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Table of content

Synthesis 6

Young Children’s Outdoor Play-Based Learning 9
[1]ANGIE REKERS, PHD, [2]JANE WATERS, PHD, JULY 2024

The Influence of Outdoor Play on Social and Cognitive Development 20
SHIRLEY WYVER, PHD, NOVEMBER 2024

Outdoor Risky Play 29
[1]ELLEN BEATE HANSEN SANDSETER, PHD, [2]RASMUS KLEPPE, PHD, OCTOBER 2024

Risky play and mental health 40
HELEN F. DODD, PHD, SEPTEMBER 2024

Active Outdoor Play 47
VALERIE CARSON, PHD, MADISON BOYD, MSC, AUGUST 2024

Outdoor play and climate change: Impacts, Adaptation and Opportunities 58
[1,2,3]ZACHARY DALY, MSC, RN, [3,4,5]BREANN CORCORAN, MSC, BA, SEPTEMBER 2024

Creating Inclusive Naturalized Outdoor Play Environments 68
NILDA COSCO, PHD, ROBIN MOORE, MCP, HONASLA, MAY 2019

Indigenizing Outdoor Play 75
[1]V. ANGELA JAMES, BED, MA, EDD, [2]CHLOE DRAGON-SMITH, BSC [2]WENDY LAHEY, BSC, BPHE, BED, MED, MAY 2019

Building Capacity to Support Outdoor Play in Early Childhood Education 80
[1]BEVERLIE DIETZE, PHD, [2]DIANE KASHIN, EDD, SEPTEMBER 2024

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Designing Cities for Outdoor Play 88
[1]TIM GILL, BA, MA, [2] EMILY GEMMELL, MPH, SEPTEMBER 2024

Early Childhood Outdoor Play and Learning Spaces (ECOPALS): Achieving Design Quality 98
ROBIN MOORE, MCP, HONASLA, NILDA COSCO, PHD, MAY 2019

Topic Commentary: Why Outdoor Play? 105
MARIANA BRUSSONI, PHD, RACHEL RAMSDEN, MPH, SEPTEMBER 2025

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Synthesis

How important is it?

Outdoor play is increasingly recognized as a foundation for children's healthy development. Children are hard-wired to need nature and to play in their natural environments. Research shows that unstructured play that takes place outdoors is vital to children's social, emotional, cognitive and physical development.

Yet it seems that children today spend less time engaged in outdoor play compared to previous generations. In fact, more than 56% of children play less than an hour a day outdoors. Caregiver concerns around children's safety may be one of the biggest barriers to outdoor play. Other factors include the growing presence of screen time in children's lives, as well as hurried, overscheduled and academically focused lifestyles. Some research suggests that this reduction in opportunities for unstructured outdoor play may already be responsible for declines in creative thinking, reduced ability to get along with others and increased mental disorders.

Climate change, (e.g., extreme temperatures, wildfire smoke, and flooding) can negatively impact outdoor play by making play less safe, reducing access to play, and reducing the quality of play that occurs.

Discussions about the place of the outdoors as a site for young children's play and learning are now commonplace in reports and publications worldwide. There is also a growing desire among parents and educators to re-engage children with nature.

What do we know?

Studies have found that when children play outdoors, they are more physically active than when they play indoors. Beyond the well-known health benefits of physical activity, research has found that outdoor play and access to green space is associated with higher vitamin D levels, improved mental well-being, better attention and prosocial behaviours, better self-regulation, and improved spatial memory.

Natural environments provide children with more challenge and stress-buffering conditions. Evidence suggests that repeated exposure to high-quality, unstructured outdoor play opportunities has a positive impact on social and cognitive development, including executive functions. This refers to thinking processes such as inhibitory control, working memory and cognitive flexibility. Children's outdoor play experience in the early years is linked to later academic performance. Playing outside is important for children with disabilities, too. Natural landscapes offer comfort and stimulation. Moreover, contact with a variety of living organisms (plants, animals, insects, bacteria) helps to boost the immune system and may reduce the development of allergies. Exposure to nature may also decrease symptoms of attention deficit disorder. Outdoor play is also linked to greater environmental awareness and connections with nature, and the development of environmental stewardship. Conversely, a lack of outdoor play may undermine children's concerns for the wider environment.

Despite the benefits of outdoor play, parents around the world report that children today play outside less than previous generations. Children's access to outdoor spaces may be increasingly limited by risk aversion—a perception that children lack competency to engage with the world alone and are in danger when outside. The general trend is a decrease in children's opportunities for risk-taking in play. Yet play appears to be an ideal context to develop the ability to handle risk; children who engage in outdoor risky play learn to assess risk in a more accurate way. Evidence also suggests that allowing children a certain level of autonomy strengthens their self-awareness and ability to self-regulate. Risky play might play a role in preventing mental health problems by lowering anxiety and depression symptoms, both in childhood and later in life.

What can be done?

Parents, early childhood educators and other caregivers are the gatekeepers for outdoor play opportunities in early childhood. They should aim to strike balance with scheduled activities, screen time and free time. When working with families, health care professionals should promote outdoor play across settings and weather conditions. Children should be given opportunities outdoors where they can explore the world around them, challenge themselves physically and play with others. Caregivers should try to avoid over-surveillance, which may prevent children from learning to negotiate risk and gaining physical competence.

Ideally, outdoor play should involve changing conditions, like those found in nature, to encourage children to adapt and become flexible. Some educational environments have introduced "loose

parts play” onto the playground—large objects with no obvious play purpose. Versatile, complex and flexible play environments can accommodate children’s diverse interests, varied competency and risk tolerance. New models of early childhood outdoor space have emerged in response to the obesity crisis and the children and nature movement. Recommended designs involve flowing and looping pathways, portable and loose part components (wheeled toys, balls and sticks), shade trees and lots of nature.

Because children spend a large part of their time in childcare settings, improved policies may be one way to ensure that young children get more outdoor time. For example, in Canada, while all provincial regulatory bodies mandate daily outdoor play if weather conditions are appropriate, only two provinces specify the frequency or duration. Early learning educators need support to understand their role in outdoor play supervision. Currently, there is a lack of formal education and professional development related to outdoor play. A more cohesive approach to developing and implementing policies, procedures and curriculum as they relate to outdoor play would help to better promote the value of outdoor play. Indigenous philosophies and research may offer a more holistic, balanced approach to developing practices, programs and policies that impact children’s growth and development in outdoor play. When time spent in nature is part of everyday living and learning, it becomes a wide-ranging and inclusive experience.

Finally, neighbourhood planning and design is important. Low traffic volumes, fewer intersections, natural environments, greenness and access to a private yard, other children to play with are all linked to higher levels of outdoor play. Key levers for change are at the municipal level, where such decisions are usually made. Naturalized play areas should also be inclusive, so that children with disabilities and their able-bodied peers and siblings can play together.

Young Children's Outdoor Play-Based Learning

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Introduction

In this chapter, we consider current thinking about young children's learning when they engage in outdoor play. The role of the teacher, parent and/or caregiver (hereafter 'adult') and the importance of cultural context in relation to the learning that takes place outside is explored. Recent research, noting the reduced opportunities for unsupervised outdoor play, centres upon:

- The child's developmental outcomes, e.g., physical, socio-emotional, cognitive, creativity and imagination;
- Children's connections with the non-human natural world.
- The adult's role in children's play, learning, access to and engagement with the outdoors.
- The setting, i.e., urban spaces, natural/non-built spaces, pedagogical spaces.

Subject

Young children's learning is the focus of attention globally and is seen as the route by which countries can invest in their futures1 as part of Sustainable Development Goals.[2] Within this global conversation, the position of play in young children's learning, the forms of play that support learning and 'effective' provision for young children's playful activity as a part of their care/education experiences are debated and contested.[3-7] Discussions about the place of the outdoors as a site for young children's play and learning are now commonplace in international literature.[8-13]

The content of research and literature relating to children's learning outside is wide ranging, and includes, for example:

- the impact of outdoor play provision on children’s motor skills development, health and fitness;[14]
- risk negotiation skills;[15,16,17]
- early scientific enquiry through hands-on engagement with the natural world;[18]
- participation and sense of self through playful experiences in the outdoors;[19]
- the attunement of young children with the physical world around them in order that they are ‘at home in the world’ and may develop an ecologically sustainable outlook;[20,21]
- post-humanist and post-colonialist ‘common world’ understandings which take account of children's relations with all living and non-living others in their worlds.[22]

Problems

An essential feature in the field of outdoor play provision is the orientation of the adult, since this will shape the learning experiences of the child. Key issues are:

- Adult understandings of and orientations toward play, children’s competencies and the outdoor space;
- Tensions between ‘free play’ and play as a directed learning activity, between structured curriculum goals and play-based approaches;
- Availability and quality of outdoor play spaces;
- Decreased opportunities for outdoor play, the causes of which are socially, culturally and historically situated.

Research

The issues above are addressed across a range of research paradigms, often through small scale qualitative studies and, increasingly, through interdisciplinary research which can be influenced by turns in philosophical thinking. This includes, for example, children’s geographies;[23,24] early childhood education considering children’s inter-/intra-activity with materials;[25,26] ecological and environmental psychology;[27] and socio-cultural perspectives within the field of education.[28]

Key Research Questions

Research questions in the area of outdoor play and learning are similarly wide-ranging. Some key questions include:

1. How does outdoor learning take place? What is the role of the adult and peers?
2. How do we understand children's engagement with their surroundings, adopting a 'common worlds' approach?[29]
3. What is the contribution of outdoor play to children's holistic development, including their relationship with the outdoor environment?[62]
4. How do children participate in different spaces? How is their participation related to the adult conceptualizations and intended purposes of the space?[30,31]

Recent Research Results

Global environmental concerns continue to urge us to incorporate environmental education and outdoor play opportunities within early childhood provision. Research demonstrates how this benefits children holistically.[62] Results of small-scale qualitative studies typically are localized to specific contexts. The evidence base includes studies, relating to social and emotional development, physical health and activity, and cognitive benefit indicators.[32-35]

However, children's experiences in the outdoors are shaped by their specific social-cultural context, the perceptions and attitudes of adults towards their competencies, and the specific affordances of the outdoor space.[36] Therefore, the existing evidence base can provide some relatable insights for planning for children's outdoor play-based learning.

The orientation of adults who provide access to, and shape interaction with, the outdoor space is emphasized throughout the literature. If adults are risk averse, or underestimate children's competencies, children can be deterred from overcoming fear of new challenges;[37] conversely, adults can support children's engagement in risk-taking to gain mastery over challenges and adjust understandings of their own competencies.[38-40]

Children's access to outdoor spaces may be increasingly limited as a result of risk aversion, the perception that children lack competency to engage with the world alone, and are in danger when outside.[13,24,41-43] The corollary to such cultural understandings is that those providing care and education for young children may be risk averse and fear litigation.[44] Similarly, those designing play equipment for young children can create unappetizing play spaces lacking

challenge.[45] Such adult orientation can mean that children's play, if understood as being freely chosen, personally directed and intrinsically motivated,[46,47] may be severely curtailed, especially outdoors.[48] Cultural aversions to inclement weather can also limit children's access to outdoor play,[49] rather than expecting children to experience weather conditions as part of their development as capable, ecological citizens.[50]

The conflict between child-directed activity and adult-driven agendas and interpretations are evident.[31,46,51] Children's playful activity may contrast with adults' expectations as children interact[25] with the socio-material environment. Importantly, playful activity does not necessarily only happen within the allotted time,[52] or within the allocated spaces.[53]

Adults adopting a 'playful pedagogy approach'[54-56] in which interactions are directed responsively toward the interests and activity of the child appears to enhance opportunities for learning,[3,57-59] including environmental engagement62 and increased responsive communication between adults and children.[36,59]

Research Gaps

Further empirical work would benefit our understanding of the impact of professional learning, and differing employment routes into the early years education-care sector, on the provision for, and outcomes of, children's playful engagement in the outdoors.

