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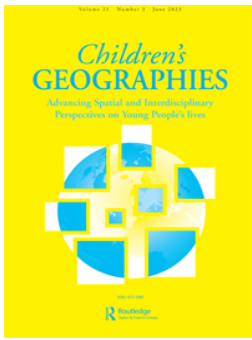
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## Children's opportunities for play in the built environment: a scoping review

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### ABSTRACT

Designing opportunities for play in the built environment is crucial to support children's health and development. A growing research focus on child-friendly environments has evidenced a shift toward creating spaces and buildings that take children's needs seriously and work with children as capable experts and active collaborators. Yet, limited attention has focused on how different scholars conceptualise and operationalise research on *understanding* and *designing* opportunities for play in the built environment. This paper reports on the findings of a scoping review of peer-reviewed empirical literature (51 publications) from 1994 to 2019. We examine the trends and trajectories in conceptualising and operationalising research on understanding and designing opportunities for play and map the landscape of scholarship through four analytical categories: (1) *who* is involved in play and research studies, (2) *what* is the thematic focus and in *what* ways is play investigated in reviewed studies, (3) *how* are opportunities for play explored methodologically, including *how/when* are children involved in research, and (4) *where* do play and research studies occur. Our findings reveal three key challenges for future work: (i) greater appreciation and engagement with children's diversity; (ii) ensuring a nuanced understanding of play as a spectrum of opportunities and types; and (iii) exploring the democratic context of play between formal and informal play spaces to bolster children's right to the city. We invite researchers, practitioners, and policy makers to work closely with children, engage with their diversity and explore interdisciplinary and interprofessional avenues to promote opportunities for play across the built environment.

### ARTICLE HISTORY

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Play; children; built environment; opportunities for play; child-friendly environments; scoping review

## Background

In recent years, the emphasis on creating cities and buildings that take children's needs and perspectives seriously has increased internationally. In particular, considerations of how the built environment can promote and enhance opportunities for play have become more prominent as a public health and children's rights concern (Carroll et al. 2019; Lester and Russell 2010). Sustained research from education, developmental psychology, and public health recognise play as crucial for supporting children's health and holistic development across key physical, emotional, cognitive,

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and social skills (Yogman et al. 2018; Whitebread et al. 2017). For the purposes of our paper, play is understood as a spectrum of opportunities that result in different types of play activities as well as play-based skills (adapted from Whitebread et al. 2017; Zosh et al. 2018 and Jelić et al. 2020). Our definition supports that different types of play will involve different people and ways of playing, will have unique characteristics, and consequently, distinct developmental and learning outcomes.

International interest in play appeared as a response to an observed decline in children's physical and mental health, linked, in recent decades, to increases in childhood obesity, diabetes, anxiety, depression, attention- and conduct disorders (Whitebread 2018; Gray 2011). In the context of the built environment, play and children's right to play have been reconsidered as a matter of public health across different spatial contexts: from educational settings (Storli and Hagen 2010), and the design of public playgrounds (Adams, Veitch, and Barnett 2018) to considering how playful learning interventions in urban spaces can help children from disadvantaged communities (Hassinger-Das et al. 2018). Most recently, in reflection of the impact of the Covid-19 pandemic, the importance of play and how the built environment can support children's well-being through play are more prevalent than ever.

Alongside attention to *understanding* opportunities for play, a growing focus on child-friendly environments has evidenced a shift toward *designing* opportunities for play – placing emphasis not only on designing *for* children, but also *with* children's involvement. Manifested through participatory research and collaborative design approaches, children are involved as rightful decision-makers with expertise to voice their experiences of play and design for play in the built environment (Bishop and Corkery 2017). The growing literature on child-friendly environments has uncovered how collaborative design and research with children can shed light on children's experiences of urban spaces (Ergler et al. 2015), leverage children's creativity and perspectives to design playful city spaces (Malone 2013), and encourage play and connections with the community through innovative installations (McGlone 2016).

Yet, in this expanding scholarship, limited attention has focused on how different scholars conceptualise and operationalise research on *understanding* and *designing* opportunities for play in the built environment. We use the term 'opportunities for play' to capture the interrelated components of 'play' and 'space' in the built environment context, as it enabled us to explore how different research domains approach *understanding play-in-space* and *designing space-for-play*.

The paper reports on the findings of a scoping review of peer-reviewed empirical literature (51 publications) from 1994 until 2019. In line with the purpose of a scoping approach (Munn et al. 2018), this review aims to map available evidence of: (1) the multi-disciplinary scholarship on opportunities for play in the built environment and (2) outline the implications of different research conceptualisations and operationalisations for future inquiries. Through our two-sided literature search on *understanding* and *designing* opportunities for play, we uncover the trends and trajectories in the research landscape by focusing on four analytical categories: (1) *who* is involved in play and research studies, (2) *what* is the thematic focus of reviewed studies and in *what* ways is play investigated therein, (3) *how* are opportunities for play explored methodologically, including *how/when* are children involved in research, and (4) *where* do play and related studies occur. The first section unpacks the review methodology, while the subsequent section provides an analysis of our findings.

## Review methodology

Our scoping review consisted of (1) a systematic literature search identifying relevant studies and (2) mapping the trends and trajectories in the literature across four categories (*who*, *what*, *how*, *where*) to describe how research on opportunities for play is conceptualised and operationalised.

