

**Abstract:** Physically challenging, risky play is a natural part of children’s outdoor play behaviour, yet risky play is often limited by the environmental affordances as well as educators’ reluctance to allow this type of play due to safety concerns. This case study explored the influence of the redesign of the outdoor environment on 18–26-month-old children’s play behaviours and their educators’ attitudes and responses to the children’s risky play. Video recorded observations examined the children’s play behaviours and adult interactions with the children during their usual outdoor play time. Interviews with educators explored their conceptions of risk-taking and attitudes towards the risky elements included in the redesigned space, whilst their attitudes towards children’s risky play and personal risk-taking behaviours were examined using the Tolerance of Risk in Play Scale and Attitudes Towards Risk questionnaire. Findings indicate that despite initial concerns, educators were supportive of the children’s risky play in the new environment and the environment afforded opportunities for diverse play including risky play.

**Keywords:** affordances; early childhood education; educator attitudes; outdoor environments; risky play; toddlers

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1. Introduction

   Play in outdoor environments provides a natural and important context that satisfies children’s intrinsic drive and innate curiosity to explore the world around them [1]. Through their active interactions with their social and physical environment, all aspects of children’s physical, cognitive, social, and emotional development are supported [1–3]. Exposure to natural outdoor environments promotes more diverse and sustained engagement in play [4,5]. For toddlers, in particular, natural outdoor environments support the interests and development of these young children through valuable sensory experiences, physically active play, creative, imaginative play, and discovery as they engage with the environment [6].

   Play enables children to experiment with novel behaviours [3]. A potential fundamental aspect of this experimentation as children explore their environment and come to understand themselves and the environment involves an element of risk-taking—the risk of failure and in the context of physical play, the risk of injury [1]. The outdoor environment is inherently a constantly changing space; consequently, it is unpredictable and typically involves some element of risk. The risks and challenges of being outdoors provide rich opportunities for learning and problem-solving. Outdoor environments provide an ideal context for physically challenging and potentially risky play as children try new things and stretch the limits of their capabilities. In their interactions with the physical environment, children are often drawn to the physical challenges and risk-taking experiences that the environment provides, testing the possibilities of their actions and coming to understand their physical and mental capacity, and emotional responses through play [7–9]. A key characteristic of this type of play involves attempting something new, feeling on the borderline of being out of control (perhaps due to height or speed) and, consequently, overcoming any associated fear [9,10].
A growing body of research has identified both positive and negative factors associated with this type of challenging physical, potentially risky play. On the negative side, concerns for children’s safety are raised. On the other hand, risky play provides many developmental benefits for young children which are seen to outweigh the injury risk. A recent systematic review revealed that risky outdoor play was positively associated with physical activity and social health [2]. Other research has also identified beneficial outcomes including risk management skills, self-confidence, mental health, and independence [11,12]. Early childhood settings characterised by diverse spaces containing more natural materials, provide children with physical and cognitive challenges, increased physical activity, and children experience more positive social relationships [13,14]. There is, however, an acknowledgement that this type of play may also involve the potential for injury, hence, risky play has been defined in the research as thrilling play involving uncertainty where there is a possibility of injury [10].

1.1. Characteristics of Risky Play

The types of behaviours and play environments that characterise risky play have been described by Sandseter [7,8]. Sandseter [7] originally proposed six categories of risky play derived from her observations of the play of children aged three to five: play at speed, at height, with dangerous tools (e.g., knives, hammers, saws), near dangerous elements (e.g., fire, water), rough and tumble (R&T) play, and play where there is a chance of ‘disappearing’ from the immediate view of adults. Recognising that resources and environments typically provided for younger children may result in limited exposure to the risky play categories identified by Sandseter [7], Kleppe [15,16] identified further categories in relation to the play of children aged one to three, namely, impact (crashing into objects), risky elements (sharing the features of objective risk, e.g., height or speed, but not sufficient to cause physical injury), and vicarious risk (observing others taking risks). Children of this age mainly experience subjective risk as they explore their own capabilities within the physical environment, rather than there being any significant risk of injury. The combined work of Sandseter and Kleppe [7,16] as resulted in nine categories of relevance to children’s play in the present study:

1. Play with heights where there is a risk of falling.
2. Play with speed or situations involving uncontrolled speed and pace, potentially leading to collision with people or objects.
3. Play with dangerous tools where there is a risk of injury.
4. Play near dangerous elements, involving the possibility of falling into or from something.
5. Rough-and-tumble play, where children can unintentionally harm each other.
6. Play where children can disappear/’get lost’ or be out of the sight of adults.
7. Play near risky elements where children experience the thrill and/or fear associated with heights or speed but without the same potential for injury.
8. Play with impact involving possibility of injury to self or others.
9. Vicarious risk where children are drawn to observing the risk-taking of others.

