Using the Theory of Affordances to Understand Environment–Play Transactions: Environmental Taxonomy of Outdoor Play Space Features—A Scoping Review

Thomas Morgenthaler, Helen Lynch, Janet Loebach, Duncan Pentland, Christina Schulze

**Importance:** The transactions between the physical environment and children’s play have not been well studied. The theory of affordances provides a way to better understand how environmental characteristics offer opportunities for play occupation.

**Objective:** To investigate the relationship between environmental characteristics of outdoor play spaces and children’s outdoor play and to develop an environmental taxonomy to support the analysis of play affordances in community play spaces.

**Data Sources:** Peer-reviewed literature (1974–2023) was sourced from a previously published scoping review (Morgenthaler, Schulze, et al., 2023). The Academic Search Complete, Avery Index to Architectural Periodicals, CINAHL, MEDLINE, PsycINFO, Scopus, and Web of Science databases were searched using the keywords and synonyms of playground, environmental qualities, and children with and without disabilities.

**Study Selection and Data Collection:** A secondary analysis of the previously published scoping review was conducted. Included studies were those that provided descriptions of physical environment–play activity transactions.

**Findings:** A qualitative content analysis of 45 articles was conducted and used to form an environmental taxonomy. This taxonomy consisted of 14 space and object categories defined by their functional qualities and linked to play affordances. An array of 284 play occupations were identified in different forms. Play affordances of spaces and object categories and their functional environmental qualities were subsequently identified.

**Conclusions and Relevance:** This study provides evidence to support the understanding of how the physical environment shapes children’s outdoor play occupations.

**Plain-Language Summary:** The study authors developed the Environmental Taxonomy of Outdoor Play Space Features as a tool that occupational therapists can use to better understand and describe how the physical environment shapes opportunities for play. The tool could also be useful to justify environmental intervention in schools and public playgrounds to create spaces that support more play for a diversity of children.
practice contexts, where play is more frequently exploited as a tool to achieve adult-driven objectives for children, including skill improvement, ability assessment, or a reward for completing tasks (Kuhaneck et al., 2013; Lynch et al., 2017; Schlager-Jaschky, 2019). Brown and Lynch (2023) suggested that occupational therapy practice should shift from this extrinsically motivated and externally controlled play-based work occupation approach to an enabling intrinsically motivated and child-initiated play occupation approach. One solution to promote play occupation is to focus on the provision of play-enabling environments by creating or modifying environments to provide space for play (Brown & Lynch, 2023). This argument aligns with scholarship advocating a practice shift away from concentrating solely on individual factors and attempting to fix impairments and, instead, emphasizes context- and environmental-focused approaches of creating participation opportunities and experiences (Anaby et al., 2021; Magasi et al., 2015; Patten, 2022).

The environment has always played a fundamental role in understanding and researching occupations in occupational therapy and occupational science (Clark et al., 1991; Hocking, 2020; Yerxa, 1993). Environment can be conceptualized broadly as “having physical—spatial, ecological, sociocultural, historical, and spiritual dimensions, and being a source of symbolic meaning, affordances, novelty, attractors, and resources” (Hocking, 2020, p. 3). Environmental perspectives can range from the more immediate physical and social environment of spaces, objects, people, and attitudes to more distant environmental influences, such as legislation, policy, culture, institutions, and norms (Hocking, 2020). Occupational therapy and occupational science have emphasized the social, cultural, and political environmental aspects (Hocking, 2020; Pierce, 2012), leaving a gap in understanding the physical environment’s influence on occupation (Hocking, 2020; Lynch & Stanley, 2018; Pierce, 2012).

Affordance theory has been proposed as a concept with great potential to support occupational science studies and occupational therapy practice (Lynch & Stanley, 2018; Pierce, 2012; Spitzer et al., 2023) and was used before to inform the creation of occupational therapy assessments (May-Benson & Cermak, 2007). Affordances are described as possibilities for action that someone perceives and may then actualize in their physical environment (Gibson, 1979). This perceptual concept is rooted in ecological psychology and provides a way of understanding the environment–person relationship as a transactional one in which affordances are potentially available, may be perceived, and may be actualized by individuals (Kytta, 2002). Gibson (1979) posits that the environment and the person are an intertwined pair, implying that affordances are neither solely environmental (objective) nor personal (subjective). This relational understanding of affordances between environment and person offers an alternative way to describe and theorize about physical environments. Affordances can be thought of as functional qualities of the environment that individuals perceive as supporting or enticing them to engage in an occupation. For example, a child might perceive a tree with low-hanging branches as climbable if it matches their ability and desire to climb. In contrast, a tree with thorny or high branches might not be perceived as climbable. From an analytical perspective, affordances offer a way to describe play spaces by the functional qualities that potentially invite children’s play occupations (actualized affordances). For example, instead of naming the physical environment in terms of its items (e.g., seat, slide, bush), the functional qualities highlight the person–environment transaction afforded by the environment (e.g., sitting, climbing, hiding; Heft, 2001, 2003). For occupational therapists, this suggests that affordances offer a way to assess an environment’s play value by identifying potential affordances as opposed to counting environmental features, such as play components in play spaces.

