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Title	Using the theory of affordances to understand environment-play transactions: Environmental taxonomy of outdoor play space features—a scoping review
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Supplemental Material

Table A.1. Comparison of Affordance Taxonomies of Outdoor Play Environments

Affording Features (Gibson, 1979)	Functional Classes of Outdoor Features (Heft, 1988)	Classes of Outdoor Features of Preschool Environments in Denmark (Lerstrup & van den Bosch, 2017)	Environmental Taxonomy of Outdoor Play Space Features (This Article)
Places (immobile)	Flat, relatively smooth surface	Open ground	Open spaces
	—	—	Designated sports areas
	—	—	Paths and walkways
	Relatively smooth slope	Sloping terrain	Topographic features
	Shelter	Shielded places	Enclosed and bounded spaces
—	—	—	Spaces on the edge
Attached objects (immobile countable)	Attached object	Rigid fixtures	Fixed natural features
	Climbable objects		Play equipment
	Nonrigid attached object	Moving fixtures	
	—	—	Themed and suggestive play features
—	—	—	Features not purpose-built for play
Detached objects (movable, countable)	Graspable or detached object	Loose objects	Manufactured tools and toys
			Loose natural parts
Substances (movable, not countable)	Moldable material	Loose material	Malleable materials
—	Water	Water	
Events (changes)	—	Creatures	Wildlife-friendly habitats
—	—	Fire	—

Note. A dash indicates not defined in this taxonomy.

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Table A.2. Search Terms

Terms	Search Terms
Playground	playground* OR playscap* OR playspac* OR “play spac*” OR “play area*”
Environment	buil* OR design* OR provi* OR natur* OR outdoor OR inclusive
Population	child* OR kid* OR caregiver* OR parent* OR mother* OR father* OR famil*

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Table A.3. Coding Frame and Examples

Examples of Extracted Data	Code Used		
	***What* Codes Were Used When a Study Described a Type of Play a Child or a Group of Children Engaged In**	***Where* Codes Were Used When a Study Described a Specific Space Children Used for Their Play**	***With What* Codes Were Used When a Study Described What Objects or Materials Children Used in Their Play**
"Collecting insects and all kinds of flowers and different kinds of shells in the sand" (Norðdahl & Einarsdóttir, 2015, p. 195)	*What:* collecting or picking up		*With What:* wildlife (insects) *With What:* natural loose parts (shells) *With What:* natural loose parts (flowers) *With What:* loose materials (sand)
"Hills were used in many ways, such as for running up and down or exploring, particularly hills with vegetation on them" (Jansson et al., 2016, p. 232)	*What:* running (up and down) *What:* exploring (not specified how)	*Where:* topographic feature (hills) *Where:* natural vegetation	
"Truck-shaped theme of the fixed play equipment, the most common play episodes were children pretending to be the driver and passengers while traveling and talking to one another during trips" (Cetken-Aktas & Sevimli-Celik, 2023, p. 963)	*What:* driver–passenger play *What:* talking while playing	*Where:* themed play structure (truck)	
"One of the children said, 'I can crawl to the swing and then we can sit and talk; we don't play anything we just talk about different things'" (Prellwitz & Skär, 2007, p. 148)	*What:* sitting and talking		*With What:* play equipment (swing)
"Children were also recorded observing or following butterflies, wild birds, and insects in diverse locations across *The Backyard*." (Loebach & Cox, 2022, p. 19)	*What:* animal play (observe and follow)	*Where:* diverse location on playground	*With What:* butterflies, birds, insects
"Particular boys were found on the paved area at Center C as this playground is overwhelmingly dominated by pavement. . . . Most children (and in particular, boys) observed were engaged in functional play and were riding bikes, pulling wagons or playing rule bound games (e.g. chasey)" (Dyment & O'Connell, 2013, p. 274)	*What:* biking *What:* pulling wagons *What:* play with rules chasing *What:* playing chase	*Where:* open space (paved)	*With What:* manufactured driving device (bike) *With What:* manufactured driving device (wagons)

Note. *With whom* codes (e.g., play alone, play with one peer [friend], play next to each other or parallel, play in big groups, play in small groups, play with adult) were applied but not used for the analysis and creation of the taxonomy. Every play can take on a social aspect. Therefore, the social qualities in outdoor play need to be understood throughout the taxonomy.

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Table A.4. Tool for Observing Play Outdoors: Play Types and Shortened Descriptions

Play Type (Compact Types)	Description (Subtypes)	Examples
Physical play	*Gross motor:* large-muscle activities requiring coordination *Fine motor:* smaller muscle movements when manipulating smaller objects *Vestibular:* activities that test and improve sense of balance, movement of the head, or quick movements in multiple directions *Rough and tumble:* playful physical fighting or wrestling	Climbing, picking up small objects, hanging upside down, wrestling
Exploratory play	*Sensory:* passive exploration of objects and environments *Active:* manipulation of objects and environments *Constructive:* building or deconstructing	Touching soft grass, digging a hole, building a dam
Imaginative play	*Symbolic:* using objects and ideas as symbols *Sociodramatic:* pretending social, domestic, or interpersonal experiences or roles *Fantasy:* enacting unlikely scenarios	Using a piece of wood as a telephone, playing family, playing being mermaid
Play with rules	*Conventional:* common, universal, and well-known rules *Organic:* children agree to play with negotiated or changing rules	Playing hide and seek, developing a chasing game, playing soccer
Expressive play	*Performance:* intentional performing for others *Artistic:* creating for artistic outcomes *Language:* playful use of words and language *Conversation:* social interaction through conversation	Singing for others, drawing in the sand, telling jokes, talking to a peer
Digital play	*Device:* playing on digital devices *Augmented:* playing with devices that digitally augment interactions *Embedded:* interacting with embedded digital prompts	Playing on phone, playing augmented reality game, playing with digital sensors as part of the playground
Bio play	*Plants:* Observing and interacting with living plants *Wildlife:* Observing and interacting with wildlife *Care:* Demonstrating care for nature	Examining a flower, catching an animal, planting a seed
Restorative play	*Resting:* taking mental or physical breaks *Retreat:* withdrawing to observe or be on one's own *Reading:* reading and writing for pleasure *Onlooking:* observing others nearby	Laying down, looking out from an enclosed space, reading, observing other children
Nonplay	*Self-care:* taking care of self or appearance *Nutrition:* breaks for eating and drinking *Distress:* disengagement with signs of distress *Aggression:* Nonplayful antagonistic interactions *Transition:* Nonplayful movement between spaces	Taking clothes off, eating a snack, crying, walking across play space, picking up belongings to leave space

Note. The descriptions are shortened to provide a concise overview of each play type and subtype. For greater detail, see Loebach and Cox (2020).

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Table A.5. Characteristics of the Studies Included in the Scoping Review (*N* = 45)

Citation and Country of Data Collection	Study Design	Study Aims	Participants		Playground Sample					Data Collection Methods
					Located in		Urbanization			
			Children	Adults	School	Public Space	Inner City	Suburban	Rural	
Aminpour (2021)[a] Australia	Qualitative	To identify the physical characteristics of natural settings with which children prefer to interact on school grounds	Children without disability, *N* = 228 (ages 8–10 yr; sex NR)		•		•			• Walking tours • Focus groups • Behavior mapping
Aminpour et al. (2020)[a] Australia	Qualitative	To examine the concept of "in-between spaces" valued by children in self-directed play and define their environmental characteristics from the children's perspective	Children without disability, *N* = 228 (ages 8–10 yr, sex NR)		•		•			• Walking tours • Focus groups • Behavior mapping
Birkner et al. (2021) Germany	Mixed	Not provided	Children with disabilities, *N* = 17 (ages 2–14 yr; 1 boy, 16 girls)	•	N/A					Survey
Bourke & Sargisson (2014) New Zealand	Quantitative	To assess children's play preferences by measuring the frequency of play area and equipment usage, as well as the engagement of boys and girls	Children without disability, *N* = 1,534 observations (ages 0–14; 763 boys, 771 girls)	•		•		•		• Observation • Interviews • Fieldnotes • Photographs
Burke (2012) Australia	Qualitative	To explore how some children with impairments construct their experiences of play in the local community	*N* = 72 (ages 6–10 yr; 42 boys, 30 girls)			•	NR			• Onsite observation • Focus group interview • Photographs

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Citation and Country of Data Collection	Study Design	Study Aims	Participants		Playground Sample					Data Collection Methods
					Located in		Urbanization			
			Children	Adults	School	Public Space	Inner City	Suburban	Rural	
		playground								taken by children • Scrapbooks
Caro et al. (2016) The Netherlands	Qualitative	To explore child-identified determinants of activity-friendly school playgrounds	Children without disability, *N* = 18 (ages 9–12 yr; 8 boys, 10 girls)		•		•			Participatory group meetings and discussions
Cetken-Aktas & Sevimli-Celik (2023) Turkey	Quantitative	To examine the design features of 6 outdoor play areas and the play preferences of children using these areas	Children without disability, *N* = 102 (ages 5–6 yr; 55 boys, 47 girls)		•		NR			Behavioral mapping of play types and environmental interaction
Chen et al. (2020) China	Qualitative	To explore the experiences of both children and their parents in a children's park and play space in Guangzhou	Children without disability, *N* = 11 (ages 4–7 yr; sex NR)	•		•	•			• Observations • Fieldnotes and photographs • Semistructured interviews • Survey
Czalczynska-Podolska (2014) United States	Quantitative	To uncover whether the contemporary playground can be a true play and social environment and how to increase its playability and sociability	Children without disability, *N* = 2,217 observations (ages 2–12 yr; 1,028 boys, 1,184 girls)			•		•		• Observation • Site observations • Photographs
Dyment & O'Connell (2013) Australia	Quantitative	To examine where and how children choose to play in 4 Australian preschools	Children without disability, *N* = 2,361 observations (age NR; 1,350 boys, 1,011 girls)		•		NR			• Systematic observation • Field notes

