Young children’s preferences: What stimulates children’s cognitive play in outdoor preschools?

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Zahra Zamani
Clemson University, USA

Abstract
A number of studies have identified childcare environments as significant resources for children’s development, learning through play, and contact with nature. However, there is a lack of knowledge about how, from a child’s perspective, specific outdoor physical environments in preschools stimulate children’s cognitive play. Emphasizing on the value of listening to children, this study reports the perspectives of 22, 4- to 5-year-olds. The study context was an outdoor preschool with natural, mixed, and manufactured settings. A combination of photo preferences and semi-structured interviews was used to investigate children’s perception of preferred settings and cognitive plays. The results identified that children mainly enjoyed functional and dramatic play. They mostly preferred mixed behavior settings that incorporated ranges of natural and manufactured elements. Compared to other settings, children found mixed settings provided the most opportunities for functional, constructive, dramatic, and game with rules play. The outcomes of this study have implications for the design of outdoor preschools, suggesting a balanced integration of nature with manufactured play features to enhance cognitive play experiences.

Keywords
behavior setting, manufactured setting, mixed setting, natural setting, outdoor preschool, photo preference, young children

Introduction
Play is a significant means to strengthen and outline patterns of problem solving, language, memory, creativity, and social-emotional development (Burdette and Whitaker, 2005). Natural environment’s variable and less constraining qualities provide complex play opportunities for children, encouraging them to move, engage in risk-taking behavior, make decisions, and solve problems (Bilton, 2010; Burdette and Whitaker, 2005; Kuh et al., 2013; Maynard et al., 2013; Ouvry, 2003).
These studies, taken together, suggest that children benefit from playing in nature, as the biodiversity of natural environments provides a variety of seasonal changes and natural play props that stimulate creativity and inventiveness (Fjørtoft, 2000; Nicholson, 1971).

Nevertheless, young children living in urban environments are more supervised and have limited access to outdoors, and therefore limited contact with nature (Ridgers et al., 2012). Most children in the United States under 5 years old spend their awake time in community institutions, such as preschools, while parents are at work (Moore and Cosco, 2010). Consequently, outdoor preschools can be valuable resources that provide daily opportunities for children’s learning, exploration, construction, and problem invention and solving (Maynard and Waters, 2007; Ouvry, 2003). Despite these advances, the physical environment of many outdoor preschool environments lacks opportunities for engagement and learning.

A further question, therefore, is whether combining natural features in outdoor preschools supports diverse ranges of cognitive play. Cognition is a complex concept, usually referring to knowledge of the physical world or particular skills (Goswami, 2014). Previous studies point out that combining outdoor preschools with nature enhances prospects of challenging, complex, and interactive play (Fjørtoft and Sageie, 2000; Moore and Wong, 1997) that helps developing children’s cognitive abilities (Bronfenbrenner, 1993; Fjørtoft, 2004). However, most outdoor preschools are not inspiring for ranges of cognitive play behaviors, lacking direct access to natural features supportive of complex interactions.

Rather than making design decisions based on mere observations, parental report, or teachers’ accounts, little is known about children’s perspective on an enjoyable outdoor play environment. Involving children in design decisions empowers them, as they perceive themselves as individuals within a community with a right of expression (Cele, 2006). However, limited data are available on the views of young children about their outdoor preschool settings, specifically those younger than school age (Clark and Moss, 2001).

While it may be challenging to communicate with younger children, Clark (2005) suggests that children of varying skills can all share their opinions through multisensory means of communication. Applying a method that does not rely on verbal communications helps children explain important facets of their daily lives (Einarsdottir, 2005). Consequently, the use of photographs during interviews of young children may overcome some communication obstacles (Harper, 2002). Clearly, there are many aspects in children’s play environments that deserve to be investigated more thoroughly, from a child’s perspective. This article examines children’s opinion on the cognitive play opportunities of existing outdoor preschool components. Rubin (2001) classifies cognitive play behaviors as follows:

1. **Functional.** It involves simple or repetitive motor behavior, such as jumping, climbing, and so on.
2. **Constructive.** This behavior happens when children manipulate and shape an already familiar material with a direct goal in mind.
3. **Exploratory.** This behavior is identified when children examine the qualities of objects to gather visual data about physical features.
4. **Dramatic.** This behavior occurs when children play the role of someone, engage in a pretend activity with an object or someone, or assign life to an inanimate object.
5. **Games with rules.** This behavior is identified when children employ a sense of competence with peers while creating regulations for games.

