

ORIGINAL ARTICLE

Educators' perceptions about outdoor play affordances for solitary, parallel, and cooperative play

Lori Guerrero¹  | Kristi Gaines²  | Malinda J. Colwell^{2,3} |
 Debajyoti Pati² | Charles Klein^{2,4}

¹Consumer and Design Sciences, Auburn University, Auburn, Alabama, USA

²Design, Texas Tech University, Lubbock, Texas, USA

³Human Development and Family Sciences, Texas Tech University, Lubbock, Texas, USA

⁴Landscape Architecture, Texas Tech University, Lubbock, Texas, USA

Correspondence

Lori Guerrero, Auburn University, 1309 Gatewood Dr. Apt 1704, Auburn, AL 36830, USA.
 Email: lori.guerrero@auburn.edu

Abstract

Grounded in the Theory of Affordances, this exploratory study examined the afforded behaviors of play in outdoor play environments. Although studies have extensively examined affordances for physical development, this study contributes to the lesser-published topic of designing spaces that foster socioemotional development in young children. A survey utilized heat map images and open-ended questions to collect qualitative data from 44 early childhood educators at campus children's centers. The data were analyzed using Strauss' three-step coding method, resulting in the confirmation of four of Kytta's affordances for sociality and the proposal of additional affordances for solitary, parallel, and cooperative play.

KEYWORDS

design, emotional domain, nature, playground, social domain

INTRODUCTION

The time children play outdoors is reducing every generation due to societal and technological trends such as increased technology (Burdette & Whitaker, 2005), more busy parents working outside of the home (Bundy et al., 2011), worries about sun exposure (Black et al., 2001), and beliefs about allergies and illnesses (Kelton Research, 2010). The reduction of outdoor play may put children's well-being at risk since the literature suggests that outdoor play is one indicator of childhood well-being (e.g., Carr et al., 2017; Cosco et al., 2010; Dankiw et al., 2020; Gorrell et al., 2024). Although most studies have focused on the physical benefits of outdoor play, literature also emphasizes the positive impact on all developmental domains (e.g. Dadvand et al., 2018; Dennis et al., 2014; Fjørtoft et al., 2009; Wells & Lekies, 2006). This study explores the lesser-published relationship between outdoor play environments and the social and emotional domains by identifying affordances for solitary, parallel, and cooperative play.

Socioemotional well-being is imperative as it leads to positive peer relationships, which may indicate success in school (Coplan et al., 2001). Alternatively, socioemotional maladjustment

may lead to loneliness, anger, and violence in children (Hartup, 1996). Socioemotionally, children may engage in richer imaginative, symbolic, and creative play in nature when compared to indoor environments (Björger, 2016; Cosco, 2006; Dennis et al., 2014; Drown & Christensen, 2014; Herrington, 2006; Miller et al., 2022; Watts, 2022). Outdoor play has been positively associated with social skills, while television and video games have been negatively correlated to social skills (Hinkley et al., 2018); it is suggested that outdoor play may foster social development because it offers children opportunities to observe and practice social skills (Aasen et al., 2009; Dowdell et al., 2011; Tremblay et al., 2015). Successful outdoor spaces may provide opportunities for socializing, assist in developing self-expression, and encourage joining a community (Al et al., 2012).

LITERATURE REVIEW

The large body of literature affirms the importance of outdoor play for children's well-being, but studies have yet to uncover which aspects of outdoor play environments support socioemotional development. Understanding the affordances that promote diverse play is critical knowledge for designers, educators, and administrators when designing and implementing enriched play environments, which are intentionally designed spaces that provide developmental opportunities for the whole child. In order to examine play affordances, it is first imperative to understand the role of play in socioemotional development, as well as the Theory of Affordance.

Social play in early childhood

The important role of play in socioemotional development has been emphasized by human development theorists since the early 1900s (Parten, 1932; Piaget, 1954; Vygotsky, 1933). The development of social play is critical for children's socioemotional well-being such as the ability to manage issues with disagreements and bullying, as well as the ability to advocate with adults such as teachers (Perren et al., 2012). It is suggested that the social competence of young children may be enhanced with high-quality social pretend play, which may improve the quality of peer relationships (Jaggy et al., 2023). Active physical play in groups has also been shown to complement social play, leading to advanced social skills in children (Feleghi et al., 2023).

The definition and categorization of social play was first explored by Parten in 1932. Parten categorized play into six developmentally sequential stages: (1) unoccupied, (2) solitary, (3) onlooker, (4) parallel, (5) associative, and (6) cooperative. In the time since Parten developed her stages of play, critics have challenged her belief that these stages are separate and sequential (Burger, 1995; Lloyd & Howe, 2003; Moore et al., 1974; Robinson et al., 2003; Smith, 1978). These critics claim that there is little empirical data to support them.

A study by Smith (1978) provides empirical evidence that there is more fluidity of movement between the types of play than Parten found, and children often do not move sequentially through Parten's six stages of play. Smith's study also suggests simplifying Parten's stages into three classifications: solitary, parallel, and cooperative play. Solitary play absorbs unoccupied and onlooker play, parallel play remains a separate stage, and cooperative play includes associative play. This study uses Smith's simplified classification of play (solitary, parallel, and cooperative) and recognizes that children may flow back and forth between the types of play instead of following a sequential path. Although this study focuses on the social factors of solitary, parallel, and cooperative play, it also recognizes that the social aspect of play is only one characteristic of many when studying the three stages of play.

Parten (1932) considered solitary play as nonsocial play, as it is indicated by no social participation between children (Luckey & Fabes, 2005), but solitary play is a critical stage on the social play continuum. Although past literature has identified nonsocial play as a predictor for socioemotional maladjustment, other literature explores a diverse range of positive aspects of solitary play. Solitary play is age-appropriate between the ages of 2–5 years old, and solitary constructive play is associated with positive self-regulation (Eisenberg & Fabes, 1992; Katz & Buchholz, 1999), adjustment to changes (Larson, 1990), and less social pressure (Burger, 1995).

Unlike solitary play, parallel play is considered social play; more closely associated with cooperative play than solitary play (Parten, 1932; Roper & Hinde, 1978). This type of play is indicated by low levels of social participation where children play next to each other but not in cooperation with one another. Parallel play requires two or more children in close proximity (Clifford, 1998) where play is often influenced by another child, but tasks are not accomplished by working and playing together (Fischer & Lazerson, 1984).

The development of cooperative play begins during the second year of a child's life, however there is some disagreement of the age when mature cooperative play emerges (Brownell et al., 2002; Brownell & Carriger, 1990; Eckerman & Whitehead, 1999). According to Parten (1932), cooperative play is the most mature stage of play occurring in children aged 4 and older, while Barbu et al. (2011) observe mature cooperative play as early as 3 years old. Brownell et al. state, "Between 18 and 24 months of age, children begin to engage in unique, non-ritualized, cooperative interactions with peers (agemates), and this development appears to be universal" (Brownell et al., 2002, p. 28). Although research shows that cooperative play typically emerges during the second year of life and matures between 3- to 4 years old, neurodiversities and other differences may impact children's social play.