While the value of large-scale quantitative studies in the area of early childhood is contested;[60] there is a gap in the empirical evidence base which lacks systematic large-scale studies comparing children's learning for those engaging in regular outdoor play compared to no such engagement.

There are also research gaps pertaining to the impact of, and mechanisms by which, children with diverse needs engage and learn through play in the outdoors.

Conclusions

The literature related to children's outdoor play and learning increasingly demonstrates that children benefit from opportunities to regularly engage in playful activity in a variety of outdoor spaces. It also demonstrates the relationships between adults' attitudes and actions and the learning outcomes of children that result from playful engagement in the outdoors. Children's learning outside is supported by adults who are responsive to the child's interests and can

support the development of them, without taking control of the activity.

This evidence base is not conclusive; however, play in varied outdoor spaces that is exploratory, includes opportunities to be social, and is supported by responsive adults appears to support children's enquiry skills, sense of self-efficacy, well-being, connections in the world, and their all-round physical competency. These benefits seem to be enhanced when adults are oriented towards and responsive to children's enquiries and interests, supportive of children's managed risk-taking and mastery of physical challenges, and feel confident enough to not restrict children's activity unless their safety is genuinely threatened.

Implications for Parents, Services and Policy

The implications of the above are wide ranging. Adults may want to consider providing experiences outdoors in which children can explore the world around them, challenge themselves, create their own challenges and play with others, without overt and limiting surveillance that restricts opportunities to successfully negotiate risk and gain, cognitive, social-emotional and physical competence. Adults may wish to consider children's opportunities for playful engagement in varied natural and built outdoor spaces balancing concerns about risk with opportunities for learning and exploring. Policy providers should consider whether regulatory requirements or guidelines for early years' service providers should include an explicit expectation for children's outdoor play. Those who regulate, inspect or assess such provision should be mindful of what appears to benefit children when they engage in outdoor play and learning, as set out above, supported by adults attuned to, and responsive to, children's interests. Additionally, those providing professional learning for the education-care workforce should consider their provision in the light of the above.[61]

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The Influence of Outdoor Play on Social and Cognitive Development

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Introduction

The past decade has seen a growth in evidence supporting the relationship between outdoor play and children's cognitive and social development. Recent research highlights the benefits for children's attention in academic contexts and prosocial behaviour. Longitudinal studies are starting to reveal pathways from early outdoor play experiences to prosocial behaviours and later quality of life. Evidence also indicates the benefits are greater when outdoor play occurs in contexts that include nature.

Subject

Outdoor play is often loosely defined and includes any activities children engage in when in childcare outdoor play areas, playgrounds, forests and other built or green spaces. The broad definition captures a wide range of activities. Recent efforts have been made to provide clearer coding schemes to better describe the types of activities children engage in outdoors[1]. Similarly, coding schemes have been developed to determine the extent to which outdoor play occurs in a natural environment.[2]

The main interest in cognition has been to determine if and how outdoor play influences executive functions and attention during group learning. Much of the work on social development has related to prosocial behaviours such as sharing, kindness and helping others. It could be argued that the focus on cognition and social development has been narrow. Nonetheless, the focus has allowed researchers to consider pathway models to understand both the short- and longer-term benefits of outdoor play[3,4].

Problems

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There is increased recognition of the importance of outdoor play. For example, most health advice for young children includes recommendations for playing outdoors. Parents and early childhood educators are often seen as gatekeepers and therefore considered responsible for children's access to outdoor play[5]. Unfortunately, there are significant barriers that can be difficult for parents and early childhood educators to overcome. These include:

Risk aversion: Outdoor space, particularly outdoor space with nature, can be unpredictable and children tend to be more active and adventurous in these spaces compared to indoors[6]. Adults worry about accidents and injuries and therefore restrict access to these forms of play[7,8].

Screen time: Time spent on screens is negatively related to time spent in outdoor play[9,10]. Nonetheless, screen time is a feature of modern childhood.

Urbanisation: Most children live in highly urbanised environments. These environments often lack child-friendly or adequate outdoor spaces for children's play. When spaces exist, they may be difficult to access[11].

The impact of reductions in opportunities for unstructured outdoor play may already be apparent12 and over time has led to problems such as reduced opportunities to socialise with others8 and an increase in mental health problems.[13,14]

The majority of research has been conducted with pre-schoolers or school-aged children. Little is known about younger children.

Research Context

Outdoor play is an important context for physical activity[15]. Much of the outdoor play research is aligned with physical activity research. It is often quantitative, multidisciplinary and linked to health and/or academic outcomes. Studies include (quasi) experimental and longitudinal designs. Measures include observation and assessment using standardised tests or questionnaires[16].

Key Research Questions

Major research questions in this area include:

- What relationships exist between outdoor play and cognitive development?

- What relationships exist between outdoor play and social development?
- Do early outdoor play experiences contribute to later cognitive and social benefits?
- In what way does nature in the outdoor play environment matter?

Recent Research Results

A continuing research area involves the investigation of outdoor play and executive functions (EFs). EFs include cognitive processes such as inhibitory control, working memory and cognitive flexibility and are associated with positive academic and social outcomes.[17,18] There is evidence that aerobic exercise improves EFs[19] and this would perhaps account for the relationship with outdoor play. Significantly greater improvements in inhibitory control have been found when preschoolers physical activity is outdoors rather than indoors[20]. However aerobic exercise alone does not seem to be sufficient. The physical activity that is associated with aerobic exercise needs to be in the context of complexity, novelty and diversity to promote EFs.[21] Research on pretend play and EFs has been found to be promising[18] as has the Tools of the Mind curriculum which incorporates pretend play.[22,23] While it is reasonable to assume that outdoor play involving physical activity and pretend play would be ideal for promoting EFs, the critical studies are yet to be conducted.

Following from the physical activity literature, one study[24] has examined the impact of single episodes of outdoor play on on-task classroom behaviour. The researchers compared the same children's on-task classroom behaviour under two different conditions. The first was with outdoor play before the classroom activity. The second was with outdoor play after the classroom activity. On-task behaviour was higher in the first condition for boys and for children from lower socioeconomic backgrounds. Of course, it is possible that any type of play before a classroom-based activity could improve attention. This was tested by comparing children's attention during classroom activities in two different conditions. The researchers used a quasi-experimental design in which teachers programmed for an hour of play before classroom activities. In the first week the play was indoors, in the second week the play was outdoors. Observations of classroom behaviours revealed children to show better attention and inhibitory control following outdoor play.

There is a growing body of evidence supporting a positive relationship between green space in children's neighbourhoods and prosocial behaviours[25]. Green spaces include parks and other

natural spaces found within urban environments. Although these studies typically lack a direct measure of children's play, researchers argue that green spaces are contexts in which children can play with peers and practice prosocial behaviours[25].

Findings from the Longitudinal Study of Australian Children found children's access to green space, based on parent report was positively associated with a range of outcomes in adolescence including better mental health, enjoyment of physical activity and health related quality of life[26]. Data were collected at six timepoints, from ages 4-5 years through to 14-15 years with a sample of 4983 children. The model indicates that green spaces promote prosocial behaviours, which in turn contribute to social and cognitive developments that promote mental health.

Further evidence of the importance of green spaces comes from studies investigating the gut microbiome[27]. Recent research on gut microbiome in infancy and early childhood has shown promising evidence of a relationship between variation in gut microbiota and both cognitive and social development[28]. A randomized controlled trial (RCT) was conducted in Hong Kong to determine whether play in nature would lead to changes in gut microbiota and psychosocial behaviours of children 2-5 years[29]. The Play&Grow early education program, which has an emphasis on connectedness to nature, was the basis of the 10-week intervention. Results indicated a change in gut microbiota and a change in psychosocial behaviours. For the latter, the main change was a reduction in anger. The Play&Grow RCT provides further evidence of the importance of playing in nature. It also demonstrates that positive impacts can be found even in highly urbanised locations such as Hong Kong.

Human geographers and environmental psychologists have examined spatial understandings, in particular, how children remember and understand larger environments, such as neighbourhoods. Studies have identified associations between active travel/independent mobility and children's spatial knowledge.[30,31] Primary school aged children have demonstrated better knowledge of home-school routes and objects encountered than children travelling in motorised vehicles. Independence of travel, way-finding and speed of travel (i.e., slow to observe details) have been considered important in developing children's spatial knowledge.[32] A qualitative study of 10-11 year olds in a Swedish community with significant green space found independent mobility involved playful experiences and included places for socialising or being alone.[33] These children also expressed awareness that their independent mobility may be threatened by increased development, particularly due to heavier traffic.

Research Gaps

While studies have included children from linguistically and culturally varied backgrounds, they are mainly from high income, highly urbanised countries. Little is known about lower- and middle-income countries.

There is potential for a wider range of cognition and social behaviour to be investigated. More research is needed in multiple contexts, such as home, childcare/school and neighbourhood.

Conclusions

There is clear evidence to recommend that children are offered opportunities for daily high-quality outdoor play. Ideally, outdoor play should involve changing conditions, such as found in nature, to encourage children to adapt and increase flexibility. It should allow for risk-taking and peer interactions. Opportunities for independent mobility appear to be important, particularly for school-aged children.

Implications for Parents, Services and Policy

Research on outdoor play and its relationship to social and cognitive development has clear implications for parents, educators/teachers and policymakers. If a child is struggling with pre-academic tasks, engaging the child in more direct instruction may seem like common sense. Yet allowing the child time to engage in high quality, unstructured outdoor play is much more likely to support their academic and social skills and support attention when engaging in academic tasks. Parents and educators/teachers may also consider children’s overall screen time and the impact this may be having on outdoor play.

Policymakers can use the outdoor play evidence to consider better ways for planning neighbourhoods and supporting initiatives for child-friendly spaces, particularly green spaces. Children’s social and cognitive development should be an important factor when planning for changes in urban green spaces.

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Outdoor Risky Play

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Introduction

Risky play has emerged as a topic of interest for researchers, parents, early childhood education and care (ECEC) practitioners/teachers and policymakers and authorities over the last twenty years. The reason for the emergence is manifold, but one point of departure might be the ambivalent wording of mixing the positive connotation of “play” with the more negative intuitive connotations attached to “risk.” Nevertheless, a growing body of research investigates various aspects of risk taking, including playful activities, indicating that the concept reflects an essential element of human life.

Subject

What is Risky Play?

Risky play shares some characteristics with various play types included in prior categorizations of play. For example, it could involve elements from locomotor[1] and physically activity play,[2] rough-and-tumble play,[2-4] as well as play with objects.[2] It also shares characteristics with deep play (confronting risks and fears and interfacing with mortality/death), exploratory play (exploration of the unknown) and mastery play (testing one´s own physical and psychic abilities).[5]

A common definition of risky play is: “thrilling and exciting forms of physical play that involve uncertainty and a risk of physical injury.”[6] Eight categories of risky play have been identified through observations and interviews with children and ECECs:[7-9] 1) Play with great heights – danger of injury from falling, such as all forms of climbing, jumping, hanging/dangling, or balancing from heights; 2) Play with high speed – uncontrolled speed and pace that can lead to a collision with something (or someone), for instance bicycling at high speeds, sledging (winter), sliding, running (uncontrollably); 3) Play with dangerous tools – that can lead to injuries, for instance axe, saw, knife, hammer, or ropes; 4) Play near dangerous elements – where you can fall

into or from something, such as water or a fire pit, 5) Rough-and-tumble play – where children can harm each other, for instance wrestling, fighting, fencing with sticks; 6) Play where children go exploring alone, for instance without supervision and where there are no fences, such as in the woods; 7) Play with impact – children crashing into something repeatedly just for fun; and 8) Vicarious play – children experiencing thrill by watching other children (most often older) engaging in risk.