In this article, the concept of behavior settings is employed as a unit of analysis that divides the outdoor preschool into its functional components. Behavior settings are ecological units that link the built environment and behavior for evaluating design policies (Barker, 1976; Cosco et al.,
2010; Moore and Cosco, 2010). Cosco (2006) defines behavior settings into natural, mixed, and manufactured categories. These categories are defined as follows:

1. **Natural.** Natural settings are mostly composed of organic materials in their original configuration (water, boulders, sand, trees, shrubs, etc.). Natural settings stimulate children’s imagination while allowing them to experience all their senses and interpret the natural world (Moore and Wong, 1997; Tranter and Malone, 2004). Previous studies suggest that natural settings promote exploratory and dramatic play (Fjørtoft and Sageie, 2000; Lester and Maudsley, 2007; Moore and Cosco, 2010; Tai et al., 2006).

2. **Mixed.** These environmental-behavior units encompass a balanced proportion of natural and manufactured elements (pathway, sand-climber, etc.). Numerous studies have explored the association between children’s play behaviors and mixed settings. For instance, Herington and Studtmann (1998) investigated how incorporating natural elements in traditional playgrounds encourage children’s play behavior. In another study, Cosco (2006) found that mixed settings offer diverse play behaviors and opportunities to change the surroundings.

3. **Manufactured.** According to Cosco (2006), manufactured settings are purposefully fabricated and mostly include fixed and synthetic elements (play equipment, shade structures, etc.). Manufactured settings provide mostly functional and challenging opportunities for children (Moore and Wong, 1997).

In conclusion, the behavior setting concept contributes in understanding children’s environmental-behavior preferences within their outdoor preschool.

**Methodology**

**Research aim and questions**

This study adds a new dimension to available work by engaging and reporting children’s accounts about their diverse outdoor preschool. Using the concept of behavior setting as the unit of analysis, the outdoor preschool is sub-divided into its functional components which enables comparison. Children’s explanations and choices for natural, mixed, and manufactured settings are gathered using data from photo preferences and interviews. These outcomes may have design and pedagogical implications by suggesting the incorporation of particular settings in outdoor preschools that encourage cognitive play behaviors.

The following questions were addressed during photo selection:

1. What is the most preferred category of behavior setting?
2. Which cognitive play behaviors do children enjoy in selected settings?
3. Are young children’s photo choices reliable?

Addressing these questions provides valuable knowledge in terms of cognitive play behaviors that young children enjoy and the behavior settings that offer these opportunities.

**Site selection**

Consulting with Robin Moore and Nilda Cosco as experts in the field of nature-play, 20 existing outdoor learning environments in North Carolina were evaluated for their diversity in behavior.
settings. Natural Learning Initiative (NLI) had designed or transformed these sites into outdoor learning environments that focus on children’s development and contact with nature. Outdoor preschools were compared based on the number and proportions of mixed, natural, and manufactured behavior settings. The study aimed for a site that had plenty and comparatively balanced types of behavior settings, with children’s direct access. While many outdoor preschools included mixed and manufactured settings, natural settings were rarely found. The evaluation with experts revealed an exceptional outdoor preschool environment with three playgrounds and diverse manufactured, mixed, and natural behavior settings (Table 1; Figure 1). Children were taken to each playground on an alternating daily basis and engaged in free play.

### Data collection methods

A number of studies discovered children’s environmental preferences through photographs (Talen and Coffindaffer, 1999). Photo preference assists children to combine their visual and verbal language (Clark, 2005). This makes photo preference more advantageous, especially when interviewing children with weaker written or verbal language or younger children (Cook and Hess, 2003).

Referring to prior studies, photo preference was employed as a means of improving young children’s way of communicating and memory retrieval. To explore the suitability of photographs for this age group, five children participated in a pilot study. Compared to mere interviews, children were able to recall and explain about their play environment more vividly when photos were employed. Also, the pilot study explored the appropriate size and quality of the photo prints.