To identify relevant research on *understanding* and *designing* opportunities for play in a global context, the literature search was based on a two-sided question: (SQ1) what knowledge exists on opportunities for play in the built environment? and (SQ2) how are children involved in the

research/design process? Due to our broader interdisciplinary focus, a scoping review was preferred to a systematic review – which typically are narrower in their scope (Munn et al. 2018). Scoping reviews require rigorous and transparent methods to ensure that the results are trustworthy. We drew on Wolfswinkel et al.'s (2013) method for rigorously reviewing literature and Ruhlandt's (2018) review procedure, and adopted a systematic, replicable search protocol with well-defined keywords, inclusion criteria, and selection stages. Through explorative searches more than 60 keyword variations emerged and a Boolean search strategy was applied (Table 1). Databases that combine keyword search queries were prioritised, with Scopus and Web of Science selected.

Our review was limited to empirical peer-reviewed journal articles, book chapters, and conference proceedings published until January 2019 in English.<sup>1</sup> Our inclusion criteria regarding play in the built environment were kept deliberately broad, in recognition of children's everyday experiences of architectural and urban settings and the diverse contexts children play in around the world (Hassinger-Das et al. 2018; Bishop and Corkery 2017).

Three relevance assessment stages were initiated to ensure, (1) keywords across 'children', 'play', 'built environment' occurred (2) the abstract, introduction, and conclusion of the paper demonstrated significant association to the review purpose and (3) a full-text assessment excluded articles not focused on (a) children and/or young people, (b) opportunities for play in the built environment and (c) empirical research. Snowballing to include seminal works that were not captured via databases were added at the final stage (Table 2).

This procedure led to a sample of 51 studies, of which most publications are journal articles (n = 43, in 29 different journals), followed by conference papers (n = 5) and book chapters (n = 3). Papers from conference proceedings were included to capture the emergence of the use of games in designing opportunities for play. Likewise, three selected chapters from a seminal edited book by Bishop and Corkery (2017) on designing city spaces with children beyond existing child-dedicated environments were included. For the full literature list, see references marked with \*.

To map the trends and trajectories of literature across our four categories (*who, what, how, where*), we extracted data from each study and compiled a comprehensive Excel database with information on: the *publication date and source*; the author(s)' *affiliation(s)*; the geographical *location*; the *focus* of the study; *study participants* (including information on age, gender, ethnicity etc.); *research partners* involved; types of *play* recorded; *study context* (including spatial scale and if available, descriptions of the built spaces); the *role* of children in each investigation; *research methods* employed; and the *study outcomes*. The extraction and review were performed by three members of the research team and checked by each member for consistency and reliability. Where inconsistencies in the coding were identified, the research team had a discussion to reach a consensus. The analysis and findings are discussed in subsequent sections.

**Table 1.** Search strategy and keywords (adjusted from Jelić et al. 2020).

<b>AND Children OR</b>	<b>Play</b>	<b>Built Environment</b>
Child*; Adolescent*	Play; Free play; Guided play; Unstructured play; Outdoor play; Spontaneous play; Playful learning; Learning through play; Affordance*; Physical activity; Imagination; Open ended; Creativ*; Situated learning; Body movement; Active learning; Child development; Cognitive development; Spatial cognition; Embodied experience*; Co-creation*; Participat*; Spatial appropriation*; Spatial experience*; Sensory experience*; Emotional experience*; Kinaesthetic; Spatial perception; Bodily engagement; Place-based learning; Child empowerment; Community engagement	Built environment; Built space*; Architectur*; Urban*; Landscape*; Neighbourhood*; Physical environment; Play environment*; Play space*; Urban space*; Public space*; Public realm; Playground*; Car park; Vacant lot; Spatial; Spatial design; Learning environment*; Learning space*; Museum*; Co-*; Co design; Collaborative design; Co production; Pop up; Tactical urbanism; Temporary use

**Table 2.** Selection stages of the literature search.

Selection stage	Procedure and objective
Explorative search	Identify keywords and keyword combinations through a subset of relevant publications (20 articles).
Select databases	Choose most relevant database for the topic ( <i>selected Scopus and Web of Science Core Collection</i> ).
Systematic database search	Search for publications that include specific keywords in title or abstract (see Table 1). Confine search filters to peer-reviewed publications ( $n = 2333$ results).
Remove duplicates	Remove repeat results (711 duplicates removed; $n = 1622$ ).
Require keywords	Require keywords occur across three descriptors (children, play, built environment) at least once in the full body of the article (1307 papers removed; $n = 315$ ).
Refine based on screening	Read abstract, introduction, and conclusion to exclude journal articles that lack a significant connection to the review topic (132 papers removed; $n = 183$ ).
Full-text assessment based on defined inclusion criteria	Read full-texts to exclude articles not specifically focused on (a) children, (b) opportunities for play in the built environment, and (c) empirical research (140 papers removed; $n = 43$ ).
Add relevant publications through forward/backward citations	Include seminal works not captured in database searches (8 papers added, final result $n = 51$ papers).

## General patterns of reviewed literature

The first step in undertaking this scoping review was to examine the general patterns of reviewed literature based on the geography, chronology, and disciplines associated with research on understanding and designing opportunities for play in the built environment.

### Geography of reviewed literature

The 51 reviewed empirical studies on opportunities for play were conducted in 23 countries, with the location of the study defined based on where the research was undertaken, rather than the authors' affiliations. Our review showed that Europe ( $n = 26$ ), Oceania ( $n = 11$ ) and North America ( $n = 8$ ) recorded the largest number of studies, whereas studies from Asia ( $n = 5$ ) and Africa ( $n = 1$ ) were markedly fewer. Internationally, Australia ( $n = 10$ ), the Netherlands ( $n = 7$ ), USA ( $n = 7$ ), and Scandinavia (Norway, Sweden, Denmark,  $n = 7$ ) share the highest frequency of studies (61%).