1.2. Risky Play in the Context of Early Childhood Education and Care (ECEC) Curriculum and Pedagogy

The importance of healthy risk-taking generally receives limited attention within ECEC curriculum frameworks [17] with those from Australia, Wales, Northern Ireland, and Norway being among the few that encourage educators to provide opportunities for children to take risks [18–21]. Furthermore, despite the benefits and little evidence that risky play increases likelihood of injury [2], this type of play is often restricted due to perceived safety concerns [22,23]. ECEC settings often experience barriers impacting the provision of stimulating, outdoor play environments due to limited resources, regulatory restrictions, and safety/liability concerns [22–25]. Previous research has found children’s risk-taking opportunities in play are related to educators’ views, whereby educators who
have a more open-minded view of outdoor play encourage risk-taking, whereas those with anxiety or fear about children’s safety limit such opportunities [26–28].

1.3. Environments That Support Risky Play

The present study draws on Gibson’s [29] theory of affordances to examine how the children engage with the outdoor environment and how the environment supports risky play. Affordance theory proposes that the physical environment has functional properties that invite or afford different actions and behaviours [30] and that these are unique for each individual, varying in accordance with an individual’s body size, strength, skills, and motivation [24]. Children perceive what they can do in the environment in relation to their individual characteristics, hence, the same features of the environment will afford different behaviours for different children.

Kyttä [31] identifies three subsets of potential affordances that are regulated by social rules and practices that influence which affordances can be utilised. Firstly, the field of promoted action (FPA) refers to affordances within the environment that can be actualised and includes rules that determine when, where, and how this can be done in a socially approved way. Although the social and cultural context can support the actualisation of affordances, it can also restrict the utilisation and shaping of affordances, which Kyttä [31] identifies as the field of constrained action (FCA). Finally, although children mainly learn to perceive affordances that they have been actively encouraged to perceive within the field of promoted action, there also exist affordances a child discovers independently that are beyond those considered by adults [31]. Kyttä refers to this as the field of free action (FFA).

Outdoor spaces, especially environments with natural elements, provide greater opportunities for risky play [32]. Variables within the outdoor environment such as space, playground design, access to natural environments, and availability of sufficient quality resources represent a range of potential affordances and influence children’s opportunities for challenging, risky play. Dynamic, flexible and natural play environments that maximise affordances support inclusive play opportunities and allow children to play as they choose, including taking risks [13]. Natural playgrounds characterised by trees, bushes, open grassy area, rocks, steep cliffs, uneven ground surfaces, and slopes support more physically active play and children exposed to these environments demonstrate better balance and coordination skills than children do in traditional playgrounds [14,24]. Affordances within the environment that support physically active risky play also include areas for gross motor equipment (including equipment for balancing and climbing), swings, slides, and bikes, for example [22].

1.4. The Current Study

Although there is a growing body of research examining outdoor play of preschool and school-aged children, there has been limited research focus on the play of infants and toddlers in the outdoor environment [6,33,34]. Similarly, within the early childhood education context, to date research examining the role of risk-taking in promoting children’s development has mainly focused on preschool aged (4–5-year-old) children’s ‘risky’ play behaviours and the affordances in the environment that promote this type of play. The risky play of children under two years of age has only recently begun to receive research attention [15,16,35–38]. The current study aims to expand the extant research by focusing on younger (1–2-year-old) children’s engagement with an environment specifically designed to provide a more natural environment and promote more challenging physical play than is typically provided for children under the age of 3 years. It also aims to examine how these young children are supported in developing skills to identify and manage risks in their play [39]. The redesign of the environment also had the potential to expand the field of promoted action (FPA) as well as the field of free action (FFA) as the children discovered their own unique ways to actualise the environmental affordances.

In addition, Cooke et al. [40] suggest conceptions of risk in ECEC should go beyond just children’s outdoor physical activity, and that further research should consider risk
not only in children’s outdoor physical play, but in all aspects of ECEC. The present study contributes to this in not only examining risk-taking in relation to children’s physical play, but through the interviews also exploring how this redesigned space challenged the educators to reflect on their attitudes and pedagogy and to take a risk themselves.

2. Materials and Methods

2.1. Research Context

The research involved one group of 18–26-month-old children in a long day care setting in regional New South Wales, Australia. This setting was purposively selected as the outdoor area had been renovated to include features that are not typically provided for children of this age in ECEC settings. The setting was known to the researcher via ECEC network connections. Figure 1a,b show the outdoor environment prior to the redesign. The redesign added more natural elements, physically challenging features, and defined spaces (see Figures 2 and 3a–e) with the aim of increasing children’s sustained engagement in the environment.