Another concern was deciding whether children or the researcher should take the photos. Reviewing prior studies, some researchers have asked children to take the pictures with or without the researcher present (Cele, 2006; Clark and Moss, 2001). However, in other studies, particularly ones focusing on young children, researchers have taken the photos themselves, if directed by a particular research framework, or exploring specific concepts (Aschermann et al., 1998; Diamond and Hestenes, 1996; Salmon, 2001).

After reviewing prior methodologies and considering the specific research aim, focusing on comparing different behavior settings, in this study photos were taken by the author. That was because particular attention had to be given in collecting photos with a “wide” field of view so that afterward behavior settings are recognizable for children and the researcher. If children were given cameras to take photos, this goal may have not been accomplished. For instance, a child could have taken a close-shot picture of a flower, but may not have recalled where the picture was taken.

### Table 1. Behavior settings within the outdoor preschool setting.

<table>
<thead>
<tr>
<th>Natural</th>
<th>Mixed</th>
<th>Manufactured</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hill</td>
<td>Looped path (manufactured zone)</td>
<td>Tables</td>
</tr>
<tr>
<td>Camp</td>
<td>Pathway (mixed zone)</td>
<td>Swings</td>
</tr>
<tr>
<td>Stone-lined swale</td>
<td>Sand-rope</td>
<td>Rockers</td>
</tr>
<tr>
<td>Stick-pile</td>
<td>Sand-climber</td>
<td>Music wall</td>
</tr>
<tr>
<td>Trail (woods)</td>
<td>Rope</td>
<td>Gazebo</td>
</tr>
<tr>
<td>Trees</td>
<td>Green tube</td>
<td>Play structure</td>
</tr>
<tr>
<td></td>
<td>Play house I</td>
<td>Storage</td>
</tr>
<tr>
<td></td>
<td>Green patches</td>
<td>House 2</td>
</tr>
<tr>
<td></td>
<td>Stage I</td>
<td>Stage 2</td>
</tr>
</tbody>
</table>

Table 1.
Furthermore, young children may have had difficulties understanding camera configuration, resulting in blurred or vague images. Another reason for not giving children cameras was due to budget and time limitations.

Figure 1. Behavior settings in the selected outdoor preschool.
Defining behavior settings. Through multiple direct observations of the three playgrounds, behavior setting boundaries were defined as environmental-behavioral units that stimulated certain cyclical patterns of activity, within particular time intervals and visual boundaries (Barker, 1976), for example, paths for biking or walking, sand pits with enclosed boundaries, or swings. These behavior settings were later categorized as natural, mixed, or manufactured. The validity of the proposed behavior settings was reviewed by NLI experts who have had several visits to the site. Afterward, the behavior setting pictures and classifications were reviewed with NLI experts for accuracy and acceptability.

Data collection procedures Following the approval from the Institutional Review Board (IRB), consents for study participation were obtained from parents for a convenience sample of children. The participants were 22, 4- to 5-year-olds (13 females and 11 males). Each child was associated with a unique ID number to enhance comparisons or correlation analysis.

Before the first recess, the two classes were visited with a teacher present. The teachers continued their class activities during data collection. Children were directed toward a table while they engaged in photo selection or interviews. In all, 22 pictures of the outdoor preschool were cut to a 5-inch by 6-inch size.

Children’s explanations were recorded on an audio recorder. They were asked to select three favorite photos of their outdoor play environment. Once children selected the photos, the child’s ID was written behind the photo. Afterward, they were asked whether they knew where the pictures were taken. Next, children were questioned about the reasons they have chosen a particular place as their favorite part of their outdoor play area and in what type of “play” they mostly engage there.

To understand the reliability of children’s responses, they were asked whether they want to take part in the photo selection for a second time. From the 24 children who participated in the first, only 71 percent participated in the photo preference for the second time (n = 18). During data collection, children’s ID and “Phase two” were written at the back of selected photos. In addition, through multiple observation sessions in recess hours, children were observed playing, while notes were taken from children’s ID numbers, cognitive play behaviors, and associated behavior settings.

Analysis

Three phases of analysis were employed. Selected photos and associated interviews were initially examined and categorized into the type of behavior settings and cognitive play behaviors (Table 2). For instance, if a child mentioned playing with sand to make castles, it was coded for dramatic play behavior and sand behavior setting. Children’s quotes were then compared with observation notes. In the second phase of the analysis, crosstab was performed, using the SPSS program, to explore associations between the categories of behavior settings and preferred cognitive play behaviors.