Due to the scope of our review – an analysis of peer-reviewed publications in English – our results highlight potential blind spots associated with a geographical bias toward published scholarly knowledge. In recognition of this blind spot, we emphasise that our final list is not exhaustive; rather, valuable knowledge will exist beyond these studies/contexts. Likewise, keyword selection may have also limited the number of research studies registered.

### Chronology of reviewed literature

To establish the chronology and progression of research on opportunities for play in the built environment, we plotted publication dates. Our findings indicate that limited research was published throughout the 1990s ( $n = 2$ ) and early 2000s ( $n = 5$ ). However, there is a significant increase in publications from 2010 ( $n = 44$ ), coinciding with the internationalisation of and growing number of municipalities participating in the *UNICEF Child Friendly Cities Initiative*. Studies prior to 2010, focused almost exclusively on playground spaces, whereas research post 2010 captured a broader context of children's play in the built environment and thus, a wider range of play categories. Articles from the 1990s and 2000s tend to gather evidence on children's play, whereas, from the 2010s onwards a shift toward collaborative approaches *with* children materialised.

### Research disciplines

In mapping the disciplines associated with research on opportunities for play, defined through author's affiliations, we identified a range of six macro disciplinary areas: *health and care; sport*

and physical activity; education and psychology; geography and built environment; architecture and landscape; and digital media.

Most publications were associated with education and psychology or architecture and landscape (19 respectively). Sport and physical activity and geography and built environment also accounted for a significant number of publications (9 studies respectively). An analysis of the breadth and range of interdisciplinary research registered a total of 14 studies (between 2013 and 2019). The most common trans-disciplinary studies linked geography and built environment with architecture and landscape (e.g. Lerstrup and van den Bosch 2017 or Mintzer and Flanders Cushing 2017), or connected health and care with sport and physical activity (e.g. Adams, Veitch, and Barnett 2018). Other studies, such as Brussoni et al. (2017), Caro et al. (2016) and Chaudhury et al. (2019) were more diverse, working across health and care with architecture and landscape, digital media and/or sport and physical activity.

## Trends and trajectories in research on understanding and designing opportunities for play

This section presents the findings of our mapping across four categories (*who, what, how, where*) and discusses the trends and trajectories in how research on understanding and designing opportunities for play is conceptualised and operationalised.

### Who: participant diversity and research partnerships

Our first category considered two aspects: *participant diversity* (i.e. the different social, ethnic and gender backgrounds of participating children), and *research partnerships* (i.e. partners involved in the studies besides children and researchers). In line with the United Nations Sustainable Development Goals (SDGs), our aim was to develop an appreciation of the diversity of children and research partners in the literature as well as the entanglements of diversity factors.

#### Participant diversity

Despite our intention, information on participant diversity was difficult to extract with significant variation across reviewed studies in how children's age, gender, and other diversity aspects were recorded. For example, there was no clear pattern to the categorisation of different age-spans between countries.

Nevertheless, children between the ages of 5–12 were the most frequently represented, featured in 36 studies (71%). The mapping revealed an overall lack of engagement with both early years children and adolescents. Only five studies with 0–3 years (Dyment and O'Connell 2013; Brussoni et al. 2017; Hassinger-Das et al. 2018; van Liempd et al. 2018; Bozkurt, Woolley, and Dempsey 2019) and four studies with adolescent participants (16–18 years) were registered (Dimoulias 2017; Lopes, Cordovil, and Nato 2018; Bozkurt, Woolley, and Dempsey 2019; Leddy-Owen, Robazza, and Scherer 2018).

Our findings highlight the presence of a logical selection criteria associated with children's age (and predetermined agency) and the researchers' purpose and method. Studies with an emphasis on an experiment involved younger children (3–12 years), whereas older children (5–15 years) participated more in co-research and collaborative design.

Our analysis of the *diversity and representation of the children* in research on opportunities for play revealed that the collection of children involved consistently received limited attention. In exploring how *children's gender* features in reviewed literature, we found that 31 studies (61%) included this information. While some studies take gender into account in their analysis of opportunities for play (Kytä 2004; Bozkurt, Woolley, and Dempsey 2019), most studies do not. More commonly, gender is included in discussions on sample size/representation. Some researchers focused on achieving a gender balance (Kytä 2002; Robbé 2017; Morrissey, Scott, and Rahimi



2017; Adams, Veitch, and Barnett 2018), others referenced the presence of a gender bias (in favour of girls) in their studies (Sandseter 2009; Prieske et al. 2015; McGlone 2016). Yet, it was uncommon to dwell on this analytically, for example, as a window into girl's opportunities for play (Porter, Spark, and de Kley 2021); rather reviewed studies focused on problems with the sample that should be disclosed.

In addition to age and gender, our review explored the inclusion of children from marginalised or deprived communities, diverse socio-economic backgrounds, race and minority ethnic children, and children with physical/cognitive impairments. Overall, we identified 17 studies that included data in these areas. Several studies prioritise the inclusion of *ethnic diversity* in different ways: selecting children to ensure representation of the cultures of the early childhood centres they worked with (Brussoni et al. 2017), capturing the diversity of the children living in the inner-city and suburban neighbourhoods they survey (Chaudhury et al. 2019), or exploring the impact of low-diversity communities with a largely English speaking and Australian-born population (Morrissey, Scott, and Rahimi 2017). Nevertheless, across reviewed studies, ethnicity primarily describes a 'representative' sample of children, rather than being a central feature of the discussion or a critical component of the analysis.

A range of scholars centred their work on *diverse socio-economic backgrounds and deprived communities*, including case studies of a deprived gang-related crime neighbourhood in Copenhagen (Magnussen and Elming 2015), low socio-economic communities with high unemployment and low income in Australia (Dimoulas 2017), children from deprived communities in the US (Hassinger-Das et al. 2018), and marginalised youth in a deprived and stigmatized urban area in Portsmouth (Leddy-Owen, Robazza, and Scherer 2018). Across this scholarship, deprivation, marginalisation, and socio-economic challenges were central to the study's aim, discussion, and conclusions. Yet, the overall range of scholarship was limited and could suitably be augmented in the future.