The theory of affordance has been used in research to analyze how functional qualities of outdoor play spaces can invite different forms of play among children. Previous research has demonstrated that play spaces contain natural environments offer more diverse play opportunities through the affordances offered by natural features, varied landscapes, and loose natural parts (Brussoni et al., 2017; Dyment & O’Connell, 2013; Luchs & Fikus, 2013; Wishart et al., 2019). Play spaces with natural environments also cater to children of different ages and abilities, provide more risk-taking opportunities, and result in longer engagement in outdoor play (Herrington & Brussoni, 2015; Kuh et al., 2013; Luchs & Fikus, 2013; Sandseter, 2009). Similarly, loose parts have been found to offer a diverse range of play supported by the numerous and unscripted opportunities they provide (Sterman, Villeneuve, et al., 2020; Woolley & Lowe, 2013). Scholars have therefore argued that play spaces with natural features offer a greater variety of potential affordances for play and can be conceptualized as higher in play value (Herrington & Brussoni, 2015; Loebach & Cox, 2020; Woolley & Lowe, 2013).

The theory of affordances has been successfully applied to analyze outdoor play environments’ meaningful functional qualities rather than name items, resulting in the development of empirically established environmental taxonomies in ecological and environmental psychology (Heft, 1988) and landscape architecture (Lerstrup & van den Bosch, 2017; see Table A.1 in the Supplemental Material, available online with this article at https://research.aota.org/ajot). Heft’s (1988) taxonomy was formed by a secondary analysis of a small subset of studies and did not indicate any specific outdoor environment for which it was developed. Lerstrup and van den Bosch’s (2017) taxonomy was formed after an observational study based on two preschool children’s use of the outdoor environment. These taxonomies provide initial tools to
understand what outdoor play is potentially afforded by which functional qualities. Yet, to date, no such taxonomy has been developed for community play spaces, which have become one of the main locations for children’s play in many societies. Drawing on these existing environmental taxonomies and the growing body of literature on outdoor play spaces at schools and in public settings, the purpose of this study was to develop a robust, evidence-based taxonomy as a foundation for conducting future environmental analyses of existing outdoor play spaces for potential play affordances.

To sum up, the need to better understand the influence of the physical environment has become more urgent as occupational therapy in many countries has gradually moved from clinical settings in medical environments to real-life settings in schools, homes, and other community settings (Marshall et al., 2017). To harness the full potential of the physical environment in practice, it is essential to gain a deeper understanding of the environment–person transaction (Lynch & Stanley, 2018). In this article, we focus specifically on the physical environment–person transactions that support children’s play in community play spaces.

Our primary objective is to use the theory of affordances to investigate the relationship between functional qualities of community play spaces and children’s outdoor play. By focusing on transactions between the person and the immediate physical environment, we seek to synthesize empirical evidence of the influence of physical environmental functional qualities on actualized play affordances to create an Environmental Taxonomy of Outdoor Play Space Features. This new knowledge will be useful for evaluating potential affordances of outdoor play spaces in research and practice.

Method
This article is based on a secondary analysis of research articles identified in a published scoping review (see Morgenthaler, Schulze, et al., 2023). Whereas the original scoping review targeted children’s lived experiences and the environmental qualities children themselves identified as enhancing outdoor play, this secondary analysis applies the theory of affordances to build the Environmental Taxonomy of Outdoor Play Space Features, focusing on play spaces located in communities (schools and public spaces) to illustrate how physical spaces and objects specifically support diverse forms of outdoor play.

Original Scoping Review Procedure
The original scoping review (Morgenthaler, Schulze, et al., 2023) followed steps proposed by Arksey and O’Malley (2005), using the research question “What is known about the functional physical environmental qualities of spaces and objects in community play spaces and their relation to affordances for children’s outdoor play activities?” The main objective was to develop an environmental taxonomy of spaces and objects within community play spaces that connects characteristics of the physical environment to specific play occupations. For this secondary analysis, all 51 articles of the initial scoping review were reviewed for inclusion. To allow for an affordance-based analysis, included articles needed to describe physical environment–play activity transactions (how children actualized the affordances in the physical environment for play occupation). Forty-five studies met these inclusion criteria (Figure 1) and were charted using study design, study aim, participants, play space location, and publication year.

Secondary Analysis: Scoping Review Procedures
The secondary analysis followed the three steps proposed by Johnston (2014): (1) forming a research question, (2) identifying an appropriate data set, and (3) performing a comprehensive evaluation of the collected data. The research question guiding this secondary analysis was “What is known about the functional physical environmental qualities of spaces and objects in community play spaces and their relation to affordances for children’s outdoor play activities?” The main objective was to develop an environmental taxonomy of spaces and objects within community play spaces that connects characteristics of the physical environment to specific play occupations. For this secondary analysis, all 51 articles of the initial scoping review were reviewed for inclusion. To allow for an affordance-based analysis, included articles needed to describe physical environment–play activity transactions (how children actualized the affordances in the physical environment for play occupation).