For evaluating the consistency of children’s preferences for behavior settings, coded responses for each participating child were paired with his or her first coded answers. If answers were identical, they were coded for “a same response,” and conversely, if the answers did not match, they were coded for “different response.” For example, if a child had chosen the sand behavior setting in the first and second phases, it was coded for the “same response.” To have a more general comparison, preferred behavior settings in first and second phases of study were grouped into categories of natural, mixed, and manufactured settings. To ensure trustworthiness of analysis, NLI experts familiar with the concept of behavior settings and cognitive play behaviors reviewed samples of analyzed data. Discrepancies were resolved by discussion of the context and content and comparison with other instances.
Findings

Children were energetic when asked to choose photos of their favorite play settings. They browsed the photos and made remarks about their choices. Analysis of children’s responses yielded records of 76 preferred behavior settings (Figure 2). Examples of children’s responses and associated cognitive play behaviors or behavior settings are shown in Table 2. These analyses reveal that children mostly preferred the green tube, swings, play structure, and trees behavior settings. Within these 76 behavior settings, 56 percent were categorized as mixed (n = 43), 28 percent as manufactured (n = 21), and 16 percent as natural (n = 12). From 75 coded cognitive play instances, the results show that children mainly enjoyed functional (41%, n = 31) and dramatic play (40%, n = 30). With a notable difference, children then preferred game with rules (13%, n = 10), exploratory play (4%, n = 3), and constructive play (2%, n = 2).

Table 3 demonstrates the results of the crosstab analysis. The “within behavior settings” row compares the cognitive play behavior offered in each setting. The “within cognitive” row evaluates the settings for their cognitive play opportunities. The findings indicate that children mostly preferred natural behavior settings for dramatic and exploratory play opportunities. Children enjoyed functional and dramatic play activities within mixed behavior settings. More than half of children’s preferences for manufactured behavior settings associated with their functional play stimulation. The comparison of all three behavior settings suggest that children highly favored mixed settings for their functional, constructive, dramatic, and games with rules opportunities.

The analysis for the reliability of children’s preferences for behavior settings revealed that almost 76 percent of children’s photo choices of particular settings were different. However, about 57 percent of children preferred the same category of behavior settings in both rounds (n = 31, N = 54). That is, children selected mixed settings as their most preferred setting for their first (54%, n = 29) and second participations (46%, n = 25). The results suggest that categorizing behavior settings to natural, mixed, and manufactured components may be a more informative and reasonable approach for understanding young children’s preferences.

Discussion

To the author’s knowledge, this is the first study to assess children’s preferences for outdoor preschool behavior settings using photos as a means of communication and memory retrieval.

<table>
<thead>
<tr>
<th>ID</th>
<th>Element</th>
<th>Behavior setting</th>
<th>Explanation</th>
<th>Cognitive play behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Grass</td>
<td>1. Hill</td>
<td>1. I like rolling down the grass hill</td>
<td>1. Functional</td>
</tr>
<tr>
<td></td>
<td>Swing</td>
<td>2. Swing</td>
<td>2. Swing</td>
<td>2. Functional</td>
</tr>
<tr>
<td>2</td>
<td>Tire</td>
<td>1. Green patches</td>
<td>1. I play animals in the tire</td>
<td>1. Dramatic</td>
</tr>
<tr>
<td></td>
<td>Tree</td>
<td>2. Trees</td>
<td>2. We play dinosaurs in the back woods</td>
<td>2. Dramatic</td>
</tr>
<tr>
<td></td>
<td>Structure</td>
<td>3. Structure</td>
<td>3. We play “people” on the top, and princess over there. On the slide, we are just being active</td>
<td>3. Dramatic</td>
</tr>
<tr>
<td>3</td>
<td>Tree</td>
<td>1. Trees</td>
<td>1. I like it, I play “Star Wars” there</td>
<td>1. Dramatic</td>
</tr>
<tr>
<td></td>
<td>Green tube</td>
<td>2. Green tube</td>
<td>2. I play “Star Wars” there</td>
<td>2. Dramatic</td>
</tr>
</tbody>
</table>

Table 2. Preferred elements and behavior settings and associated cognitive play behaviors (N = 24).
Considering children as the main users of outdoor preschool environments, their ideas and preference should be a major concern during planning and decision-making of play environments (Moore and Marcus, 2008; Moore and Wong, 1997; Tranter and Malone, 2004). This approach respects children’s rights to express their views as individuals in the community (Einarsdottir, 2005; Cele, 2006). If valid, the photo preference approach could be extremely useful in regular design building process for outdoor preschools, valuing children’s opinion.