Finally, a single study explored designing a playground for autistic children (Yuill et al. 2007) and four studies focused on how children's different bodily action capabilities enable/restrict their affordances for play (Jongeneel, Withagen, and Zaal 2015; Prieske et al. 2015; Sporrel, Caljouw, and Withagen 2017a; Sporrel, Caljouw, and Withagen 2017b). Of the 51 studies reviewed, no explicit research on disability and opportunities for play were recorded. Some scholars, such as Clark (2007), reflected on several children with speech and language difficulties and the importance of including different research tools to enable all children to express themselves; but disability was not a central focus more broadly.

### Research partnerships

Inconsistencies in how scholars recorded research partnerships meant only 22 reviewed studies (43%) explicitly included information on the assembly of partners (i.e. other actors beyond children and researchers). Across these works we identified five core types of supplementary actors: local government and parks staff; school staff; built environment professionals (planners, urban designers, architects, and landscape architects); local communities (including facilities and services) and family members; as well as university students. The most frequent partnerships involved university students ( $n = 9$ ), school staff ( $n = 7$ ), and built environment professionals ( $n = 6$ ). Studies with communities and family members ( $n = 3$ ), and local government and parks staff ( $n = 2$ ) were less common.

The combination of 'university students' and 'schools' as the two dominant partnership categories emphasise the sustained role of education/school settings in working with children in their communities. This raises important questions on 'who' is prioritised in the opportunities for play research and who is excluded. Of particular significance were studies that include a diverse range of supplementary partners (Clark 2007; Magnussen and Elming 2015; Jansson 2015; Robbé 2017; Menconi and Grohmann 2018). In Clark (2007), a diversity of inputs was used to redesign an outdoor space next to a school and change attitudes to the space held by built environment



professionals and community groups/families. Future work could consider if child-dedicated settings and the selected partners may potentially exclude other possibilities to engage with children.

### What: thematic focus and interpretations of play

#### Thematic focus

Examining trends in the thematic focus (i.e. what is the aim of the study and (expected) knowledge outcome), we identified two conceptual approaches in the opportunities for play research: studies which have a *research-oriented focus* (e.g. to generate new knowledge on play and/or opportunities for play) and studies which have a *design-oriented focus* (e.g. to generate knowledge on the research or design process, or to design specific opportunities for play with children). Our two-sided interest in understanding and designing opportunities for play revealed an important link between the researchers' aims and the role of children in research and/or the design process studied. Specifically, studies with a research-oriented focus ( $n = 25$ ) typically include children as study participants (e.g. children's play and/or engagement with play spaces analysed by experts), whereas studies with a design-oriented focus ( $n = 26$ ) featured two strands of inquiry (a) involving children as co-researchers or (b) children participating in collaborative design; both unpack participatory approaches, collective creative processes and knowledge generation by collaborative partnerships but differ in their design emphasis.

The reviewed studies were diverse in aim and scope, but generally clustered around main themes in accordance with the identified conceptual perspective (Table 3). For studies with a *research-oriented focus*, the most common aims centred on affordances for play in playgrounds and children's perspectives on the affordances of outdoor environments. By comparison, the most common themes for studies with a *design-oriented focus* involved the engagement of children in urban planning approaches to inform child-friendly policy, co-designing or retrofitting spaces for play across

**Table 3.** Main themes between research- and design-oriented approaches.

<b>Main Themes:</b>	
<b>Research-oriented focus</b>	
Affordances for play – playgrounds and playground configurations ( $n = 10$ )	Susa and Benedict 1994; Storli and Hagen 2010; Azlina and Zulkiflee 2012; Dymont and O'Connell 2013; Luchs and Fikus 2013; Jongeneel, Withagen, and Zaal 2015; Prieske et al. 2015; Lerstrup and van den Bosch 2017; Morrissey, Scott, and Rahimi 2017; Hyndman and Mahony 2018
Children's perspectives on affordances of outdoor environments ( $n = 4$ )	Kyttä 2002; Kyttä 2004; Jansson 2015; Morrissey, Scott, and Rahimi 2017
Child development and environment conditions ( $n = 3$ )	Herrington and Studtmann 1998; Zamani 2016; Adams, Veitch, and Barnett 2018; van Liempd et al. 2018
<b>Design-oriented focus</b>	
<i>(a) children as co-researchers</i>	
Child-friendly urban planning approaches ( $n = 5$ )	Malone 2013; Bosco and Joassart-Marcelli 2015; Caro et al. 2016; Saridar Masri 2018; Zhou, Li, and Larsen 2016
Mapping children's meaningful neighbourhood places ( $n = 3$ )	Kyttä et al. 2018; Lopes, Cordovil, and Nato 2018; Chaudhury et al. 2019
Gathering children's views to inform outdoor/school environment design ( $n = 3$ )	Clark 2007; Şahin and Dostoğlu 2012; Christidou et al. 2013
<i>(b) children as collaborative designers</i>	
Co-designing spaces for play ( $n = 7$ )	Xu and Izadpanahi 2015; Robbé 2017; Dimoulias 2017; Katoppo and Valencia 2017; Mintzer and Flanders Cushing 2017; Itenge-Wheeler et al. 2018; Leddy-Owen, Robazza, and Scherer 2018
Children's use of ICT/digital games to design spaces ( $n = 4$ )	Häkkiälä et al. 2013; Magnussen and Elming 2015; Polyzou, Tamoutseli, and Sechidis 2017; Scholten et al. 2017
Participatory design processes/designer-child interactions ( $n = 3$ )	Lozanovska and Xu 2013; Menconi and Grohmann 2018; Birch et al. 2017

playgrounds and neighbourhoods, and the use of digital games to capture children's design ideas (see also Jelić et al. 2020). In uncovering research- and design-oriented specialisms within the literature we identified patterns in scholarship between conceptual perspective and understandings of play, discussed in the next subsection.