Cooperative play is indicated by high levels of social engagement between children during play (Parten, 1932). Studies have shown that cooperative play may support the development of emotional regulation (Bretherton, 1989), social relationships (Eckerman et al., 1996), communication skills (Howes et al., 1991), and perspective-taking abilities such as understanding other's emotions (Piaget, 1954; Vygotsky, 1933). Cooperative play may be crucial to the development of empathy through shared experiences, sharing altered emotional realities, and disclosing emotions and mental states verbally to peers (Brownell et al., 2002). Larson (1990) stresses that it is not the quantity of social play that matters, but the quality of social play that is important.

THEORY OF AFFORDANCE

To understand how built environments impact the quality of play, this study utilized an affordance lens to explore the relationship between the built environment and children's participation in solitary, parallel, and cooperative play. Gibson began theorizing the concept of affordances in 1966 when he studied the reciprocal relationship between perception and behavior; the theory has been influential in environmental psychology and environmental design since its introduction in 1979. He coined the noun affordance to describe the actions provided to the occupant by the surrounding environment (Gibson, 1979). For example, a chair typically affords sitting, but it could also potentially afford climbing up, standing on, sliding off, hiding behind or under, tipping it over, as well as many other less typical affordances. The study of children's affordances in outdoor spaces focused on physical activities (e.g. Fjortoft, 2001; Heft, 1988) until 2002 when Kytta suggested affordances for sociality: affords role-playing, affords playing rule games, affords playing home, affords playing war, affords being noisy, and affords following/sharing adult's businesses.

In addition to suggesting social affordances, Kyttä (2002) also expanded upon Gibson's theory by categorizing types of affordances: potential and actualized. Potential affordances are the affordances available in the environment that are not perceived by the occupant. Actualized affordances are subdivided into perceived, utilized, and shaped. Perceived affordances are understood by the occupant, but the occupant chooses not to engage in the affordance. Once the occupant acts upon an affordance, it can either be utilized or shaped. Utilized describes affordances that are acted upon, while shaped affordances refer to the occupant not only acting upon the affordance but also changing the environment or object, which may lead to altering the type of affordances available. This study focuses on children's utilized affordances of social play.

This theory-driven exploration acknowledges the positive impact of outdoor play on children's well-being (e.g. Benfield et al., 2015; Dankiw et al., 2020; Gorrell et al., 2024; Kaplan, 1993; Tremblay et al., 2015; Ulrich, 1984) and aims to further examine the affordances of the physical environment that influence play. In addition to the quality of the play itself, the environment supporting it is equally important. Studies demonstrate that rich, quality play may occur more often in natural play environments than in manufactured play environments (Björger, 2016; Cosco, 2006; Drown & Christensen, 2014; Hand et al., 2017; Herrington & Lesmeister, 2006; Miller et al., 2022; Watts, 2022). Although this study does not assess the quality of the outdoor play environments offered to the participants in the survey, the play environments were selected by the researchers as possible examples of quality environments. It is important to clarify that this study's focus is not to assess the quality of the built environment or other qualities of play outside of the social characteristics but to identify affordances of the physical space that afford solitary, parallel, and cooperative play.

Current study

This exploratory study investigated early childhood educators' (ECEs) beliefs about affordances for three types of play: (1) solitary play, (2) parallel play, and (3) cooperative play. The research questions guiding the study were: (1) *Which outdoor play settings do early childhood educators believe afford higher proportions of solitary, parallel, and cooperative play, which are important for socioemotional well-being?* and (2) *What particular features of the outdoor play settings do early childhood educators believe afford solitary, parallel, and cooperative play?* The aim was to learn which affordances of the independent variables (attributes of the physical environment) impacted the dependent variables (solitary, parallel, and cooperative play).

METHODS

A survey collected qualitative data with heat maps, photographs, and open-ended questions. The data were analyzed with Strass' three-step coding method to reveal a list of affordances for each type of play. This study was approved by the Texas Tech University Institutional Review Board. The findings reported here are from one part of a larger study that utilized a 3-part survey. The part of the study's survey included in this manuscript focused on qualitative data extracted from heat map images and open-ended questions. The parts of the survey not included in this manuscript utilized a quantitative ranking of the play settings to understand settings that afford the three types of play, and a repertory grid technique with open-ended questions to collect qualitative data about the particular features of the built environment that impact the play affordances.

Population and sample

The target population included early childhood educators (ECEs) who work at campus children's centers in the United States of America. The participants were recruited using the National Coalition of Campus Children's Centers' (N4C) listserv, which includes 538 members ($N=538$). The researcher was a member of the N4C with open access to the listserv and emailed an invitation to participate in a survey. Participants were qualified for inclusion with the first question that also collected consent. The inclusion criteria required the participants to be at least 18 years of age and an early childhood educator at a campus children's center. The survey response rate was 23% (125/538) and the completion rate was 35% with 44 participants who consented and completed the survey ($n=44$; 44/125).

Research instrument

The survey was researcher-created and informed by *Internet, Phone, Mail, and Mixed Mode Surveys: The Tailored Design Method* (Dillman et al., 2014). It was approved by an expert reviewer and 10 conveniently sampled ECEs who participated in a pilot study. The survey showed the participating ECEs one image (Figure 1) of an outdoor play space and prompted the participant to "Select the place that you believe affords solitary play the most." When the ECE clicked on a space in the image, the location of the click was recorded to populate a heat map image for the researcher to utilize during the analysis. The following open-ended question asked, "Why do you believe the place you clicked affords solitary play the most?" Next, the ECE was shown a second image (Figure 2) of an outdoor play environment and asked to provide the same two steps of data collection. The participants went through the same process for all three types of play.

The images (Figures 1 and 2) were selected from a catalog of over 1000 images taken during site visits to outdoor play environments across the United States, plus the exploration of digital



FIGURE 1 Environment 1.



FIGURE 2 Environment 2.

images available on the internet. The use of both images was approved by the owner of the intellectual property. The images were selected to show a wide variety of play settings across the two images. The survey's images of Environment 1 and 2 were viewed at a similar size to this manuscript as they fit the entire width of the internet browser window.

The survey collected qualitative data in a sequential order of 1) heat maps and 2) open-ended questions. Heat mapping in Qualtrics provided a visual representation of the areas clicked for each type of play. Red areas represent a high number of clicks in the same location, while blue areas represent a low number of clicks in the same location. Areas that were not clicked are not colored. The number of clicks is quantifiable; although the heat maps in this study were used as a visual prompting technique, they were not quantitatively analyzed. The heat maps were visual examples that connected the specific setting with the descriptions of why ECEs believed these spaces afforded the type of play. For example, [Figure 3](#) indicates two orange spots that the participants believed afforded higher proportions of solitary play: (1) the loose parts tray sitting on a stump and (2) the gardening/digging area at the back. The answers to the open-ended questions that followed the heat map images provided the data for the qualitative coding analysis and were essential to uncover unknown themes in this exploratory study.

Research data analysis plan

The data analysis utilized the three steps of qualitative coding defined by Strauss in [1987](#): open, axial, and selective. Strauss' coding aims to look for similarities and differences within the data guided by the researcher's judgment and reasoning. Data of similar ideas are organized into categories such as themes and concepts. Next, the themes and concepts are analyzed to determine if there are links or absences of links between the themes. Rather than reducing the qualitative data to a numerical form, Strauss' qualitative coding demonstrates a close connection to the raw data in a nominal format.