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					Located in		Urbanization			
			Children	Adults	School	Public Space	Inner City	Suburban	Rural	
Fahy et al. (2021) Ireland	Qualitative	To explore the outdoor play preferences of a group of children with autism ages 6–9 yr	Children with disabilities, *N* = 5 (ages 6–9 yr; 4 boys, 1 girl)	•	•	•			•	• Observation • Behavioral mapping • Interviews
Goodenough et al. (2021) United Kingdom	Qualitative	Not provided	Children without disability, *N* = 12 (ages 7–10 yr; sex NR)			•	NR			• Observation • Drawings • Fieldnotes as a recording device • Child-led walking interviews • Map-making and installations
Hayward et al. (1974) United States	Mixed	To explore the connection between children's play and their play environment and to examine differences between play and the environment in playgrounds with varying designs	Children without disability, *N* = 91 in interviews; *n* = for observations NR (age range and sex NR)			•	NR			• Behavioral mapping observation • Behavior setting records • Interviews
Horton & Kraftl (2018) United Kingdom	Mixed	To analyze the diverse ways in which play was valued and practiced at 3 playgrounds and to explore the narratives, anxieties, and urban myths that emerged at these 3 sites	Children without disability, *N* = 1,243 observations (ages 5–13 yr; 596 boys, 647 girls)			•	•			• Survey • Mapping • Observation
James et al. (2022)	Quantitative	To examine how a newly	*N* = 1,333			•	NR			Systematic ob-

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Canada		built playground intentionally designed to be accessible to and inclusive of children of all ages, genders, and abilities is being used by the community	observations, (1 child with disabilities, 1,332 children without disability; ages 0–13 yr; 51.82% boys, 48.20% girls)							servation using system for observing play and recreation children (soparc) tool
Jansson (2008)[b] Sweden	Qualitative	To investigate children's viewpoints regarding local public playgrounds and their experiences of playground play in 2 distinct Swedish communities	Children without disability, *n* = 141 (ages 6–11 yr; sex NR)			•			•	• Focus group interviews • Interviews
Jansson (2010)[b] Sweden	Qualitative	To find playgrounds that, from a user's point of view, are better functioning and more attractive and to identify qualities that make them successful	Children without disability, *N* = 141 (ages 6–11 yr; sex NR)	•		•			•	• Focus group interviews • Questionnaires • Observation
Jansson (2015)[b] Sweden	Qualitative	To examine the perspectives of children on their onsite playground use and to compare the children's perspectives with those of local park workers	Children without disability, *N* = 141 (ages 6–11 yr; sex NR)			•			•	• Focus group interviews • Interviews
Jansson & Persson (2010)[b] Sweden	Qualitative	To assess the extent to which existing playground provision aligns with the identified needs	Children without disability, *N* = 141 (ages 6–11 yr; sex NR)	•		•			•	• Observation • Focus group interviews • Questionnaires

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					Located in		Urbanization			
			Children	Adults	School	Public Space	Inner City	Suburban	Rural	
		and preferences of user groups, taking into account potential variations in local contexts.								• Interview • Photographs • Geographic Information System mapping
Jansson et al. (2016) Sweden	Qualitative	To reveal the role of green spaces and their management from children's perspectives	Children without disability, *N* = 16 (ages 10–11 yr; 5 boys, 11 girls)			•			•	• Focus group interviews • Walk-along interviews • Photographs • Observations • Fieldnotes
Jeanes & Magee (2012) United Kingdom	Qualitative	To explore parents' and young people's experiences of using the new facility and whether it was considered inclusive	Children with disabilities, *N* = 19 (ages 4–12 yr; sex NR)	•	•		•			• Interviews • Focus groups
Lerstrup & van den Bosch (2017) Denmark	Qualitative	To determine suitable terminology and analytical approaches for comprehending the affordances of outdoor environments for preschool-age children	Children without disability, *N* = 49 (ages 3–6 yr; sex NR)		•				•	• Participatory observation • Field notes • Video recording
Loebach & Cox (2022) United States	Quantitative	To capture and examine the environmental features and conditions of a large natural playscape that support diverse outdoor play activities among young children	Children without disability, *N* = 693 observations (ages 0–8 yr; 406 boys, 287 girls)			•	•			Behavior mapping using tool for observing play outdoors, little risk behavior typology, and environmental interaction of

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										loose parts, fixed parts, and topographical change
Luchs & Fikus (2013) Germany	Quantitative	To explore how diverse play environments afford different forms of play in kindergarten children ages 5–6 yr	Children without disability, *N* = 59 (ages 5–6 yr; 33 boys, 26 girls)		•		•			• Systematic observation • Field notes
Lynch et al. (2020) Ireland	Qualitative	To examine the perspectives of both children and adults regarding their experiences in public parks and playgrounds and to investigate the experiences and viewpoints of local council park and playground providers concerning inclusive public parks and playgrounds	*N* = 12 (ages 3–11 yr; 5 boys, 7 girls) Children with disabilities, *n* = 5 Children without disability, *n* = 7	•		•	•			• Playground audits • Walk-and-talk observation and interviews • Semistructured interviews
Moore et al. (2021) Australia	Qualitative	To investigate the impact of features in an outdoor play space on the emotional well-being of young children	Children without disability, *N* = 6 (ages 4–5 yr; 2 boys, 4 girls)		•			•		• Conversational storytelling • Drawings, walks, photographs, collecting objects, creating maps, positioning wishing stones
Norðdahl & Einarsdóttir (2015) Iceland	Qualitative	To ascertain the preferences of children regarding outdoor activities and their surroundings in	Children without disability, *N* = 16 (ages 4–9 yr; 8 boys, 8	•	•			•		• Interviews • Walking tours

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		the outdoor school environment	girls)							
Nunma & Kanki (2022) Thailand	Mixed	To investigate the characteristics and use of playground areas under flyovers and expressways in Bangkok	Children without disability, *N* = 58 (ages 5–11 yr, sex NR)			•	•			• Field observation • Survey • Interviews
Obee et al. (2020) Norway	Qualitative	To analyze and present findings on actualized affordances for risky play	Children without disability, *N* = 38 (ages 3–5 yr; 6 boys, 5 girls, 27 sex NR)	•	•		NR			• Field observation • Field notes • Photographs • Secondary data source focused-video observation
Pitsikali & Parnell (2019) Greece	Qualitative	To make comparisons between contrasting cases but to study the typical playground population, examining a range of patterns of behavior	Children without disability (*N,* age range, and sex NR)			•	•			• Observations • Field notes • Informal discussions • Interviews
Prellwitz & Skär (2007) Sweden	Qualitative	To better understand how children with different abilities use playgrounds to engage in creative play and interact with peers	*N* = 20 (ages 7–12 yr, 11 boys, 9 girls)		•	•			•	Interviews

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Refshauge et al. (2015) Denmark	Mixed	To develop, explore, and evaluate an approach to evidence-based playground design, which can be helpful to practitioners	Children without disability, *N* = 96[e] (ages 0–12 yr; 44 boys, 52 girls) *N* = 152 observations (97 boys, 55 girls)	•		•		•		• Onsite observation • Survey
Ripat & Becker (2012) Canada	Qualitative	To gain an understanding of the experiences of playground use of children with disabilities and their caregivers and to generate ideas that would improve the usability of future playground constructions	Children with disabilities, *N* = 9 (ages 7–15 yr; 3 boys, 6 girls)	•	N/A					Interviews
Sanderud et al. (2020) Norway	Qualitative	To explore how a group of children build their understanding of themselves and their environment during playful explorations in winter landscapes	Children without disability, *N* = 20 (ages 3–6 yr; sex NR)		•			•		• Observation • Play-along • Interviews • Photographs
Sandseter et al. (2021)[c] Norway	Quantitative	To examine the relationship between outdoor play spaces and play materials for the occurrence of children's risky play	Children without disability, *N* = 86 (ages 3–6 yr; 44 boys, 42 girls)		•		NR			Systematic observation using video recording

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			Children	Adults	School	Public Space	Inner City	Suburban	Rural	
Sandseter et al. (2022)[c] Norway	Quantitative	To examine how features in children's early child-care education center outdoor environment (spaces and materials) were actualized by children for different types of play	Children without disability, *N* = 86 (ages 3–6 yr; 44 boys, 42 boys)		•		NR			Systematic observation using video recording
Sargisson & McLean (2012) New Zealand	Mixed	To assess the extent and manner in which children use natural elements when present in public playgrounds and to determine their preferences for playing on built equipment versus engaging with natural elements	*N* = 4,597 observations (ages 0–10; sex NR)			•	•	•	•	• Systematic observation • Photographs • Google Earth satellite images of 23 playgrounds
Stanton-Chapman & Schmidt (2021) United States	Mixed	To develop an in-depth understanding of children's social play behaviors on school and community playgrounds	Children without disability, *N* = 6 (ages 4–5 yr; 3 boys, 3 girls)		•	•	•			• Observation • Interviews
Stettler et al. (2022)[d] Switzerland	Qualitative	To explore the play experiences, participation, and social interaction of children with cerebral palsy in inclusive playgrounds	Children with disabilities, *N* = 5 (ages 9–12 yr; 4 boys, 1 girl)			•	NR			Secondary analysis of semistructured interviews
Truong & Mahon (2012)	Qualitative	To explore how children experience play and sense of place at the	Children without disability, *N* = 23 (ages 8–12			•	NR			• Participatory photography • Walking tours

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Thailand		Duangkae Centre	yr; 12 boys, 11 girls)							• Creation of maps • Drawings • Discussion groups
Veitch et al. (2021) Australia	Quantitative	To examine the relative importance of park features among children for influencing their choice of park for engaging in park-based physical activity	Children without disability, *N* = 252 (ages 8–12 yr; 105 boys, 147 girls)		N/A		•			Survey instrument
Veitch et al. (2020) Australia	Qualitative	To gain in-depth insights from children about park features that influence their park visitation, park-based physical activity, and social interaction using walk-along interviews in parks	Children without disability, *N* = 30 (ages 8–12; 14 boys, 16 girls)			•	•			• Parent demographic questionnaire • Walk-and-talk interview
Wenger et al. (2021)[d] Switzerland	Qualitative	To explore the experiences of children with and without disabilities of playing on inclusive playgrounds	*N* = 32 (ages 7–12 yr) Children with disabilities, *n* = 18 (16 boys, 2 girls) Children without disability, *n* = 14 (7 boys, 7 girls)			•	•	•		• Interviews • Observations

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Wishart et al. (2019) Australia	Quantitative	To investigate whether the naturalized design of the new space can offer comparable opportunities for various types of physical activity, compared with the traditional play space with its conventional equipment	Children without disability, *N* = 50 (ages 4–5 yr; sex NR)		•		•			Behavior mapping
Yates & Oates (2019) United Kingdom	Qualitative	To gather young children's insights on new play provision of 2 local playgrounds.	Children without disability, *N* = 60 (ages 6–7 yr; sex NR)			•			•	Different participatory methods (inspired by mosaic approach)

Note. Observational counts were excluded from total sample size. N/A = not applicable; NR = not reported.