### Interpretations of play

Capturing the ways in which play is conceptualised (i.e. how is play defined, what types of play are investigated) and operationalised (i.e. the role of play in research design) as a spectrum of opportunities for different play activities (Whitebread et al. 2017; Zosh et al. 2018 and Jelić et al. 2020), our mapping uncovered eight different categories of play (Table 4). Across the review, we identified a predominant interest in physical play (or physical skills via play) ( $n = 10$ ) and free play ( $n = 5$ ). By comparison, play with objects ( $n = 3$ ); pretend/socio-dramatic play ( $n = 3$ ); social play skills ( $n = 2$ ); creative play skills ( $n = 3$ ); cognitive play skills ( $n = 2$ ); and games with rules ( $n = 3$ ) received less research attention. Consistently, the focus on free play and understanding of play as a child-led activity without adult support were presented as a 'golden standard' (Holloway and Pimlott-Wilson 2018). Albeit, two studies exploring the potential of playful learning in urban/built settings, as guided play with caregivers' involvement, have emerged in recent years (Hassinger-Das et al. 2018; Bustamante et al. 2019).

Of the 51 studies reviewed, only 28 studies clearly define or conceptualise play, of which 71% ( $n = 20$ ) are associated with the research-oriented perspective. While studies with a design-oriented focus consistently discuss play, they frequently do so without a clear definition of the concept or a robust appreciation of the type of play explored.

**Table 4.** Overview of how play is conceptualised and operationalised (categories adapted from Whitebread et al. 2017 and Zosh et al. 2018). \* = play used as a medium in the research/design process.

Categories of play	Reviewed studies	
	Research-oriented focus	Design-oriented focus
Free play	Kyttä 2004; Luchs and Fikus 2013; Lerstrup and van den Bosch 2017; van Liempd et al. 2018	Bosco and Joassart-Marcelli 2015*
Physical play (or physical skills via play)	Sandseter 2009; Storli and Hagen 2010; Dymont and O'Connell 2013; Jongeneel, Withagen, and Zaal 2015; Prieske et al. 2015; Brussoni et al. 2017; Sporrel, Caljouw, and Withagen (2017a); Sporrel, Caljouw, and Withagen 2017b; Adams, Veitch, and Barnett 2018	Caro et al. 2016
Play with objects	Dymont and O'Connell 2013; Brussoni et al. 2017; Bozkurt et al. 2019	
Pretend/Sociodramatic play	Susa and Benedict 1994; Dymont and O'Connell 2013; Morrissey, Scott, and Rahimi 2017	
Social skills via play	Yuill et al. 2007; Brussoni et al. 2017	
Creative skills via play	Hyndman and Mahony 2018	Xu and Izadpanahi 2015*; Katoppo and Valencia 2017*; Itenge-Wheeler et al. 2018*
Cognitive skills via play	Hassinger-Das et al. 2018; Bustamante et al. 2019	Magnussen and Elming 2015*; Polyzou, Tamoutseli, and Sechidis 2017*; Scholten et al. 2017*
Games with rules		
Play not clearly defined	Herrington and Studtmann 1998; Kyttä 2002; Azlina and Zulkiflee 2012; Jansson 2015; Zamani 2016	Christidou et al. 2013; Zhou, Li, and Larsen 2016; Chaudhury et al. 2019
Play is implicitly invoked		Clark 2007; Şahin and Dostoğlu 2012; Häkikä et al. 2013; Lozanovska and Xu 2013; Malone 2013; McGlone 2016; Birch et al. 2017; Dimoulas 2017; Mintzer and Flanders Cushing 2017; Robbé 2017; Leddy-Owen, Robazza, and Scherer 2018; Lopes, Cordovil, and Nato 2018; Kyttä et al. 2018; Menconi and Grohmann 2018; Saridar Masri 2018

Almost half of the studies reviewed (45% or  $n = 23$ ) do not clearly define play ( $n = 8$ ) or alternatively, tend to invoke play implicitly as a normative everyday activity without nuance ( $n = 15$ ). In cases of implicit use of the concept, play is not the focus of the study in itself; instead, play is reflected in the context of the study (e.g. context of child-friendly cities or collaborative design of playgrounds). Overall, we uncovered differentiation in the role of play in research design: from explicit investigation of how children play in built settings, with *play as a conceptual objective* to be challenged, reconceptualised, or theorised (more common in research-oriented studies) to the use of *play as a medium in the research and/or design process* as well as instances where play remained undefined or is used implicitly (more common in studies with a design-oriented focus).

## How: methodological approaches and categories of children's involvement

### Methodological approaches

In examining how opportunities for play are explored methodologically – i.e. how data was collected, recorded, and collated in reflection of each study's focus – our review identified thirteen different methods used. Here, observations ( $n = 20$ ), workshops ( $n = 18$ ), interviews ( $n = 17$ ), and visual methods (e.g. photographs/sketches/drawings) ( $n = 13$ ) were the most common (Table 5). Other methods identified across reviewed studies include behavioural mapping, questionnaires/surveys, physical installations, child-led tours, mapping/PPGIS, model making, digital games/models, site/field visits, and exhibitions. Research-oriented studies primarily relied on the use of observations and behavioural mapping, whereas studies with a design-oriented focus favoured visual methods. The choice of methods reveals the principal tactics used to engage children in research, as discussed below.

