Children's social play and affordance availability in preschool outdoor environments

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ABSTRACT

The aim of this study was to examine whether the availability of affordances in preschool outdoor environments influences children's social play. Participants were 173 children aged between 3 and 6 years (M = 3.95, SD = 0.82) who were attending a total of 18 early childhood education centers in the Basque Country (Spain). The results indicate that low availability of affordances in the preschool outdoor environment has a negative impact on children's group social play. Based on application of the Affordance Scale [Kyttä, Marketta. 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. doi:10.1006/jevp.2001.0249] we propose a cut-off score for identifying environments that are likely to discourage social play. In light of the results obtained we believe that the educational community should consider the concept of affordances in order to ensure that the features of preschool outdoor environments promote a variety of social play activities.

Keywords: affordance; social play; play; outdoor; early childhood education

Introduction

Aside from being a fun and pleasurable activity in which children naturally engage, play is important for their wellbeing and healthy development, and it is a key source of early childhood learning (Coelho et al. 2017). Through play, children explore and communicate the sensory characteristics of the world around them, acquiring and practicing skills and manifesting various needs that underpin individual and social wellbeing (Loizou 2017). Thus, play offers children the opportunity to develop a wide range of motor, cognitive, social, and emotional skills (Coplan and Arbeau 2009).

As a result of the importance ascribed to play in the context of children's development (Pellegrini 2011) it is regarded in numerous countries as a key resource for establishing the curriculum and approaches to teaching in early childhood education (Gunnarsdottir 2014; Karila 2012). Thus, play is nowadays commonly seen as a basic psychoeducational activity in early childhood education (Coelho et al. 2017). It is important to note that this is an educational stage during which children engage in numerous and frequent spontaneous social interactions, many of them in the context of play (Coplan, Rubin, and Findlay 2006). Social play involves the coordinated participation of different individuals and it is thus an excellent opportunity for promoting psychosocial development. This kind of play occurs when a child is motivated to engage other children in shared playful activities, is able to regulate emotional arousal, and possesses the skills required to initiate interactions with others such that his or her social overtures are responded to in kind (Coplan, Rubin, and Findlay 2006). Social play is therefore a driver of socialization and social integration (Pellegrini 2011) as it encourages children to adapt their behavior to that of their peers, exposes them to other points of view, which they may then come to share, and fosters, in the process, the development of more complex knowledge, values, and ways of interact-ing (Howes 2011). As social play requires children to use their cognitive and communica-tional skills it is also an

important indicator of their psychosocial development (Coplan, Rubin, and Findlay 2006) and adaptation to school (Coplan et al. 2014).

Social play has been studied for many years. One of the earliest classifications of chil-dren's social participation in play was proposed by Parten (1932), who established the cat-egories of unoccupied play, solitary play, onlooker play, associative play, and cooperative play. More recently, Rubin (2001) took this classification as a reference and defined three categories of social play: solitary play, parallel play, and group play. Solitary play occurs when children play alone and relatively apart from their peers, to whom they do not pay attention; it usually involves playing with different materials to what the others are using. Parallel play is when a child plays adjacent to another child or children in a similar activity, but does so independently. Finally, Rubin (2001) considered group play to be the category involving the highest degree of social participation, since it refers to several children engaging in the same play activity with a shared objective. This notion of group play encompasses the categories of associative and cooperative play that were described previously by Parten (1932).

Studies that have examined the characteristics of social play and its implications for children's development have mainly been conducted within the classroom, with only a few considering the preschool outdoor environment (Veiga et al. 2017). In terms of differ-ences between these two contexts, some studies have reported greater social participation and more complex forms of play among peers in the outdoor environment (Shim, Herwig, and Shelley 2001). For his part, Henniger (1985) observed more solitary activity indoors and more parallel play outdoors. By contrast, Bar-Haim and Bart (2006) found that solitary play occurred more frequently in the outdoor environment. It is argued that this is because the outdoor environment offers more opportunities for solitary-functional activities (e.g. running, climbing).