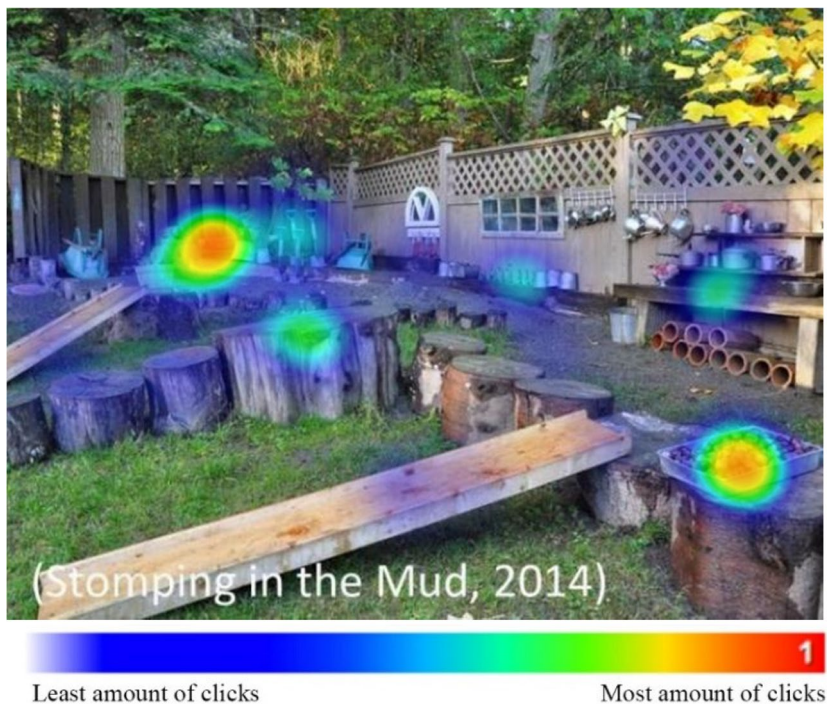


FIGURE 3 Heat map of environment 1 delineating the areas that ECEs believed afforded higher proportions of solitary play.

RESULTS

The 44 ECEs self-reported the state where they are currently working, which resulted in representation of 32% of the states in the United States (16/50; [Table 1](#)). In order for the respondents to be included in the study, they had to complete every question. One respondent chose to not disclose the state in which they work.

The analysis of the early childhood educators' (ECEs') responses reveals four overarching themes of 11 affordances for solitary play, four overarching themes of 11 affordances for parallel play, and two overarching themes of 12 affordances for cooperative play. There is one additional theme that was consistent across the three types of play that acknowledges that a child's stage of development and interest may be more influential than the physical environment. It is well-established that a child's personal development and freedom of choice are the largest factors determining the type of play in which a child engages. Since this theme is applicable to all three types of play, it is not included in the axial and selective coding processes. [Table 2](#) lists the open coding results across solitary, parallel, and cooperative play. The subsequent paragraphs discuss the axial and selective coding results for each type of play individually.

Solitary play

The results from the first heat map ([Figure 3](#)) show that ECEs believe the loose parts tray on the stump and the gardening/digging area at the back of the play space afford the highest proportions of solitary play. Fewer respondents selected the mud kitchen (also a loose parts play setting), structures for gross motor development, and the mirror area adjacent to the fence. The second heat map ([Figure 4](#)) depicts one large red-orange spot, which indicates more agreement

TABLE 1 Geographical location of the survey respondents.

State (alphabetically ordered)	Number of ECE respondents who completed every question in the corresponding state	Percentage of ECE respondents who completed every question in the corresponding state (%)
Arizona	1	2.2
California	8	18.2
Florida	3	6.8
Illinois	2	4.5
Indiana	3	6.8
Iowa	1	2.2
Kentucky	3	6.8
Massachusetts	2	4.5
Minnesota	1	2.2
Missouri	2	4.5
New Jersey	1	2.2
New York	1	2.2
Oregon	2	4.5
Texas	9	20.5
Washington	3	6.8
Wisconsin	1	2.2
Undisclosed	1	2.2

TABLE 2 A comparison table of the open coding results for each type of play.

Type of play affordances	Solitary play	Parallel play	Cooperative play
Open coding results that ECEs believe afford the corresponding type of play	Seclusion	Success does not require cooperation	Type of activity
	Type of activity	Adequate space for more than one child	Conversation
	Type of materials	Adequate materials available	Dramatic play
	Limited space	Object orientation	Role-taking
	Limited number of available materials	Side-by-side body orientation	Competition
	Enclosed/cozy spaces	Visibility/onlooking	Games/rules
	Object orientation	Type of activity	Requires more than one child to complete
	Flexibility in the child's body position	Limited interaction	Building
	Quiet spaces	Taking turns	A variety of ample materials
	Pique interest/exploration	Copying/imitating	Large/open spaces
	Settings that promote high amounts of focus	Attract others to join	Teamwork Working towards a common goal

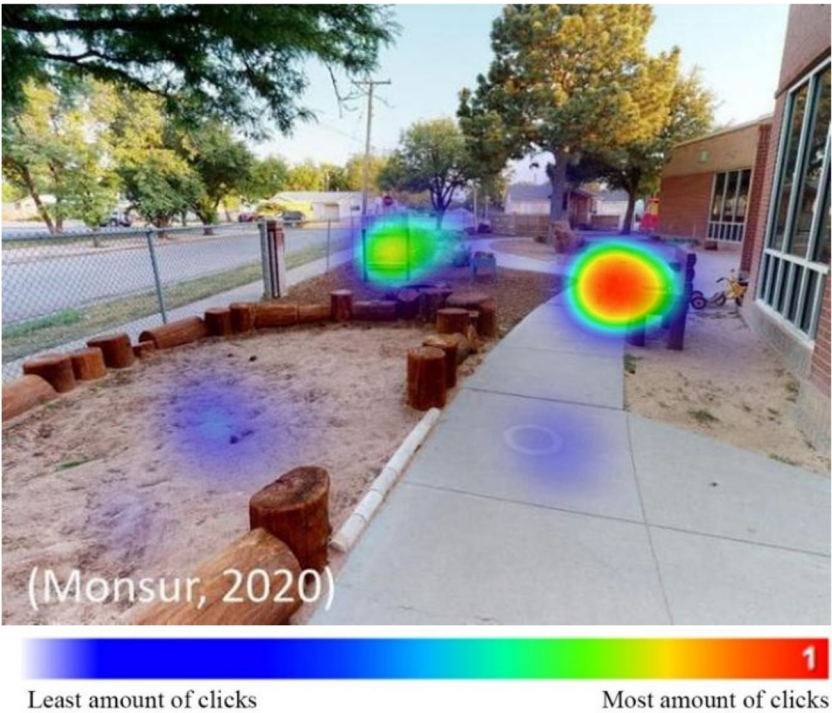


FIGURE 4 Heat map of environment 2 delineating the areas that ECEs believe afford higher proportions of solitary play.

among the respondents as compared to Figure 3. The participants believe that in Figure 4, the tricycle on the looping pathway affords the highest proportions of solitary play. The answers to the open-ended questions that followed the heat map images reveal the ECEs' reasoning as to why the loose parts tray, gardening/digging area, and the tricycle on the looping pathway afford solitary play. The ECEs' beliefs regarding these affordances are represented in the open coding analysis below.