### Categories of children's involvement

By coupling methods with the role of children in the research and/or design process investigated, we examined entanglements between the aim of the study and the way/s in which children are operationalised in opportunities for play research. Our analysis revealed six categories of involvement that differ between studies with a research- and design-oriented focus (Table 5). Within each category, the children's role is predetermined and clearly defined in reflection of the research purpose. Our findings reveal that research-oriented studies were disproportionately associated with the *study participants* category ( $n = 26$ ). Design-oriented studies by contrast were linked with a spectrum of categories, in particular, the *perspectives (co-researchers)* ( $n = 6$ ), *perspectives (informing design)* ( $n$

**Table 5.** Categories of children's involvement.

Category of children's involvement	Principal methods
<b>Study Participants:</b> Children participate in play experiments / observing children's play in a specific setting.	Observation; behavioural mapping; interviews/focus groups; physical installations.
<b>Perspectives (co-researchers):</b> Children discuss their views, actively influence the form and content of the research process and disseminate findings.	Interviews/focus groups; questionnaire/surveys; mapping/GIS; visual methods.
<b>Perspectives (informing design):</b> Children's perspectives about an existing environment are gathered to recommend practical changes with/for spatial professionals.	Workshops; visual methods; design precedents.
<b>Digital designers:</b> Children use digital tools and games (e.g. Minecraft) to develop design solutions – their ideas are amalgamated by professionals or external actors into a feasible design proposal.	Digital games/models.
<b>Design concepts:</b> Children create design responses, often in collaboration with adults (e.g. teachers, researchers, or professionals), to generate an informed brief, vision, or concept to be taken forward by professional or external actors.	Workshops; visual methods; physical/3D model making
<b>Design in space:</b> Children are involved in the entire design process from analysis, generation of design ideas to construction on site.	Workshops; visual methods; physical/3D model making; exhibitions; site visits.

= 5), and *design concepts* (n = 7) categories. Emerging approaches involving digital technology and real-world design on site were also registered but remain less common than the other categories.

Despite differentiation in perspectives, the review of children's involvement across research studies revealed that scholars understand children as skilled spatial agents, whose awareness and intention on matters of play indicates the importance of their direct involvement in understanding and designing opportunities for play.

### **Where: spatial contexts of play**

Motivated by our interest in the built environment our final category analysed how different spatial settings and spatial scales are foregrounded in the opportunities for play literature (Table 6). A critical component of this analysis was to identify and distinguish between traditional or '*formal play spaces*' where children are typically expected to play and be present (e.g. school yards, public playgrounds) and settings that go beyond these child-dedicated environments (Bishop and Corkery 2017). In doing so, we explored the role of '*informal play spaces*' (e.g. vacant lots, streets, or plazas) and the breadth of literature that considers opportunities for play in a variety of architectural and urban settings. With similarity to Woolley's (2015, 163) 'constructed' and 'found' spaces, we explored the entanglements of opportunities for play and their connections to a broad definition of space as well as how space can limit or expand the everyday realms of children.

### **Spatial settings: between formal and informal play spaces**

Of the 51 studies, 27 (53%) were conducted in *formal play spaces*, with playgrounds the most common spatial context to feature in the reviewed literature. This finding was consistent between research- and design-oriented perspectives (16 and 11 studies respectively). It suggests that research on opportunities for play remains predominantly set in child-dedicated environments and that playgrounds – whether located in schools, kindergartens, or public parks – are still regarded as the common 'spaces' or 'contexts' of play. The evidence supports existing scholarship on the exclusionary role of planning and development in restricting children to confined settings (Carroll et al. 2019).

However, our findings also revealed an expanding area of scholarship on opportunities for play in what we term *informal play spaces* in children's everyday lives, with 16 studies (31%) set in these contexts. Since 2016, we observed an increase in innovative approaches to the conceptualisation of play spaces across the built environment with multiple scholars exploring opportunities for play in public spaces (n = 12), neighbourhoods (n = 7) and buildings (n = 4). For public spaces, examples include creative public spaces for children to champion change within the community (Katoppo and Valencia 2017), and the appropriation of neglected public spaces by marginalised youth (Leddy-Owen, Robazza, and Scherer 2018). Across urban neighbourhoods, Lopes, Cordovil, and Nato (2018) explored affordances of places for children in Lisbon, with similarity to seminal works by Kytta (2002; 2004) analysing affordances of children's outdoor environments in communities of varying degrees of urbanisation. In buildings, Bustamante et al. (2019) develop an approach to embed playful learning opportunities where children and families spend time together but play is unexpected, including supermarkets and libraries.

Of particular significance were eight studies (16%) focusing on both formal and informal play spaces, which evidence an ambition to compare opportunities for play offered to children by different types of spaces (Kytta 2002; Kytta 2004; Storli and Hagen 2010; Malone 2013; Birch et al. 2017; Lerstrup and van den Bosch 2017; Kytta et al. 2018; Chaudhury et al. 2019). Malone (2013), for example, included playgrounds and public spaces in her study of children as collaborative designers in a neighbourhood in Sydney, while Kytta et al. (2018) uncover the transnational role of buildings, public spaces, and neighbourhoods in their research on children's meaningful places between Finland and Japan.

### *Spatial scale of play*

The frequency of playgrounds as the spatial context of study ( $n = 25$ ) meant researchers typically focused on an individual play site scale or occasionally, a play element (e.g. playground provisions,  $n = 8$ ). The next recorded scale were public spaces of varying sizes ( $n = 12$ , from residual spaces to larger public squares), followed by studies at a building level ( $n = 8$ , e.g. library). While opportunities for play across a neighbourhood scale ( $n = 7$ ) and in nature ( $n = 4$ ) were less common, the combination show the variety of meaningful indoor and outdoor places children use daily for play. Research at these scales captured unique play spaces across neighbourhoods internationally – including riverbanks, car parks, construction sites, shrines/churches, vacant lots, and forests – showcasing the importance of research that expands considerations of what constitutes ‘play space’ across the built environment.