Regarding the implications of outdoor social play for children's development, the results of several studies suggest that a greater incidence of social play is associated with better performance on measures of children's learning and development (Coplan et al. 2014; Veiga et al. 2017). It should be noted, however, that this relationship is more marked when the type of social play involved is group play (Miranda et al. 2017).

Another important point to consider is that the variable 'affordance' has not featured in research on children's social play in the preschool outdoor environment. However, Waters (2017) suggests that the concept of affordances should be considered in order to obtain a fuller understanding of outdoor play, since it tells us something about how children experience the outside environment and, therefore, could add to our understanding of how they perceive it (Heft 2010; Kyttä 2002, 2004). In his original conceptualization, Gibson (1979) related the notion of affordance to the animal's (in this case, the child's) perception of the features of the environment. Specifically, affordances in the preschool outdoor environment refer to what this environment provides and what is perceived or recognized by children as realizable in relation to their needs, interests, motivation, or capabilities (Kyttä 2002). Thus, the same preschool outdoor environment may offer each child different possibilities, due to their subjective perception of it (Waters 2017). For example, one child may perceive an element of the outdoor environment as climbable, while another sees it as something for sliding on. In fact, each child's perception may be determined by the situation, by the actual environment, and/or by the sociocultural context (Raymond, Kyttä, and Stedman 2017). In the view of Kyttä (2002), affordances are the functionally significant properties of the environment that are perceived through the active detection of information, and they include properties from both the environment and the acting individual. This means that the play which occurs in a given space will differ from one child to the next depending on the affordances, as the latter have the potential to encourage behavior (Dings 2017; Heft 2010).

Consequently, various authors have highlighted the importance of creating outdoor environments in which a wide variety of affordances are available and in which the range of resources ensures that play and exploration are possible, thus enabling children to engage in different play behaviors and interactions that promote their development and learning (Cosco, Moore, and Islam 2010; Fjørtoft 2001). This is what is generally referred to as a child-friendly environment (Broberg, Kyttä, and Fagerholm 2013; Jansson, Sundevall, and Wales 2016; Kyttä 2004). Note that a child-friendly environment is also a space that offers multiple opportunities for play and interactions among children, and it is one that can be used by individuals of different ages (Hussein 2015; Kyttä 2004). A number of authors have also stressed that such spaces should encourage challenging play (Little and Eager 2010; Prieske et al. 2015; Sandseter 2009). In fact, children have been found to show a preference for spaces that allow them to explore their surroundings, try new things, accept challenges, and take risks (Little and Eager 2010), in other words, for environments that might contribute to peer interaction and social play.

In sum, the concept of affordances can enrich our understanding of children's social play in the preschool outdoor environment. To the best of our knowledge, however, this variable has yet to be considered in research on this topic. Consequently, the aim of the present study was to examine whether the availability of affordances in the pre-school outdoor environment influences children's social play. Our hypothesis was that a greater availability of affordances would be associated with increased participation in social play.

Method

Participants

The participants in this study were 173 children (87 girls, 50.3%; 86 boys, 49.7%) aged between 3 and 6 years (M_{age} = 3.95; SD = 0.82) who were

attending a total of 18 early child-hood education centers in the Basque Country (Spain). Fifty-one teachers (50 women, 1 man) also participated. Class sizes ranged between 21 and 25 children and the staff/child ratio was 1:24. Children spent five hours per day in class and 30 min per day in the pre-school outdoor environment. Both the children and the teachers were selected based on their availability. Written informed consent was obtained from all the children's parents, as well as from the teachers and the schools' management board. The study was carried out in accordance with the current ethical standards established by the authors' universities.