![Figure 1a](image1a.png)

(a)

![Figure 1b](image1b.png)

(b)

**Figure 1.** (a) View of outdoor area prior to renovation. (b) Play provision in unrenovated outdoor environment.
Figure 2. Sketch of redesigned outdoor environment.

Figure 3. Cont.
Figure 3. (a) Seating area. (b) Walled pathways. (c) Sandpit and adjacent areas. (d) Stepping blocks and pathways. (e) Rocks, tyre tower and secluded areas.

2.1.1. Affordances for Risky Play in the Outdoor Environment

The redesign of the outdoor space used by the children in this study reflected Sandseter’s [41] affordances for risky play and included the following:

- **Features that afforded climbing** (heights or risky elements)—for example, tyre tower, A-frames, graduated stepping logs, and large rocks;
- **Features that afforded jumping down** (heights or risky elements)—for example, rocks, graduated stepping logs, A-frames and boards, and jumping dome;
- **Features that afforded balancing** (heights or risky elements)—for example, large rocks, a dry creek bed, graduated stepping logs, A-frames, and boards;
- **Flat, smooth surfaces, and open spaces** affording running, cycling and rough-and-tumble play (impact, speed or rough-and-tumble play)—for example, paths and open grass areas;
- **Secluded areas**, affording privacy and hiding—for example, walled activity spaces and areas behind bushes.

Figures 4–9 show the range of affordances available for children in the outdoor environment that potentially support risky play.

Figure 4. Tyre tower.
2.2. Participants
Twenty children (12 female, 8 male) aged 18 to 26 months (M = 22.68 months), their seven educators, the centre’s Educational Leader, and Director (8 females, 1 male) participated in the study. This group of children was of particular interest as they were the youngest of the children who shared this outdoor space. For the purpose of this paper, all adult participants will be referred to as educators. The nine educators ranged in age from 18–40 years and had experience in the ECEC sector ranging from one to ten years. Three had a Diploma of Early Childhood Education and Care (ECEC 1 (with one studying to upgrade to university qualification), and the remaining six were assistants with a Certificate III in ECEC 2.
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2.3. Data Collection

Ethical approval for the study was gained from the Macquarie University Human Ethics Committee. Educators provided written consent for their participation, and parents provided written consent for their children to participate. When researching with children, considerations that ensure the rights of the participants should be taken, hence, the children were also informed verbally that their play was being recorded by the cameras placed in the playground on each occasion of data collection. No instances of children indicating reluctance to be videoed were noted or reported to the researcher. Details of the children in attendance on each day of recording (including what the child was wearing) was provided by the educators to facilitate recognition of children and any footage of children for whom consent had not been provided was not included in the data analysis.
The children’s play and educator interactions were observed in the outdoor environment using GoPro cameras two days per month (except August and September—only one day per month) over a seven-month period from April to October (Autumn, Winter, Spring) during their morning play session (typically from 10.00–11.00 a.m.). The average duration of the observations was 52 min 18 sec per day. The cameras were mounted in three fixed locations within the playground, providing coverage of the entire space.

Educators’ interactions with children during play were also captured using the LENA system, which comprises a small audio recorder, worn by the educator, that records all speech and other sounds experienced and produced by that adult and children or adults they are conversing with.

Adult attitudes and beliefs about risk-taking were explored through formal questionnaires, semi-structured interviews, and observations of their interactions with children during play. Individual semi-structured interviews with teachers were conducted during the first two visits to the centre to explore their opinions on the redesigned space and responses to children’s engagement with the risky play affordances within the space.

2.4. Measures

Educators’ personal risk-taking disposition was assessed using the **Attitudes Towards Risks Questionnaire** [42] which comprises 20 items pertaining to risk-taking beliefs and behaviours and included issues such as physical risks, social approval/disapproval, the enjoyment that comes from taking risks, and disregard for danger. This is a self-report measure in which educators were asked to indicate the extent to which the statement is representative of their behaviour using a 5-point scale ranging from ‘like me’ (score = 4) to ‘not like me’ (score = 0). A total score was derived from the sum of all the item choices with the minimum score being zero and the maximum 80.

Educators’ attitudes towards children’s risk-taking in play was also explored via the **Tolerance of Risk in Play Scale** (TRiPS) [43]. The TRiPS consists of 31 items relating to supervision, child injury risk, and everyday risk scenarios derived from Sandseter’s [7] six categories of risky play activities for children aged 2 to 12 years and range from those most people would deem ‘not risky at all’ to items most would deem as ‘very risky’. Item 1 (How much do you encourage children to take everyday risks?) was answered using a Likert scale from 1 (Not at all) to 5 (A lot/Always) and the remaining 30 items with the root question, ‘Would you allow the child to...?’, require a ‘Yes’ or ‘No’ response. “No” answers are scored 0 and “yes” answers are scored from 1–12 weighted according to their acceptability based on a Rasch analysis of a validation study [43], with the most acceptable statements scoring lower than the least acceptable statements.