In line with previous studies (Cele, 2006; Houts et al., 2006), the findings emphasize the appropriateness of photos as a visual tool for communication. Evaluating the observational data with 

Figure 2. Frequency of preferred behavior settings in the photo preference (Total number of codes = 76, N = 24).

Table 3. Preferred cognitive play behaviors and category of behavior settings in the photo preference (total number of codes = 76, N = 24).

<table>
<thead>
<tr>
<th>Category of behavior settings</th>
<th>Cognitive play behaviors</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Functional</td>
<td>Constructive</td>
</tr>
<tr>
<td>Natural Count</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Percent in category of behavior setting</td>
<td>16.7</td>
<td>0</td>
</tr>
<tr>
<td>Percent within cognitive behavior setting</td>
<td>6.5</td>
<td>0</td>
</tr>
<tr>
<td>Mixed Count</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td>Percent in category of behavior setting</td>
<td>41.9</td>
<td>4.7</td>
</tr>
<tr>
<td>Percent within cognitive behavior setting</td>
<td>58.1</td>
<td>100</td>
</tr>
<tr>
<td>Manufactured Count</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Percent in category of behavior setting</td>
<td>52.4</td>
<td>0</td>
</tr>
<tr>
<td>Percent within cognitive behavior setting</td>
<td>35.5</td>
<td>0</td>
</tr>
</tbody>
</table>
photo selections, most children were capable to select photos of behavior settings in which they actually interacted during outdoor play. However, the results suggest the inconsistency of 4- to 5-year-old children for explaining or choosing particular settings of play environment. This may suggest that children’s daily experiences were an influential factor in choosing particular photos. This result is an additional indication that children’s photo preferences need further study.

Nevertheless, the repeated photo selection results indicate categorizing children’s behavior setting preferences may be a more reliable approach for interpreting their perspectives. The findings demonstrate that although children were often not reliable in selecting the same behavior setting, they were mostly reliable in favoring mixed behavior settings. The following discussion evaluates children’s preferences of natural, mixed, and manufactured settings. Based on children’s accounts and observations, each sub-section addresses the possible reasons for selecting particular behavior settings.

**Natural settings and cognitive play preferences**

The flexibility of natural settings inspired children’s sense of imagination and adaptability for different dramatic play themes. In harmony with prior studies (Moore and Cosco, 2010; Moore and Wong, 1997; Tranter and Malone, 2004), children described how natural loose materials found in natural settings sparked a number of dramatic play behaviors.

Similar to previous studies (Fjørtoft, 2000; Fjørtoft and Sageie, 2000; Lester and Maudsley, 2007; Moore and Wong, 1997; Waite, 2010), children perceived the potentiality of natural settings for exploratory play. They were fascinated by the changing qualities of creatures and ecosystems in natural settings. The results emphasize children’s enthusiasm and eagerness for experiencing, learning, and watching natural transitions and cycles (Maynard et al., 2013; Moore and Wong, 1997; Tranter and Malone, 2004).

Consistent with prior studies (Fjørtoft, 2004; Maynard et al., 2013), the findings suggest that complex and exciting interactions presented in natural settings may promote higher levels of cognitive play. These characteristics were topographic change, distinct and challenging features, and moldable props. The following paragraphs describe children’s cognitive behavior preferences in particular natural settings.

**Trees.** Loosely designed or unfurnished settings kindle children’s imaginative and unstructured play (Fjørtoft, 2000). In this study, trees provided a varied and mysterious environment that stimulated children’s dramatic play. Children enjoyed fantasizing about different heroic characters and chasing one another. For instance, children described playing “princess,” “finding a baby cheetah,” or playing “partners” as their favorite play around the trees. Trees promoted dramatic play through providing loose play props including sticks, leaves, and fruits (Fjørtoft and Sageie, 2000; Tai et al., 2006; Tranter and Malone, 2004). Children enjoyed collecting sticks and logs to create houses and hide-outs (Figure 3). For instance, a child explained, “We usually play in one of the wood houses [stick piles] and you think you are a ‘kitty’ and you live in the house.”