Measures

Play Observation Scale (POS). The POS (Rubin 2001) is a tool that measures social partici-pation and the cognitive quality of preschool children's play. It has proved useful in deter-mining age and gender differences in children's play, socioeconomic status differences in play, effects of the ecological setting of play, individual differences in play, and the social contexts within which the various forms of cognitive play are distributed (Fromberg and Bergen 2015).

Affordance Scale (AS). The AS (Kyttä 2002) is a scale that measures the availability of affordances in the outdoor environment of preschools. In developing the scale its author drew upon the functional taxonomy of children's outdoor environments described by Heft (1988), to which she added a subscale of affordances for sociality (Gaver 1996). The instru-ment considers 29 affordances: structures that afford cycling, running, skipping, skating, playing hopscotch, skiing, playing football, playing ice-hockey, playing tennis or badmin-ton, coasting down, skateboarding, throwing, digging, building of structures, using plants in play, swinging on, hanging, climbing, being in peace and quiet, molding, building of snow, swimming, fishing, role playing, playing rule games, playing home, playing war, being noisy, and following/sharing adult's activities. It also evaluates the environmental features that support certain affordances, and affordances for sociality.

Procedure

The present research was carried out in several steps. First, the research project was pre-sented to various early education centers in the Basque Country (Spain). Once informed consent for participation had been obtained from the schools, the teaching staff and the children's parents or legal guardians we drew up a timetable for data collection. The outdoor environments analyzed met the minimum requirements established by the Spanish Ministry of Education. They all covered an area of at least 150 m^2 ($M = 189.5$; SD = 15.82) and they were used by children in accordance with an agreed timetable that separated children of different ages.

Next, the children's free play in the preschool outdoor environment was video-recorded. Play observations were carried out over a period of three months, from April through to the third week of June. The researchers began with a randomized list of chil-dren from the participating preschools, each of whom would be filmed for 6 min on a single day. On each day of observation we selected four children from the list and made recordings lasting a total of 24 min (6 min per selected child). Although the record-ing focused on the selected child, the other children from his/her class who had attended preschool on that day were also present in the playground and therefore featured in the observation. The two observers, both experts in early childhood education, underwent a training period in use of the video recorder.

Finally, the recordings were viewed and analyzed using the POS (Rubin 2001) and the AS (Kyttä 2002). A time code superimposed on each videotape in conjunction with a remotely controlled tape-stop device allowed observers to view the tapes at 10-s intervals, as recommended in the user manual for the POS (Rubin 2001). These intervals were then coded for social participation (six variables: unoccupied, onlooking, solitary play, parallel play, peer conversation, and group play) using the POS and for affordances using the AS, resulting in 36 coding intervals per child over the total observation period of six minutes. Intra-observer and inter-observer agreement achieved coefficients

(Cohen's kappa) of .92 and .89, respectively for the POS, and .94 and .91, respectively for the AS. These calculations were based on the 30% of videos that were double-coded.

Results

Descriptive analysis of affordances in the preschool outdoor environment

In order to obtain as accurate an idea as possible regarding the environmental features that support certain affordances we applied the Affordance Scale (Kyttä 2002), counting the number of times a child repeated a play behavior in the outdoor environment. Table 1 shows the means, standard deviations and frequencies for the different features of the outdoor environment that support affordances.

It can be seen in the table that most of the activities that children engaged in occurred on flat surfaces, and thus for the outdoor environments analyzed it was these surfaces that provided the most affordances. To a much lesser extent there were also activities involving climbing, handling non-rigid or detached objects, and the use of moldable material. Play activities on relatively smooth slopes or involving the use of shelters were very few in number. No activities involving water were observed. Therefore, there were no environments that supported these kinds of affordances.

Regarding the kinds of affordances that were available, although most activities occurred on flat surfaces, affordances that supported climbing were the most common (20%), followed by those that supported playing football (17%) or running (16%). There were also, to a lesser extent, affordances supporting swinging (9%), cycling (8%), jumping (7%), molding (6%), or the use of plants in play (5%). We did not observe behavior involving digging, skating, or the building of structures, among others.