Research Context and Results

Initial research on children's risky play was situated mainly within ECEC contexts (preschool, kindergarten, child care centers etc.). Smith,[10] Greenfield[11,12] and Stephenson[13] were early in pointing out how children sought risk in their play, how staff handled the risk in children's play and what benefits this kind of play might have for children. Building on this research, Sandseter[6-8] explored the phenomena of four to six-year-old children's risky play and how it can be defined and categorized. Kleppe et al.[9,14] identified such play among even younger children, down to one year old. Overall, the existing research shows that children between the ages of one and six years are engaged in risky play in some way and on a level that suits their individual competence and courage. Studies of older children (six to fourteen-year-olds) show that they also enjoy being engaged in risky play and wish for more freedom and challenging play environments.[15]

Both observations and interviews reveal that children's emotional experiences in risky play range from pure exhilaration, through exhilaration and fear at the same time (exhilaration bordering fear), to pure fear. This ambiguous feeling is probably what makes this type of play attractive to children.[6,13,16] The highly aroused feeling children have when engaging in risky play is expressed by joyful, happy and enthusiastic facial expressions, children looking ecstatic and verbal expressions, such as laughing, shrieking, showing their exhilaration and expressions of fearful joy.[13,17] However, these typical expressions are individual and suggested to be partly related to age, as young children's risky play might appear subtler and less exhilarated.[9] Regardless of age or level of expressed arousal, such activity seems to be repetitive and induce deep engagement.[17,18] The existing research is mainly descriptive and less is documented regarding actual benefits of risky play.

The concept of risky play is studied in various countries within Europe, in North America and Australia, indicating some cross-cultural commonalities of this type of play.[19,20] Nevertheless, there are indications that both attitudes towards- and practical management of risk in children's

play and everyday life are largely influenced by culture. Studies from central Africa describe common child-rearing practices with risk levels that would be unacceptable in present Western contexts, such as eight-month-old infants playing with knives, and helping to chop tinder for the household fire,[21] or two-year-olds independently roaming the village and the surrounding forests and fields.[22] However, comparative studies also indicate variations between Western countries. New, Mardell and Robinson[23] compared Norwegian, Swedish, Danish, Italian and American ECEC teachers and found that European teachers were less worried about children's risk-taking than are their American colleagues. Similarly, Little, Sandseter and Wyver[24] found that Scandinavian, and particularly Norwegian ECEC practitioners, were more liberal towards children's risky play than practitioners in Australia. Sandseter et al. also found that southern European countries were more risk-averse to children´s play than northern European countries.[25] Explanations might be found in different theoretical-pedagogical approaches,[26] but are also rooted in cultural beliefs and values, often related to a varying emphasis on outdoor play and learning between countries.[23,27]

Regardless of cultural context, play appears to be an ideal context to develop the ability to assess and handle risk, where the pretend- or nonliteral aspect allows the players to test out behaviour, situations or actions without the severe real-life consequences. With this as a backdrop, researchers have argued that the ability to handle risk has been a favourable evolutionary trait and that adventurous risky play can reduce children´s risk for developing anxiety.[28,29] Additionally, risky play experiences have been positively associated with children's risk management skills,[30] and with several positive health effects among children.[31] From a different angle, there are indications of negative effects from children being overly protected; that curbing risky play and autonomy may increase the likelihood of anxiety, both in childhood[32,33] and into adolescence and adulthood.[28,34-38]

Despite the well-documented benefits and interest among children in engaging in risky play, there are indications that this type of play is being restricted in ECEC settings.[39,40] There are several reasons for this, including ECEC practitioners' perceptions, attitudes and practices, which often are influenced by societal factors, not least parents' opinions.[41,24] Although some research indicates that ECEC practitioners allow children to test their abilities, thereby developing necessary skills to cope with real-life challenges,[24,42-45] practitioners face an obvious balancing act between the potential short- and long-term benefits of such play and the possibility of injuries. This balancing act is not an easy task, and it is understandable that both ECEC

practitioners and parents want to avoid injuries. However, the general decrease in children's opportunities for risk-taking in play,[46,47] might have wider negative consequences. First, it is already documented that an increased safety focus has resulted in more restricted freedom of movement, and in more boring playgrounds.[40,48-54] Second, albeit less documented, there is a worry that this lack of play opportunities might result in negative long-term consequences such as reduced well-being, excessive risk taking or, on the other hand, increased anxiety.[28,32] In many ways, the growing research on children's risky play and its possible benefits might be seen as a reaction to the safety discourse.

Key Research Questions and Gaps

Most research on risky play is based on the assumption that engagement in risky play in childhood promotes physical activity, contributes to well-being and protects against anxiety, faulty decisions and/or excessive risk taking later in life. However, since most studies consist of small samples and/or lack the appropriate longitudinal design, randomization and control groups, they are not designed to properly address this assumption. Not least, this assumption is difficult to test empirically. There are obvious ethical issues with conducting studies designed to let children take risks (with the potential for injury), while restricting children from playing freely and thereby assessing the long-term effects of play deprivation would be equally problematic. Creative methods such as Kretch and Adolph's[55,56] experiments with the visual cliff (allowing children to cross narrow bridges without the real possibility of falling) should be further developed, suggestively with virtual reality (VR) as a promising methodological field. For example, Sandseter et al.[57] aim to examine children's development of risk management skills through risky play in VR. However, transferability of results from laboratory conditions or controlled environments to real life contexts might be a challenge. There are also challenges in finding appropriate ways of measuring long term effects of risky play, considering appropriate measures in adolescence and/or adulthood, and finally, to have comparable control groups. The limited studies examining how regulatory documents influence practices show that educators sometimes contravene or challenge regulations to support children's risky play.[58,59,60,61] Therefore, rules and regulations might have less impact than expected and should be investigated more concretely. Lastly, a few studies suggest that children with disabilities experience fewer opportunities for risky play, even if one can assume the same benefits as for normal developing children[62,63,64]. Such perspectives should be investigated further.

Implications for Parents, Services and Policy

The existing research base could be used to guide both parents and ECEC practitioners in how to appropriately support children engaged in risky play. The best available evidence suggests that allowing children a certain level of autonomy strengthens children's self-awareness and ability to self-regulate and reduces the likelihood of anxiety – present and later in life.

ECEC owners, playground developers and policymakers should include knowledge of risky play in the development of play environments.[65] Research suggests versatile, complex and flexible play environments to accommodate children's diverse interests, varied competence and risk tolerance.

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Risky play and mental health

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Introduction

There is growing concern about the mental health of children and young people. Parents and those teaching and caring for children increasingly recognise that a significant proportion are experiencing difficulties, including high levels of anxiety, low mood and challenging behaviour. The foundations of good mental health are laid during early childhood. It is therefore important to consider what factors during early childhood can help lay positive foundations that foster good mental health. It is intuitive that rich, diverse play experiences are important for supporting healthy development. Increasingly it is recognised that risky play, in particular, might play a role in preventing mental health problems.

Subject

Risky play is included in the early years curriculum in many countries[1,2] but it can be challenging for practitioners and parents to support risky play. Facilitating risky play requires a balance between prevention of serious injury and giving children space to explore and learn[3]. It can be anxiety-provoking for adults to support children's risky play, due to worries about injury, incompatible policies, lack of understanding regarding potential benefits, and absence of appropriate space and equipment[3,4].

Problems

A significant proportion of children and young people have difficulties with their mental health. Before the Covid-19 pandemic, it was estimated that around 1 in 8 living in high income countries had a mental health problem at any given point in time[5]. The pandemic negatively impacted mental health and, it is now estimated that rates are as high as 1 in 5.[6,7]

Western societies have become increasingly risk averse which has had the effect of decreasing children's opportunities for taking risks in their play, and for independence (e.g., walking to a

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friend's house)[8].

Research Context

It has been proposed that decreasing opportunities for risky play are having a negative impact on children and young people's mental health. This is a difficult proposal to assess rigorously because measurement of risky play is challenging; the extent to which any play activity is risky varies from one child to another. In addition, the impact of risky play on mental health may only be seen over a long period of time, or in certain circumstances. Nevertheless, some initial research provides some support for a link between risky play and mental health in children.

Key Research Questions

To what extent is the decline in risky play related to the increase in children's mental health problems?
If children's opportunities for risky play increase, does this decrease their risk for mental health problems?

Recent Research Results

A number of researchers have proposed that risky play might help to prevent mental health problems. For example, Sanseter & Kennair explained how risky play might help children to overcome phobias such as a fear of heights[9]. More recently, Dodd & Lester drew on an understanding of the cognitive and behavioural processes involved in anxiety to explain how risky play may help prevent the development of anxiety[10]. Specifically, they argue that risky play supports children's learning about uncertainty, physiological arousal and effective coping. Peter Gray has also written extensively about the links between rising rates of mental health problems and the decline in children's play[11].

Despite the theoretical interest, research evaluating links between risky play and mental health is relatively rare, especially in young children. One recent exception is a study that focused on preschoolers in the UK, which found that children aged 2 to 4 years who spend more time engaged in risky play have lower levels of internalising problems such as anxiety and depression, and higher positive mood[12]. This mirrors findings from research carried out with school-aged children, although for the older children no link with externalising problems was found[13]. These studies have used large, national samples, but rely on parent-report questionnaires.

Complementing this approach, a study by Imai and colleagues used observation of preschoolers' risky play in Japanese preschools[14]. They found that observed risky play behaviours were associated with better prosocial behaviour, after other characteristics of the child were taken into consideration[14].

Rough and tumble play is a specific type of risky play that has been studied in a little more detail, although often in the relatively narrow context of father-child play. Findings are mixed regarding links with mental health. For example, some research has shown that more rough and tumble play is associated with better emotional expressiveness and emotion regulation one year later in preschool-aged children[15]. In contrast, other studies have found that rough and tumble play is linked to more physical aggression and emotion dysregulation in 4-6 year olds[16]. Whilst the reasons for these inconsistencies are not yet clear, it is possible that the effect of rough and tumble play varies depending on other developmental and relational difficulties that the child may be experiencing.

Although not all outdoor play is risky play, playing outdoors facilitates risky play. It is relevant therefore that there is growing evidence that more time spent playing outdoors is associated with better mental health. For example, Piccininni and colleagues found that outdoor play was associated with fewer psychosomatic symptoms in teenage girls[17], and Flouri and colleagues found associations between park and playground use and both internalising and externalising symptoms[18].

Research Gaps

There is a lot of scope for more research investigating the links between risky play and mental health. Longitudinal research measuring risky play and mental health symptoms over time would help to disentangle cause and effect. The best design for evaluating whether risky play can help to decrease risk for mental health problems would be to increase opportunities for risky play, within a randomised controlled trial (RCT) design, and assess what the impact is on mental health. Some work is underway taking this approach within schools[19].

The vast majority of risky play theory and research comes from Western contexts and focuses on children growing up in relatively safe environments. Risky play may have different effects and may look different in different contexts. Where children live with high levels of risk in their environments, risky play may not have the same impact, and could have a negative impact[20].

Research in different contexts is therefore vital.