Similar to Tranter and Malone’s (2004) findings, children explained how they like to “move the rocks,” “balance over the rocks,” or “shake the trees.” One child explained, “I like to jump on to the swing from the logs and swing off of it and do a back flip.” Another other child described, “I like to run fast in the woods and jump.” These results indicate the potentiality of tree settings for functional play opportunities (Figure 4). The findings may have some implication for enhancing physical activity opportunities in outdoor preschools.

**Hill.** Previous studies note how topography variations offer opportunities for rolling, running down, or sliding (Moore and Wong, 1997; Woolley and Lowe, 2012). According to Fjørtoft and Sageie (2000), grassy hills positively encourage children’s gross motor skills through sliding,
running, or games (Figure 5). In line with prior studies, children described their preferences for the topographic variations that inspired games such as “tag,” “rolling balls,” or “Frisbee.” Consistent with the findings of Özdemir and Çorakçı (2010), children enjoyed chasing each other on the wide-open grassy hill. The results suggest the hill setting was inspiring for children’s fantasy play. This was consistent with Moore and Wong’s (1997) work that found topographic variations supported fantasy play, orientation skills, and games with rules.

Stone-lined swale. This setting was covered with rocks and dirt and adjacent to the tree and sand settings. Children enjoyed walking on the existing bridges, as well as balancing, running, or jumping on the rocks. The swale inspired child-initiated games. For instance, a girl explained,

I jump on the rocks. It is called “Jumping house.” We jump from one place and another friend jumps to another place, and the other friend jumps to the “two” place. Then I jump, and other friend jumps to the “three” place.

Combining rocks, dirt, mud (after rain), and vegetation in this setting stimulated children’s explorative and imaginative play. Through weather and seasonal changes, this natural setting fascinated children with elements such as bubbles or puddles. Children were curious of small transformations, creatures, and novel experiences provided by the natural surroundings (Figure 6).

Evaluating children’s accounts suggest their preference for settings that change over time while offering challenging and explorative experiences.

Mixed settings and cognitive play preferences

According to Cosco (2006), the challenging experience of manufactured materials combined with the variety of natural elements in mixed settings prompts children’s physical play behaviors. The results of this study extend this knowledge and suggest the value of mixed settings for children’s
cognitive play stimulation. Children preferred the diversity of options in the mixed settings that offered the most functional, constructive, dramatic, and game with rules chances.

The physical characteristics of the green tube, sand-climber, and playhouse offered many hiding and climbing opportunities that children enjoyed. These child-scaled settings created protected enclosures that fostered children’s need for retreat, solitude, and privacy. The surrounding trees offered many natural props that children incorporated into their play, such as sticks, pine needles, and leaves. Children enjoyed collecting natural loose elements, and sometimes toys, and arranging

**Figure 4.** Children enjoyed climbing and jumping over the logs in tree settings.

**Figure 5.** The hill setting encouraged rolling tires and competitive games.
them in the semi-enclosed, private structures. The following describes children’s preferences for particular mixed settings:

**Green tube.** The green tube was the most preferred setting. The existing natural loose props surrounding the tube developed children’s sense of imagination and creativity. The interior space of the tube provided a popular, protected, and safe boundary in which children retreated, socialized, and explored their surroundings (Figure 7). Weinstein and Pinciotti (1988) also found tires were supportive of such interaction and quality.

According to Tai et al. (2006), hiding provides restorative or privacy opportunities children value. Furthermore, climbing satisfies children’s need for exploring and understanding their surroundings (Cele, 2006; Moore and Wong, 1997). The findings suggest children’s preference for the hiding-climbing quality of the green tube that intrigued dramatic play. Children created imaginative characters in the green tube, such as “Star Wars,” “cheetahs,” or “dinosaurs.” One child explained, “I like the green tube because you can get in it and on the top. Sometimes we play ‘dinosaurs’. Sometimes I’m the baby dinosaur; sometimes I am the baby coyote.” These findings suggest including settings that have access to natural features and simultaneously offer hiding or climbing opportunities.