2.5. Data Analysis

For children’s risky play and adult interactions during play, a deductive approach to analysis was adopted with initial codes drawn from the existing literature [44]. The children’s engagement in the environment was coded using NVivo software [45] in relation to risky-play categories [7,15] and the affordances within the outdoor space (the tyre tower, rocks, secluded spaces, etc.) were coded using a priori codes developed based on key defined areas/features of the environment and knowledge of the extant risky play affordance literature [16,41]. The video episodes were coded at two-minute intervals for any instances of the target behaviours or actualisation of environmental affordances.

Video and audio recordings of educators’ interactions and discussions with children during play were coded using NVivo software in relation to both physical and verbal behaviour. Categories of behaviour were adapted from Morrongiello and Dawber [46] to include physical as well as verbal behaviours. Behaviour was coded in accordance with the following broad categories: no active interaction (supervision); physical presence (being actively available to provide support should child request it); active interaction (offering physical support, modelling, praise/encouragement, or instructions); intervention (redirecting or stopping the behaviour or using some form of behaviour management or
crisis intervention when child upset or injured). Educator interviews were transcribed verbatim and coded thematically in NVivo in terms of educators’ conceptions of risk-taking, opinions on the changes to the environment, and their responses to the children’s play behaviours within the redeveloped environment. Quantitative data from the ATR and TRiPS was analysed in SPSS using descriptive and inferential statistics.

3. Results

3.1. Educators’ Attitudes towards Risk, Risky Play and the Outdoor Environment

Analysis of educators’ personal risk-taking disposition as assessed by the ATR Questionnaire. Total scores ranged from 21 to 54 with a mean of 30.89 (SD = 11.53). Scores for the physical risk items ranged from 14 to 31 with a mean of 21.89 (SD = 6.74)), whilst scores on the psychological risk items ranged from 1 to 23 with a mean of 9.0 (SD = 6.96).

TRiPS total scores ranged from 16 to 112 (M = 57.33, SD = 32.05). The median score on the TRiPS scale was 50 (16–112) out of 184. A median of 12 (6–21) out of 30 statements were answered “yes”, indicating that most educators would allow children to engage in 40% of the risky play activities. The association between educators’ personal risk-taking dispositions and their tolerance of children’s risk-taking was examined using Pearson’s r and no significant correlation was revealed (r = 0.395, p = 0.293).

Educators’ conceptions of risk, views on the changes to the outdoor environment, and responses to children’s risky play were examined via semi-structured interviews. Overall, the majority of the educators (n= 8.89%) discussed risk-taking from a positive perspective with risk-taking being equated with challenge or trying something new. Of these, three educators (33%) also explained that it involved weighing up the risk in relation to your own capabilities and that it involves an affective component related to overcoming fear. Only one educator spoke about risk-taking purely in terms of negative outcomes associated with injury or causing harm.

Deductive analysis of the educators’ responses related to the redesigned environment and the children’s engagement in risky play revealed five main themes: changes offered opportunities; environment supports children’s development; initial safety concerns; strategies for managing risk and safety; and children being more capable than expected.

Overall, the changes to the environment were considered positively and supported greater diversity of play experiences than previously.

“It’s good because it like gives the kids something to do that’s more difficult” (ECE01)

“Just having the rocks around. They love to stand on them, and walk around and count as they’re going around, and jump from one rock or from the big rock to the little rock. It’s really good being the natural stuff rather than a climbing frame . . . you must climb up the climbing frame this [particular] way . . . ” (ECE04)

As a consequence of the positive experience the educators had with the changes that had been made, they also saw the possibilities for making further changes in some of the less utilised spaces at the side of the building, both in terms of adding more natural elements as well as more physical challenges.