Forming the Environmental Taxonomy of Outdoor Play Space Features
First, data from the studies were transferred into Atlas.ti (Version 23 for Windows) for a structured...
qualitative content analysis (Elo & Kyngäs, 2008). Coding was performed in two rounds by Thomas Morgenthaler following Heft’s (1988) approach to identifying child–environment transactions, in this case where a child’s play activity was mentioned in combination with some aspect of the physical environment. These play–environment transactions were coded as applicable by play activity (what children play), the location or functional qualities of the space where play occurred (where children play), and the objects and materials or functional qualities of objects and materials used during play (with what children play). Where possible, extracts contained a combination of what, where, and with what codes. Extracts ranged from broad descriptions, such as “at tree stump,” to detailed descriptions of functional qualities,
such as “tree stump with soft-textured bark that children perceived as compelling to touch.” Initial codes were developed using words manifested in the text and applied to a subset of studies (see Table A.3 in the Supplemental Material for examples). Subsequently, a refined code set was extended to the entire data set, involving the translation of codes from one study to another and adjusting the code names (either broadening or narrowing codes) to ensure consistency; otherwise, new codes were created (Thomas & Harden, 2008).

Second, broader categories of play activity codes, space codes, and object–material codes were formed by grouping together codes that conveyed similar meanings. For instance, codes related to various topographical features, such as hilly terrain, depressions, and sloped terrain, were clustered together to create a single where topographical features category.

Third, children’s play activities (what codes) were categorized using the existing typology of outdoor play types (the Tool for Observing Play Outdoors [TOPO]–Collapsed Version) from Loebach and Cox (2020). The TOPO was originally developed to effectively capture and categorize children’s outdoor play in an environment during observation. The collapsed version of the TOPO consists of nine different types of outdoor play: physical play, explorative play, play with rules, imaginative play, restorative play, bio play, expressive play, digital play, and nonplay (Loebach & Cox, 2020; see Table A.4 for descriptions). All play activities identified were subsequently organized according to these types of outdoor play.

Step 4 aimed to identify and describe the space and object–material categories. This was done by reading the clustered codes and associated data for each space (where codes) and object–material (with what codes) category separately. In this step, attention was given to the following interconnected aspects: (1) spaces and objects–materials examined to determine potential category names, (2) functional qualities described, and (3) linked play activities (what codes). A distinct category for the taxonomy was achieved when enough data were found to link all three aspects. For example, the taxonomy category open space is supported by 24 articles referring to open yard, open areas, open space, fields or lawns, or open ground and describing functional qualities of open spaces as open, flat, more or less smooth and different surfaces such as grass, pavement, synthetic, or loose materials. Examples of linked play affordances include running, skating, picnicking, and playing soccer. This synthesis resulted in the Environmental Taxonomy of Outdoor Play Space Features presented in Table 1 (and the extended version presented in Table A.6). To further demonstrate the nature of the physical environment in shaping children’s outdoor play occupation, examples of play affordances were summarized. In detail, for each TOPO play type, one play activity was chosen on the basis of the substantial evidence extracted for it.

**Substantial evidence** refers to the amount of diverse information drawn from the included research articles for a specific play affordance (e.g., “running” is noted in 36 extracts from 18 articles). Descriptions illustrate specific functional qualities and environmental categories supporting this play occupation.

The main analysis, which underscored the formation of the environmental taxonomy, was performed by Morgenthaler. Codes and analyses were then reviewed by Janet Loebach, including independent coding of a subset of studies (12%) to identify common gaps or discrepancies and a review of all initial codes assigned by Morgenthaler. Afterward, both met several times to discuss discrepancies in coding, categorization, terminology, and finalization of taxonomy categories. Morgenthaler then made necessary changes to the original data codes and categories. Finally, the other authors were asked to verify the accuracy and clarity of the final taxonomy.

### Results

Included studies (N = 45) originated primarily from Europe (n = 25) and Australia or New Zealand (n = 10), followed by North America (n = 6) and Asia (n = 4). Studies used qualitative (n = 27), quantitative (n = 11), and mixed (n = 7) designs. Participants represented in the studies included children without disabilities (n = 35), children with disabilities (n = 5), or both (n = 5). Play spaces were located on school grounds (n = 18) or in public spaces (n = 27) and were distributed across inner city (n = 17), suburban (n = 8), or rural (n = 10) locations. Ten studies did not report location. Publication year of studies ranged from 1974 to 2023, with about 82% of the studies published in the past 10 yr (see Table A.5 in the Supplemental Material).

### Environmental Taxonomy of Outdoor Play Space Features

Fourteen environmental categories were formed, each with distinct environmental functional qualities and associated play occupations afforded by that environment. A compact version of the taxonomy is presented in Table 1. (An extended version of the taxonomy, including supporting references, is presented in Table A.6.)