**Looped pathway.** Moore and Cosco (2010) found that looped pathways inspire running and riding activities in addition to their intended purpose of connecting children to other play settings. Similarly, Cosco et al. (2010) note that looped pathways attract children to play and increase their activity levels. According to Cosco (2006), children enjoy riding on wheeled toys on hard, curvy pathways. Regarding cognitive play opportunities, findings show that children preferred the looped pathway for its functional play behaviors, including riding bikes and scooters, running, and walking.

**Sand-climber and sand-rope.** According to Boldermann et al. (2006), integrating manufactured fixed equipment with natural features increases children’s play opportunities. In these settings, the
changeable and shapeless qualities of sand supported constructive and dramatic play. Children combined sand with other loose elements to create symbolic representations, such as “ships,” “boats,” or “fish.” The rope attached to a central pole in the sand-rope setting offered a change in levels and variety of experiences (Cele, 2006; Fjørtoft and Sageie, 2000).

Similar to prior studies (Barbour, 1999; Weinstein and Pinciotti, 1988), the availability of toys, sand, seats, as well as the child-friendly height of the climber and ropes encouraged dramatic play. Furthermore, the climber supported refuge or hiding opportunities that encouraged children’s dramatic play (Figure 8).

**Green patches.** The green patches incorporated many natural and manufactured loose features and often served as a link between other settings. This setting included tires and bushes that support dramatic play behaviors (Tai et al., 2006; Weinstein and Pinciotti, 1988). Similar to Weinstein and Pinciotti’s (1988) study, children enjoyed collecting loose props in the enclosed and private space of tires and imagined being “warriors” or “cats.” The tire represented “home,” a “ship,” and a place of refuge (Figure 9). Sometimes, children transferred chairs, tables, or logs to the tires and prepared imaginary “food” that they would “cook” and serve at their “home.” Other times, children preferred jumping and balancing on tires, suggesting their functional play opportunities.

**Playhouses.** Designers recommend incorporating child-scaled playhouses to support young children’s dramatic play opportunities (Moore and Marcus, 2008; Moore and Wong, 1997). These small-scaled settings create “nooks and crannies” that develop a sense of belonging (Moore and Wong, 1997). Far from adult supervision, children enjoyed the sense of privacy and refuge in the houses. They gathered and decided about their imaginary plots in these hiding spaces. Children described their game as “house,” practicing their roles as “mothers,” “children,” or “shopkeepers,” among other roles (Figure 10).

Relating to these interpretations, one child explained, “I really like them [the play houses]. I play ‘Kitty’ and ‘Baby and Mommy’.” Another child explained, “We pretend to have a house and make food on the table.” Confirming previous studies (Fjørtoft and Sageie, 2000; Moore and
children enjoyed the hiding opportunities of the playhouse. Some boys remarked how they hide and pretend to be characters such as “Iron Man” in the playhouses. One child explained, “We hide in the house and try to kill the enemy.” Similar to the green tube setting, the results suggest the significance of enclosed settings that offer hiding opportunities, as well as direct access to natural props.
Ropes. Ropes tied to the trees became behavior settings that challenged children to balance, walk, climb, jump, and swing. Consistent to Moore’s (1986) findings, the swinging opportunity inspired children’s activity. Children enjoyed holding trees to climb and balance on ropes. This challenging arrangement stimulated children’s games with rules. In accordance with Moore (1986), children enjoyed ropes that provided lookout opportunities associated with the change of level.

Pathway. Based on children’s descriptions, the hard, smooth surface of the pathway promoted functional behaviors such as cycling, running, kicking balls, or walking. Previous studies have also regarded the value of pathways for functional play opportunities (Cosco et al., 2010; Moore and Cosco, 2007). Consistent with Striniste and Moore’s (1989) statement, the pathways allowed children to experience fast movement and challenging opportunities while riding bikes. One girl explained,

I like playing with the bikes mostly, and I just play with bikes, because sometimes I get to go really fast, even though if someone is on the bike with me I can go really fast, because I have really strong legs.

The pathway inspired chasing and running opportunities for dramatic play and games. Some children described how they play “pretend” activities on the pathway: “We usually play ‘Star Wars’ on the pathway.” Consistent with Moore and Cosco’s (2010) findings, children enjoyed running and chasing along the pathway. A girl explained, “I like to run up and down it and have races. Sometimes I run on the pathway and pretend to be a snail, and I also pretend that I am a fast ‘fairy’ when I go over the concrete.”