Conclusions

There are good theoretical reasons for thinking that opportunities for risky play early in childhood might help support the development of good mental health, in particular in relation to anxiety. There is emerging research supporting this link; more risky play is linked to lower anxiety and depression symptoms in preschool-aged children and school-aged children. Nevertheless, there remain significant gaps in the research. It will be important for future research to use longitudinal methods and experimental designs to better clarify cause and effect. It is also vital that we consider in future work a wider range of cultures and contexts within which children grow-up. This will require a significant expansion of research outside of western countries and relatively safe contexts. There is a growing evidence base around how to create environments within early years settings and in community spaces to support risky play, so an important next step is to evaluate the impacts on mental health when this guidance is put into practice.

Implications for Parents, Services and Policy

For parents and for early years practitioners it can be challenging to give children opportunity to take risks in their play. Parents and practitioners tell us that they worry about a child getting hurt. Where possible to do so, resist the temptation to jump in and help or to ask a child to stop immediately, if you think they might be able to resolve something for themselves. Every time we jump in and help when a child could work something out for themselves, we deny them a learning opportunity.

Services may benefit from adopting benefit-risk analysis, rather than traditional risk assessments, which focus on minimising all risk. Benefit-risk analysis allows practitioners to consider what the benefits of an activity are for children, as well as what the risks are, and to take a balanced approach[21]. Where the benefits are assessed as being greater than the risk, then the activity can go ahead even if there is some risk present. An example would be a child using a hammer and nail: there are risks in terms of the child getting hurt by the hammer or the nail, but letting them try helps to develop their hand-eye coordination and concentration, and gives them an opportunity to impact their environment.

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Having clear policies for early years settings about the use of benefit-risk analysis and accompanying support on how to carry out this type of assessment is useful and gives practitioners a clear steer on what is expected. Broader government level policy about expectations in terms of providing sufficient opportunities for risky play, whilst preventing serious injuries, would be helpful in guiding settings to create aligned policies.

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Active Outdoor Play

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Introduction

Play is a fundamental part of childhood and is typically defined as a spontaneous, enjoyable, and self-directed activity with no external goal.[1] Active play is one main type of play.[1] Active play can occur indoors and outdoors but this section will focus on active outdoor play.

Subject

Definition: A scientific review on active play in early childhood identified common terms used in definitions of active play including, increased energy exerted, rough and tumble, gross motor movement, unstructured, freely chosen, and fun.[2] Furthermore, common examples of active play were also identified, including swinging, climbing, pulling, balancing, jumping, rolling, running, and skipping.[2] Based on this current research a working definition of active play was created: "A form of gross motor or total body movement in which young children exert energy in a freely chosen, fun, and unstructured manner."[2] (pg. 164)

Settings: Active outdoor play in early childhood is typically supported by parents in the home (e.g., back-yard) and surrounding neighbourhood (e.g., park) settings.[3] However, since the number of children attending child care outside the home is increasing,[4] the importance of the child care setting for supporting outdoor play opportunities is increasingly being recognized.[5-7]

Prevalence: Information on how much time young children currently spend in active outdoor play is limited to a small number of studies. For example, in a representative sample of Canadian children (3-4 years), parents reported an average of 1.6 (children cared for at home) to 2.1 (children cared for outside of home) hours of outdoor time per day.[8] Conversely, in relatively large samples of young children from Australia (2-5 years) and the United States (3 years), parents reported average outdoor play time as 3.1 hours a day and 2.6 (weekday) to 3.8 (weekend) hours a day, respectively.[9,10] Similarly, in a large sample of children followed from the age of 3 to 6 across five European countries (Germany, Spain, Italy, Poland, Belgium) average

outdoor play across the 4 time-points was 2.4 (weekday) and 3.2 (weekend) hours a day, respectively.[11] Bigger day of the week differences were observed in a large representative sample of Swedish 4-year-olds, with parents reporting double the amount of daily outdoor play on weekend days (3 hours) compared to weekdays (1.5 hours).[12] Cultural differences have been noted in outdoor play.[13] For example, in a small sample, it was observed that outdoor time was significantly higher in a Swedish preschool setting compared to a United States preschool setting (211 versus 91 minutes per day).[14] Furthermore, in a large sample of 3-6 year olds from China, outdoor play was higher among male children and those living in urban versus rural areas.[15]

The COVID-19 pandemic also impacted young children's outdoor play. In a study of preschool children (3-4 years) from 14 countries, parents reported that their child's outdoor time during the height of COVID-19 pandemic restrictions (May-June 2020) was less than their outdoor time prior to March 2020.[16] In a sample of Canadian children (1-4 years at baseline) who were followed throughout the first two years of the COVID-19 pandemic, outdoor play significantly increased by 30 minutes in April and October of 2020, compared to the month before March 11, 2020. However, by April 2022, outdoor play had returned to pre-pandemic levels.[17] It is also important to note that this body of evidence regarding the prevalence of outdoor play likely overestimates active outdoor play because not all outdoor play is active.[18]

Problems

In some countries, there is evidence to suggest that children's outdoor play has been declining in recent decades.[19-22] This decline has been attributed to various cultural changes including the increase of perceived safety risks by parents,[23-27] the growing presence of sedentary screen time in children's lives,[23,26-28] and the hurried, overscheduled, and academically focused lifestyle.[24,25,29] Parental concerns around children's safety is thought to be one of the biggest barriers to active outdoor play.[28,30] For example, in a sample of over 400 Australian mothers with 3.5 year olds, 42% perceived that it was not safe for children to play outdoors in their neighbourhood during the day.[31] Commonly perceived safety risks include stranger abduction, bullies/teenagers, child pedestrian collisions, and injuries.[26,30,32] Despite findings that the frequency and seriousness of these risks are quite low, parents are increasingly monitoring their children's play, enrolling children in more structured activities, and keeping children indoors.[25,26,30] Similar barriers have been reported by early childhood educators in the child care setting, including safety precautions, fear of injury,[33-35] and a focus on school readiness.[33] However, the level of perceived risk by parents and early child educators appears to vary from country to country.[32,36]

Research Context and Key Research Questions

The majority of research on active outdoor play in early childhood has been published in the last 10 to 15 years.[2] Existing evidence is primarily observational using cross-sectional designs, and therefore of lower quality.[2] Consequently, there are a number of research questions to be answered in this area. Three key research questions that are gaining increasing attention include: 1) What are the unique benefits of active outdoor play? 2) What is the role of the child care setting in promoting active outdoor play? 3) How do we accurately measure active outdoor play?

Recent Research Results

Benefits: Studies have found that when children play outdoors, they are more physically active then when they play indoors,[25,26] likely due to less space and equipment restrictions.[37] Therefore, active outdoor play is associated with healthy physical, social, emotional, and cognitive development due to the increased engagement in physical activity.[38] However, the benefits of active outdoor play extend beyond the well-known health benefits of physical activity. For instance, research has found that active outdoor play and access to green space is associated with higher vitamin D levels,[39] improved mental wellbeing,40 better attention behaviours,[41-43] better self-regulation,[44] and improved spatial working memory.[45]

Child care setting: Child care represents an important setting for a large proportion of children to engage in active outdoor play during the day time.[46,47] Policies at the national, state/provincial, local or centre level may be one potential strategy to ensure young children have adequate active outdoor play opportunities when cared for outside of the home.[48,49] Recent research has examined provincial/state policy.[50-52] For example, in Canada, all provincial regulatory bodies mandate daily outdoor play if weather conditions are appropriate but only three provinces specify the frequency or time for outdoor play.[50,53] Similarly in the United States, most States (86%) recommend daily outdoor time[51] but few (n=9) provide minimum lengths.[52] Several studies have also examined outdoor play policies at the child care centre level.[54-58] Overall, these studies have highlighted the importance of policies being translated into practice,[54] for example, through resources and training for early childhood educators,58 and ensuring the content of policies are not restrictive to outdoor active play (e.g., weather-related policies).[55]

Research Gaps

Given the infancy of research on active outdoor play in early childhood a number of research gaps exist. One key gap involves the current measurement of active outdoor play.[2,59,60] Questionnaires administered to parents or educators, are prone to measurement error, and activity monitors typically lack the contextual information needed to identify active outdoor play. However, an accurate measure of active outdoor play that combines activity monitors, global positioning systems (GPS), and log books has been introduced in older children.[61,62] Future research should determine if a similar technique is feasible to use in early childhood, and whether it can improve our understanding of active outdoor play. It is also unclear how much active outdoor play is needed daily for optimal growth and development.8 Therefore, future research should examine different amounts of active outdoor play with a variety of health indicators in early childhood to inform an evidence-based benchmark that can be promoted.

Conclusions

According to the United Nations High Commission for Human Rights, play is a fundamental right for every child.[63] Several organizations worldwide have endorsed the importance of active outdoor play and have encouraged future research in this area.[26,64,65] However, parents from around the world have reported that children today play outside less compared to previous generations,[19,22,23,66] largely due to cultural changes around parenting and technology.[23,25-27] This decline is a major concern as active outdoor play is strongly related to physical activity in children,25 an important behaviour in healthy growth and development.[38] Furthermore, active outdoor play is associated with unique health benefits above and beyond those of physical activity.[39-45] Efforts to reverse the trend of declining active outdoor play in early childhood should consider home, neighbourhood, and child care settings. There are several relevant partners across these settings that can play an important role in increasing active outdoor play in early childhood.[26]

Implications for Parents, Services and Policy

Despite the research gaps in active outdoor play, recommendations for relevant audiences can still be made based on current evidence. Young children have limited autonomy from adults. Therefore, parents, early childhood educators, and other caregivers are the gatekeepers for outdoor active play opportunities in early childhood. To encourage healthy growth and development, these individuals should aim to strike a balance with scheduled activities, screen time, and free time so children have ample opportunities to engage in active outdoor play.[67]

Health care professionals and policymakers also play key roles in supporting outdoor active play in early childhood. Where policy does not already exist, regulatory bodies should add policy in child care settings around minimum frequency and duration of daily outdoor time, and policy should be updated as evidence evolves. Additionally, health care professionals should promote active outdoor play to families across settings and weather conditions as an important component of healthy growth and development.[29] Emphasis should be placed on the feasibility of facilitating outdoor active play opportunities for children, given specific programming or equipment is not required.[2] Though research is needed to continue to advance knowledge in this area, these collective efforts are a starting point to ensure all children regularly experience the joy of playing in the great outdoors.

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Outdoor play and climate change: Impacts, Adaptation and Opportunities

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Introduction and Subject

Play is essential for healthy child development.[1] Outdoor play, along with the risks that come with it, offers additional unique benefits to children.[2,3]

Unfortunately, climate change is changing the landscape of children's outdoor play, with more frequent and extreme weather events.[4] The impacts of climate change are expected to grow, with nearly 3 billion people living outside the ideal temperature zone by the end of the century.[5] Children will bear a disproportionate share of the climate change burden, affecting their wellbeing in a myriad of direct and indirect ways.[6]

We examine the potential benefits of outdoor play in the context of climate change and pedagogical opportunities for environmental learning. We also share evidence on how climate change, through factors such as extreme temperatures, wildfire smoke, and flooding impact children's outdoor play and the growing body of evidence on how to adapt outdoor play to these impacts.

Opportunities and Problems

- Outdoor play provides pedagogical opportunities to teach children about nature generally, and climate change specifically.[7-9]
- Climate change negatively impacts the health and wellbeing of young people.[5,10] Against this backdrop, the many health benefits of outdoor play[2,3] are notable.

- Children engaged in outdoor play will be exposed to increased air temperature, including through extreme heat events4, alongside increases to the temperatures of play spaces.[11,12]
- Wildfires, and resulting smoke, will become more prevalent in some parts of the world.[13]
- Storms and flooding, in addition to damaging outdoor spaces[14], can deposit sediment, which can contain various toxins[15].