[a,b,c,d]Studies with same superscript use the same dataset but different analysis. [e]Number of participants in a survey.

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Table A.6. Environmental Taxonomy of Outdoor Play Space Features (Extended Version With Supporting Literature), by Physical Environmental Categories and Functional Qualities of the Environment

Play Types (TOPO)	Play Occupations Afforded by Environment	No. of Supporting References and Citations
Open spaces are areas within or surrounding a playground characterized by *primarily flat terrain* and *mostly open, typically with ample space* between play equipment, other built structures, or natural fixed features such as trees and bushes, resulting in features being distributed rather clustered in one location. The specific surface qualities of open spaces can vary, and the affordances they offer may differ depending on the ground surface material (soft or solid surfaces; Caro et al., 2016; Czalczynska-Podolska, 2014; Pitsikali & Parnell, 2019; Sargisson & McLean, 2012). Subcategories might be grassed open spaces and open spaces with hard surfaces.		
Physical play	Running; riding, driving, skating; using wheeled devices or wheelchairs; pulling wagons; playing with brought manufactured play objects (e.g., hula hoops, kites, frisbees, balls), doing gymnastic—like handstands and backflips; jumping on floor markings; chasing games; play fetch with pet dog	18 (Aminpour, 2021; Aminpour et al., 2020; Bourke & Sargisson, 2014; Caro et al., 2016; Czalczynska-Podolska, 2014; Dyment & O'Connell, 2013; Fahy et al., 2021; Jansson, 2010; Lerstrup & van den Bosch, 2017; Lynch et al., 2020; Moore et al., 2021; Nunma & Kanki, 2022; Obee et al., 2020; Pitsikali & Parnell, 2019; Sandseter et al., 2020; Veitch et al., 2020; Wenger et al., 2021; Wishart et al., 20198)
Exploratory play	Watching objects that roll or spin, building and construction in open space	2 (Fahy et al., 2021; Jansson, 2010)
Imaginative play	Floor-is-lava play, sociodramatic play (not specified), symbolic play (not specified)	3 (Cetken-Aktas & Sevimli-Celik, 2023; Czalczynska-Podolska, 2014; Fahy et al., 2021)
Play with rules	Most often this play was some kind of ball play such as soccer, basketball, or a chasing or tag game	9 (Aminpour, 2021; Aminpour et al., 2020; Bourke & Sargisson, 2014; Cetken-Aktas & Sevimli-Celik, 2023; Czalczynska-Podolska, 2014; Dyment & O'Connell, 2013; Jansson et al., 2016; Lerstrup & van den Bosch, 2017; Sargisson & McLean, 2012)
Expressive play	Singing song games	1 (Lerstrup & van den Bosch 2017)
Digital play	NA	
Bio play	NA	
Restorative play	Sitting, standing,	6 (Dyment & O'Connell, 2013; Goodenough et al., 2021; Horton & Kraftl, 2018; Jansson et al., 2016; Moore et al., 2021; Sargisson & McLean, 2012)
Nonplay	Picnicking, walking across, transitioning to another area	4 (Aminpour, 2021; Jansson et al., 2016; Refshauge et al., 2015; Sargisson & McLean, 2012)
Others[a]	NA	
Designated sports areas are *flat areas* that afford children certain kinds of play, such as soccer, basketball, and table tennis. These sports areas are sometimes separate from the playground or close to the playground. Designated sports areas usually *provide rigid built elements* (sports equipment such as goal posts) or *visual floor markings* that are used by children for sports or other play. Sports areas can have variety of ground surfaces depending on the activity (Caro et al., 2016; Nunma & Kanki, 2022; Pitsikali & Parnell, 2019; Sandseter et al., 2020; Veitch et al., 2020).		
Physical play	Hanging on the basketball basket	1 (Caro et al., 2016)
Exploratory play	NA	

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Play Types (TOPO)	Play Occupations Afforded by Environment	No. of Supporting References and Citations
Imaginative play	NA	
Play with rules	Playing soccer, playing basketball	4 (Bourke & Sargisson, 2014; Cetken-Aktas & Sevimli-Celik, 2023; Pitsikali & Parnell, 2019; Veitch et al., 2020)
Expressive play	NA	
Digital play	NA	
Bio play	NA	
Restorative play	NA	
Nonplay	NA	
Others[a]	NA	
Paths and walkways are supporting features of the playground that are easily distinguishable by their *distinct surface transitions and clear boundaries*. They serve as *connecting elements, linking various zones* within the playground (Czalczynska-Podolska, 2014; Dyment & O'Connell, 2013; Moore et al., 2021) and providing access to play components (Ripat & Becker, 2012). Sometimes designed as a stand-alone feature that *loops around* the playground, affording running, driving, and walking in circles (Czalczynska-Podolska, 2014; Dyment & O'Connell, 2013; Moore et al., 2021; Wenger et al., 2021), and may have having different-sized elements, such as *bumps, obstacles, dips, and dikes,* affording running, driving, walking, and jumping over (Lerstrup & van den Bosch, 2017; Moore et al., 2021; Veitch et al., 2020; Wenger et al., 2021). Studies described paths and walkways as needing a *solid surface* such as pavement, wood, or concrete (Bourke & Sargisson, 2014; Moore et al., 2021; Prellwitz & Skär, 2007), sometimes described as an *accessible surface* (Prellwitz & Skär, 2007; Ripat & Becker, 2012). Rubber surfaces were disliked because they slow children's speed when driving or riding something (Wenger et al., 2021). A common environmental category that was linked to paths and walkways was manufactured tools and toys, such as driving devices (e.g. wheelchairs, bikes, scooters) used to drive on paths.		
Physical play	Riding, driving, skating with bike, scooter, trikes, skates; running	9 (Bourke & Sargisson, 2014; Czalczynska-Podolska, 2014; Dyment & O'Connell, 2013; Lerstrup & van den Bosch, 2017; Moore et al., 2021; Pitsikali & Parnell, 2019; Sandseter et al., 2020; Veitch et al., 2020; Wenger et al., 2021)
Exploratory play	NA	
Imaginative play	NA	
Play with rules	Ball play on concrete path	1 (Bourke & Sargisson, 2014)
Expressive play	NA	
Digital play	NA	
Bio play	Enjoying nature and wildlife from a path	1 (Veitch et al., 2020)
Restorative play	Sitting and observing	1 (Bourke & Sargisson, 2014)
Nonplay	Walking somewhere	2 (Bourke & Sargisson, 2014; Czalczynska-Podolska, 2014)
Others[a]	NA	
Topographic features can be identified as hills, slopes, ramps, and depressions or cliffs in the terrain. Environmental qualities of slopes and hills, such as *more or less smooth with varying degree of steepness or inclination* (Goodenough et al., 2021; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022;		

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Play Types (TOPO)	Play Occupations Afforded by Environment	No. of Supporting References and Citations
Obee et al., 2020; Wishart et al., 2019), *varying sizes or heights* (Goodenough et al., 2021; Norðdahl & Einarsdóttir, 2015), and *varying surfaces providing different textures* (e.g., artificial turf, snow with varying properties, ice, earth, grass; Goodenough et al., 2021; Jansson et al., 2016; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Sanderud et al., 2020). Play can be enhanced through *steeper* slopes and *bigger* hills (Goodenough et al., 2021; Norðdahl & Einarsdóttir, 2015; Wishart et al., 2019), as well as *weather and/or seasonal conditions* (such as rain, snow, ice, or frost making terrain more slippery or dry and crumbly; Goodenough et al., 2021; Jansson, 2010; Jansson et al., 2016; Norðdahl & Einarsdóttir, 2015; Obee et al., 2020; Sanderud et al., 2020). Five studies also pointed to hilly terrain, emphasizing *varying landscape* and *the presence of several* hills or slopes (Cetken-Aktas & Sevimli-Celik, 2023; Goodenough et al., 2021; Jansson, 2010; Jansson et al., 2016; Lerstrup & van den Bosch, 2017), and 1 study described a playground built on a sloped yard contributing to affordances of rolling objects (Fahy et al., 2021). Less commonly, topography pointed to *depressions* such as puddles and ditches (Norðdahl & Einarsdóttir, 2015), *cliffs* (Obee et al., 2020), or *human-constructed flowing water features like creeks* (Loebach & Cox, 2022).		
Physical play	Going up and/or down hills and slopes: sliding, sledding, gliding; running, climbing up, rolling themselves down, biking and driving, jumping, balancing, carrying things up, making up an own obstacle course	13 (Fahy et al., 2021; Goodenough et al., 2021; Jansson, 2010; Jansson et al., 2016; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Norðdahl & Einarsdóttir, 2015; Obee et al., 2020; Refshauge et al., 2015; Sanderud et al., 2020; Stanton-Chapman & Schmidt, 2021; Veitch et al., 2020; Wishart et al., 2019)
Exploratory play	Interest in observing and watching rolling things down a hill, making paths and footprints in snow up the hill, a space utilized to construct and built, puddles and depression in the terrain with water to build dams, manipulating floating toys in creeks	6 (Cetken-Aktas & Sevimli-Celik, 2023; Fahy et al., 2021; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Norðdahl & Einarsdóttir, 2015; Sanderud et al., 2020)
Imaginative play	Described as a space where sociodramatic play occurred (not specified)	1 (Cetken-Aktas & Sevimli-Celik, 2023)
Play with rules	Hide-and-seek games, developing own rules in a racing game, battle or war play	3 (Goodenough et al., 2021; Jansson et al., 2016; Loebach & Cox, 2022)
Expressive play	NA	
Digital play	NA	
Bio play	Hills with vegetation used to explore nature	1 (Jansson et al., 2016)
Restorative play	Observing other children's physical play, enjoying an outlook (view)	2 (Norðdahl & Einarsdóttir, 2015; Stanton-Chapman & Schmidt, 2021)
Nonplay	NA	
Others[a]	NA	
Enclosed and bounded spaces provide a *more or less clear bounded area that might be fully to partly enclosed*. Enclosed and bounded spaces are found in the natural and human-built environment. These spaces were described as *having low raised boundaries, walls* and/or *coverage* or roofs as well as *a bounded area nested between a bigger space.* Bounded qualities refer to *a subtle change in surface pattern indicating a space within a space.* Natural enclosed and bounded spaces were formed by natural features, such as low hanging trees, entrances into vegetation such as bushes, circle of trees,		