“Probably get more pot plants, more plants to have like fruit and stuff so they can learn . . . experience growing plants” (ECE03)

“We’ve got a little rock-climbing wall that we’ve got over outside the nursery which was to help the children stand and get used to climbing . . . I think I would like to have a climbing wall within the outdoor yard itself” (ECE07)

“Maybe around the side or something, more things like the tower because they love climbing on things like that so I think it would be good to have a few more things” (ECE10)

The positives of the new environment were also discussed in terms of the benefits for children’s development with the educators highlighting how the redesigned environment supported not only children’s physical development, but their language and social development as well.
“I think the tyre tower is definitely one of the best things we’ve got. Because it’s more for their upper strength. We do have a lot for their lower body so they’re working the muscles in their legs but it [the tyre tower] definitely really focusses on their upper strength which is really good” (ECE01)

“The other good thing about it, once they’re up the top [of the tyre tower], the conversation that they have with you about what they can see. So, they’re just sitting up there . . . even though they’re not thinking about it, they’re talking so much more—so you’ve got that whole language development side of things as well. And social skills . . . they do watch their friends and like they’re at different levels and they play ‘peek-a-boo’ or ‘I’m up bigger [higher] than you’ and that sort of thing. So they have a look and they encourage them—‘can I go a little bit higher’ or ‘which way can I go’ that sort of thing” (ECE04)

Despite their overall positive views on the resigned environment, the educators did acknowledge concerns. Whilst some of the educators participating in the study had been involved in the redesign of the environment, others joined the centre after it had been completed, but overall, most of the educators revealed they did have some initial safety concerns, both in terms of what they saw as potential hazards as well as coming to terms with their own fears, especially in relation to the tyre tower.

“The tyre tower I guess frightened a few of us at first but it didn’t take long for us to get used to it” (ECE08)

“I liked the tyre tower but then in the first week [I thought] I’ve got to watch these kids climb to the top of this—I was a bit ‘stand-offish’ because . . . oh my god . . . they’re so little . . . they’re only 18 months old some of them . . . so I was a bit nervous because as a parent you think ‘come down from there, you’re going to hurt yourself’ . . .” (ECE04)

“I thought ‘that looks scary’ [the tyre tower]. I don’t like heights” (ECE09)

In addition to the tyre tower, the educators also identified the rocks and the stepping blocks as features that raised concerns for them.

“Even though we can hold their hands [when the children are balancing on the blocks], sometimes they’ll jump up without us being there and they’ll try to walk and they’ll fall and with the concrete and everything, it really scares me . . .” (ECE03)

“Actually, I was a bit surprised because I honestly didn’t think they’d have that sort of stuff in a childcare yard because of the dangers of it. Like . . . but the girls [other educators] obviously make it work here and that’s all that matters” (ECE06)

This previous comment points to the importance of developing strategies for managing risk to ensure the children’s safety. Supervision, being present to offer support, and teaching children necessary skills were identified as the most important means of ensuring the children’s safety.

“You always think ‘ooh what’s gonna happen’ but we do talk to the educators about it and we make sure that there’s plenty of supervision and that they understand the steps in showing the children how to climb up or down. Because a lot can climb up but they have a lot of trouble when it comes to climbing down again and that’s when they [the children] get scared the most . . . coming back down . . . and just giving the educators the tools to know how to show. Demonstrate or talk to the children about how . . . and if a child does start to get that completely scared that they just can’t move, then that’s when we step in and help them off the tower and comfort them and that sort of thing” (ECE07)

“We’re always with them and guide them if they need any help. They seem to really know what they can do. If they don’t feel safe they usually come down” (ECE01)

Over time, the educators gradually came to terms with their initial concerns and came to the realisation that their concerns were unfounded, through taking the time to stand back and observe how the children engaged and coped with the environment.
“To watch them and the way that they know how to go through the middle and climb up rather than hanging on the outside. They’re actually quite capable – they must be able to see for themselves how they’re going to do it” (ECE04)

“Some of the boulders around the edge of the sandpit can be quite big for the really little kids and they do have trouble stepping over . . . but they do learn how to do it and they do find the best spot to go in so it does help them problem solve and work out the best way to get into particular areas” (ECE07)

“Watching the kids – like if they knew how to climb up it and they were safe . . . and if they were standing up, just telling them they had to sit down. Like, I did like it and does let them show how they can climb and their strength . . .” (ECE09)

Coming to see the children as capable contributed to changes in the educators thinking about the abilities of these young children, contributing to changes in practice and a willingness to take risks themselves in their pedagogy.

“One part was that they could do it and they could hang on without me having to put my hands around their waist and be ready at any second. And realise that they weren’t scared, so why should I be scared. You can quite easily stand back and talk to them and be there and they know that you’re there and be that safety [for them]. But they love sitting at the top and they look down and [say] ‘look what I can see’. So, it’s seeing them with that bit of confidence and that independence that ‘I’m up here and I’m bigger than you’ that they really shine and they just love it up there. . . . Why should I be scared if they’re not scared and [are] having fun - just let them go . . . so it’s about taking the risk” (ECE04)

3.2. Children’s Play Preferences

The children utilised most of the outdoor space for their play during the periods observed. Children’s preferences for specific affordances within the outdoor environment are outlined in Table 1. Overall, elements within the outdoor environment that afforded climbing (e.g., tyre tower, A-frame, stepping blocks), jumping (large rocks, jumping dome, stepping blocks), balancing (large rocks, dry creek bed, stepping blocks), and riding/pushing (wheeled toys) were the most popular. The variety of wheeled toys were the most frequently used affordance in the children’s play as the children rode/pushed these around all areas of the environment, with climbing the tyre tower being the second most preferred activity.