Axial coding

Axial coding showed that four categories embody the 11 themes for solitary play: *location*, *prepared environment*, *crowd control*, and *emphasis*. *Location* encompasses secluded, quiet, and enclosed/cozy spaces. *Prepared environment* covers the type of activity, type of materials, and the child's body orientation. *Crowd control* refers to limited materials and space. *Emphasis* includes object orientation, piques interest/exploration, and the level of focus.

Selective coding

Five cases of raw data were selected to illustrate the solitary play themes revealed in the open coding process. The following respondent's answer exhibits the theme *enclosed/cozy spaces afford solitary play* as she refers to a space along the perimeter of the play space that is enclosed. She also describes the theme *type of activity* as she describes sitting and playing alone. Lastly, she describes the settings that allow *flexibility in their body position* affords solitary play as an

important factor in solitary play. “This space is along the fence in a semi-enclosed area where a child could either sit and play on their own, facing out and watching others, or turning their back and focusing on their own play.” Another strong example of describing *secluded* and *enclosed/cozy spaces* that afford solitary play is:

Area is out of the main traffic, surrounded by low bushes that give the impression of safety and coziness. Not likely to draw crowds of other children, so it gives a personal space for a child who wishes to be alone.

The following example describes how *objects to become orientated with* affords solitary play may increase solitary play if the child becomes more focused on the objects and less on socializing.

This involves a child interacting and engaging with objects in his or her environment. This can be done through the child's own thought process and does not need to include his or her peers.

An additional response emphasizes how *limited space* affords solitary play. This response also explains how the physical design of a play space is not the only factor determining whether or not a child decides to play solitarily or collaboratively. This supports the theme *a child's stage of development and interest may be more influential than the physical environment*.

The spacing in the area seems to encourage one child to engage in the activity. However, children may choose to cooperate based on their age and desire to be with other children.

This last quote was selected to demonstrate the themes of solitary play, which refers to the *type of materials* and settings that *pique interest/exploration*, *secluded type of activity* (wandering) and the last theme that reminds us that the type of play a child decides to engage in is also dependent on the child's development and will: *a child's stage of development and interest may be more influential than the physical environment*.

There is an access to open-ended materials—soil, rock—that would pique exploration. It's off to the side which may appeal to some children. A child could wander along this level or choose the garden bed or the grassy area below. The buckets might be used to collect. It's hard to predict how a space is used, but this is certainly rich enough that it affords kinds of play.

Parallel play

The heat map results demonstrate that the participants overwhelmingly agreed that the loose parts at the mud kitchen afford the highest proportions of parallel play (Figure 5).

The second heat map (Figure 6) shows the areas in the second outdoor play environment that the ECEs believed afforded parallel play: (1) sand play, (2) nature art, and (3) tricycle on a looping pathway.

Axial coding

The links between the themes of parallel play generated four categories that reflect the 11 open coding themes: *physical environment*, *promoted behavior*, *noncritical behavior*, and *emphasis*.



FIGURE 5 Heat map of environment 1 delineating the areas that ECEs believed afforded higher proportions of parallel play.

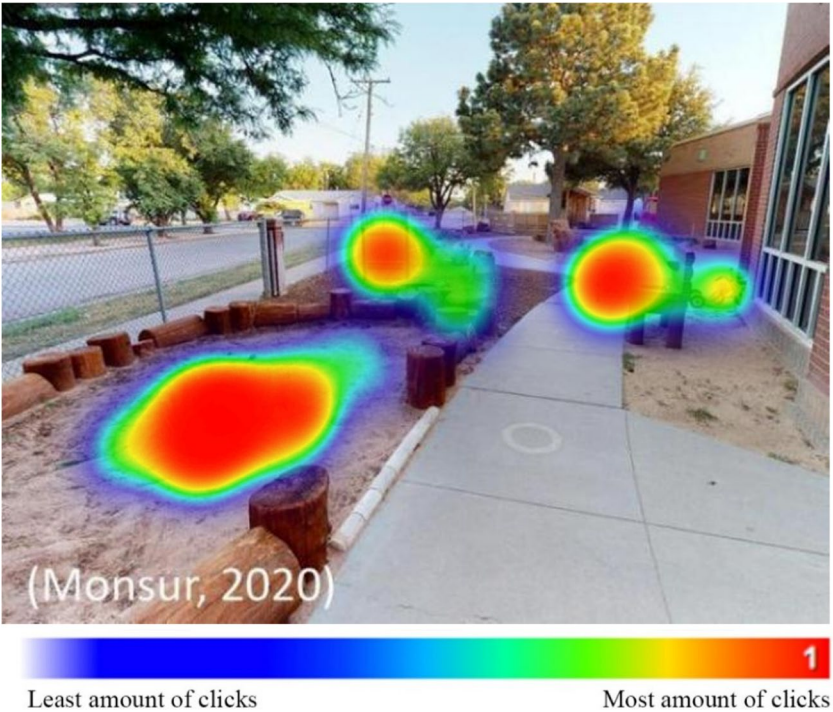


FIGURE 6 Heat map of environment 2 delineating the areas that ECEs believed afforded higher proportions of parallel play.

Physical environment includes visibility/onlooking, the amount of materials, space for more than one child, and the child's body orientation. *Promoted behavior* encompasses taking turns, copying/imitating, and the type of activity. *Noncritical behavior* refers to behaviors that are not needed or not critical for parallel play such as interaction and cooperation. *Emphasis* describes object orientation and attracting others to join.

Selective coding

Six cases of raw data were selected to illustrate the parallel play themes revealed in the open coding process. The following example represents the themes *settings where success does not require cooperation*, affords parallel play, and *adequate materials available* afford solitary play. It also demonstrates the overarching theme that *a child's stage of development and interest may be more influential than the physical environment* when she says it is also dependent on the child's desire and will to engage in the type of play and the settings that will afford it.

Engaging materials that can be used successfully without assistance or input from playmates. Multiple materials that are the same so less temptation to grab from each other, which prompts interaction. Children in this space are not necessarily seeking to be away from business.

This respondent refers to the theme *adequate materials available* explaining the importance of providing enough materials of the same type; and an additional theme *adequate space for more than one child*. "There is a space for more than one child to be side by side and all who play have access to the same type of materials as those next to them in the space." The following answer highlights that settings that provide *visibility/onlooking* may encourage copying/imitating and therefore may afford higher proportions of parallel play. "Children can watch what another is doing in a somewhat open space and follow suit. Like climbing across stumps." This participant's response reinforces the themes *adequate space for more than one child*, *adequate materials available*, and *side-by-side body orientation*.

The sand area would allow for children to be in the same location side by side. The arrangement of the toys would promote the style of play and interaction. Teachers create the environment by being thoughtful about the arrangement of the equipment.

The following quote illustrates the themes *adequate materials available*, settings where *success does not require cooperation*, and activities where *limited interaction* is needed. "Looking through rocks ... 2 children can do that together ... parallel play. They don't really need to interact or talk or engage, just look through the rocks side by side." This statement explains the themes *side-by-side body orientation* and *objects to become oriented with* afford parallel play. "Opportunity to be next to one another without facing one another. Engaging with the object next to peers while remaining engaged in their own pursuit."