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Play Types (TOPO)	Play Occupations Afforded by Environment	No. of Supporting References and Citations
dense planting, high-grown grass, or a change in natural ground surfacing, such as a dry patch of grass (Aminpour, 2021; Goodenough et al., 2021; Jansson, 2015; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Moore et al., 2021; Norðdahl & Einarsdóttir, 2015). Human-made or -built enclosed and bounded spaces included huts, smaller spaces integrated in play structures, storage areas, forts, tree houses, nooks, niches, edges, crannies and corners, willow domes, under stairs, between low raised boundaries, between clustered benches, or semipermanent enclosures such as zip-up tents (Aminpour et al., 2020; Burke, 2012; Cetken-Aktas & Sevimli-Celik, 2023; Dyment & O'Connell, 2013; Goodenough et al., 2021; Jansson, 2015; Lerstrup & van den Bosch, 2017; Luchs & Fikus, 2013; Stettler et al., 2022). Enclosed and bounded spaces are also created by children themselves, such as building a den or fort, forming a nest in high-grown grass or simply laying out a picnic blanket in open space spaces (Aminpour, 2021; Dyment & O'Connell, 2013; Goodenough et al., 2021; Jansson, 2008, 2015; Jansson et al., 2016; Jansson & Persson, 2010; Loebach & Cox, 2022; Moore et al., 2021; Norðdahl & Einarsdóttir, 2015). Functional qualities included affordances for *seclusion and privacy or semiprivacy*, being *less supervised,* and offering a *less interrupted space* that *shields their play from others* and at the same time provides a place that children can call "their" space" for their play (Aminpour et al., 2020; Goodenough et al., 2021; Lerstrup & van den Bosch, 2017; Norðdahl & Einarsdóttir, 2015; Stettler et al., 2022). Studies described these enclosed and bounded spaces as cozy, secretive, and offering a new perspective and outlook on the surroundings (Aminpour et al., 2020; Goodenough et al., 2021; Lerstrup & van den Bosch, 2017; Norðdahl & Einarsdóttir, 2015).		
Physical play	Jumping between parallel standing benches that formed a small space, accessing small spaces by climbing in, physical play incorporated in imaginative play such as house play or superhero play	3 (Aminpour et al., 2020; Goodenough et al., 2021; Moore et al., 2021)
Exploratory play	Exploring a small space in a natural environment, such as in high grass; constructing a small space such as dens or creating a small space, such as digging a big hole, making a nest	4 (Dyment & O'Connell, 2013; Goodenough et al., 2021; Jansson, 2015; Norðdahl & Einarsdóttir, 2015)
Imaginative play	Fantasy, symbolic, and sociodramatic play that often also included loose natural parts such as playing house, playing shopping, mum and dad play, being a princess, secretive space entered by password play, monster play, witch play, superhero play, and mer-maids play; fighting invisible people	6 (Aminpour et al., 2020; Burke, 2012; Cetken-Aktas & Sevimli-Celik, 2023; Goodenough et al., 2021; Moore et al., 2021; Prellwitz & Skär, 2007)
Play with rules	Playing chase and tag in a cops-and-robbers play where a hut functions as the prison	1 (Cetken-Aktas & Sevimli-Celik, 2023)
Expressive play	Chatting with peers	2 (Hayward et al., 1974; Prellwitz & Skär, 2007)
Digital play	NA	
Bio play	NA	
Restorative play	Enjoying being inside a small space, resting in a small space that provided shade, enjoying the outlook, hid-ing in a hideout, sitting or lying in a small space	6 (Cetken-Aktas & Sevimli-Celik, 2023; Czalczynska-Podolska, 2014; Goodenough et al., 2021; Jansson, 2015; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022)
Nonplay	NA	

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Play Types (TOPO)	Play Occupations Afforded by Environment	No. of Supporting References and Citations
Others[a]	Social opportunity to sit with peers in a small space	1 (Cetken-Aktas & Sevimli-Celik, 2023)
Play equipment was the most represented environmental feature in the studies, with almost all studies referring to some kind of play equipment. Play equipment is always human-constructed and refers to stand-alone play components such as one swing or one slide but also play structures where diverse play opportunities were integrated into one bigger structure offering multiple play opportunities. Play equipment is rigid or has moving fixtures. Play equipment was importantly understood as human-constructed or -built structures that are placed intentionally on the playground. Play equipment was described as *made from different materials* such as metal, plastic, or wood but also *natural materials* such as boulders, tree stumps, or tree logs placed on the playground for the purpose of being played with (referred to as *hybrid play structures*). Another aspect of playground equipment is that it is often designed with specific play affordances, such as a climbing frame intended for climbing. However, play equipment is commonly repurposed for other affordances, such as sitting on a climbing frame (see also theme of flexible use in Morgenthaler et al., 2023).		
Physical play	Balancing, using a cable way, climbing on, crossing bridges, and balancing opportunities, crawling under, doing gymnastics, hanging on, jumping, pulling themselves up, rocking, running, throwing things on play equipment, sliding, spinning, turning, rotating, swinging, repetitive play routes, bumping into each other	41 (Birkner et al., 2021; Bourke & Sargisson, 2014; Burke, 2012; Caro et al., 2016; Cetken-Aktas & Sevimli-Celik, 2023; Chen et al., 2020; Czalczynska-Podolska, 2014; Dyment & O'Connell, 2013; Fahy et al., 2021; Goodenough et al., 2021; Hayward et al., 1974; Horton & Kraftl, 2018; James et al., 2022, 2022; Jansson, 2008, 2010, 2015; Jansson et al., 2016; Jansson & Persson, 2010; Jeanes & Magee, 2012; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Luchs & Fikus, 2013; Lynch et al., 2020; Norðdahl & Einarsdóttir, 2015; Nunma & Kanki, 2022; Obee et al., 2020; Pitsikali & Parnell, 2019; Prellwitz & Skär, 2007; Refshauge et al., 2015; Ripat & Becker, 2012; Sandseter et al., 2021; Sargisson & McLean, 2012; Stanton-Chapman & Schmidt, 2021; Stettler et al., 2022; Truong & Mahon, 2012; Veitch et al., 2020, 2021; Wenger et al., 2021; Wishart et al., 2019; Yates & Oates, 2019)
Exploratory play	Making sounds with musical instruments, filling or building on play equipment with surface material, digging under play equipment, walking barefoot over play equipment	5 (Fahy et al., 2021; James et al., 2022; Jansson, 2015; Lerstrup & van den Bosch, 2017; Refshauge et al., 2015)
Imaginative play	Sociodramatic play; slide becomes a mountain to climb, swing becomes an imaginative boat, crocodile-pulls-me-down-the-slide play	5 (Cetken-Aktas & Sevimli-Celik, 2023; Czalczynska-Podolska, 2014; James et al., 2022; Prellwitz & Skär, 2007; Stanton-Chapman & Schmidt, 2021)
Play with rules	Hide and seek, playing duck, duck, goose in circularly arranged tree stumps, playing tag on play equipment, creation of own obstacle course game that included play equipment	3 (Caro et al., 2016; Loebach & Cox, 2022; Stettler et al., 2022)
Expressive play	Conversational play, such as sitting on play equipment and chatting with known peers or friends, telling stories and jokes, laughing together, doing an artistic performance (singing or dancing) on a stage, perform	9 (Burke, 2012; Caro et al., 2016; Czalczynska-Podolska, 2014; Jansson, 2008; Jeanes & Magee, 2012; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Prellwitz & Skär, 2007; Truong & Mahon, 2012)