Table 1. Children’s play preference for environmental affordances.

<table>
<thead>
<tr>
<th>Environmental Affordances</th>
<th>Frequency (% of Total Observed Outdoor Play)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-frame</td>
<td>60 (18%)</td>
</tr>
<tr>
<td>Dry creek bed</td>
<td>93 (30%)</td>
</tr>
<tr>
<td>Jumping dome</td>
<td>35 (10%)</td>
</tr>
<tr>
<td>Large Rocks</td>
<td>94 (28%)</td>
</tr>
<tr>
<td>Open space</td>
<td>13 (4%)</td>
</tr>
<tr>
<td>Seclusion</td>
<td>64 (19%)</td>
</tr>
<tr>
<td>Slide</td>
<td>47(10%)</td>
</tr>
<tr>
<td>Stepping blocks</td>
<td>47 (10%)</td>
</tr>
<tr>
<td>Tyre tower</td>
<td>182 (55%)</td>
</tr>
<tr>
<td>Wheeled toys (bikes, wagons etc)</td>
<td>199 (60%)</td>
</tr>
</tbody>
</table>

Note: Frequency represents observations of children’s play in various locations at the same time as captured by the three cameras.
3.3. Children’s Engagement in Risky Play

Frequency of children’s engagement in risky play are outlined in Table 2. Kleppe’s category of ‘risky elements’ (sharing features of objective risk, e.g., loss of balance due to uneven surfaces, height or speed, but not sufficient to cause physical injury) represented the most frequent form of risky play, followed by play with heights associated mainly with the tyre tower.

<table>
<thead>
<tr>
<th>Risky Play Categories</th>
<th>Frequency of Risky Play (% of Total Observed Outdoor Time)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact</td>
<td>46 (14%)</td>
</tr>
<tr>
<td>Heights</td>
<td>256 (77%)</td>
</tr>
<tr>
<td>Hiding/’Disappear’</td>
<td>65 (17%)</td>
</tr>
<tr>
<td>Risky elements</td>
<td></td>
</tr>
<tr>
<td>Uneven ground</td>
<td>111 (34%)</td>
</tr>
<tr>
<td>Heights</td>
<td>156 (47%)</td>
</tr>
<tr>
<td>Speed</td>
<td>138 (42%)</td>
</tr>
<tr>
<td>Rough &amp; tumble play</td>
<td>4(1%)</td>
</tr>
<tr>
<td>Vicarious</td>
<td>8 (2%)</td>
</tr>
</tbody>
</table>

Note: Frequency represents observations of children’s play in various locations at the same time as captured by the three cameras.

The environmental affordances identified above were analysed in terms of Sandseter’s [7] and Kleppe’s [16] categories of risky play (see Table 3). The tyre tower afforded play with heights for those children who climbed to the top of the tower to sit on the rim of the tyres and move between the two sections of the tower at its full height. The tyre tower also promoted play with risky elements (heights) for those children who only climbed to lower levels within the centre of the tower structure. A variety of wheeled toys afforded play with risky elements (speed) as well as play with impact as children banged the toys into physical features in the environments such as rocks, fences, poles, and stepping blocks. Overall, the rock area and dry creek bed provided opportunities for the children to engage with risky elements as they routinely balanced, precariously stepping or jumping from rock to rock, as well as play with heights as they jumped from the highest rock. Children competently negotiated the space, however, they often sought adult support as few children felt confident enough to jump independently from the rock.

<table>
<thead>
<tr>
<th>Risky Play Categories</th>
<th>Frequency of Risky Play Occurrences Associated with Environmental Affordances</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-frame</td>
<td>1 12</td>
</tr>
<tr>
<td>Bikes/wheeled toys</td>
<td>88 43</td>
</tr>
<tr>
<td>Dry creek bed</td>
<td>39</td>
</tr>
<tr>
<td>Jumping dome</td>
<td>21</td>
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<tr>
<td>Open space</td>
<td>3</td>
</tr>
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Table 3. Cont.

