or safe from teenagers. Furthermore, three studies showed that girls and boys preferred different elements in playgrounds (Karsten 2003; Ferré et al. 2006; Brockman et al. 2011a).

**Social factors** – The impact of social neighbourhood factors on children’s outdoor play falls into three categories: social safety, social norms and cohesion, and the presence of other children. Ten quantitative and 10 qualitative studies included at least one of these factors in their analysis.

**Social safety** – Six quantitative studies (Handy et al. 2008; Page et al. 2010; Veitch et al. 2010; Bringolf-Isler et al. 2010; Faulkner et al. 2015; Wilkie et al. 2018) included social safety in their models. The outcomes are, however, mixed. One set focused on perceptions of neighbourhood crime. Bringolf-Isler et al. (2010) found no association between parents’ perception of crime and children’s outdoor play, while Handy and colleagues (2008) found that lower levels of perceived crime were associated with more outdoor play. Page et al. (2010) found an association between children’s perceptions of crime, noise and bullying in the neighbourhood and outdoor play, but only for girls. Wilkie et al. (2018), on the other hand, reported that heightened crime-related concerns were associated with increased odds of time outside after school. The authors indicate that it is possible that parents of children who play outside more often are more aware of potential dangers, and thus express more concerns. The second set of studies focused on general feelings of unsafety and stranger-danger. Here too, results were mixed. Faulkner et al. (2015) found that outdoor play was associated with perceived stranger-danger, but not with perceived safety. Veitch et al. (2010), on the other hand, found no associations between stranger-danger and outdoor play but did find an effect of parental perceptions of safety. Page et al. (2010) found no effect of children’s perceptions of ‘safety at night, daytime and fear of strangers’ on their outdoor play.

Eight qualitative studies explored the effect of social safety. Safety issues included the presence of strangers, bullies, older kids, drug dealers or dogs (Veitch et al. 2006, 2007; Castonguay & Jutras 2009; Brockman et al. 2011b; Witten et al. 2013; Horton & Kraftl 2018; Solomon-Moore et al. 2018). Several studies showed that parents’ concerns played a central role (Veitch et al. 2006; Brockman et al. 2011b; Horton & Kraftl 2018; Solomon-Moore et al. 2018). Solomon-Moore et al. (2018), for example, stated that the internalization of fear was especially prevalent among mothers; by allowing their child to play outside unsupervised they would be considered a ‘bad parent’. This ‘culture of fear’ influenced how and when parents allowed their child to interact with their local environment, when in reality these fears were disproportionate. Ferré et al. (2006), on the other hand, found that safety concerns referred mainly to the equipment, maintenance and traffic rather than the behaviour of other people. Three studies compared social safety concerns in neighbourhoods with a low, middle and high socio-economic status; two showed that these concerns were heightened in neighbourhoods with a low socio-economic status (Veitch et al. 2006, 2007; Horton & Kraftl 2018). At the same time, Castonguay and Jutras (2009) found a surprising popularity of streets and alleys in a poor neighbourhood. They argued that children there are more likely to play outdoors because of crowded homes and limited opportunities for other out-of-school activities.

Several qualitative studies referred to strategies for dealing with perceived unsafety and unfamiliarity. Play indoors or in alternative private spaces such as backyards was seen as a ‘safe’ option by many parents (Veitch et al. 2006; Solomon-Moore et al. 2018). But children
felt ‘stuck’ in their homes (Veitch et al. 2007). Particularly for children from poor families, spending time outdoors might offer opportunities to escape cramped homes (Castonguay & Jutras 2009). Parental strategies to avoid danger, such as involving children in organized play in other settings (Witten et al. 2013) or chaperoning kids, was often described in negative terms such as ‘bubble-wrapped’ kids (Solomon-Moore et al. 2018). From a positive angle, Brockman et al. (2011b) referred to the mobile phone as a license to play, by alleviating parents’ safety fears, it promoted outdoor play.

**Social norms and cohesion** – Three quantitative studies included a variable for neighbourhood social environment, such as social cohesion (Aarts et al. 2010), social norms (Page et al. 2008) and interaction with neighbours (Handy et al. 2008). All three found that a positive neighbourhood social environment was related to more outdoor play.