Research Context

Research into climate change and outdoor play is a new and rapidly growing area of scholarship. Findings come from a variety of disciplines, including education[7,16], sports medicine[17], occupational therapy[18], environmental research[19-21], urban planning11 and pediatrics[22]. Unfortunately, a lack of consistency in language and terminology can make it difficult to find, assess and synthesize research, and there are multiple distinct, but potentially overlapping, terms in use.

Key Research Questions

- What are the benefits of outdoor play in the context of climate change? How can we foster land-based play and connections between children's wellbeing and climate resilience?
- What are the ways in which climate change impacts outdoor play?
- How can negative impacts of climate change on outdoor play be responded to? What Indigenous and land-based approaches can we integrate?

Recent Research Results

Emerging research points to the importance of outdoor play in the context of climate change. It also shows that climate change can negatively impact outdoor play through several pathways, including making play less safe, reducing access to play, and reducing the quality of play that occurs. However, research also highlights the potential for adaptation of play spaces in response to climate change.

Potential benefits: There are benefits to outdoor play within the context of climate change. Outdoor play provides an excellent forum for engaging in education about nature broadly, and climate change specifically.[23,24] For example, studies show that childhood experience in nature fosters subsequent greater environmental stewardship for the natural world within adult life.[25-27]

Further, we note that given the many negative health impacts children will experience as a result of climate change[5,10], the numerous health benefits of outdoor play[2,3] are potentially even more relevant.

*Safety***:** There is expected to be an increase in the number of hot days, defined as greater than 30℃.[28] Another consideration is heightened temperatures of surfaces, particularly artificial surfaces, in playgrounds, when exposed to direct sunlight.[11,12] This has implications for children's safety, given that they are less able to tolerate high temperatures for extended periods of time than adults, and are at greater risk of heat stress, sunburns, and thermal burns.[19,28]

Another potential safety concern is the depositing of sediments which contain contaminants, such as heavy metals, into play spaces after flooding or major storms.[15,20,21,29-32] This is particularly concerning for children due to potential impacts such exposures to their developing nervous systems. Children are also at risk as they are more likely to ingest dirt, due to play activities on the ground as well as placing hands in their mouths.[20]

Access: One way reduced access to outdoor play can occur is through children remaining indoors during extreme heat or smoke events, which has been reported in research from Australia[33-36], Bangladesh[37] and Canada[38] Furthermore, extreme weather events can damage play spaces, as was seen after Hurricane Katrina14; residents in regions that experienced flooding were also less likely to access parks[39].

Quality: There is emerging research that climate change can change the quality of children's play. For example, research has found that as ambient air temperatures increase, preschoolers[22], and older children and adolescents[40] engage in less moderate or vigorous physical activity and increase time spent in sedentary activities. Furthermore, research suggests that during inclement weather children are likely to increase the amount of time spent consuming various forms of media.[36]

Adaptation: There are emerging recommendations for how play spaces can be designed to adapt to some of these negative impacts.[41] Some materials, such as rubber, gravel, or artificial turf become notably hotter than others, especially compared to natural materials, when exposed to direct sunlight.[11,12] Similarly, the colour of artificial materials can impact how hot they become, and many artificial materials can become hot enough to cause burns even on "typical" summer days.[11] Increasing shade can substantially lower temperatures[11,42], particularly shade from trees

(as opposed to artificial shade sails)[12].

There are important co-benefits to these adaptations.[43] Adding natural elements (as opposed to concrete or rubber surfaces) improves the ability of play spaces to absorb rainwater during storms.[18,28] Furthermore, it may also positively facilitate play activities with high play value.[18] Schoolyard greening and environmental learning in schools, as well as incorporating Indigenous ways of knowing, are burgeoning areas of scholarship and have the potential to foster greater connections to nature and eco-centric worldviews among children.[44-47]

Beyond changes to physical spaces, it is also important to consider policy. For example, researchers have pointed to the need to develop policies for child care which balance the need for children to engage in outdoor play and physical activity, with the need to protect them from negative health impacts of wildfire smoke exposure.[13]

Research Gaps

Most of the literature focuses on extreme heat and associated thermal effects, with comparatively less research on other impacts, such as flooding, extreme cold, or other adverse weather events. For example, despite increases in wildfires, and wildfire smoke, in many parts of the world, there is a little research on how to effectively respond while maintaining access to outdoor play. Additionally, the study settings are largely confined to manufactured play spaces, such as playgrounds, with relatively fewer studies focused on nature-based play settings.

Conclusion and Implications for Parents, Services and Policy

While outdoor play must be prioritized among parents and service providers so that children can reap the many benefits, climate change impacts on children must also be considered for their safety and well-being. In Canada, current play spaces for young children do not adequately consider thermal comfort and sun safety in their design.[28] There is a need for improved policy and safety guidelines to mitigate harmful effects of extreme heat and UV radiation in children's outdoor play settings[28] so they can spend more time engaging in quality outdoor play.

There is growing evidence on the long-term health effects of wildfire smoke[48-51] and exposure to environmental contaminants from floods and severe storms[21,29]. Appropriate guidelines and policies regarding outdoor play during periods of wildfire smoke and/other adverse climate change events need to be developed to ensure safety and wellbeing of children during outdoor

play.

While further research is needed, there is a strong body of evidence to start adapting to the impacts of climate change on outdoor play.[41] Playground shade, particularly natural forms of shade such as trees, shrubs and vines, as well as cooler and more natural playground materials, have been shown to effectively mitigate extreme heat and hot playground surface temperatures.[11,12,18,42] In tandem with this, regular access to drinking water for hydration at child care centres and access to water fountains in parks and playgrounds is critical to extend outdoor play for children.[41] Of course, while various forms of *adaptation* are important, in terms of the design of play spaces, it is also critical to encourage *mitigation* efforts, including reductions in carbon emissions, aimed at minimizing future climate impacts.

We conclude by acknowledging that the work of mitigating and adapting to the impacts of climate change on outdoor play requires collaboration between communities, policymakers, educators, child care leaders, and health professionals; however, there is a clear path forward and concrete actions that can be taken now.

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Creating Inclusive Naturalized Outdoor Play Environments

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Introduction

Outdoor play in naturalized environments has a positive impact on children's development[1] and physical health,[2-5] including children with disabilities. Exposure to nature may strengthen the immune system[6] help decrease attention deficit disorder symptoms;[7,8] and assist all children to improve well-being.[9] These findings suggest a strong link between inclusion and biophilia (the innate human tendency to have positive feelings towards nature), recognizing that all life forms are part of the Earth's ecosystem.[10]

Biodiversity and allergies. Contact with a variety of living organisms from all sources of nature (plants, animals, insects, bacteria) is associated with the balance of microbiota (bacterial cells living in the body) boosting the immune system that may reduce allergies.[6] Contact with environments rich in microorganisms in childhood reduces the risk of developing allergies later in life.[11]

Note of caution: Parents and caregivers should evaluate if children with disabilities with weak immune systems can interact freely with these types of environments. The issue of toxic and allergy-triggering properties of plants must be carefully considered.[12,13]

Subject

According to the *Well-being of Canada's Young Children*,[14] children under 4 years of age have a low rate of disability (boys 2.1%, girls 1.2%) as compared to older children, although the report queries the identification of disabilities this early in life.

Canada ratified the UN Convention on the Rights of Persons with Disabilities in 2010 after consultation with the provinces, territories, Aboriginal self-government entities, and the Canadian public. The Indigenous Persons with Disabilities Global Network invites policy makers

to “apply a rights-based framework to addressing the need of First Nations persons with disabilities”[15] Coupled with the child’s right to play (Article 31, UN Convention on the Rights of the Child)[16] all children (with and without disabilities) are recognized as full persons and are fully protected.

Based on these considerations, carefully designed natural environments can help maintain the balance necessary for the healthy growth and enjoyment of all children.[17] Nature presents the child with all life’s facets: birth, growth, end of life, and metamorphosis. Observing small critters such as butterflies, amphibians, and birds can be life affirming. Cycles of life offer clear messages of hope and recovery for those suffering illnesses. The drama of meteorological phenomena (thunder, wind, rain) compels humans of all ages to re-dimension their finite human strengths in relation to the power of nature.[18]

Problems

Although play is essential for healthy child development and contact with nature is a health promotion factor, children (especially those with disabilities) do not spend enough time outdoors, neither do they find high quality, age / skill appropriate play areas easily accessible.[19,20] The need for daily outdoor play in inclusive settings should be ensured by state-of-the-art environments located where children spend most of their time that offer healthy risk opportunities.[21,22]

Research Context

Beyond the concept of accessibility, universal design— “the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design”[23] is an inclusive concept that addresses the needs of all users. The concept of universal design includes children whose freedom may be constrained by environmental barriers, which they are unable to influence or redesign. However, historically most attention has been given to issues related to adult accessibility (including ageing) and to those with physical disabilities.[24]

Most topical research has been carried out using surveys and purposeful sampling (e.g., children and families attending municipal programs). Findings are relevant but of weak value for generalization.[25] Systematic research studies on the topic are needed, including larger samples under experimental, controlled conditions.

Key Research Questions

Current research questions address the need of professionals and parents looking for evidence-based guidance to create stimulating, age / skill appropriate play environments for children. They include demand for information on built environment characteristics relevant to children with differing abilities such as autism spectrum, sensory impairments, cognitive and behavioral problems, chronic diseases, and allergies. Relevant findings are needed to guide development of innovative design guidelines, municipal codes, and early childhood education policies.

Awareness of the importance of children's contact with nature has increased requests for evidence-based design of naturalized play environments. As they appear on the ground, parents are inquiring about risks and benefits of such places and providers are raising concerns about safety and exposure to liability.[26,27]

Recent Research Results

The concepts of accessibility, usability, and social interactions in play areas appear repeatedly in the latest inclusive playground studies.[28,29] Based on the concept of affordance,[30] which shows that characteristics of the environment influence behaviour, it is possible to identify and analyse similarities and differences in children's play behaviours among activity settings (e.g., manufactured play equipment compared to sand play areas, pathways, or natural settings). Research findings include:

Barriers to inclusive outdoor play:

- Inappropriate ground covers and inaccessible play equipment render it difficult for children to access and use equipment and play spaces.[25,26,31]
- Ground level components lacking diversity can reduce children's interest in play.[29]
- Highly concerned caregivers preventing children from engaging in exploratory play.[32,33]
- Planners, designers, and policy makers' insufficient knowledge about children's needs especially across developmental stages can make it difficult to develop play spaces and policies that adequately support children.[24,25,34]
- Exposure to uncomfortable weather elements (sun, wind, temperature, precipitation) may influence frequency of use.[24]

- Lack of engaging children in participatory design processes may result in inadequate play spaces.[35]

Positive aspects:

- Natural landscapes offer comfort and stimulation for children with disabilities and their companions.[24]
- Able-bodied children can play alongside peers and siblings with disabilities when diverse ground level play opportunities are available.[24,31]
- Sensory stimulation (touch, sight, sound, fragrances, vestibular) supports multiple learning abilities, sustains interest, and promotes repeat visits.[24]
- Outdoor cooperative activities can foster learning opportunities and positive social behaviours.[36]
- Play in parks supports social inclusion and joyful family time.[20,28]
- Contact with nature supports the immune system.[6,37]

Research Gaps

Research gaps include the need for studies addressing both benefits and detrimental aspects for children with disabilities interacting with naturalized environments. Aspects include potential allergies; sun exposure; special provisions for children with mental, cognitive, sensory disabilities; chronic illness; developmental and behavioral problems; dose-response to natural environment exposure; appropriate types of play components and related risk management strategies; analysis of regulations / legislation supporting evidence-based outdoor play provisions for children with disabilities; and evidence-based universal / inclusive design guidelines.[38]

Conclusions

For most children, including children with disabilities, outdoor play in naturalized environments has a salutogenic impact. Healthy environments (free of pollution, age appropriate, and with sufficient diversity to stimulate play for all ages and skills) encourage caregivers to extend time outdoors, engage children via ever changing nature / weather conditions, support social interactions and joyful family moments and, therefore, support child quality of life. Research on gaps and emerging topics may offer tools to create evidence-based design solutions, risk benefit

assessments, and environmental management and programming guidance for naturalized, inclusive, outdoor environments. Participatory design processes (including children of all abilities, parents, caregivers, and community representatives), conducted by knowledgeable designers, using evidence-based indicators and tools, may ensure innovation and address the needs of young children to explore the places where they spend most of their time.