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<thead>
<tr>
<th>Risky Play Categories</th>
<th>Frequency of Risky Play Occurrences Associated with Environmental Affordances</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hiding/‘Disappear’</td>
</tr>
<tr>
<td>Large rocks</td>
<td>42</td>
</tr>
<tr>
<td>Seclusion behind</td>
<td>48</td>
</tr>
<tr>
<td>bushes/walls</td>
<td></td>
</tr>
<tr>
<td>Slide</td>
<td>12</td>
</tr>
<tr>
<td>Stepping blocks</td>
<td>73</td>
</tr>
<tr>
<td>Tyre tower</td>
<td></td>
</tr>
</tbody>
</table>

3.4. Educators’ Interactions with Children during Play

Table 4 summarises adult interactions with the children during the observed play episodes. The majority of interactions with children involved supervision of the play space (31.35%) with providing physical support or having a physical presence (to readily provide support) being the next most frequent interaction type. Verbal support, especially related to climbing down from the tyre tower, was provided in the form of instructions as to where to place feet and hands. Opportunities for conversations were also common when children were sitting on the top of the tyre tower as they could view the neighbourhood surrounding the centre. Overall, there were few instances where educators felt they needed to intervene to manage risks to ensure children’s safety.

Table 4. Adult interactions during observed play episodes.

<table>
<thead>
<tr>
<th>Interaction Category</th>
<th>Number of Episodes</th>
<th>Percentage (%) of Observed Interactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervision</td>
<td>74</td>
<td>31.35</td>
</tr>
<tr>
<td>Physical presence</td>
<td>18</td>
<td>7.62</td>
</tr>
<tr>
<td>Encouragement</td>
<td>20</td>
<td>8.47</td>
</tr>
<tr>
<td>Praise</td>
<td>16</td>
<td>6.78</td>
</tr>
<tr>
<td>Physical support</td>
<td>39</td>
<td>16.52</td>
</tr>
<tr>
<td>Modelling</td>
<td>3</td>
<td>1.27</td>
</tr>
<tr>
<td>Instruction</td>
<td>15</td>
<td>6.36</td>
</tr>
<tr>
<td>Explanation</td>
<td>3</td>
<td>1.27</td>
</tr>
<tr>
<td>Play</td>
<td>5</td>
<td>2.11</td>
</tr>
<tr>
<td>Conversation</td>
<td>15</td>
<td>6.36</td>
</tr>
<tr>
<td>Caution</td>
<td>7</td>
<td>2.97</td>
</tr>
<tr>
<td>Request to stop</td>
<td>6</td>
<td>2.54</td>
</tr>
<tr>
<td>Prevention</td>
<td>6</td>
<td>2.54</td>
</tr>
<tr>
<td>Directive to stop</td>
<td>3</td>
<td>1.27</td>
</tr>
<tr>
<td>Directive—other</td>
<td>2</td>
<td>0.88</td>
</tr>
<tr>
<td>Crisis intervention</td>
<td>4</td>
<td>1.69</td>
</tr>
</tbody>
</table>

Note: Recorded interactions reflect behaviours of different educators engaged with different children in different locations at the same time.

Using Nvivo software (QSR International, 2020), a coding matrix query was conducted to identify relationships between child risky play behaviour, affordances, and adult interactions. This analysis revealed that interactions were contingent upon children’s behaviour
and the environmental affordances (see Figures 10 and 11) with physical presence, physical support, instruction, encouragement, and praise being the most frequent form of adult response after supervision and these were mainly related to play with heights associated with the tyre tower and rocks.

Figure 10. Frequency of adult interaction categories associated with risky play categories.

Figure 11. Frequency of adult interaction categories associated with different affordances.
4. Discussion

The redesign of the outdoor environment was informed by an understanding of the benefits of encouraging risky play and exploration of the natural world [4–6]. Overall, the video observations demonstrated the ease with which these children adapted to and negotiated the additional challenges presented by the affordances within the redesigned environment.

The findings align with those of Sandseter, Storli, and Sando [47] indicating that the provision of fixed functional equipment, pathways, open areas, and nature is associated with children’s engagement in functional play (running, riding bikes, tumbling, scrambling over rocks, sliding, climbing). This type of play is also associated with higher levels of physically active play (running, climbing, jumping, pedalling) which was observed as the children actualised environmental affordances such as the tyre tower, rocks area, jumping dome, open areas and paths, again consistent with previous studies [34]. Such activities are important in providing opportunities for children to meet the recommended daily physical activity of at least 180 min a day in a variety of physical activities, of which 60 min is energetic play, spread throughout the day [48].