### Examples of Play Occupations Afforded by the Physical Environment

An array of 284 distinct play occupations afforded by the environment were identified (see Table A.6) that were associated with space and object categories in the taxonomy. Play occupations take on many different forms depending on the functional environmental qualities of the spaces and objects. These functional qualities of the physical environment significantly shape children’s outdoor play occupations, as illustrated by the following two examples, selected because...
<table>
<thead>
<tr>
<th>Physical Environment Category</th>
<th>Environmental Functional Qualities</th>
<th>Examples of Play Occupations Afforded by Environmenta</th>
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</thead>
</table>
| Open spaces                   | • Primarily flat  
• Mostly open; offers space between play equipment, built structures, and natural features (not too cluttered)  
• Can have a variety of ground surfaces (solid, soft, or loose material; might have subcategories such as grassy open spaces, open spaces with hard surfaces) | • Running; riding, driving, or skating; pulling things; doing handstands, backflips, or jumping  
• Watching objects that roll or spin  
• Playing “floor is lava”  
• Playing soccer, playing tag  
• Sitting, standing  
• Picnicking |
| Designated sports areas       | • Often clearly separated from other areas  
• Flat area intended for a particular sport activity  
• Can include rigid built elements (nets, goalposts) or visual floor markings  
• Can have a variety of ground surfaces depending on activity | • Playing soccer, playing basketball  
• Hanging on basketball basket |
| Paths and walkways            | • A designated change of surface to adjacent surfaces, clearly bounded  
• Can have many types of ground surfaces, sometimes described as solid surface and accessible  
• Connects and links to other zones  
• May loop around (circular stand-alone routes)  
• Can incorporate features such as bumps and dips | • Riding, driving, or skating using bike, scooter, trike, skates, wheelchair; running  
• Playing ball  
• Sitting down on and observing  
• Walking on |
| Topographic features          | • Features such as hills, slopes, depressions, or cliffs in the terrain  
• Surfaces can vary in degree of smoothness; varying surfaces provide different textures  
• Varying degrees of steepness or inclination  
• Varying sizes and heights or depths  
• Weather conditions may change functional qualities (e.g., more slippery because of snow or rain) | • Sliding, sledding, gliding, running, climbing up, rolling down, jumping down  
• Rolling things down and watching, building bridges over puddle  
• Enjoying outlook from high up |
| Enclosed and bounded spaces   | • Can be a fully to partly enclosed space that offers shielding and hiding qualities  
• Bounded spaces may include some change in surface pattern or material (e.g., a picnic blanket, a dry patch of grass, floor painting, low raised hedges), providing a nested space within a space  
• Scaled for a small group of children  
• Affords private to semiprivate spaces that seclude and separate child or children from other spaces or people  
• Can be provided through both human-constructed environments (e.g., low raised boundaries, walls, coverage by a roof such as tree houses or huts, nooks, crannies) and natural environments (e.g., willow domes, circle of shrubs, high grass, low-hanging canopies) | • Exploring “being inside something,” making a nest  
• Diverse imaginative playing such as playing house, caged animal, shopping, monster, witch, cops and robbers  
• Withdrawing, resting, looking out from, hiding  
• Sitting, social opportunity such as sitting with peers |
| Spaces on the edges           | • Spaces adjacent to or on the edge of more busy zones, although they may have no distinct boundaries  
• May wrap around other spaces (e.g., corners, nooks, staircases, walls)  
• May have natural fixed features such as trees or shrubs | • Having a conversation with peers  
• Watching others from a distance  
• Daydreaming, relaxing  
• Getting together with peers |

(Continued)
Table 1. Environmental Taxonomy of Outdoor Play Space Features (Compact Version) (Cont.)