Cooperative play

The results from the first heat map (Figure 7) depict two equally dispersed orange spots that indicate that the loose parts at the mud kitchen and the garden/digging setting afford the highest proportions of cooperative play.

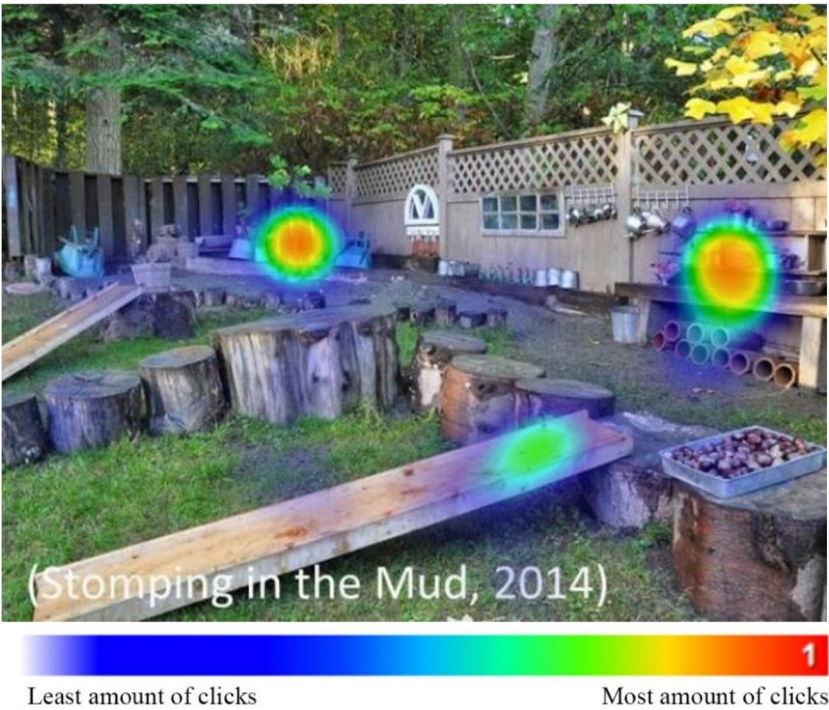


FIGURE 7 Heat map of environment 1 delineating the areas that ECEs believed afforded higher proportions of cooperative play.

The second heat map (Figure 8) depicts two equally dispersed red spots that indicate that the tricycle on the looping pathway and the playhouse afford the highest proportions of cooperative play.

Axial coding

The cooperative play affordances cluster into two categories that embody the 12 themes: *promoted behavior* and *prepared environment*. *Promoted behavior* describes the behaviors promoted by the affordances, such as conversation, building, role-taking, teamwork, dramatic play, competition, and games/rules. The *prepared environment* refers to aspects of the play setting that are design characteristics prepared by the ECEs or designer, such as an activity that requires more than one child to complete, multiple materials being provided, the type of activity, the space being large/open, and the children working towards a common goal. It is suggested that *an activity that requires more than one child to complete*, or the children *working towards a common goal*, could be considered a promoted behavior, but it can also be encouraged by aspects of the prepared environment that require the children to work together to be successful. Therefore, the theme was categorized as prepared environment.

Selective coding

This step selected seven strong examples of cooperative play data that illustrate the themes developed during open coding. These two examples describe *activities that require more than*

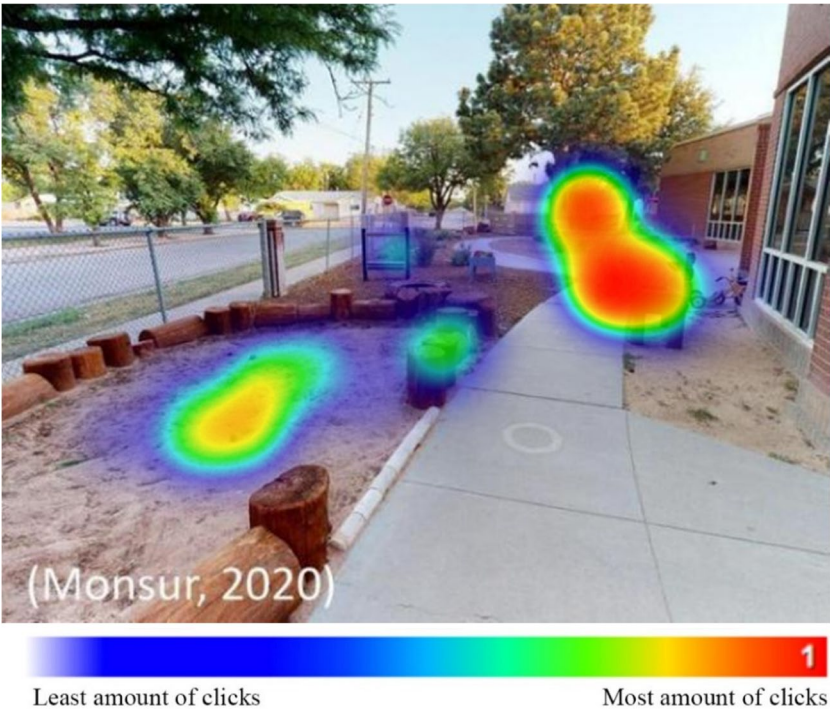


FIGURE 8 Heat map of environment 2 delineating the areas that ECEs believed afforded higher proportions of cooperative play.

one child to complete. “A wheelbarrow can be difficult to manage and often takes 2 to work it creating a wonderful opportunity to see cooperative play.” In addition to *activities that require more than one child to complete*, this second quote explains *building* as a behavior that leads to cooperative play.

We are lucky enough to have some cut logs on our playground. Moving them to different locations requires effort and cooperation. They rarely stay in the first place they are moved to. Adjusting them and aligning boards just right is almost always done through cooperation.

This respondent describes a setting that promotes *conversation*, *games/rules*, and *dramatic play*. “Using the large motor/climbing space would require more communication between children, “rule” making, and inspire imaginative play.” The following response about the mud kitchen highlights two themes in the prepared environment category: *a variety of ample materials* and *largel open space*. “This area affords lots of materials and space for children to play, create and play.” These two respondents explain how settings that promote *competition* afford cooperative play. “The ramps invite cooperation and competition. One child at the top dropping the wooden ball and one at the bottom catching or two children dropping balls to see whose ball goes fastest or furthest.” “Riding bikes children may compete on who is the fastest, or go in different directions around the sidewalk etc.”

Another quote illustrates behaviors that promote cooperative play, such as *dramatic play*, *games/rules*, *role-taking*, and *conversation*. “This looks like a climbing area of a playhouse which would inspire imaginative play, “rule” making and “role” taking, and communication between children.” This last comment describes a setting where boards are placed across the

tree stumps as ramps to create structures for gross motor development. It explains activities that *require more than one child to complete* and *games/rules*.

Benches allow for children to walk down the plank, hold a peer's hand for support and to turn the action of walking up and down into a game. Again, teachers facilitate the learning by establishing the rules of play. Providing equipment and non-verbal and verbal clues.