Mixed settings triggered children’s imaginations and inspired self-initiated games. In conclusion, the findings suggest children’s high preferences for mixed settings that encourage different cognitive play behaviors.

Manufactured settings and cognitive play behavior opportunities
Manufactured settings mainly support children’s gross motor development (Barbour, 1999; Moore and Wong, 1997). Consistent with the previous studies, children believed manufactured settings...
mostly provided functional play behaviors. The following paragraphs evaluate children’s perceptions of cognitive behavior opportunities in significant manufactured settings:

**Play structure.** Consistent with prior studies (Barbour, 1999; Moore and Wong, 1997), the play structure mainly provided functional play behavior. Children described how they climb, balance, slide, or jump from the play structure (Figure 11). In accord with prior findings (Cele, 2006; Tai et al., 2006), children enjoyed the complexity of the compound play structure. The structure inspired hiding opportunities that encouraged dramatic play. Furthermore, natural loose and manufactured loose elements around the play structure stimulated children’s dramatic play. For example, children pretended the mulch was “lava” as they jumped from the play structure to the tire. Some children jumped on the mulch pretending to be “football players.” Furthermore, children described how the play structure inspired games. For instance, one child explained, “We all slide; sometimes people hold on to each other and chain down the slide and say ‘Whee!’” In general, children enjoyed the complex and challenging opportunities of the play structure.

**Swing.** According to Woolley and Lowe (2012), swings provide challenging opportunities for children. As a result, many children explained their joy and excitement for swinging and engaging in functional play. This may be due to the change in height, speed, and overlooking opportunities that swings offered.

**Gazebo.** Previous studies consider gazebos to be structures that support social gatherings for children (Moore and Cosco, 2007; Moore and Wong, 1997). The gazebo situated at the top of the hill provided lookout opportunities. This setting included a shelf that children enjoyed for “hiding” during dramatic play, pretending to be “animals,” playing “superheroes,” or “sleeping.”

**Rockers.** Children enjoyed this setting for its functional play chances (swinging, rocking, etc.). They also enjoyed dramatic play chances (riding a “horse,” “superheroes,” etc.). A child explained, “I like
to play ‘sick fairy’ [at the rockers]. Someone has to be the good fairy and the other one gets sick.” This
dramatic play activity may have been encouraged through the circular arrangement of rockers.

The results suggest children’s preference for manufactured settings that offer hiding, lookout, and diverse play opportunities.

**Limitations**

This article explored children’s preferences for outdoor preschool settings and their associated
cognitive play opportunities. However, as with all qualitative research involving young children,
the research encountered some limitations. First, most 4- to 5-year olds were not reliable in explain-
ing preferences for particular behavior settings, while they mostly preferred mixed ones. Second,
verbal communication with some children was problematic, as they were not comfortable or patient
to converse with the researcher. Subsequently, in some instances, the researcher was not able to
conduct in-depth interviews to understand the reasons for selecting particular photos. Third, some
children had shorter memory spans for recalling past events. Photos contributed to children’s mem-
ory retrieval for subsequent interviews. Nevertheless, this approach required more time and con-
centration that may have exhausted some children.

The findings in this article need to be interpreted with caution because the number of partici-
pants was relatively small. Future studies are recommended to include larger sample sizes, with an
equal distribution of participating genders. More research is needed to investigate the effectiveness
of young children taking the photos of their preferred behavior settings themselves. Further studies
are needed in order to explore the effectiveness of photo preference as a tool for evaluating young
children’s environmental-behavior preferences. The results identified particular behavior settings
that children enjoy for their cognitive play opportunities. Further research on diverse outdoor pre-
schools is needed to complement these results.

**Conclusion**

As policy makers aim for high-quality childcare, this study intended to explore behavior settings
that are supportive of cognitive play while creating an enjoyable outdoor preschool for children.
Employing photos as visual tools, children accounted mixed settings to offer a range of cognitive
play opportunities. In view of these findings, the developmental benefits of diverse settings are
recognized. This diversity can be accomplished through combining natural and manufactured com-
ponents and creating mixed settings. Children enjoy natural components that foster biodiversity,
manipulation, and natural loose props. They also prefer manufactured features that offer challeng-
ing, hiding, and climbing opportunities. Indeed, diverse settings in outdoor preschools broaden the
range of possible cognitive play behaviors for children, as well as supporting concurrent play of
children with different needs.

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