Affordances of formal/informal spaces for play show that topographical variations, climbable elements, movable and open-ended equipment/materials, vegetation and water features, malleable and loose natural materials, a variety of ground surfaces, a range of seating/shelters, and non-standardisation are important for play (see also Jelić et al. 2020). Yet, there is scope to expand research on what built environment features support play, particularly for diverse children.

### **Conclusions and recommendations for future research, policy, and practice**

In undertaking this scoping review on how scholars conceptualise and operationalise research on understanding and designing opportunities for play in the built environment, we found the field to be geographically widespread, inclusive of a diverse range of disciplines, and quickly expanding. Yet, further variation is needed if the discussion is to be considered on a global scale.

Considering *who*, *what*, *how*, and *where*, we mapped existing knowledge of opportunities for play in the built environment (SQ1) and the way/s children are involved in the research/design process (SQ2). Our analysis revealed three salient challenges for future research, policy, and practice: (i) children’s diversity, (ii) nuanced understanding of play, and (iii) democratic contexts of play, between formal and informal play spaces. This section discusses each challenge in turn.

### *Diversity of children*

Across the reviewed studies, the collection of children involved in research received limited attention, with information on age, gender, and other diversity aspects difficult to consistently extract. When data was available, we recorded a disproportionate emphasis on children between the ages of 5–12 and a lack of scholarly engagement with early years children or adolescents.

Our findings, with similarity to Freeman, Ergler, and Guiney (2017) and Ergler et al. (2015), show that participant observation, behavioural mapping, and physical installations that children can interact with are key strategies to convey views, ideas, and knowledge from early years children on opportunities for play. Yet, a lack of spatial practitioners with training/skills to consult different age groups authentically remains a challenge (Jelić et al. 2020). Our insight regarding adolescents suggests that ‘play’, as used in our scoping review, is age dependent, indicating potential limitations of our search terms but also a need for scholars to be attentive to youth and their ‘variations’ of the play spectrum e.g. ‘hang out’ spaces. Even so, we found that challenging social hierarchies with adolescents require participatory methods that build rapport with young people over time. Here, a two-tailed approach combining creative and physical activities with digital tools/games can greatly aid the elicitation of older children’s views in a more genuine way (Dimoulis 2017). For policy development and practice, a key protocol is to recognise children outside the discourse and include adaptations to consultation, methods, and timelines to capture variations across age spans (Ergler et al. 2015).

Other diversity aspects, such as gender and ethnicity, were commonly mentioned in methodological commentary on the sample representativeness, rather than as a critical component of the

**Table 6.** Mapping of spatial settings and scales.

Reviewed studies	Formal or informal play space	Play element	Play-ground	Buildings	Public space	Neighbourhood	Nature environment
<b>Research-oriented focus</b>							
Susa and Benedict (1994)	formal		x				
Herrington and Studtmann (1998)	formal		x				
Kyttä (2002)	both					x	
Kyttä (2004)	both					x	
Yuill et al. (2007)	formal		x				
Sandseter (2009)	formal		x				x
Storli and Hagen (2010)	both		x				x
Azlina and Zulkiflee (2012)	formal		x				
Dyment and O'Connell (2013)	formal		x				
Luchs and Fikus (2013)	formal		x				
Jansson (2015)	formal		x				
Jongeneel, Withagen, and Zaal (2015)	formal	x					
Prieske et al. (2015)	formal	x					
Zamani (2016)	formal		x				
Brussoni et al. (2017)	formal		x				
Lerstrup and van den Bosch (2017)	both		x				x
Morrissey, Scott, and Rahimi (2017)	formal		x				
Sporrel, Caljouw, and Withagen (2017a)	informal	x					
Sporrel, Caljouw, and Withagen (2017b)	informal	x					
Adams, Veitch, and Barnett (2018)	formal		x				
Hassingier-Das et al. (2018)	informal		x	x	x		
Hyndman and Mahony (2018)	formal	x					
van Liempd et al. (2018)	formal			x			
Bozkurt, Woolley, and Dempsey (2019)	informal				x		
Bustamante et al. (2019)	informal			x	x		
<b>Design-oriented focus</b>							
Clark (2007)	formal		x				
Şahin & Dostoğlu, (2012)	formal		x	x			
Christidou et al. (2013)	formal		x				
Häkikilä et al. (2013)	informal				x		
Lozanovska and Xu (2013)	formal		x				
Malone (2013)	both		x		x		
Bosco and Joassart-Marcelli (2015)	informal				x		x
Magnussen and Elming (2015)	informal					x	
Xu and Izadpanahi (2015)	formal	x					
Caro et al. (2016)	formal		x				
McGlone (2016)	informal				x		
Zhou, Li, and Larsen (2016)	informal					x	
Birch et al. (2017).	both	x	x	x			
Dimoulias (2017)	formal			x			
Katoppo and Valencia (2017)	informal				x		
Mintzer and Flanders Cushing (2017)	informal				x		
Polyzou, Tamoutseli, and Sechidis (2017)	formal		x				
Robbé (2017)	formal		x				
Scholten et al. (2017)	informal				x		
Itenge-Wheeler et al. (2018)	formal			x			
Leddy-Owen, Robazza, and Scherer (2018)	informal	x					
Lopes, Cordovil, and Nato (2018)	informal					x	
Kyttä et al. (2018)	both			x	x	x	
Menconi and Grohmann (2018)	formal		x				
Saridar Masri (2018)	informal					x	
Chaudhury et al. (2019)	both				x		

analysis. When purposeful reflections on gender were analysed (Kyttä 2004; Bozkurt, Woolley, and Dempsey 2019), findings showed gender was a significant indicator impacting opportunities for play. Burgeoning research e.g. Porter, Spark, and de Kleyn (2021) and recent initiatives on gendered



play and girls' perspectives on planning/designing inclusive cities<sup>2</sup> are bringing better recognition to this agenda – local authorities must promote inter-cultural and gender dynamic opportunities for play.