DISCUSSION

It is well-established by the disciplines of environmental psychology and design that the physical environment impacts the behavior of its occupants. Understanding the affordances that are critical for socioemotional development is important knowledge when designing intentionally enriched play spaces. The aim of this study was to expand on Kyttä's (2002) affordances for sociality. The researchers suggest that sociality is comparable to social play, in which Parten categorized parallel and cooperative play as social play (1932). This study revealed 29 affordances for social play to be compared to Kyttä's (2002) six affordances for sociality. This section discusses a comparison between this study's findings and Kyttä's (2002) affordances for sociality, as well as a cross-comparison of the affordances for solitary, parallel, and cooperative play within the current study's findings.

A comparison to Kyttä's affordances for sociality

The results of this study found similarities to Kyttä's six affordances for sociality. Four of the six affordances were confirmed by this current study: (1) affords role-playing, (2) affords playing rule games, (3) affords playing home, and (4) affords playing war. It is suggested that Kyttä's "affords role playing," "affords playing home," and "affords playing war" is encompassed in this study's finding "affords dramatic play," and Kyttä's "affords playing rule games" is the same as this study's "affords games/rules." Coincidentally, Larrea et al. (2019) also observed affordances for role-playing and rule-based play in their 2019 study. Two of Kyttä's affordances for sociality were not confirmed by this study: (1) affords being noisy and (2) affords following/sharing adult's businesses. If sociality is compared to parallel and cooperative play as the literature suggests (Parten, 1932), the findings of this study offer additional affordances for sociality. Enriched play spaces should afford conversation, competition, building, teamwork/working towards a common goal, observing a peer, taking turns, copying/imitating, and attracting more than one child to the setting.

This study also offers possible affordances for solitary play, which is not considered social play but is equally important for socioemotional well-being. When designing settings for solitary play, it is imperative to consider the location of the play setting, the ECEs' preparation of the environment, crowd control, and emphasis. The six affordances for solitary play are: (1) affords seclusion, (2) affords being enclosed, (3) affords orienting with an object, (4) affords quiet, (5) affords exploring, and (6) affords focusing.

A comparison between the findings of affordances for solitary, parallel, and cooperative play

As established previously, solitary play is considered nonsocial play, while parallel and cooperative play are considered social. Interestingly, the affordances for solitary and

parallel play resulted in more overlapping themes when compared to the affordances for cooperative play because solitary and parallel play affordances were focused on the physical environment, while cooperative play affordances were behavior-based. This section identifies and discusses the similarities and differences in affordances across the three types of play.

Privacy

The educators reported that spaces that afford solitary play are more private, secluded, quiet, cozy, and enclosed when compared to spaces that afford parallel play, which allow visibility, onlooking, copying, imitating, and attracting others to join. When designing an enriched outdoor play space, it is important to create private areas with lower visibility and public areas with high visibility to provide affordances for both solitary and parallel play. When focusing solely on sociality, public spaces that are more visible and attract others to join the play afford parallel and cooperative play.

Quantity and type of materials/manipulatives

This physical design attribute was described as important for all three types of play. The educators revealed that a limited number of materials/manipulatives afford higher proportions of solitary play, while adequate materials afford parallel play, and ample materials afford cooperative play. These results are expected since the quantity of materials/manipulatives does create a moderation of the number of children that can participate in a play setting. Areas that accommodate smaller numbers of children due to fewer manipulatives would provide more opportunities for solitary play, whereas play settings that accommodate a larger number of children would provide more opportunities for collaborative and cooperative play. It is suggested that this attribute is flexible and dynamic. It could be continuously changed by educators to mediate the type of play afforded.

Size of the physical space

Educators report that smaller play spaces that can accommodate fewer children afford solitary play, while larger play spaces that accommodate more children afford parallel and cooperative play. It is assumed that this concept is similar to the reasoning behind the quantity of materials/manipulatives, since larger spaces accommodate more children, which would provide more opportunities for collaborative and cooperative play.

Object orientation

According to the participating educators, play settings that afford object orientation promote solitary and parallel play. Object orientation is when the child's interest is piqued by an object rather than a person. The child becomes fascinated by the object, which leaves little room for engaging with another person. The educators suggest that orienting with an object can be done solitarily or with two children side by side in parallel play.

Cooperative behaviors

As discussed previously, the educators revealed that the affordances for cooperative play focused heavily on the play behaviors of the children and minimally on the relationship between the physical environment and play affordances. For example, the educators stated that play spaces that afford conversation, dramatic play, role-taking, competition, games/rules, building, and teamwork afford cooperative play. The educators did not suggest which physical environment characteristics would afford these particular play behaviors.

LIMITATIONS AND IMPLICATIONS

The open-ended questions which followed the heat map were essential to uncover unknown themes in this exploratory study. Although it is necessary to allow the respondents to answer the questions freely without the influence of a set of provided answers (Dillman et al., 2014), a weakness of the open-ended questions is the difficulty and increased work to answer. Respondents are more likely to skip open-ended questions; this lower response rate may lead to bias in the data set (Dillman et al., 2014). The low response (23%, 125/538) and completion (35%, 44/125) rates may indicate self-selection. This self-selection is also shown in the number of states represented in the respondents (32%, Table 1). In order to be included in the study, all questions must be answered. If more respondents had completed 100% of the survey, more states would have been represented in the data. Due to the small sample of this study and limited representation of the United States, further studies are needed to confirm whether or not the proposed affordances for solitary, parallel, and cooperative play are generalizable to the population. Additionally, the population may not be an accurate representation of all ECEs in the US because some campus children's centers have a research-focused mission, which may or may not be representative of a community childcare center.

This exploratory study began with six affordances of sociality developed by Kyttä in 2002. Although many of her affordances generally refer to social play types such as dramatic play, role-playing, or games with rules, Kyttä's affordances were not specifically applied to the different stages of play. Dramatic play, role-playing, or games with rules are often associated with one stage of play: cooperative. If an educator or designer relied solely on Kyttä's affordances for sociality, it is probable that solitary and parallel play may not be supported by the environmental affordances. This study identified social play affordances linked to specific stages of social play, which, if used as a guide for the design of outdoor play spaces, may provide more inclusive affordances for all stages of social play.

Unfortunately, the ECEs' responses did not describe the specific features of a play space that afford the behavior-based affordances this study revealed for cooperative play: conversation, dramatic play, role-taking, competition, games/rules, building, and teamwork afford cooperative play. Additional studies are needed to understand the characteristics of the built environment that afford these cooperative behaviors. It is proposed that if cross-disciplinary focus groups with educators and designers were provided the aforementioned behavior-based affordances, they may ideate possible environmental features and solutions that may afford the behaviors. Behavior observations of children actively participating in these cooperative behaviors may also illuminate the physical design features that afford conversation, dramatic play, and the other behaviors revealed in this study. Lastly, an additional study with a broader participant pool of educators representing all 50 states may provide more generalizable findings across the U.S. Once these missing pieces are developed, a taxonomy of affordances for social play could be developed to guide the implementation of research-based outdoor play environments in childcare centers across the U.S., which has the potential to improve the social play

experiences of the 59% of American children in childcare outside of the home (National Center for Education Statistics, 2019).

CONCLUSION

Designers of children's spaces and educators have the responsibility to promote children's well-being, learning, and development. This study aimed to provide designers and educators with a list of affordances that may promote solitary, parallel, and cooperative play which are important for socioemotional development. As literature continues to emphasize that children are experiencing reduced exposure to nature, that time outdoors is beneficial to children's health and well-being, and that naturalized play environments promote richer play, it becomes increasingly important to progress past generalized constructs such as "exposure to nature benefits children's development." Studies like this one offer evidence for practitioners to apply to outdoor play spaces to provide the largest impact on children's well-being.