Table 1. Means, standard deviations and frequencies for the environmental features that support certain affordances.

Environmental features that support certain affordances	*M*	SD	Absolute frequencies	Percentage frequencies	*N*
Flat, relatively smooth surfaces	26.20	10.98	4.532	79	173
Relatively smooth slopes	0.49	1.53	84	1	173
Graspable/ detached objects	0.93	3.97	161	3	173
Non-rigid, attached object	1.42	5.52	246	4	173
Climbable feature	3.26	6.43	564	10	173
Shelter	0.32	1.49	56	1	173
Moldable material (dirt, sand, snow)	0.69	3.82	119	2	173
Water	0	0	0	0	173
Total	–	–	5.762	100	–

The taxonomy proposed by Kyttä (2002) also considers affordances for sociality, and in this respect we observed activities involving role-playing (42%) and rule-based play (58%). Thus, the outdoor environments analyzed provided these kinds of affordances for social-ity, although they did not support other affordances such as playing war, being noisy, or playing home.

Influence of affordance availability on social play

In order to categorize different levels of affordance availability we applied Kyttä's (2002) taxonomy and counted the number of affordances provided by a given outdoor environ-ment. Given the nature of the Affordance Scale, possible scores range between 0 and 29. Scores for our sample of children ranged between 5 and 13 ($M = 8.22$; SD = 1.83). As Kyttä's taxonomy does not specify thresholds for defining different levels of affordance availability we decided to define two categories, taking a score of 7, equivalent to the 25 percentile, as the cut-off. We labeled the two categories *Low availability* (score between 0 and 7) and *Greater availability* (score above 7).

In order to examine whether the availability of affordances influenced children's social play we carried out a multivariate analysis of variance, taking affordance availability (low vs. greater) as the predictor variable and social play (solitary, parallel, group) as the cri-terion variable.

Table 2 shows the means and standard deviations for children's social play with respect to the two levels of affordance availability.

Table 2. Means and standard deviations for children's social play with respect to each level of affordance availability.

Social play	Affordance availability	*M*	SD	*N*
Solitary	Low availability	3.06	5.12	64
	Greater availability	1.92	3.27	109
Parallel	Low availability	4.23	9.34	64
	Greater availability	1.84	5.03	109
Group	Low availability	13.53	11.08	64
	Greater availability	17.72	9.83	109

The results showed that affordance availability had a statistically significant influence in relation to both parallel social play, F (1,171) = 4.786; p = .030 and group social play, F (1,171) = 6.677; p = .011, but not with respect to solitary social play, F (1,171) = 3.215; p= .075. The effect size for the difference in means was moderate for both parallel play (Hedges g = 0.35) and

group play (Hedges g = 0.41). The effect size associated with the group comparison for solitary social play was small (Hedges g = 0.28).

Discussion

The aim of this study was to examine the influence of affordance availability on children's social play in the preschool outdoor environment. In terms of which features of the outdoor environments provided affordances, the results showed that most of the children's play activities occurred on flat surfaces. Thus, the first conclusion to be drawn from this study is that, in general and for the environments analyzed, it was flat surfaces that provided chil-dren with the greatest number of affordances. In our view, this is more a limitation than a positive feature, since the children's interactions and the type of play they engaged in were strongly determined by the design of the outdoor environments (Little and Eager 2010; Raymond, Kyttä, and Stedman 2017). In other words, the children had access to flat, relatively smooth surfaces that were suitable for playing popular sports such as football or basketball, but few of the resources that might encourage a more varied range of play activities. For instance, materials such as ropes, nets, or paint were rarely available, and as the environments normally comprised flat, concrete surfaces, the children did not have the opportunity to play with natural elements such as sand, grass, or water.