Three qualitative studies dealt with the role of social norms and cohesion. Veitch et al. (2006) revealed strong social norms regarding ‘unsupervised’ outdoor play. For example, the majority of parents living in quiet areas allowed their child to play in their street, whereas this was considered unacceptable in less-quiet areas. Furthermore, Witten et al. (2013) noted the importance of neighbourhood social connections and ‘eyes on the street’. Parents with busy lives knew fewer people in the neighbourhood, which made them feel unsafe. This was particularly the case in low-income neighbourhoods, where parents’ employment uncertainty and financial pressure meant they had to work long hours. Finally, Castonguay and Jutras (2009) showed that children’s favourite places were near home. Proximity to the home, associated with familiar spaces and friends, conferred both children and parents with a sense of comfort and safety.

**Presence of other children** – Five quantitative studies investigated how the presence of other children in the neighbourhood influenced outdoor play. Bringolf-Isler et al. (2010), Loucaides and Tsangaridou (2017) and Veitch et al. (2010) found a positive association between friends nearby and time spent playing outdoors. The same was true for younger boys in the study of Cleland et al. (2010), but not for older boys or for girls. Furthermore, Reimers et al. (2018) found that the presence of other, active children at playgrounds was the main explanatory variable for outdoor play, but that the presence of boys was a negative predictor for girls playing outside.

Seven qualitative studies investigated the role of other children in the neighbourhood. The social aspects of outdoor play were considered important by both children and parents, and the presence of friends was often a reason to play outside (Burke 2005; Veitch et al. 2006, 2007; Castonguay & Jutras 2009; Brockman et al. 2011a, 2011b; Horton & Kraftl 2018). In a study by Veitch et al. (2006), for example, 40 per cent of parents perceived the absence of neighbours or nearby friends as a negative influence on their child’s outdoor play. According to Veitch et al. (2007), children expressed a strong desire to have someone to play with. Interestingly, Horton and Kraftl (2018) found that the social function of playgrounds differed between neighbourhoods. The playground in a disadvantaged area in their study was mostly used for ‘sitting and chatting’ with friends, whereas the playground in an advantaged neighbourhood was mostly valued for family play.

**How do neighbourhood factors matter for different groups?** – **Age and gender** – Seven quantitative studies included individual-level moderating variables in their models. Three looked at the combination of age and gender. For younger boys, Cleland et al. (2010) found that social factors (presence of siblings, friends or pets) were positively associated with outdoor play. Aarts and colleagues (2010) investigated how social and physical characteristics influenced the outdoor play of different subgroups. Social cohesion was positively associated with outdoor play in five of the six age-gender subgroups, but the impact of different physical characteristics differed among the subgroups. In their follow-up study, Aarts et al. (2012) found that environmental correlates of outdoor play differed by age and gender. Neither study, however, clearly distinguished whether neighbourhood factors mattered more for boys or girls or for certain age groups.
Three other quantitative studies only looked at gendered differences. Here too, results were mixed: two studies reported stronger effects for girls, one for boys. Page et al. (2010) found that girls’ outdoor play was positively associated with their perception of traffic safety but negatively with experienced nuisance, while no such effects were found for boys. Furthermore, Reimers et al. (2018) concluded that the presence of other active children had only a positive effect on girls’ outdoor play, but that the number of boys present on playgrounds was inversely related to girls’ outdoor play. Wilkie et al. (2018) found that traffic-related safety concerns negatively influenced boys’ outdoor playtime. One study (Handy et al. 2008) looked at the moderating role of age and found that outdoor play was positively associated with living on a cul-de-sac, but only for children aged 6–12 (not <6 or 12–16).

Five qualitative studies considered how gender was related to neighbourhood context and outdoor play (Karsten 2003; Ferré et al. 2006; Brockman et al. 2011a, 2011b; Horton & Kraftl 2018). Several studies noted differences in use of neighbourhoods and playgrounds by boys and girls. Brockman et al. (2011a) showed that boys were more likely to play in green spaces or on the streets than girls, who preferred to stay close to their own homes or play in their own garden. Karsten (2003) found that playgrounds were divided into separate boys’ and girls’ spaces. Compared with girls, boys were highly visible users of public playground space; they controlled much larger territories during many more hours. The physical quality of the playground greatly influenced the gender composition of users. Playgrounds with very few play objects or in bad condition did not appeal to girls. Ferré et al. (2006), on the other hand, indicated that boys and girls participated in different kinds of activities in public playgrounds (e.g. boys playing soccer, girls roller-skating), but that the amount of space they used was about equal. Some studies suggest that girls are more affected by social safety concerns. Horton and Kraftl (2018) found that the outdoor mobilities of female respondents were more constrained by the presence of groups of older children in their neighbourhoods.