AUTHOR CONTRIBUTIONS

Lori Guerrero (first author) contributed to the writing, editing, and revising of all sections of the paper, as well as contributing to research methods, participant recruitment, instrument design, data collection, and data analysis. Kristi Gaines (second author) contributed as an advisor and reviewer to the literature review, research methods, data analysis, and revisions to the final manuscript. Malinda Colwell (third author) contributed as an advisor and reviewer to the literature review, research methods, data analysis, and revisions to the final manuscript. Debajyoti Pati (fourth author) contributed as an advisor and reviewer to the research design and revisions to the final manuscript. Charles Klein (fifth author) contributed as an advisor and reviewer to the research design.

FUNDING INFORMATION

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article.

CONFLICT OF INTEREST STATEMENT

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

DATA AVAILABILITY STATEMENT

The data to replicate all analyses are available from the authors upon request.

ORCID

Lori Guerrero  <https://orcid.org/0000-0002-3274-9214>

Kristi Gaines  <https://orcid.org/0000-0003-3327-2654>

REFERENCES

- Aasen, W., Grindheim, L. T., & Waters, J. (2009). The outdoor environment as a site for children's participation, meaning-making and democratic learning: Examples from Norwegian kindergartens. *Education 3-13*, 37(1), 5–13.
- Al, S., Sari, R. M., & Kahya, N. C. (2012). A different perspective on education: Montessori and Montessori school architecture. *Procedia - Social and Behavioral Sciences*, 46, 1866–1871.
- Barbu, S., Cabanes, G., & Le Maner-Idrissi, G. (2011). Boys and girls on the playground: Sex differences in social development are not stable across early childhood. *PLoS One*, 6(1), e16407.
- Benfield, J., Rainbolt, G., Bell, P., & Donovan, G. (2015). Classrooms with nature views: Evidence of differing student perceptions and behaviors. *Environment and Behavior*, 47(2), 140–157.

- Björge, K. (2016). Physical activity in light of affordances in outdoor environments: Qualitative observation studies of 3–5 years olds in kindergarten. *Springerplus*, 5(1), 950.
- Black, C., Grise, K., Heitmeyer, J., & Readdick, C. A. (2001). Sun protection: Knowledge, attitude, and perceived behavior of parents and observed dress of preschool children. *Family and Consumer Sciences Research Journal*, 30(1), 93–109. <https://doi.org/10.1177/1077727X01301005>
- Bretherton, I. (1989). Pretense: The form and function of make-believe play. *Developmental Review*, 9, 383–401.
- Brownell, C. A., & Carriger, M. S. (1990). Changes in cooperation and self-other differentiation during the second year. *Child Development*, 61(4), 1164–1174.
- Brownell, C. A., Zerwas, S., & Balaram, G. (2002). Peers, cooperative play, and the development of empathy in children. *Behavioral and Brain Sciences*, 25(1), 28–29.
- Bundy, A., Naughton, G., Tranter, P., Wyver, S., Baur, L., Schiller, W., Bauman, A., Engelen, L., Ragen, J., Luckett, T., Niehues, A., & Brentnall, J. (2011). The Sydney playground project: Popping the bubblewrap—Unleashing the power of play: A cluster randomized se children's physical activity and social skills. *BMC Public Health*, 11, 680.
- Burdette, H., & Whitaker, R. (2005). A national study of neighborhood safety, outdoor play, television viewing, and obesity in preschool children. *Pediatrics*, 116(3), 657–662.
- Burger, J. (1995). Individual differences in preference for solitude. *Journal of Research in Personality*, 29, 85–108.
- Carr, V., Brown, R. D., Schlembach, S., & Kochanowski, L. (2017). Nature by design: Landscape affordances support the use of executive function in preschoolers. *Children, Youth and Environments*, 27(2), 25–46.
- Clifford, R. (1998). Beyond parallel play. From our president. *Young Children*, 53(1), 2.
- Coplan, R. J., Wichmann, C., & Lagacé-Séguin, D. G. (2001). Solitary-active play behavior: A marker variable for maladjustment in the preschool? *Journal of Research in Childhood Education*, 15(2), 164–172.
- Cosco, N. (2006). *Motivation to move: Physical activity affordances in preschool play areas*. (Doctoral Dissertation). School of Landscape Architecture, Edinburgh College of Art.
- Cosco, N. G., Moore, R. C., & Islam, M. Z. (2010). Behavior mapping: A method for linking preschool physical activity and outdoor design. *Medicine and Science in Sports and Exercise*, 42(3), 513–519.
- Dadvand, P., Pujol, J., Macià, D., Martínez-Vilavella, G., Blanco-Hinojo, L., Mortamais, M., Alvarez-Pedrerol, M., Fenoll, R., Esnaola, M., Dalmau-Bueno, A., López-Vicente, M., Basagaña, X., Jerrett, M., Nieuwenhuijsen, M. J., & Sunyer, J. (2018). The association between lifelong greenspace exposure and 3-dimensional brain magnetic resonance imaging in Barcelona schoolchildren. *Environmental Health Perspectives*, 126(2), 027012.
- Dankiw, K. A., Tsiros, M. D., Baldock, K. L., & Kumar, S. (2020). The impacts of unstructured nature play on health in early childhood development: A systematic review. *PLoS One*, 15, e0229006.
- Dennis, S. F., Wells, A., & Bishop, C. (2014). A post-occupancy study of nature-based outdoor classrooms in early childhood education. *Children Youth and Environments*, 24(2), 35–52.
- Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: The tailored design method*. John Wiley & Sons.
- Dowdell, K., Gray, T., & Malone, K. (2011). Nature and its influence on children's outdoor play. *Australian Journal of Outdoor Education*, 15(2), 24–35.
- Drown, K. K. C., & Christensen, K. M. (2014). Dramatic play affordances of natural and manufactured outdoor settings for preschool-aged children. *Children, Youth and Environments*, 24(2), 53–77.
- Eckerman, C. O., & Whitehead, H. (1999). How Toddlers Peers Generate Coordinated Action: A Cross-Cultural Exploration. *Early Education and Development*, 10(3), 241–266.
- Eckerman, N., Fabes, R. A., Murphy, B., Karbon, M., Smith, M., & Maszak, P. (1996). The relations of children's dispositional empathy-related responding to their emotionality, regulation, and social functioning. *Developmental Psychology*, 32, 195–209.
- Eisenberg, N., & Fabes, R. (1992). Emotion, regulation, and the development of social competence. In M. S. Clark (Ed.), *Emotion and social behavior* (pp. 119–150). Sage.
- Felehi, S., Abedansadeh, R., & Saemi, E. (2023). 'Let them play' the effect of active play on motor proficiency and social maturity of children. *Early Child Development and Care*, 193(2), 201–210.
- Fischer, K. W., & Lazerson, A. (1984). *Human development: From conception through adolescence*. Freeman.
- Fjortoft, I. (2001). The natural environment as a playground for children: The impact of outdoor play activities in pre-primary school children. *Early Childhood Education Journal*, 29(2), 111–117. <https://doi.org/10.1023/A:1012576913074>
- Fjortoft, I., Kristoffersen, B., & Safeie, J. (2009). Children in schoolyards: Tracking movement patterns and physical activity in schoolyards using global positioning system and heart rate monitoring. *Landscape and Urban Planning*, 93(9), 1580–1586.
- Gibson, J. (1979). *The ecological approach to visual perception*. Houghton Mifflin.
- Gorrell, L., Shen, X., MacDonald, M., Logan, S. W., Hatfield, B. E., Parkinson, C., D'Antonio, A., & Massey, W. (2024). The effect of outdoor play, physical activity, and screen time use on the emotional wellbeing of children and youth during a health crisis. *Leisure Sciences*, 1–18. <https://doi.org/10.1080/01490400.2024.2335930>