Implications for Parents, Services and Policy

Rich naturalized environments can encourage children to explore the world around them. Children with disabilities enjoy interacting socially with peers and others, exploring their surroundings, and experiencing stimulating, ever changing environments with degrees of freedom related to their own skills.

Parents

Parents should be informed of the fact that research addressing the benefits of outdoor play in naturalized environments supports the claim that most children benefit from experiences in nature. Access to reliable information about the benefits of inclusive environments for children is key. As awareness grows, the desire to protect children may become an obstacle for young children with disabilities wanting access to rich experiences. Playgrounds can be designed as special, comfortable places full of engaging choices for children of all abilities, supporting engagement in active and imaginative play.

Services

Providers and services using the latest translated research findings could create or access existing educational resources to disseminate information to parents and create awareness for general audiences. Parks and recreation, school systems, early childhood education services and interested organizations are critical to support system change and popularize the creation of naturalized inclusive play areas.

Policy

Policy makers should support research into inclusive naturalized play environments and develop evidence-based solutions to infuse innovation into regulations and policies for early childhood inclusive environments. Innovative policies should call for universally designed, naturalized play areas for daily use.[39]

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Indigenizing Outdoor Play

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Introduction

Indigenous peoples have thrived on the land now called Canada, since time immemorial. Many cultures and distinct peoples took shape over this time, all intimately tied in co-evolution with land. Nature remains integral to Indigenous systems across the country – encompassing those of languages, politics, governance, and of course, education and childrearing. Through colonization, these systems encountered new ones, intrinsic to Euro-Western cultures. There are fundamental differences of worldview between Indigenous and European cultures, values, practices, and actions.[1] Understandings of outdoor learning and play are no exception. There is much to learn from Indigenous perspectives on outdoor play, perspectives that are rooted in the very places that all children play today.

Subject

No matter the culture or place, early learning discourses are filled with references to children's laughter, fun, and curiosity when playing outdoors. Play is human nature, and through history, Indigenous children spent much time immersed in play, exploring, splashing, digging and wandering where the outdoors and adventures awaited them. As Indigenous scholar, Kathy Absolon expresses:[2]

"Searching was [also] central to my experience in the bush. I spent most of my childhood to young adulthood in the bush. The absence of fences, neighbors and physical boundaries led way for the natural curiosities of a child to grow and be nurtured. My curious nature ushered me to find my way in the bush."

Internationally, the different Indigenous cultures have as many ways to express being 'in the bush' as there are Indigenous approaches to outdoor play. These vary from speaking about

being ‘on the land,’ ‘on country,’ ‘in the forest,’ as well as ‘nature-based experiences’.[3,4] Indigenous worldviews tend to place humans as part of nature, in reciprocal relationship with other animals, plants, rocks, water, and ecosystems. When time spent in nature is part of everyday living and learning, it becomes a wide-ranging and inclusive experience - as diverse as life itself. Even before children can walk, they engage in play using all of their senses in nature. Dene Elders and knowledge keepers express that time must also be protected for play while on the land for life-long learning:[5]

“Parents and Elders allow play at the same time as teaching. A child's own play and curiosity lend themselves well to teaching opportunities. Elders believe that play is essential to learning."

Problems

These Indigenous traditional settings with the natural opportunities for children to experience being outdoors seem to have been displaced from mainstream learning, as Euro-Western approaches have dominated the public education system in Canada. In these contemporary approaches to early learning, children are often corralled and controlled by well-meaning adults into set time limits and environments, usually consisting of bright colourful play structures, rather than in natural settings where the land is the “classroom” and the mud, insects, and trees are the “teachers.” As Herrington, Brunelle, & Brussoni describe the modern emphasis on health and safety, risk aversion, and fixed playgrounds are having:[6]

“an unfortunate and unintended effect [on the] creation of outdoor play spaces that consist of primarily equipment rather than natural play elements – what landscape researcher Helen Woolley calls Kit, Fence, Carpet, or KFC.[7] These KFC spaces are rated as having the fewest opportunities for play compared to play spaces incorporating natural elements and risk-taking.”

We have overstructured our environments through the evolution of the Western system. With these shifts in play spaces during the past century and into the new 21st century, many concerns have arisen related to the development of children’s agency, happiness and well-being. Casey describes that children’s sense of identity, connection to community, social relations, contact with natural environments, and physical growth are being negatively impacted due to the many parameters that impinge upon children’s outdoor play.[8] These parameters deny Indigenous worldviews of children as part of the environment.

Research Context

There appears to be a high need in the outdoor play scholarship to consider Indigenous research that respects and honours the child in his natural learning and growth patterns, rather than to focus so adamantly on what adults deem important. Knowledge keepers and Elders who contributed to the NWT Indigenous curriculum shared their perspective:[9]

Among the Dene, it is said that the child is born with integrity. The child has worth. It is the birthright of the Dene child to be acknowledged and respected for this. The child who is not respected cannot become what it is meant to be… [that is] a capable person.

Key Research Questions

With this Indigenous worldview to guide the thinking on children's birthrights towards becoming capable people that are integrated in their environments, can Indigenizing approaches provide a more balanced approach to developing practices, programs and policies that impact children's growth and development in outdoor play?

Recent Research Results

Inuit advocate and educator, Rowan argues that Indigenous ways of knowing and being are essential for children's outdoor learning.[10] She speaks of thinking with land, water and ice, allowing access to Indigenous, and more specifically Inuit approaches, when planning and delivering land-based experiences. She describes her outdoor learning activity with preschool children, an Elder-educator, and staff going out on the land to search for avaalaqiat (willow branches) to prepare branch backpacks. The pedagogy of such outdoor excursions is grounded in a worldview focusing on knowing and experiencing. "These dual elements are tukisiumaniq, which means building understanding or making meaning in life; and silatuniq, which means experiencing the world". Together they bring forth the essence of outdoor play and learning. These Indigenizing elements of outdoor play add depth by making sense of the natural world that surrounds children. Cree scholar, Michael Hart adds:[11]

"It can be said [Indigenous] knowledge is holistic, personal (subjective), social (dependent upon inter-relations), and highly dependent upon local ecosystems. It is also intergenerational, incorporates the spiritual and physical, and heavily reliant on Elders to guide its development and transmission."

Research Gaps

Although beneficial in its approach, Indigenizing early learning and outdoor play epistemologies and perspectives present only limited appearance in the Euro-Western dominated scholarship. Warden shares:[12]

In terms of research into outdoor learning, the consideration of indigenizing pedagogies is minimal, with more emphasis being placed on UK and Scandinavian research into land-based experiences in wilder spaces. Carruthers, Den Hoed and Spoel (cited in[12]) state, 'Aboriginal people have been offering sophisticated, land-based education to their children for millennia.'

This limited presence in the Eurocentric literature is in large part due to the fact that written literature comes from Eurocentric systems. To bridge this gap, it becomes incumbent on Indigenous researchers and leaders to contribute to the scholarship on Indigenizing outdoor play in the early learning discourses in order to consider a more naturalistic approach to children's growth, development and learning. It is equally important for non-Indigenous researchers and educators to recognize that knowledge comes in many forms, and will be accessed differently when Indigenizing outdoor play. Using an ethical space, Indigenous and non-Indigenous educators can share a working relationship where values, worldviews and knowledge co-exist respectfully and guide decision making, policy and practice.[1]

Conclusions

When Indigenous children participate in outdoor play, they will experience the gifts of Indigeneity, as they develop their ways of knowing, being, doing and believing. And all children, Indigenous or non-Indigenous, will feel a sense of belonging in the place where they learn to play together, as they tap into cultures, practices and worldviews of the Indigenous peoples and lands. Indigenous based philosophies and approaches need to be honoured and acknowledged, and be an integral part of the policy development voice as it relates to outdoor play.

Implications for Parents, Services and Policy

Caregivers and early childhood educators need to pay attention to the many powerful features of Indigenous knowledge across the nations, which can enhance children's learning over the continuum of education. With Indigenous knowledge guiding outdoor play pedagogy, practices and policy, children will gain the exposure to understanding elements of Indigeneity, such as the holistic development of not only their minds, but also their bodies, hearts, and spirits as they experience the outdoors. They may also experience that when learning is personal and relational

while facilitated on the land with Elders, knowledge keepers, and extended cultural families, they can begin to understand the ecosystem around them. Moreover, by focusing on Indigenizing outdoor play, children can experience the energy and medicines of the land, along with place-based stories, circle learning, ceremonies, language, and the cultural and spiritual teachings of Elders and Knowledge keepers. Connecting with Indigenous cultures means connecting with land through many dimensions.

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Building Capacity to Support Outdoor Play in Early Childhood Education

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Introduction

Children's play experiences in outdoor environments are increasingly recognized as essential for their healthy development and well-being.[1,2,3,4] Universal system reviews indicate that outdoor play contributes to children's physical, and social-emotional development, mental health, emotional regulation. cognition and level of curiosity required for later academic learning.[4,5,6] However, children today are spending less time engaged in outdoor play compared to children in the 1970s.[7,8] Findings from a 2016 global survey suggest that more than 56% of children play less than an hour a day outdoors.[8] Increased use of technology, disruptions and changes to children's daily lives since COVID 19, and societal attitudes toward favouring indoor environments contribute to the reduction of children playing outdoors.[9] Reversing this indoor trend is important to children and for society.[6,9,10,11,12]

Governments responsible for early learning programs have a variety of policies, funding levels, regulatory structures, workforce competencies, and expectations including curriculum frameworks intended to support quality play-based programs for children and families.[6,9,13] Curriculum frameworks offer pedagogical approaches[1,2,6,10,14] that guide the design and execution of experiences to build upon children's curiosity, exploration, thinking, and learning in indoor and outdoor environments. However, this does not mean that outdoor play is explicit in policies and frameworks. Early learning teachers do not focus enough on outdoor play, due in part, to a lack of training in outdoor pedagogy during post-secondary education and professional development options.[9,10,15,16,17]

Researchers such as Pacini-Ketchabaw & Nxumalo[18] and Shanker[19] identify a correlation between children's outdoor play experiences during their early years with later academic performance. Others outline the relationship between outdoor play and speech, language and communication skills4 and the connection between outdoor play and the development of environmental

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stewardship.[1,12,13] These findings suggest an urgent need to emphasize outdoor play in policies and competencies in early learning teacher preparation and in post-secondary programs.[9,10,15,16,17] Curriculum frameworks and in turn government policies,[20] funding levels, regulatory structures, workforce competencies and expectations need to emphasize its importance.[6,8,14,15,16,17]

Subject relevance

Play in outdoor environments is increasingly recognized as a foundation for children's healthy development and wellness.[1,2,3,4,6,9] Early learning curricula should embody outdoor play, as it is vital to children's social, emotional, cognitive, and physical development and their learning.[21,22] Children are hard-wired to need nature and to play in natural environments.[1,22]