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Play Types (TOPO)	Play Occupations Afforded by Environment	No. of Supporting References and Citations
	risky maneuvers on play equipment	
Digital play	NA	
Bio play	Laying in hammock and observing the sky	1 (Goodenough et al., 2021)
Restorative play	Sitting or laying and resting on equipment; laying in shade by play equipment; laying in swings or hammocks; hiding by, on, or in play equipment; enjoying the view from a high point up on play equipment, such as climbing or tree houses; watching other children's play	11 (Birkner et al., 2021; Goodenough et al., 2021; Jansson, 2008, 2015; Jansson & Persson, 2010; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Obee et al., 2020; Prellwitz & Skär, 2007; Refshauge et al., 2015; Stanton-Chapman & Schmidt, 2021)
Nonplay	Walking around play equipment	2 (Czalczynska-Podolska, 2014; Stanton-Chapman & Schmidt, 2021)
Others[a]	Play equipment was used to get in proximity to other children or being close to other children (e.g., sitting together, knowing a spot that was popular to get in contact and find someone to play with, seeking peers to play with), getting social approval from peers through playing in small groups, opportunities to be with peers away from adults	7 (Bourke & Sargisson, 2014; Burke, 2012; Jansson, 2008; Jansson et al., 2016; Nunma & Kanki, 2022; Prellwitz & Skär, 2007; Veitch et al., 2020)
Themed and suggestive play features (play structures and components) afford play other than play equipment category. Play opportunities afforded by recognizable and less recognizable play structures or components on the one hand *inspire children to create play* that the *theme suggested* (Burke, 2012; Cetken-Aktas & Sevimli-Celik, 2023; Dyment & O'Connell, 2013; Loebach & Cox, 2022; Luchs & Fikus, 2013; Nunma & Kanki, 2022; Prellwitz & Skär, 2007) and on the other hand *inspire children to create an own play idea by repurposing the themed play structure or component* (Burke, 2012; Cetken-Aktas & Sevimli-Celik, 2023; Prellwitz & Skär, 2007). Either way, studies emphasized that children use themed and suggestive play features by applying their own rules within their play. Recognizable and less recognizable play structures also afford new physical challenges such as using the structure for climbing (Prellwitz & Skär, 2007; Refshauge et al., 2015). Themed and suggestive play features can also be small and enclosed spaces (Burke, 2012; Cetken-Aktas & Sevimli-Celik, 2023; Prellwitz & Skär, 2007) or small objects that are attached but movable like a wheel (Ripat & Becker, 2012)		
Physical play	Climbing on top of a themed play structure	3 (Jansson, 2008; Prellwitz & Skär, 2007; Refshauge et al., 2015)
Exploratory play	Explorative opportunities by opening, closing, sliding, turning things in playhouses to play with	2 (Czalczynska-Podolska, 2014; Ripat & Becker, 2012)
Imaginative play	Sociodramatic and fantasy play, such as soldier and enemy play, driving play by a truck shape, an attached wheel and pretending to be on a ship, princess play by a castle shape, loosely shaped playhouses affording a variety of play such as store, family, post office, bakery, school, jail, or monster and witch play	7 (Burke, 2012; Cetken-Aktas & Sevimli-Celik, 2023; Dyment & O'Connell, 2013; Luchs & Fikus, 2013; Prellwitz & Skär, 2007; Ripat & Becker, 2012; Sandseter et al., 2020)

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Play Types (TOPO)	Play Occupations Afforded by Environment	No. of Supporting References and Citations
Play with rules	Conventional games such as tag or chasing,	1 (Cetken-Aktas & Sevimli-Celik, 2023)
Expressive play	Performative play such as singing or dancing by a stage-themed play structure, making graffiti in play-houses and three houses	4 (Goodenough et al., 2021; Loebach & Cox, 2022; Luchs & Fikus, 2013; Nunma & Kanki, 2022)
Digital play	NA	
Bio play	NA	
Restorative play	Hiding in a themed play structure, enjoying being in-side somewhere and looking out	3 (Goodenough et al., 2021; Refshauge et al., 2015; Ripat & Becker, 2012)
Nonplay	NA	
Others[a]	NA	
Spaces on the edges are *areas adjoining more busy zones* on the playgrounds. These spaces might have no distinct boundary, *bordering or wrapping* around other spaces (e.g., corners, nooks, and staircases adjoining open spaces, paths and walkways, designated sports areas, play equipment, or themed and sug-gestive play features and in more naturalized spaces). These were described as *less busy, less interrupted, more quiet and still, meaning less hectic for slower play affordances* (Aminpour, 2021; Aminpour et al., 2020; Dyment & O'Connell, 2013; Loebach & Cox, 2022). Furthermore these areas where described as *being overlooked by supervising adults* (Aminpour, 2021; Aminpour et al., 2020; Lerstrup & van den Bosch, 2017; Prellwitz & Skär, 2007).		
Physical play	NA	
Exploratory play	NA	
Imaginative play	NA	
Play with rules	NA	
Expressive play	Allowing conversational play by being in a less super-vised and more private space	1 (Prellwitz & Skär, 2007)
Digital play	NA	
Bio play	NA	
Restorative play	Watching other children from a distance (e.g., by the edges of more busy areas, daydreaming, relaxing)	4 (Aminpour, 2021; Aminpour et al., 2020; Dyment & O'Connell, 2013; Loe-bach & Cox, 2022)
Nonplay	Waiting to get a turn in play	1 (Caro et al., 2016)
Others[a]	Getting together and socializing with peers	3 (Aminpour et al., 2020; Dyment & O'Connell, 2013; Prellwitz & Skär, 2007)
Features not purpose-built for play *are supporting features of the playground* that were not particularly built for the purpose of play, but children still uti-lized them for play. These features can be defined as *human built and fixed* and included fences (Caro et al., 2016; Cetken-Aktas & Sevimli-Celik, 2023; Luchs & Fikus, 2013; Norðdahl & Einarsdóttir, 2015; Nunma & Kanki, 2022; Pitsikali & Parnell, 2019), lower raised boundaries (e.g., to indicate new activity zones or as a protection around natural environments; Aminpour, 2021; Aminpour et al., 2020; Bourke & Sargisson, 2014; Wishart et al., 2019), any type of seating area with tables and/or benches (Aminpour et al., 2020; Bourke & Sargisson, 2014; Loebach & Cox, 2022; Moore et al., 2021; Prellwitz & Skär, 2007; Veitch et al., 2020), columns and poles, lamp posts (Aminpour et al., 2020; Caro et al., 2016; Fahy et al., 2021; Jansson et al., 2016), staircases (Aminpour et al., 2020; Caro et al., 2016), water fountains (Jansson et al., 2016; Sargisson & McLean, 2012), window blinds (Moore et al., 2021), and shelters (Norðdahl & Einarsdóttir, 2015).		

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Play Types (TOPO)	Play Occupations Afforded by Environment	No. of Supporting References and Citations
Physical play	Climbing on fences or poles, jumping over fences, balancing on fences, jumping on or from benches, running around supporting features	9 (Aminpour et al., 2020; Cetken-Aktas & Sevimli-Celik, 2023; Fahy et al., 2021; Moore et al., 2021; Nunma & Kanki, 2022; Pitsikali & Parnell, 2019; Refshauge et al., 2015; Sandseter et al., 2021; Wishart et al., 2019)
Exploratory play	Building and constructing steps to further climb over the fence, using the water from water fountains in play	2 (Cetken-Aktas & Sevimli-Celik, 2023; Sargisson & McLean, 2012)
Imaginative play	Incorporate low raised boundaries into their sociodramatic play (e.g., afford playing house, family; fences used to play animal in the cage).	5 (Aminpour, 2021; Aminpour et al., 2020; Moore et al., 2021; Pitsikali & Parnell, 2019; Refshauge et al., 2015)
Play with rules	Chasing play between built structures such as poles or staircases, hide-and-seek games using built environmental structures	3 (Aminpour et al., 2020; Caro et al., 2016; Jansson et al., 2016)
Expressive play	Conversational play by sitting and talking with peers on benches, tables	2 (Loebach & Cox, 2022; Prellwitz & Skär, 2007)
Digital play	NA	
Bio play	NA	
Restorative play	Resting, recovering, and observing by sitting on benches or boundaries and walls; hiding opportunities; sitting and laying	5 (Bourke & Sargisson, 2014; Caro et al., 2016; Fahy et al., 2021; Loebach & Cox, 2022; Prellwitz & Skär, 2007)
Nonplay	Eating and having picnics or barbecue	2 (Veitch et al., 2020; Wenger et al., 2021)
Others[a]	Seeking opportunities to be with peers hanging out on top of built structures	1 (Nunma & Kanki, 2022)
Manufactured tools and toys can be described as *graspable, detached,* and *portable objects.* Manufactured tools and toys were either brought to the playground from home (Czalczynska-Podolska, 2014; Lynch et al., 2020) or provided on the playground, such as when playground was on school grounds (Caro et al., 2016; Cetken-Aktas & Sevimli-Celik, 2023; Dyment & O'Connell, 2013; Obee et al., 2020; Wishart et al., 2019). Affordances of manufactured tools and toys need to be understood in relation to where they are used. For example, vehicles such as bikes, scooters, wagons, tricycles, wheelchairs, or sleds were used in combination with space affordances such as topography like hills and slope, path and walkways, or more open areas with sufficiently solid surfaces (Bourke & Sargisson, 2014; Czalczynska-Podolska, 2014; Dyment & O'Connell, 2013; Jansson et al., 2016; Lerstrup & van den Bosch, 2017; Moore et al., 2021; Norðdahl & Einarsdóttir, 2015; Obee et al., 2020; Sandseter et al., 2020, 2021; Veitch et al., 2020; Wishart et al., 2019). Similar toys such as hula hoops, plastic crates or blocks, balls, frisbees, elastics, rackets and bats, foam circles, toy boats, and disks were used in open spaces, hills, or creeks (Caro et al., 2016; Cetken-Aktas & Sevimli-Celik, 2023; Fahy et al., 2021; Loebach & Cox, 2022; Lynch et al., 2020; Norðdahl & Einarsdóttir, 2015; Nunma & Kanki, 2022; Obee et al., 2020; Pitsikali & Parnell, 2019; Sargisson & McLean, 2012; Stanton-Chapman & Schmidt, 2021; Truong & Mahon, 2012; Wenger et al., 2021; Wishart et al., 2019). Functional qualities of balls included the hardness and bounceability and functional qualities of toys needed to have some resistance to potential damage (Caro et al., 2016). Other manufactured tools and toys (such as bowls, buckets, funnels, shovels, wheelbarrow) are utilized in accordance with other material properties (sand, mud, earth, water) or loose parts (Loebach & Cox, 2022; Sargisson & McLean, 2012; Wishart et al., 2019). Furthermore, movable, rigid, and durable objects such as tires, ropes, and crates (Obee et al., 2020) are part of this		