Five qualitative studies looked at age-related differences with regard to the impact of neighbourhood factors. In general, older children were allowed more independence than younger ones (Veitch et al. 2006, 2007; Holt et al. 2008; Castonguay & Jutras 2009). Castonguay and Jutras (2009) showed that children aged 10–12 identified parks and playgrounds as ‘liked places’, whereas children of 7–9 years preferred spaces near an acquaintance’s home. Parents’ restrictions also played an important role (Veitch et al. 2006, 2007; Horton & Kraftl 2018). In the article by Horton and Kraftl (2018), younger respondents perceived parents’ rules as obstacles to outdoor play whereas older respondents cited crime, gangs and drugs. Veitch et al. (2006) found that younger children (aged 6–8) commented more on restricted mobility; many were unable to go anywhere at all in their neighbourhood without an adult. Some of the older ones (aged 8–12) could walk to locations such as their friend’s house or around the block. Holt et al. (2008) found that walkability of the neighbourhood influenced outdoor play, especially for older children. Finally, two studies (Burke 2005; Ferré et al. 2006) showed that many playgrounds were primarily geared to younger children, making outdoor play less attractive for older age groups.

Race and ethnicity – One quantitative study considered how ethnicity moderates the impact of the neighbourhood on outdoor play. Yoon and Lee (2019) found that among white children, the prevalence of playgrounds and high-density residential development increased outdoor play, whereas the prevalence of traffic accidents decreased it. Among Hispanic children, neither association was found. For Hispanic children – but not for white children – outdoor play was positively associated with the presence of water features but negatively with the presence of undeveloped areas and the density of intersections.

Only two qualitative studies investigated ethnic or racial differences in outdoor play and the impact of the neighbourhood (Karsten 2003; Horton & Kraftl 2018). According to
Horton and Kraftl (2018), bullying affected outdoor play among ethnic-minority respondents. Moreover, the outdoor mobilities of female Indian, Pakistani and Somali respondents were constrained by a wide range of factors, particularly parents’ rules. According to Karsten (2003), girls with Turkish and Moroccan backgrounds in Amsterdam were underrepresented at playgrounds.

CONCLUSION AND DISCUSSION

This review provides insight into the urban neighbourhood factors that influence children’s outdoor play. While that context clearly matters, studies differ on which elements matter most.

Regarding physical factors, the quantitative studies highlight the importance of traffic safety (88% found at least one positive association), followed by the presence of green space (50%). Yet the presence of formal playgrounds was less important: only 29 percent of the studies that included this variable found that it contributed to more outdoor play. These findings suggest that creating play-friendly neighbourhoods is likely to be more effective than building formal playgrounds. As found by Veitch et al. (2007), children care little about elaborate equipment or facilities as long as they have a place where they can safely play with their friends. The importance of green and safe spaces was confirmed by the qualitative studies. Interestingly, while the quantitative studies showed mixed results on the importance of formal playgrounds, many qualitative studies focused on what made playgrounds attractive. They showed that maintenance and design made playgrounds attractive for outdoor play as well as suitable for different ages and genders. Moreover, concerns and preferences about the design of the ideal playground differed between children and adults. Whereas parents prioritized safety (Horton & Kraftl, 2018), children desired enjoyment and risk (Ferré et al. 2006). Given the contradictory results regarding the importance of formal playgrounds, the field could benefit from future research that delves deeper into the importance of formal versus informal opportunities.

Regarding the social neighbourhood context, all quantitative studies that included social context and the presence of other children found positive associations with outdoor play. The results for social safety were mixed: four (67%) found at least one positive association, while one found none (Bringolf-Isler et al. 2010) and another a negative association (Wilkie et al. 2018). The negative association might reflect the fact that parents of children who play outdoors are more aware of the safety issues in their neighbourhood. The qualitative studies confirmed the importance of all three social factors: social safety, social cohesion and the presence of other children. What stood out from these studies is that parents’ safety concerns restricted children’s free play.