The outdoor play experiences extended to children are influenced by the pedagogical interactions exchanged with program administrators, the early learning teachers, children and families.[1,10,14,15] Early learning teachers require experiential outdoor learning during their post-secondary education and access to professional development that will enhance their understanding of their role in outdoor play provision.[9,15,16,17]

Problem

Gaps in knowledge, skills, and practices that early learning teachers bring to their workplace should be addressed to enhance the outdoor play experiences of children in early learning programs.[15,16,17,21,23] In Canada, this is challenging because of the varying provincial and territorial government policies and departments that guide early learning programs, post-secondary programs, and the differing provincial and territorial policies on outdoor play in early learning programs, programming competencies of early learning teachers, and the professional development requirements of early learning teachers.[9,15] As well, post-secondary professors designing and teaching courses do not require specialized education or experience in outdoor pedagogy.[9,16,17] For example, specific competencies related to outdoor play in college early childhood education programs may be at the discretion of professors, programs or institutions rather than defined by government policy.[9,10,15,16,17] Some critics suggest the coursework may not necessarily be based on latest research nor is there guarantee that the practice-based learning is connected to the theory presented.[9,10,15,17]

Research Context

Play has long been identified as the way children learn best.[1,2,6,9,15,21,23,24] Yet, with the varying post-secondary early childhood education curricula, educational levels and backgrounds of early learning teachers, compounded with diverse guidelines and standards for children's daily access to outdoor play, this vital tenet of education may not be explicit in practice. Creating an outdoor-based practicum in Canadian post-secondary early childhood education programs is viewed as a new approach for advancing skills in outdoor pedagogy with early learning teachers.[9,10]

Professional development is highly influenced by employers, provincial funding models, collective agreements, and individual early learning teacher motivation, which adds to the problem.[9,15,17] There is limited peer-reviewed research that provides insight into the depth and breadth of early learning teachers' outdoor pedagogy or competencies in planning or implementing intriguing outdoor play experiences or their receptivity and attitudes toward outdoor play.[15,21,25] This area is important as their pedagogical approach to outdoor play influences children's outdoor play time, experiences, opportunities and attitudes toward outdoor play.[3,5,9,10,23] Post-secondary professors have limited access to professional development.[9,15,16,17] Furthermore, having experienced professors does not ensure quality teaching. In many cases, professors are assigned courses to design and teach without having expertise in the subject.[17]

Key Research Questions

What is the impact of the lack of formal education and professional development related to outdoor play on the practice of early learning teachers? How do post-secondary courses and teaching and learning strategies influence how early learning teachers transfer outdoor play into practice?[6,10,15,16,17] What barriers must be overcome to change the practice, thereby increasing children's access to outdoor play?[24] What are the perspectives of professors in post-secondary institutions who are involved in implementing outdoor play and nature pedagogy courses for on-line and in outdoor learning spaces?

Recent Research Results

The research results provide insight into how early learning teachers describe their preparation for outdoor pedagogy and practice. Eight hundred and ninety-six early learning teachers who enrolled in a professional development course on outdoor play were asked at the onset of the course to identify how they would assess their knowledge and skills related to outdoor play. Seventy-two percent of the respondents indicated that they had limited knowledge about outdoor

pedagogy theory or how to implement outdoor play in early learning programs. Eighty-nine percent of indicated that this course was their first exposure to studying outdoor play pedagogy, while 11% indicated that they acquired their knowledge through workshops.[15,17]

The authors completed another study that explored whether the current nature-based learning and forest and nature school movements were influencing programs or practice.[15] A movement is characterized by a group of people who collectively work together to advance their shared ideas intended to bring about change to a social issue, such as outdoor play. Across Canada, the growing interest in outdoor play has resulted in the growth of these movements designed to provide more outdoor play experiences for children.[1,2,3,5,9,10] Of the 212 early learning teachers who participated, 61% of the respondents identified that these movements did not influence their practice.[15] Respondents identified other factors that they deemed more influential, such as childhood experiences, and the attitudes of their fellow teachers, which determined how outdoor play was positioned within their programs, as well as families' understanding of the benefits of daily outdoor play. Further, the lack of outdoor play space and materials were noted as contributing to early learning teachers not wanting to be outdoors. In the data examined and narratives shared, the barriers reveal a need to emphasize pre and post service training to early learning teachers on outdoor play and for professors teaching outdoor pedagogy to have access to resources and supports.[9,15,16,17] A third study conducted in 2018 examined 98 Canadian publicly-funded college early childhood education programs for calendar descriptions of courses on outdoor play or for explicit content related to outdoor play within other courses. Only three had explicit courses and 39 identified outdoor play in descriptions leaving more than half without reference to this crucial curriculum area for early learning teachers.[17]

In 2023, a further examination of early childhood education course descriptions at 92 Canadian publicly-funded colleges and institutes was undertaken to determine if there had been any significant change to the status of outdoor play in the programs. Only seven percent of the course descriptions explicitly identified having a module or course related to outdoor approaches and/or indigenous worldviews within their programs.[9]

Could the extreme diversity among college programs and student learning experiences, combined with differing provincial and territorial policies and regulations for outdoor play act as obstacles in advancing children's access to quality outdoor play experiences?

Research Gaps

The research needed to support expansion of children's outdoor play is multifaceted due in part to the various government and territorial departments and jurisdictions that influence early learning programs. Research is needed that examines how leaders of early learning environments position outdoor play in their policies, practices,[25] staff professional development, family orientation, and family education. Further research is required to determine the depth and breadth of outdoor pedagogy being implemented in college programs and the types of professional development that professors require related to the theory and practice of outdoor pedagogy with students.[9,10,15,16,17] Ideally, a participatory research approach would be utilized to investigate the interactions among government policies and post-secondary curriculum. This approach would create synergies and expose gaps in theories and approaches.

Conclusion

Across Canada there are various provincial and territorial jurisdictions responsible for the development and implementation of policies, procedures, and curricula in publicly-funded post-secondary early childhood education programs that influence children's outdoor play experiences. Without a cohesive approach toward outdoor pedagogy, the opportunities for children to be in outdoor play environments that honour their right to play are diminished. Co-constructing policies, procedures, curricula and action plans has the potential to 'raise the bar' in promoting the value and influence of outdoor pedagogy in children's development; this contributes to establishing healthy communities.

Implications for Families, Services and Policy

With expansion of policies and corresponding services that support outdoor play, early learning programs, post-secondary institutions, professors, and governments can increase children's access to environments that contribute to the developmental benefits that outdoor play has to offer. As families become more aware of the importance of outdoor play to children's healthy development and later academic success, they will become informed consumers and advocates for their children. Change to the current state of outdoor play requires engagement among families, government, community, administrators, professors, and early learning teachers in their programs. Working collaboratively helps key stakeholders to bring the knowledge and skills from research and theory to practice in support of children's outdoor play experiences.

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Although Diane Kashin passed away in 2024, her commitment to research and co-learning, will continue to influence the early childhood education sector for many years. Thus, this entry retains aspects of Diane's voice and knowledge presented in the previous edition of this Encyclopedia, while adding recent research relevant to expanding outdoor play in all facets of early childhood education.

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Designing Cities for Outdoor Play

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Introduction and Subject

Children's right to play is enshrined in international conventions.[1] Moreover, the importance of outdoor play for children's health and well-being is well established.[2–5] Yet around the world, opportunities for outdoor play are declining.[6]

This paper reviews evidence on the relationship between children's outdoor play and urban planning and design. It focuses on 'neighbourhood built environment attributes'[7] such as yards, housing typologies, streets and public open spaces, and how these are arranged in residential neighbourhoods, rather than just playgrounds (the most obvious built environment intervention).

This review does not examine design features within play spaces (e.g., landscaping, play equipment) as this topic is covered elsewhere.[8] It also does not examine toxic or hazardous environmental features. Finally, it does not examine social, cultural and economic factors (which may have a greater influence on children's outdoor play experiences than built environment factors[7]).

Problems

Limited outdoor play opportunities have health and well-being consequences for children.[9–12] Families, communities and wider society also have much to lose.13,14 Playable public spaces provide important social, health-related and environmental co-benefits for all ages.[15] What is more, outdoor play is linked to greater environmental awareness and connections with nature,[16] while limited outdoor play experiences may undermine children's concern for the wider environment, and lead to lower levels of engagement with nature and community.[17,18]

Increasing evidence for the importance of outdoor play to child health and wellbeing has prompted incorporation of child-friendly design into some official city plans.[19,20] However, in most

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cities, planning and design decisions continue to be made with limited consideration of their impacts on children.[21–23] The challenges are greater in low and middle income country contexts due to rapid, often unplanned growth.[24,25]

Research Context

The evidence base for neighbourhood-built environment influences on outdoor play, though increasing, remains relatively slim. Recent systematic reviews found 61 relevant quantitative studies, 30 qualitative and 6 mixed methods studies.[7,26–28] However, most quantitative studies analyzed data from a single time point, limiting interpretation to correlational, rather than causal effects; and almost all were observational, making neighbourhood effects difficult to distinguish from other determinants of behaviour. Studies are also highly heterogeneous, including a diverse set of interventions, population groups, urban contexts, and outcome measures. Outcome data are often parent reported, rather than objectively measured, presenting a potential risk of bias. Many studies focus on physical activity, rather than on outdoor play (though physical activity may serve as a reasonable proxy for outdoor play in children).[29] Despite these challenges, increased attention has advanced understanding of this complex topic, and qualitative and mixed methods evidence provide contextualized data that help to explain diverging results across settings and groups.

Key Research Questions

The central question for research is how the planning and design of neighbourhood housing, streets and public spaces shape children's play opportunities. Given the growth of cities worldwide, one priority for research should be informing the master planning of new residential developments. Economic, cultural and geographical contexts need to be explored, as well as issues for children and families of different ages, abilities and backgrounds, and for caregivers with infants and small children, who may have distinct challenges and concerns.

Planning and design factors that could be studied include:

- Neighbourhood population density;
- Size, distribution and accessibility of parks, playgrounds and other public open spaces;
- Proximity and ease of access to local services and facilities including schools, childcare, shopping and health services;

- Housing densities, typologies and tenure patterns;
- Access to private and semi-private outdoor space;
- The relationship between housing and the surrounding public realm;
- Design and layout of walking and cycling paths and networks;
- Traffic flows and speeds;
- Street grid patterns;
- Street designs, including traffic calming and other street features;
- Detailed design features of public open spaces.

Recent Research Results

Low traffic volumes, fewer intersections, neighbourhood greenness and access to formal and informal space for play are all linked to greater levels of outdoor play. Sidewalks, cycling paths, and pedestrian amenities have also been associated with outdoor play.[7,26,28] More limited evidence suggests that lower residential density, living in rented/public housing, not living in an apartment and higher physical disorder are linked with greater outdoor play.[7,26]

Three recent reviews found overall positive links between public open space and outdoor play,[26,28,30] while one reported no relationship.[7] Proximity, route and space characteristics and social context influence use of public space for play, and the importance of public space may be greater in high vs. low residential density areas.[26] One noteworthy study of newly-built English housing developments suggests that direct, traffic-free access from homes to green spaces, good oversight of outdoor space and good walking networks are associated with more people, including children playing, in public open space.[31]

Research Gaps

The empirical research literature is not only heterogeneous; it also shows significant gaps. As already noted, few studies use robust intervention methodologies, limiting the scope for making claims of cause and effect. To understand the complex interactions between social and built environments influencing outdoor play, integration of quantitative and qualitative evidence is needed.