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Play Types (TOPO)	Play Occupations Afforded by Environment	No. of Supporting References and Citations
category.		
Physical play	Jumping and skipping play using hula hoops, rubber bands, driving or riding vehicles, jumping over bumps, sledding using sleds, pulling wagons, carrying loads around, throwing, balancing on movable wood planks, chasing and hitting each other with foam blocks, ball play, play fighting and pushing each other from higher points	20 (Bourke & Sargisson, 2014; Cetken-Aktas & Sevimli-Celik, 2023; Czalczynska-Podolska, 2014; Dyment & O'Connell, 2013; Fahy et al., 2021; Hayward et al., 1974; Jansson et al., 2016; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Lynch et al., 2020; Moore et al., 2021; Norðdahl & Einarsdóttir, 2015; Nunma & Kanki, 2022; Obee et al., 2020; Pitsikali & Parnell, 2019; Sandseter et al., 2020, 2021; Veitch et al., 2020; Wenger et al., 2021; Wishart et al., 2019)
Exploratory play	Building or constructing with blocks, damming flowing water and manipulating toy boats, manipulating materials such as and and/mud, rolling discs down the hill, looking at spinning disks, stirring, hammering, transporting material around	13 (Cetken-Aktas & Sevimli-Celik, 2023; Czalczynska-Podolska, 2014; Fahy et al., 2021; Jansson et al., 2016; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Moore et al., 2021; Norðdahl & Einarsdóttir, 2015; Obee et al., 2020; Sandseter et al., 2020; Sargisson & McLean, 2012; Truong & Mahon, 2012; Wishart et al., 2019)
Imaginative play	Sociodramatic play, such as being a pilot while playing with toy boat, playing captain by a steering wheel, doll play	3 (Loebach & Cox, 2022; Lynch et al., 2020; Ripat & Becker, 2012)
Play with rules	Ball play, kicking, throwing, frisbee play	10 (Caro et al., 2016; Czalczynska-Podolska, 2014; Dyment & O'Connell, 2013; Lynch et al., 2020; Norðdahl & Einarsdóttir, 2015; Obee et al., 2020; Pitsikali & Parnell, 2019; Sargisson & McLean, 2012; Veitch et al., 2020; Wenger et al., 2021)
Expressive play	Arranging, sorting	1 (Lerstrup & van den Bosch, 2017)
Digital play	Play on cell phone or on a digital device while sitting somewhere	2 (Caro et al., 2016; Loebach & Cox, 2022)
Bio play	NA	
Restorative play	Building something to hide in	1 (Obee et al., 2020)
Nonplay	Fighting over play objects	1 (Stanton-Chapman & Schmidt, 2021)
Others[a]	Meeting friends or peers	1 (Lynch et al., 2020)
Fixed natural features is a broad category that could be described as naturalized areas and the natural features integrated *within the playground design or surrounding the playground and made available and inviting to play in, on, and with* and including any kind of vegetation, such as high-grown grass, shrubs, bushes, and bush walks or hedges but also natural elements such as trees and boulders. These environmental features were mostly described as being utilized in play and not just decorative elements of the playground. Most often a connection to trees with was found (19 studies) that described children's play *by, on, under, surrounding, or between specific trees or amounts of trees together forming a forest area* (Aminpour, 2021; Bourke & Sargisson, 2014; Caro et al., 2016; Cetken-Aktas & Sevimli-Celik, 2023; Dyment & O'Connell, 2013; Goodenough et al., 2021; Jansson, 2008, 2010, 2015; Lerstrup & van den Bosch, 2017; Norðdahl & Einarsdóttir, 2015; Obee et al., 2020; Pitsikali & Parnell, 2019; Refshauge et al., 2015; Sanderud et al., 2020; Sargisson & McLean, 2012; Veitch et al., 2020, 2021; Wenger et al., 2021; Wishart		

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Play Types (TOPO)	Play Occupations Afforded by Environment	No. of Supporting References and Citations
et al., 2019), with 12 studies play involving *bushes, shrubs, and undergrowth* (Aminpour, 2021; Aminpour et al., 2020; Caro et al., 2016; Dyment & O'Connell, 2013; Goodenough et al., 2021; Jansson, 2008; Jansson et al., 2016; Luchs & Fikus, 2013; Moore et al., 2021; Obee et al., 2020; Refshauge et al., 2015; Veitch et al., 2020; Wishart et al., 2019), 3 studies involving play in *high-grown grass* (Jansson et al., 2016; Moore et al., 2021; Norðdahl & Einarsdóttir, 2015), and 5 studies involving play with *boulders and rocks* (Dyment & O'Connell, 2013; Loebach & Cox, 2022; Sargisson & McLean, 2012; Veitch et al., 2020; Wishart et al., 2019). Regarding trees, the studies described using certain parts of the trees that were *available to and reachable* by children. These tree parts included branches, roots, stems or trunks, leaves, bark, and fallen trees that were utilized in play (Aminpour, 2021; Aminpour et al., 2020; Goodenough et al., 2021; Jansson & Persson, 2010; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022). Environmental qualities of these natural elements were *dense leaves thick undergrowth, or low-hanging canopies* (Aminpour, 2021; Moore et al., 2021), as well as *low-hanging branches* (Aminpour, 2021; Goodenough et al., 2021) or *trees grouped circularly* together (Aminpour, 2021; Jansson, 2008). Four studies found the quality of needing *many trees* (Goodenough et al., 2021; Jansson, 2010; Moore et al., 2021; Veitch et al., 2020), and tree studies point to the importance of the *maturity of trees*—"big, massive, and old" trees (Aminpour, 2021; Goodenough et al., 2021; Moore et al., 2021). Furthermore, sensory qualities included *soft textures* children wanted to touch (Aminpour, 2021; Jansson et al., 2016; Loebach & Cox, 2022) or *unique shapes* (e.g., roots) that children use in their play (Aminpour, 2021; Goodenough et al., 2021). Natural environments provided shaded areas (Aminpour, 2021; Jansson et al., 2016; Loebach & Cox, 2022), reduced temperatures (Aminpour, 2021), or cooled the air in combination with wind (Nunma & Kanki, 2022). Natural environment was described as being more at the edges or surrounding the play-ground (Jansson & Persson, 2010; Lynch et al., 2020; Norðdahl & Einarsdóttir, 2015; Refshauge et al., 2015; Sandseter et al., 2020; Veitch et al., 2021) and was described as less busy, calmer, restorative, and peaceful (Aminpour, 2021; Horton & Kraftl, 2018; Moore et al., 2021; Veitch et al., 2020). Studies pointed to the importance of natural environments not being overgrown (Aminpour, 2021; Aminpour et al., 2020; Sargisson & McLean, 2012; Veitch et al., 2020) but also not cut back too much (Jansson et al., 2016).		
Physical play	Climbing trees, boulders, shrubs, branches; balancing on roots or stumps; running along a bush walk; rolling on the forest floor; jumping off somewhere; swinging on tree branches; chasing and tag play	24 (Aminpour, 2021; Aminpour et al., 2020; Caro et al., 2016; Cetken-Aktas & Sevimli-Celik, 2023; Dyment & O'Connell, 2013; Goodenough et al., 2021; Jansson, 2008, 2015; Jansson et al., 2016; Jansson & Persson, 2010; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Moore et al., 2021; Norðdahl & Einarsdóttir, 2015; Obee et al., 2020; Pitsikali & Parnell, 2019; Refshauge et al., 2015; Sandseter et al., 2020, 2021; Sargisson & McLean, 2012; Veitch et al., 2020, 2021; Wenger et al., 2021; Wishart et al., 2019)
Exploratory play	Constructing and building, often in combination with loose parts (e.g., dens), ripping bark, touching plant materials, observing and exploring surrounding nature, natural elements such as holes in trees or wildlife, walking barefoot in forest floors, hiding and findings something, shaking and rattling twigs	14 (Aminpour, 2021; Aminpour et al., 2020; Cetken-Aktas & Sevimli-Celik, 2023; Dyment & O'Connell, 2013; Goodenough et al., 2021; Jansson, 2008, 2010; Jansson et al., 2016; Loebach & Cox, 2022; Lynch et al., 2020; Nunma & Kanki, 2022; Refshauge et al., 2015; Sanderud et al., 2020; Sandseter et al., 2020)
Imaginative play	Sociodramatic play, such as kitchen, making food, office play, house, sleeping play on a tree trunk, war	9 (Aminpour, 2021; Aminpour et al., 2020; Cetken-Aktas & Sevimli-Celik, 2023; Dyment & O'Connell, 2013; Goodenough et al., 2021; Jansson, 2008;

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Play Types (TOPO)	Play Occupations Afforded by Environment	No. of Supporting References and Citations
	battle play; fantasy play such as being a dragon, superhero play, being an animal	Jansson et al., 2016; Loebach & Cox, 2022; Moore et al., 2021)
Play with rules	Playing tag or chasing, hide and seek, ball play such as soccer (e.g., tree trunks as goal posts)	9 (Aminpour, 2021; Aminpour et al., 2020; Caro et al., 2016; Dyment & O'Connell, 2013; Jansson, 2008; Jansson et al., 2016; Loebach & Cox, 2022; Moore et al., 2021; Veitch et al., 2020)
Expressive play	Chatting with friends, singing, dancing, leaving marks like drawings, shadow play	4 (Aminpour, 2021; Goodenough et al., 2021; Jansson et al., 2016; Loebach & Cox, 2022)
Digital play	NA	
Bio play	Observing, looking for, and caring for wildlife, touching and smelling plant parts, listening to birds	7 (Goodenough et al., 2021; Horton & Kraftl, 2018; Jansson et al., 2016; Loebach & Cox, 2022; Norðdahl & Einarsdóttir, 2015; Veitch et al., 2020; Yates & Oates, 2019)
Restorative play	Enjoying an outlook (e.g., from a tree); hiding and not being seen; sunbathing; laying; sleeping; reading; resting or relaxing not specified; sitting in nature; daydreaming	10 (Aminpour, 2021; Aminpour et al., 2020; Dyment & O'Connell, 2013; Goodenough et al., 2021; Horton & Kraftl, 2018; Jansson et al., 2016; Loebach & Cox, 2022; Moore et al., 2021; Obee et al., 2020; Veitch et al., 2020)
Nonplay	Having a picnic, doing homework, walking somewhere	4 (Aminpour, 2021; Jansson et al., 2016; Loebach & Cox, 2022; Refshauge et al., 2015)
Others[a]	Being with friends, gathering with friends	2 (Aminpour, 2021; Goodenough et al., 2021)

Loose natural parts are described with qualities such as *graspable, portable, collectable (countable)* that offer some *flexibility of repurposing or shaping them into new affordance* (e.g. building a den). They include a variety of plant parts that have *different sizes and weights,* including branches, sticks, fruits, grass, leaves, wood, bark, pinecones, flowers, and others (Aminpour, 2021; Aminpour et al., 2020; Bourke & Sargisson, 2014; Caro et al., 2016; Cetken-Aktas & Sevimli-Celik, 2023; Czalczynska-Podolska, 2014; Fahy et al., 2021; Goodenough et al., 2021; Hayward et al., 1974; Horton & Kraftl, 2018; Jansson, 2010, 2015; Jansson & Persson, 2010; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Lynch et al., 2020; Norðdahl & Einarsdóttir, 2015; Nunma & Kanki, 2022; Ripat & Becker, 2012; Sandseter et al., 2020; Sargisson & McLean, 2012; Truong & Mahon, 2012; Veitch et al., 2020; Wishart et al., 2019). Additionally rocks and stones, ice chunks, and shells were included in this category (Caro et al., 2016; Cetken-Aktas & Sevimli-Celik, 2023; Jansson & Persson, 2010; Luchs & Fikus, 2013; Norðdahl & Einarsdóttir, 2015; Sanderud et al., 2020; Sargisson & McLean, 2012; Veitch et al., 2020).