<table>
<thead>
<tr>
<th>Physical Environment Category</th>
<th>Environmental Functional Qualities</th>
<th>Examples of Play Occupations Afforded by Environment&lt;sup&gt;a&lt;/sup&gt;</th>
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</thead>
<tbody>
<tr>
<td>Physical Environment Category</td>
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<tr>
<td></td>
<td>Offers a space that is less hectic, and quieter, for slower play affordances; a space that is safe from interruptions by others</td>
<td>Balancing, climbing, crossing, crawling under, doing gymnastics, jumping, pulling themselves up, rocking, running, sliding, spinning, turning, rotating, swinging</td>
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<tr>
<td></td>
<td>Might be overlooked by supervising adults</td>
<td>Imaginative playing such as “crocodile pulls me down the slide”</td>
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<td></td>
<td>Hide and seek, creating own play routes</td>
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<td></td>
<td></td>
<td>Sitting and chatting with peers</td>
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<td></td>
<td></td>
<td>Lying in, enjoying an outlook from high up, watching other children, getting closer to peers</td>
</tr>
<tr>
<td>Play equipment</td>
<td>Always human constructed, with fixed or moving fixtures</td>
<td>Climbing on top</td>
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<td></td>
<td>Sometimes stand-alone components, sometimes bigger more complex structures</td>
<td>Exploring of twisting, opening, closing, sliding, and turning things</td>
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<td></td>
<td>Can be made from different materials (e.g., metal, plastic, wood or natural materials)</td>
<td>Diverse imaginative playing such as driving a truck; being a pilot; playing princess in a castle; playing family, post office, jail, or shopping</td>
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<td></td>
<td>Some could be described as hybrid play structures, where play features are constructed but using natural materials such as wood logs or creating a circle of tree stumps, intentionally positioned boulders with climbing grips</td>
<td>Performing and singing on a stage play</td>
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<tr>
<td></td>
<td>Often constructed for certain play activity, may be repurposed for other play affordances (e.g., using swings to jump off)</td>
<td>Hiding in, looking out from</td>
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<tr>
<td>Themed and suggestive play features</td>
<td>Always human constructed but can span from highly themed to less suggestive features</td>
<td>Climbing, jumping over, balancing on</td>
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<td></td>
<td>Can inspire children to initiate play activities suggested by the themed feature (e.g., playing fire brigade on a fire truck structure, playing captain on a ship structure with a steering wheel)</td>
<td>Chasing games, playing hide-and-seek</td>
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<td></td>
<td>Also allows children to repurpose the themed play feature for their own play idea (e.g., climbing on themed and suggestive play structures)</td>
<td>Sitting on and having a conversation, hanging out with peers</td>
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<td></td>
<td></td>
<td>Resting, recovering, sitting, and observing</td>
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<tr>
<td></td>
<td></td>
<td>Eating, picnicking</td>
</tr>
<tr>
<td>Features not purpose-built for play</td>
<td>Available features not explicitly included for play interactions, such as fences, seating, stairs, or weather shelters that may be repurposed for play</td>
<td>Climbing, jumping over, balancing on</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chasing games, playing hide-and-seek</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sitting on and having a conversation, hanging out with peers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resting, recovering, sitting, and observing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eating, picnicking</td>
</tr>
<tr>
<td>Manufactured tools and toys</td>
<td>Graspable, detached, and portable human-made objects such as balls, sleds, and funnels</td>
<td>Jumping and skipping, using hula hoops or rubber bands, driving and riding, sledding, pulling and pushing, playing ball</td>
</tr>
<tr>
<td></td>
<td>Might be provided in a play space or brought by visiting children</td>
<td>Building and constructing, manipulating materials (e.g., stirring, hammering, transporting)</td>
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<td></td>
<td>Can be manufactured loose parts (e.g., tires, ropes, crates, cardboard boxes)</td>
<td>Imaginative playing such as playing captain with a steering wheel</td>
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<td></td>
<td>Can be digital or electronic objects</td>
<td>Kicking balls, throwing frisbees</td>
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<tr>
<td></td>
<td>Can be used in conjunction with other environmental features (e.g., riding a bike on a sufficiently solid-surface hill, kicking a soccer ball on a grassed open space)</td>
<td>Arranging and sorting</td>
</tr>
<tr>
<td></td>
<td>Can be used in conjunction with available loose materials (e.g., pails and spoons for mud and water play, a wheelbarrow to transport sand)</td>
<td>Playing on cell phone</td>
</tr>
<tr>
<td>Fixed natural features</td>
<td>Can be large-scale vegetation (e.g., trees), small-scale vegetation (e.g., shrubs, bushes, long grass), or hardscape features (e.g., boulders)</td>
<td>Climbing, running, jumping off</td>
</tr>
<tr>
<td></td>
<td>Integrated within or surrounding the play space; available to play in, on, and with and not just for decorative purposes</td>
<td>Constructing and building, ripping off, touching, exploring features, walking barefoot, hiding things</td>
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<tr>
<td></td>
<td></td>
<td>Imaginative playing such as making food, being an animal, or playing house</td>
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</tbody>
</table>

<sup>a</sup>Examples of play occupations are illustrative and not exhaustive.
### Table 1. Environmental Taxonomy of Outdoor Play Space Features (Compact Version) (Cont.)