The redesigned permanent physical features in the environment provided diverse play opportunities and supported different forms of risky play. In line with previous research [7,8,16], the young children in this study were drawn to play involving heights, speed, impact and hiding, and, to a lesser extent, rough-and-tumble play. Play with heights was supported by the tyre tower, as it presented a more challenging climbing experience than is typically available in outdoor play spaces for children of this age group. Despite its potential challenge, the tyre tower was a popular activity and children demonstrated their climbing competence. Similarly, the rocks and dry creek bed introduced risky elements into the environment that provide opportunities for children to develop their balance as they engaged with the instability these elements introduced. These toddlers also enjoyed play with speed and impact in their use of a variety of wheeled toys. These forms of risky play support children’s development as they develop the use of their large muscles, proprioception, and practice and refine their stability and locomotor skills as they negotiate the environmental affordances in this redesigned space [49].

As well as the opportunities for more physically challenging play, risky play in the form of secluded play was also frequently observed in the area behind the bushes and mirrors. Children are drawn to creating ‘secret’ spaces where they feel they are removed from rules, adults, and daily routines [50] and develop a sense of belonging and connection to the place and each other [37].

The ability to appraise risk and take responsibility for one’s own safety is an important life skill. Nikiforidou and colleagues [51] argue that the provision of opportunities for children to manage risk in a familiar environment should begin in early childhood. The redesign of this environment to include more challenging experiences along with supportive adults provided an ideal context for these young children to begin to develop the risk management skills as they were supported to take responsibility for their own and others’ safety. By stepping back and watching children, giving them the time and space to make their own decisions, practitioners saw that children were capable not only in terms of their motor competence but also in adhering to the ‘rules’ that had been developed, and managing their own safety. Other studies have similarly found that educators who view children as capable are more open to trusting children to direct their own learning and take responsibility for their own safety [52,53] and that educators have an important role in teaching children how to manage dangers by allowing them to experience risky challenges. This was evident in both the educators’ interview responses as well as their interactions with the children during play. These findings lend further support to those of Tangen and colleagues [39] whose observations of 17–24-month-old children in natural outdoor environments found that the children were constantly assessing and managing risks as they negotiated the environment. They also highlighted the importance of adults trusting children to explore and handle risks on their own.
Finally, both the interviews with the educators and their interactions with the children demonstrated how the educators themselves also took risks in relation to their pedagogy in coming to terms with supporting the children in an environment that is not typical for ECEC provision for children under 3 years of age. In their study of educators’ risk-taking in professional practice, Cooke and colleagues [40] found that educators’ risk-taking was enacted through the provision of “opportunities for children to take risks; trusting children; doing things that are new; expressing ideas and beliefs; and including curriculum content that may be considered controversial, complex and inappropriate for children” (p. 14). These same themes were evident in the views and practices of the educators in the present study.

**Limitations**

Although the study identified positive outcomes associated with the redesign of the outdoor environment, both in terms of children’s actualisation of the affordances within the environment and educators’ pedagogy in supporting risky play, the limitations of this small-scale study need to be acknowledged. Some of the educators in this study were involved in the decision-making process in the redesign of the space and therefore potentially more open to accepting the beneficial outcomes of risky play. It should also be acknowledged that participation in the study may also have influenced the other educators’ greater acceptance of the children’s risky play behaviours. As previous research has found, children’s actualisation of affordances in the environment are influenced by adult attitudes, therefore, professional development and ongoing dialogue regarding the benefits of risky play and intentional teaching strategies that support children in this type of play are important considerations in ensuring children’s actualisation of affordances for risky play are promoted rather than constrained by adult attitudes towards risk.

5. Conclusions

The redesign of the outdoor environment, combined with the presence of supportive adults created a greater field of promoted action [32] than was previously the case in this environment. Prieske et al. [54] suggest that children tend to actualise affordances that are not overly challenging, engaging in more challenging activities only occasionally. The physical elements added to this playground (e.g., tyre tower, large rocks, graduated stepping blocks) are features that are generally not the norm in ECEC outdoor spaces for children under three; however, the extent to which the children actualised these affordances suggests that these features were not beyond their Zone of Proximal Development [55], suggesting that these children were capable of negotiating a more challenging environment than is typically provided for this age group. These findings provide support for greater recognition of the capabilities of young children and a rethinking of appropriate outdoor environments in ECEC settings for children under 3 years.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** The study was conducted in accordance with the Declaration of Helsinki, and approved by the Macquarie University Human Research Ethics Committee (protocol code 5201600869 and date of approval: 19 December 2016).

**Informed Consent Statement:** Informed consent was obtained for all participants involved in the study.

**Data Availability Statement:** The data in this study are unavailable for individuals other than the researchers involved in this project due to the risk of identifying research participants.

**Acknowledgments:** The author acknowledges the support and contribution of the educators, children and families who participated in the study.

**Conflicts of Interest:** The author declares that there are no conflict of interest.
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