Scholars who focused on diverse socio-economic backgrounds and deprived communities highlight the importance of recording the experiences of marginalised children and youth more centrally in debate and provision (Dimoulias 2017; Magnussen and Elming 2015). We recommend future studies augment these endeavours to provide further empirical evidence in understanding and designing opportunities for play in reflection of the impacts of urban deprivation and stigmatisation. Finally, our review revealed that more knowledge and practice on children with physical/cognitive impairments and opportunities for play are needed – a finding consistent with emerging literature on inclusive play space, see Moore, Boyle, and Lynch (2022).

In support of Freeman, Ergler, and Guiney (2017), we advocate that age or level of understanding is 'not' a sufficient reason to omit intersectional thinking. Future practice and research could better contend with diversity/underrepresented groups and how children's social, physical, and cognitive identities combine to create different modes of discrimination and privilege in the opportunities for play discourse. Practitioners, either in place-making or policy development must link consultation plans with a broader range of community services e.g. youth clubs, childcare centres, and facilities for children with impairments to enable consideration and provision of inclusive play in the built environment.

### *Nuanced understanding of play*

Our mapping revealed distinct differences in the conceptualisation and operationalisation of play between studies with a research- and design-oriented focus. We observed that the role of play in research design varies from explicit investigation of how children play in built settings, to studies which use play as a medium in their research and/or design process and those that consider play as a normative everyday activity without conceptual nuance. Despite our emphasis on opportunities for play, almost half of the studies reviewed operationalise play in an implicit way.

Our findings pinpoint the need for future research and practice to explore play as a complex nuanced concept (Table 2). In support of Whitebread et al.'s (2017) types of play and Zosh et al. (2018, 4), we emphasise the need for scholars, policy makers, and practitioners to adopt a nuanced understanding of 'play as a spectrum' of opportunities and types. For projects, this entails paying attention to different variations of play as an activity and providing built spaces that address multiple dimensions of children's play. Nuanced play promotion must also show consideration of who is (or should be) involved in play. We recommend understanding play in the built environment as an intergenerational activity (Hassinger-Das et al. 2020; Bustamante et al. 2019). Refining the concept of child-friendly to family-friendly environments should be a key endeavour for researchers, spatial/design professionals, and local authorities.

Approaches which promote play as a child's way of being and appropriating built settings (Jelić et al. 2020), can strengthen our understanding of their creative agency and active participation in the everyday lives of their communities (Bishop and Corkery 2017). Explorations of play as a spectrum of opportunities can begin to identify how specific spatial aspects across the built environment support different developmental and health outcomes for children (Yogman et al. 2018) as well as inspire investigations into the role and function of play in collaborative research and design with children (Birch et al. 2017) to inform play-friendly policy/place-making in cities.

### *Democratic contexts of play, between formal and informal play spaces*

In analysing how different spatial settings and scales are foregrounded in the reviewed literature, our analysis identified that most research remains focused on 'formal play spaces' – child-dedicated environments such as schools, and in particular playgrounds, which were the most common



context to feature in the review. This evidence supports existing literature, that children, and opportunities for play, are restricted to set ‘spaces’ across the built environment, highlighting the exclusionary role of planning and design which confine children’s play (Bishop and Corkery 2017).

Nonetheless, our analysis also revealed an expanding area of scholarship on opportunities for play in ‘*informal play spaces*’ in children’s everyday lives: such as neighbourhood spaces, public buildings, public spaces, or city streets and squares (Table 4). The emerging emphasis on informal play spaces demonstrate the importance of showcasing and capturing the variety of meaningful indoor and outdoor places children use daily for play and the unique opportunities they provide to expand our understanding of what constitutes ‘play space’ across the built environment (Kytta et al. 2018).

Overall, our findings highlight the increased recognition in research of children’s democratic right to the city, their everyday appropriations of urban spaces, and the prefigurative politics of play enacted by children (Carroll et al. 2019). Future research, legislation and practice should continue to expand the conceptualisation of children’s play spaces to bolster children’s rights, presence/ use of space, opportunities for play and contributions to place-making (Jelić et al. 2020).

The synthesis of evidence from this scoping review brings together an improved awareness of critical issues in understanding and designing opportunities for play in the built environment for future research, policy, and practice. Ultimately, this review identifies a need for further research *for, by* and *with* children to redress the ways in which urban and architectural settings are designed (often to reflect adult values) and the social, legal, and physical controls that restrict children’s use of the built environment. We invite researchers, policy makers, community leaders and practitioners to work closely with children, engage with their diversity, and explore interdisciplinary and inter-professional avenues to bolster and promote opportunities for play across the built environment.

## Notes

1. Additional partial searches were performed during manuscript preparation (last search June 2022), with recent studies included to highlight consequent developments in the field and augment our findings.
2. See, for example, ‘Make Space for Girls’ <https://makespaceforgirls.co.uk/> and ‘Her City’ <https://hercity.unhabitat.org/> initiatives.

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## Author contributions

All three authors contributed to the conceptualisation, data collection, analysis, and writing of this review equally.

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\*= Scoping review source

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