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<td><strong>Physical Environment</strong></td>
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<tr>
<td>Category</td>
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<tr>
<td><strong>Examples of Play Occupations afforded by Environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ May be used in combination with loose natural parts, materials, or wildlife</td>
<td>▪ Playing tag and chasing games, playing hide-and-seek</td>
</tr>
<tr>
<td></td>
<td>▪ Chatting with peers, leaving marks, playing with shadow</td>
<td>▪ Observing, looking for, and caring for wildlife; touching, smelling, or tasting plant material</td>
</tr>
<tr>
<td></td>
<td>▪ Observing, looking for, and caring for wildlife; touching, smelling, or tasting plant material</td>
<td>▪ Lying in shadow or sun, reading, resting, picnicking, gathering with peers</td>
</tr>
<tr>
<td><strong>Loose natural parts</strong></td>
<td>▪ Graspable, portable, collectable (countable) natural objects such as sticks, rocks, bark</td>
<td>▪ Play fighting with sticks; pushing, carrying, or transporting heavy objects</td>
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<tr>
<td></td>
<td>▪ Can have different sizes, weights, and textures</td>
<td>▪ Picking up, throwing leaves in air; constructing and building dens, forts, dams, or nests; hitting ice with a stick; searching and sourcing; hiding something; ripping off; tearing apart</td>
</tr>
<tr>
<td></td>
<td>▪ May be first sourced and gathered from the play space</td>
<td>▪ Smelling, tasting, touching, or feeling</td>
</tr>
<tr>
<td></td>
<td>▪ May be shaped or repurposed for new or alternate affordances</td>
<td>▪ Imaginative playing, such as Harry Potter with stick-wand, playing stick fight, making monster traps, play-making food</td>
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<tr>
<td></td>
<td>▪ Weather and seasonal changes offer new loose natural parts (e.g., flowers, fruits, ice)</td>
<td>▪ Competing to find biggest object</td>
</tr>
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<td></td>
<td>▪ May be used in combination with human-made materials or objects, fixed natural features, and manufactured tools and toys</td>
<td>▪ Arranging, sorting, drawing, observing, and enjoying flowers and plants</td>
</tr>
<tr>
<td><strong>Wildlife-friendly habitats</strong></td>
<td>▪ Natural green or blue features or spaces (e.g., shrubs, grass, flowers, forest, ponds, creeks) close to or integrated into the play space that attract wildlife, including insects (e.g., butterflies, snails), birds (e.g., songbirds, ducks) or pets (dogs)</td>
<td>▪ Playing fetch</td>
</tr>
<tr>
<td></td>
<td>▪ Wildlife may also be kept in cages or fenced-in spaces close to or in play spaces</td>
<td>▪ Searching for and finding, touching, following around</td>
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<td></td>
<td>▪ Wildlife’s unique functional qualities, such as how animals move (e.g., crawl, jump, swim, or fly, which affords following or catching) and make sounds (e.g., bird singing affords observing)</td>
<td>▪ Closely observing, watching, listening to</td>
</tr>
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<td></td>
<td>▪ Wildlife often described as “smaller” animals</td>
<td>▪ Catching, collecting, picking up</td>
</tr>
<tr>
<td></td>
<td>▪ Wildlife often described as “smaller” animals</td>
<td>▪ Caring for, feeding</td>
</tr>
<tr>
<td></td>
<td>▪ Wildlife often described as “smaller” animals</td>
<td>▪ Wildlife often described as “smaller” animals</td>
</tr>
<tr>
<td><strong>Malleable materials</strong></td>
<td>▪ Substances that are shapable, malleable, portable, or mixable</td>
<td>▪ Clambering up a slippery slope, skiing, sledding, sliding, throwing, transporting</td>
</tr>
<tr>
<td></td>
<td>▪ May be purposefully provided in the play space, such as water, sand, or mud play areas</td>
<td>▪ Scooping up, picking up, walking barefoot, building, molding, damming water, floating, filling, burying, making tracks or footprints, stirring, pouring, splashing, sieving, touching, smearing</td>
</tr>
<tr>
<td></td>
<td>▪ May involve surface materials or those provided by the natural environment (e.g., dirt, mud, soil, clay, sand, gravel, water, snow, frost, tree sap)</td>
<td>▪ Imaginative play—making food, playing house, making sand cakes</td>
</tr>
<tr>
<td></td>
<td>▪ May be ground-surface malleable materials (e.g., mulch, wood chips, sand, gravel)</td>
<td>▪ Shaping snow figures</td>
</tr>
<tr>
<td></td>
<td>▪ Properties might change depending on weather and temperature (e.g., water turning to ice, moist sand)</td>
<td>▪ Watering plants</td>
</tr>
<tr>
<td></td>
<td>▪ Can provide different textures to explore</td>
<td>▪ May be used in combination with loose natural parts and manufactured tools and toys</td>
</tr>
<tr>
<td></td>
<td>▪ May be used in combination with loose natural parts and manufactured tools and toys</td>
<td>▪ Clambering up a slippery slope, skiing, sledding, sliding, throwing, transporting</td>
</tr>
</tbody>
</table>

<sup>a</sup>Items in this column represent example play occupations. The full list can be found in Table A.6 of the Supplemental Material.
of their prominence in outdoor play: “running as play” and “chatting and talking with peers as play.” “Running as play” is part of the TOPO outdoor play type Physical Play (Loebach & Cox, 2020) and was primarily evident in four of 14 environmental categories. Running play took on various forms, including running up and down topographic features (Fahy et al., 2021; Jansson et al., 2016; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Refshauge et al., 2015; Veitch et al., 2020), running with play equipment (e.g., running up slides or running across bridges; Fahy et al., 2021; Refshauge et al., 2015), and running in loops in open spaces or along paths and walkways, often following a specific route (Aminpour, 2021; Fahy et al., 2021). Additionally, running frequently involved other play, such as running while engaged in a game such as tag (Fahy et al., 2021) or jumping off swings and running down slopes (Refshauge et al., 2015), or it was interwoven with other play activities, such as running, climbing, and jumping over features (Caro et al., 2016; Pitsikali & Parnell, 2019). Running also often involved following peers’ lead, running in groups, being fast, and competing with peers in races (Aminpour, 2021; Caro et al., 2016; Fahy et al., 2021), highlighting the social environmental dimensions of play. Altogether, play occupations for running were often perceived by children on the basis of a combination of several environmental functional qualities, such as a relatively firm surface that could be flat or have various degrees of inclination (Aminpour, 2021; Fahy et al., 2021; Goodenough et al., 2021; Lerstrup & van den Bosch, 2017; Refshauge et al., 2015), along with enough room to run afforded by spaces between or around natural features or built structures (Aminpour et al., 2020; Cetken-Aktas & Sevimli-Celik, 2023; Fahy et al., 2021; Jansson, 2010; Refshauge et al., 2015; Veitch et al., 2020) and a running route with no ground surface obstacles, such as roots that cause tripping or low-hanging branches that might hit children’s faces (Aminpour, 2021; Caro et al., 2016).