Thus, only a small number of activities involved the use of shelters, climbing, and the handling of non-rigid or detached objects, and we observed no activities involving water. As regards affordances for sociality the analysis showed that role-playing and rule-based activities were more common than were playing war, being noisy or playing home. Overall, the lack of availability of a considerable number of affordances suggests that, in general, the outdoor environ-ments analyzed were far from what might be considered child-friendly (Broberg, Kyttä, and Fagerholm 2013; Jansson, Sundevall, and Wales 2016; Kyttä 2004).

Regarding the influence of affordance availability on children's social

play in the pre-school outdoor environment the results showed that the availability of affordances had a notable impact on social play. Specifically, low affordance availability was associated with fewer group play behaviors and more parallel social play. As a number of authors have noted (Coplan, Rubin, and Findlay 2006; Howes 2011), group play involves a greater degree of social participation and a high frequency of this type of play has been associated with healthier development among children of preschool age (Coplan et al. 2014; Miranda et al. 2017; Veiga et al. 2017). In terms of the present results, therefore, the conclusion to be drawn is that the negative impact of low affordance availability on children's group social play in the preschool outdoor environment would, in turn, have negative repercussions for their psychosocial development. One contribution of the present study in this respect is that we employed a cut-off score on the Affordance Scale (Kyttä 2002) that could be used to identify outdoor environments that are lacking in affordances and which, therefore, are likely to discourage children's group social play. Based on our results this score would be 7 or less. This has practical applications in that it could be used by educational institutions to determine the adequacy of a given outdoor environment and make whatever changes are necessary to ensure that it fulfills the minimum requirements for promoting group social play.

In terms of practical implications for educational policy, our results suggest that affor-dances may be a useful complement to other quality indicators for assessing preschool outdoor environments. In our opinion, early education centers need to provide outdoor spaces that are child-friendly (Broberg, Kyttä, and Fagerholm 2013; Jansson, Sundevall, and Wales 2016; Kyttä 2004), that is, environments which offer children multiple oppor-tunities for independent mobility, play, and social interaction, including risky play and the possibility of close contact with nature (Kyttä 2004; Miranda et al. 2017; Prieske et al. 2015). Contexts of this kind are clearly distinct from those geared toward traditional sports or stereotypical games. In this respect, initiatives to ensure that outdoor

environ-ments are child-friendly appear to be more advanced in Scandinavian countries such as Norway, Denmark and Sweden (Kos and Jerman 2013; Little, Sandseter, and Wyver 2012; Williams-Siegfredsen 2012), whereas in Spain (Miranda et al. 2017) and other Euro-pean countries (Kos and Jerman 2013) greater efforts are needed in this regard.

From this perspective, the concept of affordances offers both a theoretical framework and practical guidelines that can be easily applied by the educational community in order to improve the quality of preschool outdoor environments. Our finding that low availability of affordances has a negative impact on children's group social play further underlines the importance of including this variable among the indicators considered when assessing children's well-being at school. Indeed, we believe that schools should pay greater attention to the notion of affordances when designing outdoor environments and/or to identify the changes that need to be made in the event that a given environment is shown to be lacking in this respect.

This study does have certain limitations that need to be addressed. First, the external validity of the results would be bolstered by replication of our findings in larger and more heterogeneous samples. Second, the objective and hypothesis would be better supported by a longitudinal design in which children were followed up throughout their early years or even primary education, in which case one could use more active methodological approaches that would capture children's perception more directly. In addition, the information obtained through the Affordance Scale should be complemented by more detailed examination of the resources and materials that are available within outdoor environments and how these may influence children's social play. Finally, it would be interesting to examine the relationship between affordance availability and other variables and dimensions of child development. Of particular interest in this regard would be the relationship between the availability of affordances and cognitive play.

Despite these limitations, the results of this study allow us to conclude that low availability of affordances in the preschool outdoor environment has

a negative impact on children's group social play. This highlights the importance for schools of providing what are regarded as child-friendly outdoor environments.

Disclosure statement

No potential conflict of interest was reported by the authors.

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