- Hand, K., Freeman, C., Seddon, P., Recio, M., Stein, A., & Van Heezik, Y. (2017). The importance of urban gardens in supporting children's biophilia. *Proceedings of the National Academy of Sciences of the United States of America*, 114(2), 274–279.
- Hartup, W. W. (1996). The company they keep: Friendships and their developmental significance. *Child Development*, 67, 1–13.
- Heft, H. (1988). Affordances of children's environments: A functional approach to environmental description. *Children's Environments Quarterly*, 5(3), 29–37.
- Herrington, S. (2006). The design of landscapes at child-care centres: Seven Cs. *Landscape Research*, 31, 1–52.
- Herrington, S., & Lesmeister, C. (2006). The design of landscapes at child-care centres: Seven Cs. *Landscape Research*, 31(1), 63–82.
- Hinkley, T., Brown, H., Carson, V., & Teychenne, M. (2018). Cross sectional associations of screen time and outdoor play with social skills in preschool children. *PLoS One*, 13(4), E0193700.
- Howes, C., Unger, O. A., & Matheson, C. (Eds.). (1991). *The collaborative construction of pretend*. State University of New York (SUNY) Press.
- Jaggy, A.-K., Kalkusch, I., Bossi, C. B., Weiss, B., Sticca, F., & Perren, S. (2023). The impact of social pretend play on preschoolers' social development: Results of an experimental study. *Early Childhood Research Quarterly*, 64, 13–25.
- Kaplan, R. (1993). The role of nature in the context of the workplace. *Landscape and Urban Planning*, 26, 193–201.
- Katz, J., & Buchholz, E. (1999). "I did it myself": The necessity of solo play for preschoolers. *Early Child Development and Care*, 155, 39–50.
- Kelton Research. (2010). 82% of Parents Restrict Playtime Activities for Children With Asthma; Allergy Season Causes Nearly Half of These Parents to Limit Outdoor Play; Working Parents of Children With Asthma Take More Precautions and Visited Hospitals More Often in 2009 Than Non-Working Parents, According to New Data. *PR Newswire*. <https://www.prnewswire.com/news-releases/82-of-parents-restrict-playtime-activities-for-children-with-asthma-allergy-season-causes-nearly-half-of-these-parents-to-limit-outdoor-play-92296324.html>
- Kyttä, M. (2002). Affordances of children's environments in the context of cities, small towns, suburbs and rural villages in Finland and Belarus. *Journal of Environmental Psychology*, 22(1–2), 109–123.
- Larrea, I., Muela, A., Miranda, N., & Barandiaran, A. (2019). Children's social play and affordance availability in preschool outdoor environments. *European Early Childhood Education Research Journal*, 27(2), 185–194.
- Larson, R. (1990). The solitary side of life: An examination of the time people spend alone from childhood to old age. *Developmental Review*, 10, 155–183.
- Lloyd, B., & Howe, N. (2003). Solitary play and convergent and divergent thinking skills in preschool children. *Early Childhood Research Quarterly*, 18, 22–41.
- Luckey, A., & Fabes, J. (2005). Understanding nonsocial play in early childhood. *Early Childhood Education Journal*, 33(2), 67–72.
- Miller, N. C., Kumar, S., Pearce, K. L., & Baldock, K. L. (2022). Primary school educators' perspectives and experiences of nature-based play and learning and its benefits, barriers, and enablers: A qualitative descriptive study. *International Journal of Environmental Research and Public Health*, 19(6), 3179.
- Monsur, M. (2020). Covenant Child Development Center 05212020_1 05132.
- Moore, N. V., Evertson, C. M., & Brophy, J. E. (1974). Solitary play: Some functional reconsiderations. *Developmental Psychology*, 10(6), 830–834.
- National Center for Education Statistics. (2019). Fast facts: Childcare. IES>NCES. <https://nces.ed.gov/fastfacts/display.asp?id=4>
- Parten, M. (1932). Social participation among pre-school children. *The Journal of Abnormal and Social Psychology*, 27, 243–269.
- Perren, S., Forrester-Knauss, C., & Alsaker, F. D. (2012). Self- and other-oriented social skills: Differential associations with children's mental health and bullying roles. *Journal for Educational Research Online*, 4(1), 99–123.
- Piaget, J. (1954). *The construction of reality in the child*. Basic Books.
- Robinson, C. C., Anderson, G. T., Porter, C. L., Hart, C. H., & Wouden-Miller, M. (2003). Sequential transition patterns of preschoolers' social interactions during child-initiated play: Is parallel-aware play a bidirectional bridge to other play states? *Early Childhood Research Quarterly*, 18(1), 3–21.
- Roper, R., & Hinde, R. (1978). Social behavior in a play group: Consistency and complexity. *Child Development*, 49, 570–579.
- Smith, P. K. (1978). A longitudinal study of social participation in preschool children: Solitary and parallel play reexamined. *Developmental Psychology*, 14(5), 517–523.
- Stomping in the Mud. (2014, November). Month end snapshots—September/October 2014. <http://stompinginthemud.blogspot.com/2014/11/month-end-snapshots-september-october.html>
- Strauss, A. (1987). *Qualitative analysis for social scientists*. Cambridge University Press.
- Tremblay, M. S., Gray, C., Babcock, S., Barnes, J., Bradstreet, C. C., Carr, D., Chabot, G., Choquette, L., Chorney, D., Collyer, C., Herrington, S., Janson, K., Janssen, I., Larouche, R., Pickett, W., Power, M., Sandseter, E., Simon,

- B., & Brussoni, M. (2015). Position statement on active outdoor play. *International Journal of Environmental Research and Public Health*, 12(6), 6475–6505.
- Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science*, 224, 420–421.
- Vygotsky, L. S. (1933). The role of play in development. In M. Cole, V. John-Steiner, S. Scribner, & E. Souberman (Eds.), *Mind in society: The development of higher psychological processes* (pp. 92–104). Harvard University Press.
- Watts, D. J. (2022). Manufactured vs nature: Affecting children's playtime engagement in a preschool playground. *International Journal of Play*, 11(3), 251–269.
- Wells, N. M., & Lekies, K. S. (2006). Nature and the life course: Pathways from childhood nature experiences to adult environmentalism. *Children, Youth and Environments*, 16(1), 1–24.

How to cite this article: Guerrero, L., Gaines, K., Colwell, M. J., Pati, D., & Klein, C. (2025). Educators' perceptions about outdoor play affordances for solitary, parallel, and cooperative play. *Family and Consumer Sciences Research Journal*, 54, e70026. <https://doi.org/10.1002/fcsr.70026>