“Chatting and talking with peers as play” is part of the TOPO’s Expressive Play type (Loebach & Cox, 2020) and took on diverse forms, such as chatting with peers, joking and giggling, telling secrets, venting, making plans about what to do, getting in contact with other children, or simply talking (Aminpour, 2021; Birkner et al., 2021; Burke, 2012; Caro et al., 2016; Hayward et al., 1974; Horton & Kraftl, 2018; Jansson, 2008; Jansson et al., 2016; Loebach & Cox, 2022; Prellwitz & Skär, 2007; Veitch et al., 2020). Talking and chatting as play was most often undertaken with peers whom children identified as friends, with no adults present (Aminpour, 2021; Birkner et al., 2021; Jansson et al., 2016; Prellwitz & Skär, 2007). Talking and chatting as play often appeared to be intertwined with other activities such as sitting and resting, eating, swinging, spinning, walking somewhere, perching on elevated structures, enjoying nature, or relaxing in the shade or sun (Aminpour, 2021; Burke, 2012; Cetken-Aktas & Sevimli-Celik, 2023; Jeannes & Magee, 2012; Lerstrup & van den Bosch, 2017; Cetken-Aktas & Sevimli-Celik, 2023; Prellwitz & Skär, 2007; Ripat & Becker, 2012; Truong & Mahon, 2012).

Similar to “running as play” and “chatting and talking with peers as play,” the forms and supporting functional qualities of other play occupations are described in Table A.7.

Discussion

The main result of this secondary analysis is the development of the Environmental Taxonomy of Outdoor Play Space Features, based on evidence for actualized affordances (play occupations) but synthesized into a taxonomy of potential play affordances as an outcome. This taxonomy describes connections between environmental characteristics of spaces and objects and their potential play affordances in shaping play occupations. It encompasses 14 distinct environmental categories, their functional qualities, and links to play occupations that they afforded. Notably, our findings highlight that children’s play is afforded by various combinations of functional qualities. Consequently, identifying these functional qualities, their combinations, and how children use them in their play is an invaluable initial step to further the understanding of how the physical environment can potentially provide play affordances and, therefore, strengthen understanding of how to design outdoor play spaces for enhanced play value.
The theory of affordances (Gibson, 1979) that underlies this taxonomy deepens the understanding of how the physical environment actively shapes play occupations. Each environmental category, with its associated functional qualities, becomes an influential agent guiding children’s play. This recognition of the environment’s active role adds a new dimension to the understanding of child–environment transactions in play occupations, highlighting that the physical environment is not a passive backdrop to play but an active component of it; it continuously presents affordances that invite children to play and therefore has agency.

The analysis revealed a diverse array of play occupations afforded by different environmental categories. In comparing the play occupations that are afforded by categories of the taxonomy, it becomes evident that play occupations are often not restricted to a single category but rather are supported across different categories and take on various forms. This underscores the idea that play spaces that provide a range of different space and object categories have the potential to support a wider variety of play. This finding aligns with prior research that has shown that play spaces promote diverse play when they offer not only play equipment (play equipment and themed and suggestive play features) but also other categories, such as open spaces, enclosed and bounded spaces, topographical features, fixed natural features, loose natural parts, and malleable materials, among other space and object categories (Brussoni et al., 2017; Dyment & O’Connell, 2013; Herrington & Brussoni, 2015; Loebach & Cox, 2020; Luchs & Fukus, 2013; Wishart et al., 2019; Woolley & Lowe, 2013).

We propose that the Environmental Taxonomy of Outdoor Play Space Features offers advantages for occupational therapy practice. First, it can serve as a shared environmental terminology, which is crucial for effective communication within the occupational therapy profession, as discussed by Kirschner et al. (2023). A shared terminology also plays an essential role in facilitating interdisciplinary collaborations (Wagenfeld et al., 2017). Because occupational therapy is concerned with goals that aim to enable children to play by modifying the environment, this taxonomy can serve as a common terminology for community practice in schools and public spaces to communicate ideas more effectively among interdisciplinary stakeholders, including designers, providers, policymakers, and researchers.

Second, using this taxonomy offers a shift from an adult-centered viewpoint of “what does this play space contain?” to a child’s viewpoint of “what can I potentially do there?” (Heft, 1988). For occupational therapists, this shift of describing what the environment potentially affords is valuable and closer to an occupational perspective of describing environments, rather than just describing and counting objects and features.