The functional qualities of loose natural parts and materials include that they are more open ended and offer multiple affordances, and they can be repurposed and adopted in children's play (Aminpour, 2021; Aminpour et al., 2020; Goodenough et al., 2021; Jansson, 2010; Jansson et al., 2016; Loebach & Cox, 2022; Norðdahl & Einarsdóttir, 2015; Truong & Mahon, 2012). Loose natural parts are often first sourced and gathered (looking for, collecting, picking), then shaped and changed by children with the intention of using them in further or new affordances, often imaginative play of some type, such as "collecting sticks to constructing a den to playing house." This shows the dynamic transaction between the child and the loose natural parts and materials.
In addition, loose natural parts are utilized in conjunction with other environmental categories, such as utilizing open spaces (Cetken-Aktas & Sevimli-Celik, 2023), using loose natural parts in combination with manufactured tools and toys (Loebach & Cox, 2022; Moore et al., 2021; Wishart et al., 2019) or in combination with provided materials for play (Czalczynska-Podolska, 2014; Loebach & Cox, 2022; Norðdahl & Einarsdóttir, 2015), as well as using them with fixed natural features such as dense leafy areas, trees, and shrubs or bushes of the playground (Goodenough et al., 2021).

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Play Types (TOPO)	Play Occupations Afforded by Environment	No. of Supporting References and Citations
Physical play	Play fighting using sticks; pushing, carrying, and transporting heavy objects; picking up and throwing ice chunks, acorns, stones, snowballs; throwing leaves in air	8 (Caro et al., 2016; Fahy et al., 2021; Goodenough et al., 2021; Jansson & Persson, 2010; Lerstrup & van den Bosch, 2017; Moore et al., 2021; Sargisson & McLean, 2012; Wishart et al., 2019)
Exploratory play	Collecting; picking something; constructing and building dens, forts, dams, walls, or nests; digging for, filling holes with, and hitting ice with a stick; searching for and poking with a stick; drawing with; grinding; hiding something; stirring with something; ripping off; tearing apart; smelling flowers; tasting herbs, fruits, or ice; touching or feeling soft textures of plant materials; looking through a piece of ice	18 (Aminpour, 2021; Aminpour et al., 2020; Cetken-Aktas & Sevimli-Celik, 2023; Goodenough et al., 2021; Hayward et al., 1974; Jansson, 2010, 2015; Jansson et al., 2016; Jansson & Persson, 2010; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Lynch et al., 2020; Moore et al., 2021; Norðdahl & Einarsdóttir, 2015; Ripat & Becker, 2012; Sanderud et al., 2020; Sandseter et al., 2020; Sargisson & McLean, 2012)
Imaginative play	Playing Harry Potter with wand-sticks, play fighting using sticks as swords, making monster traps with leaves and sticks, imagining sticks as monsters, making food out of loose parts, playing selling things, playing town or village, playing war, playing eating ice cream	9 (Aminpour, 2021; Aminpour et al., 2020; Fahy et al., 2021; Goodenough et al., 2021; Loebach & Cox, 2022; Moore et al., 2021; Norðdahl & Einarsdóttir, 2015; Sanderud et al., 2020; Truong & Mahon, 2012)
Play with rules	Competing to find the biggest stick, snowball fights	2 (Caro et al., 2016; Goodenough et al., 2021)
Expressive play	Arranging patterns; sorting; drawing with charcoal or burned stick; drawing on stones or branches; playing with own shadow; writing on a piece of wood	7 (Cetken-Aktas & Sevimli-Celik, 2023; Goodenough et al., 2021; Jansson et al., 2016; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Norðdahl & Einarsdóttir, 2015; Sanderud et al., 2020)
Digital play	NA	
Bio play	Aesthetic appreciation of a piece of ice,	1 (Sanderud et al., 2020)
Restorative play	Observing and enjoying the loose natural parts, resting in cool grass, enjoying flowers and plants	3 (Goodenough et al., 2021; Loebach & Cox, 2022; Moore et al., 2021)
Nonplay	NA	
Others[a]	NA	
Wildlife-friendly habitats includes green and blue spaces (e.g., shrubs, grass, flowers, forest, ponds, creeks) close to or integrated within the play space design that provide for or attract wildlife such as insects (bugs, spiders, snails, butterflies, amphibians, reptiles, fish, bunnies, and birds (singing birds, ducks, chicken; Aminpour, 2021; Goodenough et al., 2021; Horton & Kraftl, 2018; Jansson et al., 2016; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Norðdahl & Einarsdóttir, 2015), pets (dogs; Veitch et al., 2020), or animals domestically kept in fenced-in or caged-in areas (Loebach & Cox, 2022; Norðdahl & Einarsdóttir, 2015). Examples of wildlife-friendly habitats include flowering vegetation and water features such as ponds and creeks (Aminpour, 2021; Horton & Kraftl, 2018; Jansson et al., 2016; Loebach & Cox, 2022; Norðdahl & Einarsdóttir, 2015; Veitch et al., 2020; Yates & Oates, 2019). Other functional qualities describe the size of smaller wildlife as important for children (Cetken-Aktas & Sevimli-Celik, 2023; Jansson et al., 2016;		

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Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Norðdahl & Einarsdóttir, 2015; Veitch et al., 2020). A unique functional quality of wildlife is that they move (crawl, fly, jump, swim) and make sounds (e.g., singing birds) and afford unique functional qualities of following, observing, and catching (Cetken-Aktas & Sevimli-Celik, 2023; Goodenough et al., 2021; Horton & Kraftl, 2018; Jansson et al., 2016; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Norðdahl & Einarsdóttir, 2015). Affordances around play with wildlife include manufactured tools and toys to capture, closely observe and take care of them (Lerstrup & van den Bosch, 2017; Norðdahl & Einarsdóttir, 2015).		
Physical play	Playing fetch and running with pet dog	1 (Veitch et al., 2020)
Exploratory play	Searching for, touching, following around, observing, watching, listening to, chasing animals away, catching animals, collecting animals, picking animals up	7 (Cetken-Aktas & Sevimli-Celik, 2023; Goodenough et al., 2021; Horton & Kraftl, 2018; Jansson et al., 2016; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Norðdahl & Einarsdóttir, 2015)
Imaginative play	NA	
Play with rules	NA	
Expressive play	NA	
Digital play	NA	
Bio play	Caring for, feeding, looking under objects for animals, looking for, close observation (e.g., animal behavior)	6 (Cetken-Aktas & Sevimli-Celik, 2023; Horton & Kraftl, 2018; Jansson et al., 2016; Lerstrup & van den Bosch, 2017; Norðdahl & Einarsdóttir, 2015; Veitch et al., 2020)
Restorative play	NA	
Nonplay	NA	
Others[a]	NA	
Malleable materials are *shapable, malleable, portable, and mixable.* Materials are provided ether purposefully or found in more natural areas. Purposefully provided materials are usually found in certain areas on the playground, such as sandpits, water play areas or mud kitchens, or a combination (Birkner et al., 2021; Chen et al., 2020; Czalczynska-Podolska, 2014; Dyment & O'Connell, 2013; Jansson et al., 2016; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Luchs & Fikus, 2013; Moore et al., 2021; Norðdahl & Einarsdóttir, 2015; Nunma & Kanki, 2022; Refshauge et al., 2015; Ripat & Becker, 2012; Sandseter et al., 2020; Sargisson & McLean, 2012; Truong & Mahon, 2012; Veitch et al., 2020, 2021; Wishart et al., 2019), but they can also be surface materials of different kinds such as wood chips, mulch, sand, and gravel (Aminpour et al., 2020; Jansson, 2015; Loebach & Cox, 2022; Nunma & Kanki, 2022; Sargisson & McLean, 2012; Wishart et al., 2019). Materials found in and by nature consist of earth, mud, soil, clay, sand, gravel, water, snow, frost, and tree sap (Aminpour, 2021; Aminpour et al., 2020; Caro et al., 2016; Goodenough et al., 2021; Jansson et al., 2016; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Lynch et al., 2020; Norðdahl & Einarsdóttir, 2015; Obee et al., 2020; Sanderud et al., 2020; Yates & Oates, 2019). Materials unfold their functional qualities in terms of their properties and textures. Properties of materials change their functional qualities *depending on the weather and temperature that affect* moistness, for example, sand, mud, clay, and earth are dry compared with wet or water changes from liquid to frozen (Aminpour, 2021; Aminpour et al., 2020; Caro et al., 2016; Goodenough et al., 2021; Jansson et al., 2016; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Lynch et al., 2020; Norðdahl & Einarsdóttir, 2015; Obee et al., 2020; Sanderud et al., 2020; Yates & Oates, 2019). Textures of materials afford children's exploration of their sensory qualities through touching, described as soft compared with rough, that caused "getting hurt" (Loebach & Cox, 2022; Moore et al., 2021; Ripat & Becker, 2012). Materials are often used in combination with the category of manufactured tools and toys such as funnels, buckets, bowls, shovels, small cars, figures, and		