These restrictions were mainly the result of the fear of being labelled a bad parent and were more prominent in low-socio-economic-status neighbourhoods.

Roughly half of the quantitative studies included individual-level moderating variables. Most focused on age and gender differences, but no clear patterns emerged. Patterns did emerge in qualitative studies: as children get older, their parents allow them more independence, with boys granted more independence. Girls, particularly those with a migration background, experienced more barriers, primarily related to social safety concerns. Individual-level socio-economic status and ethnic background were hardly considered, which makes this an interesting avenue for future research.

Towards a multi-dimensional understanding of outdoor play – The majority of the reviewed studies approached outdoor play from a health perspective. Indeed, many used ‘time spent outdoors’ or ‘level of physical activity’ as their main outcome of interest. However, there has been limited interest in the social functions of play. How do playgrounds or informal play opportunities facilitate interaction between neighbourhood peers and their parents? How can playgrounds contribute to social cohesion and social safety in neighbourhoods?

Public spaces provide opportunities for interaction (Smoyer-Tomic et al. 2004; Stevens 2004). The presence of a range of people could stimulate the emergence of activities and
interactions, encouraging mutual understanding between ethnically diverse groups in neighbourhoods and society as a whole (Wise & Noble 2016). Furthermore, Ferré et al. (2006) regard playgrounds as places for observing, questioning and challenging traditional gender roles. At the same time, playgrounds could also be sites of conflict and tension between different groups of children (Karsten & Pel 2000; Karsten 2003). We therefore recommend research that goes beyond a health focus to investigate the social dimensions of outdoor play.

Understanding outdoor play in a social-ecological context – Nine studies examined the impact of neighbourhood characteristics on playing outdoors exclusively from parent’s perspectives and ten exclusively from children’s perspectives. Only four studies included both parent and child perspectives. This is a major shortcoming, as some qualitative studies revealed differences between children’s and parents’ perceptions of the neighbourhood and their ideas about independent outdoor play. Children like to play without supervision to feel a sense of freedom (Veitch et al. 2007; Brockman et al. 2011b), while parents are concerned about children’s safety. Children’s outdoor play should therefore be seen as the outcome of an interplay between characteristics of the child, parent and neighbourhood (Bronfenbrenner 1979; Lee et al. 2015). Several characteristics influence outdoor play, ranging from proximal to distal factors, and there are reciprocal relationships between factors at different levels. Children’s personal characteristics (age, gender, competence) influence their opportunities for outdoor play, but parents also have a direct influence and may limit or stimulate the ways in which they can engage in outdoor play. Both the child and the parent are likely to be influenced by neighbourhood factors such as safety, the availability of playgrounds and presence of other children, and the experiences of the neighbourhood might differ between children and their parents (Prout & James 1990). Future research on children’s outdoor play should therefore incorporate the complex interaction induced by this difference between children and their parents. Merely assessing safety (whether objectively or subjectively), for example, may not be sufficient for understanding parents’ restrictions on their children’s play. It is important to also consider how safety concerns and outdoor play are being negotiated between children and parents, based on their different experiences of the neighbourhood and the child’s competence.

Incorporating the heterogeneity of neighbourhood experiences – Research emphasizes that the neighbourhood does not affect all individuals in the same way (Sharkey & Faber 2014). However, the reviewed papers give little attention to individual-level moderators; their inclusion is limited to age and gender differences, both in quantitative and qualitative studies. Only three papers considered ethnic background, and none investigated the impact of individual socio-economic status (SES). But some qualitative studies compared neighbourhoods with a low, medium and high SES (Veitch et al. 2006, 2007; Witten et al. 2013; Horton & Krafil 2018) or were focused on a poor neighbourhood (Castonguay & Jutras 2009). Because only a few studies investigated heterogeneity in effects, it remains unclear how the neighbourhood context matters for different groups. We should work towards developing theory and collecting evidence on how different features of neighbourhoods matter and gain insight into differential exposure and vulnerability to these contexts. To this end, data collection should be guided by insights into the interactions of children and their parents with different neighbourhood contexts and their experiences of these contexts.

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