Third, this taxonomy could be used by occupational therapists to evaluate play spaces for potential play affordances and inform better playground design and modifications. An evaluation of supporting features of the environment is one of five facets of how play occupations can be assessed (Bundy, 2011). Using the play affordance taxonomy in the evaluation of a play space would involve several steps. First, it is important to get an overview of what environmental categories are evident in a play space. Second, a description of functional qualities supports the identification of potential play affordances of this play space. Conducting this environmental audit using the taxonomy is then followed by observations of children’s actualized play occupations within the play space. In this step, observational tools such as the TOPO (Loebach & Cox, 2020) might be used.

This article contributes to the growing body of evidence emphasizing the significance of the physical environment in understanding outdoor play occupations. Occupational therapy scholars have stressed the importance of practitioners possessing knowledge about play space users, environments, and play occupations (Moore et al., 2022; Prellwitz & Skär, 2007; Ripat & Becker, 2012). They advocate for practitioners to extend their practice beyond clinical settings; engage with communities (Moore & Lynch, 2015); support policy changes to enable play for marginalized populations (Gately et al., 2023; Lynch et al., 2020; Moore & Lynch, 2015; Sterman et al., 2019); and empower families, children, and communities to advocate for themselves (Prellwitz & Skär, 2016; Sterman, Naughton, et al., 2020). This article aims to equip occupational therapy practitioners with a taxonomy to facilitate context-focused interventions that create play occupation–enabling environments for diverse user groups. Although the theory of affordances enhances understanding of the physical environment and children’s play interactions, it is crucial for environmental and contextual interventions to also consider local policies, play space standards, country-specific legislation, sociocultural factors, and adult beliefs and attitudes that influence children’s outdoor play (Grady-Dominguez et al., 2021; Ramsden et al., 2022). To comprehensively advance the environmental and contextual approach in occupational therapy practice, changes are needed both in the immediate physical environments that support play and in the broader environmental dimensions that affect children’s outdoor play in community play spaces.

Limitations and Future Research
In secondary data analyses, the existing data were originally collected for a different research question (Johnston, 2014). The data and search terms used were tailored to the original research question, not the one being explored. This means that that some relevant articles might have been missed because no new search was conducted.
It is essential to recognize that taxonomies are dynamic and will continue to evolve (Heft, 1988) as the evidence base for children’s play and specific physical environments grows. To ensure its accuracy and continued relevance, further empirical testing and refinements are needed. For example, we anticipate that categories may be further divided into distinct subcategories or that new categories may emerge. Also, categories in this taxonomy are overlapping and nested within each other, which means that future refinements should investigate whether common patterns of play affordances coexist in these categories.

Ongoing development should be supported by empirical testing of the taxonomy combined with other tools such as the TOPO’s behavior mapping protocol (Loebach & Cox, 2020). Furthermore, this taxonomy provides part of the evidence base for an audit tool investigating children’s play opportunities in play spaces (The Playground Play Value and Usability Audit Tool; Morgenthaler, Lynch, et al., 2023).

A notable finding of this study pertains to the limited research on children with disabilities and play spaces, beyond issues such as play space accessibility and human-constructed play equipment. Although these are fundamental issues in addressing inclusion, this narrow emphasis provides limited insights into how other environmental play space features support play for these children. A play space that affords a diversity of play can also potentially cater to a more diverse population and therefore has potential to enhance inclusion. Previous research has demonstrated that play spaces that support a wide array of affordances benefit children with varying abilities (Barbour, 1999; Serman, Villeneuve, et al., 2020), different age groups, and different genders (Loebach & Cox, 2022) and provide children with options to explore new affordances (Fjørtoft, 2001) and the freedom to choose play activities that align with their individual abilities (Prieske et al., 2015). To address this research gap effectively, future studies should investigate the role of categories such as loose natural parts, fixed natural features, topographic features, malleable materials, and wildlife-friendly habitats in supporting inclusive play environments. Future studies need to provide detailed descriptions of children’s play occupations in environmental contexts and the functional qualities of the environment that support and shape their play.

Implications for Occupational Therapy Practice

The findings of this scoping review have the following implications for occupational therapy practice:

- The theory of affordances is useful for exploring and describing environment–child transactions in outdoor play.
- The Environmental Taxonomy of Outdoor Play Space Features could be used in practice to evaluate existing play spaces, identify missing features and their functional qualities, and justify environmental interventions aiming to create space for play.
- To enable more time and space for play, practitioners should collaborate with communities and partner with other professionals, such as landscape architects, play advocacy working groups, and stakeholders responsible for play space provision. The taxonomy can be used as a common terminology.

Conclusion

This scoping review provides a deeper understanding of the transactions between the physical environment and children in outdoor play. By drawing on the theory of affordances, this study emphasizes the significant role the physical environment plays in shaping children’s outdoor play occupations. Although affordances remain underexplored in occupational science and occupational therapy, they align seamlessly with occupational therapy’s core values of the transactional person–environment relationship and are, therefore, well suited to support the understanding of what people do in the physical environment.

The Environmental Taxonomy of Outdoor Play Space Features introduced in this article provides a valuable tool to describe and analyze play spaces and could be used to justify environmental intervention in schools and public playgrounds to create spaces that enable diverse play occupations in order to maximize play value.

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References


*Studies included in the secondary analysis of literature from Morgenthaler, Schulze, et al. (2023).


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