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others (Czalczynska-Podolska, 2014; Jansson et al., 2016; Loebach & Cox, 2022; Wishart et al., 2019). Tools and toys are integrated into the playground design (Sargisson & McLean, 2012) or when used with play equipment in combination such as applying materials on slides or merry-go-rounds (Hayward et al., 1974; Jansson, 2015; Sargisson & McLean, 2012). Furthermore, 5 studies pointed to the importance of available and accessible diversity of materials, loose natural parts, and tools and toys in combination (Cetken-Aktas & Sevimli-Celik, 2023; Czalczynska-Podolska, 2014; Jansson et al., 2016; Loebach & Cox, 2022; Sargisson & McLean, 2012). Provision of these combinations afforded manipulation and shaping of the materials to make use of their properties.		
Physical play	Clambering slippery slope, scooping up and picking up materials, jumping over sandpit, skiing, sledding on snow-covered slopes, sliding down, throwing snow, transporting materials	6 (Caro et al., 2016; Jansson et al., 2016; Lerstrup & van den Bosch, 2017; Norðdahl & Einarsdóttir, 2015; Obee et al., 2020; Sanderud et al., 2020)
Exploratory play	Walking barefoot in sand, sweeping materials into mounds, building and constructing, molding, damming water, digging, extracting, filling, floating, burying, forming snow, searching for buried objects, making tracks or footprints in snow, stirring, pouring, splashing, mixing, sieving, exploring properties by touching, smearing	17 (Aminpour, 2021; Aminpour et al., 2020; Birkner et al., 2021; Cetken-Aktas & Sevimli-Celik, 2023; Czalczynska-Podolska, 2014; Dyment & O'Connell, 2013; Jansson, 2015; Jansson et al., 2016; Lerstrup & van den Bosch, 2017; Loebach & Cox, 2022; Luchs & Fikus, 2013; Lynch et al., 2020; Moore et al., 2021; Nunma & Kanki, 2022; Refshauge et al., 2015; Sanderud et al., 2020; Sargisson & McLean, 2012)
Imaginative play	Pretending making food with materials, playing house, making monster traps, playing making food/cooking, playing mum and dad, playing house, playing restaurant, playing making sand cakes	5 (Aminpour, 2021; Aminpour et al., 2020; Dyment & O'Connell, 2013; Loebach & Cox, 2022; Truong & Mahon, 2012)
Play with rules	NA	
Expressive play	Shaping snow into figures	1 (Sanderud et al., 2020)
Digital play	NA	
Bio play	Watering flowers or animals	1 (Truong & Mahon, 2012)
Restorative play	Observing and enjoying the water	1 (Loebach & Cox, 2022)
Nonplay		
Others[a]	NA	

Note. NA = not applicable; TOPO = Tool for Observing Play Outdoors.

[a]Play that was more about a social aspect. TOPO, which is designed for observation, might not capture this, so data often came from qualitative verbal accounts, thus highlighting the need for multiple methods of data gathering.

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Table A.7. Examples of Play Occupations: Forms and Environmental Functional Qualities, Associated Categories, and Supporting References

Example Play Occupation (TOPO)	Various Forms of Play Occupations	Functional Qualities of the Environment Supporting This Play Occupation	Environmental Categories Associated With Play Occupation	Supporting References
Building and constructing (exploratory play)	• Building structure for further climbing on • Constructing tepees, forts, dens, secret places • Building water dams • Constructing with sourced materials and loose natural parts • Building sandcastles, sand cakes • Stacking objects • Building a fire • Building bridges • Creating things • Making a nest • Building a train • Scooping things into mounds	• Availability of diverse graspable, portable and countable loose parts and/or malleable material (in combination) to create something or alter the physical environment to shape new play affordances • Availability of manufactured tools and toys used in building and constructing • Spaces that afford further building, such as under trees • Materials that have the right properties (e.g., snow is formable; sand, mud, or soil is moist enough) • Inspiring themed or natural environments that afford extension of building ideas (flowing water, mature trees, inviting paths into nature)	• Loose natural parts • Materials • Fixed natural features • Enclosed and bounded spaces • Manufactured tools and toys	Aminpour (2021); Aminpour et al. (2020); Cetken-Aktas & Sevimli-Celik (2023); Chen et al. (2020); Czalczynska-Podolska (2014); Dyment & O'Connell (2013); Fahy et al. (2021); Goodenough et al. (2021); James et al. (2022); Jansson (2008, 2010, 2015); Jansson et al. (2016); Lerstrup & van den Bosch (2017); Loebach & Cox (2022); Norðdahl & Einarsdóttir (2015); Obee et al. (2020); Refshauge et al. (2015); Sandseter et al. (2020); Sargisson & McLean (2012); Truong & Mahon (2012)
Resting as play (restorative play)	• Recovering • Relaxing • Sitting on (e.g., boulders) • Laying in shade or sun • Resting and chatting with friend • Staring at trees • Laying in hammock • Leaning on (e.g., poles) • Standing and observing • Quietly observing other children from the side	• Quiet spaces that afford withdrawal from busy areas often in more natural environment • Spaces that are scaled for being alone or in smaller groups of peers (swings, picnic blanket, corners, huts, cubbies, in shrubs and bushes, in high-grown grass nest) • Spaces that are overlooked by supervising adults • Spaces shaded by trees (cooling down) • Sunny spaces (sunbathing) • Grassed open spaces where children want to lay down • House-like or room-like spaces • Natural or built features that afford siting on, laying on	• Open space • Enclosed and bounded spaces • Features not purpose-built for play (e.g., seating, walls, and boundaries of varying shape and sizes) • Fixed natural features (e.g., mature trees)	Aminpour (2021); Aminpour et al. (2020); Birkner et al. (2021); Bourke & Sargisson (2014); Caro et al. (2016); Dyment & O'Connell (2013); Goodenough et al. (2021); Jansson et al. (2016); Lerstrup & van den Bosch (2017); Loebach & Cox (2022); Luchs & Fikus (2013); Moore et al. (2021); Obee et al. (2020); Pitsikali & Parnell (2019); Prellwitz & Skär (2007); Sargisson & McLean (2012);

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	• Daydreaming • Sitting in (e.g., swing) • Cooling down in the grass		• Play equipment • Spaces on the edge	Veitch et al. (2020)
Playing tag and catch (play with rules)	• Running around or after • Running and hiding • Playing tag with commonly known or agreed-on rules • Playing cops and robbers • Playing you're going to catch me • Competing with peers in catching	• Flat ground surface with no tripping hazards (such as bulky tree roots) that afford fast running • Enough space to fit the size of a group engaging in tag play • Natural or built features surrounded by an open area—play anchors (a mature tree with soft bark perceived as a safe haven in a catch-me play accessible from all sides, a dry patch of worn-out grass, a play hut perceived as a jail where caught peers would be locked in) • At least two children but typically a small group up to bigger groups	• Open space • Features not purpose-built for play • Fixed natural features • Themed and suggestive play features • Malleable materials • Fixed natural features	Aminpour (2021); Aminpour et al. (2020); Cetken-Aktas & Sevimli-Celik (2023); Czalczynska-Podolska (2014); Dyment & O'Connell (2013); Fahy et al. (2021); Jansson et al. (2016); Obee et al. (2020); Stanton-Chapman & Schmidt (2021); Truong & Mahon (2012); Veitch et al. (2020); Wenger et al. (2021)
Playing domestic scenarios (imaginative play)	• Playing house • Playing family • Playing mum and dad • Playing making food or cooking	• Available mud kitchen or sand play area with material, loose natural parts, and containers • Enclosures and bound spaces providing house-like or room-like qualities, such as tree canopies that hang lower to the ground, circular arranged trees, play huts, themed and suggestive play features repurposed (e.g., a ship-themed play structure) • Unique and novel natural features such as mature old trees with bulky roots • Often played when several children get together (such as small groups of children) • Siting opportunities (human constructed or natural fixed features)	• Loose natural parts • Materials • Fixed natural features • Enclosed and bounded spaces • Themed and suggestive play features • Manufactured tools and toys • Features not purpose-built for play	Aminpour (2021); Aminpour et al. (2020); Cetken-Aktas & Sevimli-Celik (2023); Fahy et al. (2021); Loebach & Cox (2022); Prellwitz & Skär (2007); Ripat & Becker (2012); Stanton-Chapman & Schmidt (2021); Truong & Mahon (2012)
Play with wildlife (bio play)	• Searching for (bugs), finding • Following • Catching and capturing • Picking up or collecting and gathering several of the same animal • Closely observing	• Natural features that attract animals and form a habitat for animals (e.g., trees for birds, flowering plants for bugs and birds, water features for fish and birds); children indicate knowing where to find the animals • Movement of animals representing a unique quality children utilize when they watch, follow, search, catch, capture, and pick up animals • Containers used to capture animals, observe them closely,	• Wildlife-friendly habitats • Loose natural parts • Open space • Fixed natural features • Manufactured tools and toys	Aminpour (2021); Cetken-Aktas & Sevimli-Celik (2023); Goodenough et al. (2021); Horton & Kraftl (2018); Jansson et al. (2016); Lerstrup & van den Bosch (2017); Loebach & Cox (2022); Norðdahl & Einarsdóttir (2015); Veitch et al. (2020);

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	• Watching • Learning about • Touching and petting • Listening to (birds) • Caring for • Feeding ducks • Chasing away • Playing fetch with pet dog	and take care of them by feeding or giving water • A natural environment with natural features that is quieter, affording active observation, listening to animals • Children often talk about smaller animals, including butterflies, bugs, birds, fish, and other • Grassy open space affording engagement with pet dogs		Yates & Oates (2019)

Note. TOPO = Tool for Observing Play Outdoors.

*TOPO compact version (Loebach and Cox, 2021) was used to organize the play affordances

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