The interactions between gender, housing tenure, socio-economic or ethnicity/culture on the one hand, and built environment features that influence outdoor play on the other, has been explored in a few recent studies,[26] however, further research is needed.

Only a handful of studies included in recent literature reviews encompass children under three.[26] Likewise, more research is needed on low and middle income country contexts[7,26] where, globally, urban child populations are set to grow the most.[32]

Research could help to explore long-term trends. Studies in several countries show generational declines in children's independent mobility and 'roaming range', which may be influenced by city design[33] and is linked to outdoor play.[7] Levels of childhood physical activity may influence activity patterns later in life,[34,35] and children's engagement in outdoor play is influenced by parental factors.[28] This raises the prospect of spiralling declines in outdoor play as adults with limited outdoor play experiences become parents.

Finally, as children's outdoor play has diminished, engagement in virtual worlds has expanded, with potentially negative consequences to health and development.[36,37] Studies are needed to explore the rapidly growing role of technology on children's lives, and how these changes might interact with city design to influence outdoor play.

Conclusions

Given the limitations of the literature, the conclusions offered here are contingent. However, empirical research suggests that residential built environment features do have an impact on outdoor play. The most robust findings indicate that play-friendly neighbourhoods are green, provide safe and pleasant routes for active travel to everyday destinations, facilitate social connections, and are not dominated by vehicle traffic.[7,26,28,38] Hence measures that reduce traffic flows within neighbourhoods are likely to be effective in increasing levels of outdoor play. Nearby spaces for play (e.g., gardens, yards, courtyards, low or no-traffic streets, vacant land) are likely to support outdoor play, especially where unmediated, traffic-free access to these spaces is possible. In addition, safe and pleasant walking and cycling routes may also support outdoor play.[26,28,30] Quantitative and qualitative results across contexts indicate that formal or informal play space, close to home, low-traffic neighbourhoods, other children to play with and natural environments support outdoor play across diverse urban settings.[7,26,28]

Implications for Parents, Services and Policy

Parents have long valued private green space for outdoor play, often due to traffic and social safety concerns.[39] However, recent research with children indicates that they desire access to and interaction with local spaces and people.[26] Without other children to play with, even the perfect physical space may quickly become boring, and children's wish for interaction may make online activities more compelling.[39,40] Decades of prioritizing adult concerns have resulted in urban environments that are often unsafe or uninspiring for outdoor play. Meaningful engagement with children is essential to inform urban design that motivates them to move, connect and play. Compact, green urban neighbourhoods, street layouts that reduce traffic speeds and volumes, and public realm features that encourage social encounters with friends and peers, between caregivers, and across generations, may align more closely with children's views of playability.[7,26]

The key levers for change are at the municipal level, where decisions about urban planning and design typically reside. Some broad play-friendly principles, such as the need to tame vehicle traffic in residential areas, are likely to apply in all cities.

Policy decisions about transport, land uses, housing design, streets, schools and services are intimately linked, highlighting the need for cross-disciplinary work.[41] 'Smart city' initiatives may allow policy makers to better explore the impact of their planning and design decisions on children.[43] The creation of a strategic municipal focus, in the form of a well-placed official with an explicit child-friendly planning brief, may be a key step.[42]

Ultimately children's entitlement to space and time for outdoor play is a matter of values, not just evidence. It is one example of what has been called spatial justice, or "the fair and equitable distribution in space of socially valued resources and the opportunities to use them".[44]

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Early Childhood Outdoor Play and Learning Spaces (ECOPALS): Achieving Design Quality

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Introduction

Child care has become an essential part of everyday life. In 2011, more than half of Canadian parents reported using some type of child care for children aged 4 or younger.[1] These children spend most of their waking hours in childcare, year-round, so it is important that nurturing environments are provided to stimulate child development across all domains. Although receiving little policy attention, evidence suggests that the design of naturalized outdoor environments can contribute substantially and uniquely to health promotion in early childhood.[2] Because child development facilities are highly regulated, quality must be measurable and created through evidence-based design. Progress is slowly being made in that direction.[3,4] Design guidelines based on available evidence influence practice.[5,6,7] Even so, the 2017 Canadian national report on early childhood education does not mention “outdoor”, “playground”, “natural”, or “nature”, even though the cover shows a child in nature.[8]

Subject

A new model of early childhood outdoor space is emerging, here termed Early Childhood Outdoor Play and Learning Spaces (ECOPALS), in response to the obesity crisis[9] and the children and nature movement,[10] designed to meet health promotion and child development goals.

Research on the value of outdoor play, particularly in support of physical health, has steadily advanced.[11] Increased portable play equipment and natural elements in play areas are recommended as a means of increasing physical activity.[12]

Problems

Standardized measures of ECOPALS quality are required to advance the state of the art.

Inequities in health and child development remain problematic in low resource communities. However, recent studies suggest that exposure to biodiverse spaces may be *equigenic*; i.e., support health equity.[13]

Regulations are indoor-centric and variable because childcare licensing policy is largely the responsibility of Canadian provinces and U.S. states. When childcare provision started growing rapidly in the 1970's, the main focus, understandably, was *building* standards to protect children's health, hygiene, and safety.

Building codes control facility design. Childcare building provision, as the dominant investment, is a mix of new construction and re-purposed facilities. The latter are more likely to serve low resource communities and present building adaptation challenges.

Outdoor regulations mainly reference basic health and safety requirements. Outdoor space is still considered as if it were a conventional playground furnished with manufactured play equipment and runnable open space. However, early childhood outdoor spaces are closely supervised, used every day (weather permitting), and need to provide broad activity choices for children.

Traditional "health and safety" codes of practice that discount nature still dominate children's environments policies;[14] however, counter arguments promote the positive impacts of nature on human development[15] and call for a "culture of reasonableness" balancing risk with developmental benefit.[16]

Teacher pre-service education traditionally does not emphasize "outdoor classroom" activity; however, pre-service teacher knowledge and self-confidence can be motivated by outdoor coursework.[17]

Research Context

Potential ECOPALS exist in many shapes and sizes, ranging from outdoor spaces in home-based, unregulated, informal care serving a few children to large licenced centres with enrolments of several hundred. Across this range, many design requirements supporting child behaviours are similar.

Type of facility and context are variable, including geographic location, enrolment size, socioeconomic profile, urban/suburban/rural location, non-profit/for-profit/national chain ownership, attachment to institutions such as churches, YMCA centres, zoos, botanical gardens, nature centres, and museums. Research on the significance of these factors is lacking. Some, such as climate, may affect design approaches substantially.

Pre-K programs in primary/elementary schools, aimed at kindergarten readiness of vulnerable four-year-olds in the U.S. and Canada, are challenged by school systems that do not recognise the need for outdoor design innovation to serve younger children. Precedent is provided by independent schools with long-standing pedagogical traditions that utilize outdoor environments to support play and learning objectives.[18]

ECOPALS can be designed to support child development, modes of learning, and variable teacher roles.[19] Pedagogically convincing, empirical tests with positive results would greatly strengthen support for outdoor learning.

Key Research Questions

Primary question: Which ECOPAL design attributes support safe, joyful places that playfully stimulate child development and intended learning outcomes across all domains? These domains include social-emotional, social studies, cognitive, language and literacy, the arts, and maths, science and technology, as well as physical development (relatively well researched).

Secondary questions: How flexible are design attributes? Are they adaptable to a wide range of contexts (climate, topography, site size, etc.)? Are they physically “lumpy” and expensive to implement like a concrete pathway or “incremental” and inexpensive like a raised deck or shade tree?

Recent Research Results

Positive correlations between outdoor play and physical activity are well established.[11] Outdoors, children are more likely to meet recommended physical activity health and fitness requirements.

A behaviour mapping study[20,3] of 30 preschool ECOPALS demonstrated the importance of adjacency (number of activity settings touching each other) and centrality (location relative to

the geographic center of the space), of activity settings in increasing physical activity.[3] These design attributes influence the *form* of site layout and relationships between activity settings.[a] As physical content, activity settings can be designed to extend the repertoire of play and learning affordances.[21] Thus, a pathway is ride-able, a lawn is run-able, a play structure is climb-able, etc. [21] Portable and loose part components such as wheeled toys, balls, and sticks, afford play and learning repertoires different to fixed components such as trees and shrubs.[21]

The presence of biodiversity is likely to engage multi-age groups of children, to stimulate social inclusion, and expand experiential learning outdoors. As children engage more freely with their surroundings and each other, more active, playful, social interaction is stimulated.[21,22]

Healthy eating can be supported via children's gardening.[23]

Exposure to rich biodiversity stimulates cognitive play and helps young children gain tacit knowledge of natural materials and processes, through which an affective foundation of love of nature and later cognitive understanding can evolve.[24]

ECOPALS can provide a stage for civic education, instilling intergenerational conservation values and active environmentalism in society.[25]

Research Gaps

Investigations are needed regarding relationships between individual activity settings and play and learning behavioural repertoires supporting ECOPALS programmatic goals.

Tests of ECOPALS designs based on behaviour setting and affordance principles are lacking across a wide range of physio/climatic/cultural/institutional conditions to better understand contextual influences.

Surveys of regulators, licensing officers, quality assessors, and educators are required to investigate knowledge and attitudes regarding ECOPALS naturalization, and provide evidence supporting changes to policy, practice, and pre-service curricula.

Conclusions

The rapidly advancing focus on early learning and a growing desire to re-engage children with nature is driving the need to demonstrate the developmental importance of high-quality

ECOPALS. Application of available research tools can create an urgently required, robust evidence base to inform early childhood policy, practice, and pre/post service professional development about the potential benefits of well-designed ECOPALS.

On both sides of the Canada-US border, research and practice issues are similar and link to a wider circle of contexts in high income countries. International collaborations among universities, professional organizations, and practitioners could increase collective impact.

Digitally-based, online professional development platforms provide multiple opportunities for sharing knowledge and its application through network extensions to universities and professional development programs in less-developed countries.

The emerging, transdisciplinary ECOPALS field must embrace many related disciplines (ecological and social sciences, child development, landscape design, conservation psychology, and more), to fully reach its potential to influence environmental values in society and ultimately to impact long-term climate change.

Implications for Parents, Services and Policy

Parents should try to choose child development facilities with ECOPALS designed with flowing, looping pathways, wheeled toys, other forms of portable play equipment, loose parts, many different types of settings besides manufactured play structures, and above all, shade trees and lots of nature.

Services providers should recognize ECOPALS naturalization as vital to healthy child development. Implement evidence-based best practices, which emphasize the importance of looping, curvy, wide (at least 1.5m), hard-surfaced pathways, wheeled toys, and a compact diversity of play and learning settings.

Policy makers should revise and expand regulatory frameworks beyond essential health and safety requirements, to include positive support of naturalized ECOPALSs containing diverse settings as “learning arenas.”[26] Create and mandate defined risk/benefit assessment protocols to broaden the outdoor imperative and experiential life of children for their good health, and the health of society and planet.[27]

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Note:

[a] An activity (or behaviour) setting is an ecological unit defined by spatial / temporal boundaries that differentiates it from adjacent settings. Activity/behaviour settings are constructed from components that afford predictable patterns of behaviour and are likely to be observed commensurate with the affordances offered – open lawn for running, slide for sliding, tree for "hiding," etc. The theories of behaviour setting and affordance are based on the work of Roger Barker (1903-1990); and James Gibson (1904-1979) and Eleanor Gibson (1910-2002), respectively.

Topic Commentary: Why Outdoor Play?

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Introduction

Play is a dominant activity of children's lives in all cultures[1]. Favourite play memories typically occur outside, particularly in natural settings[2–4]. Adults reflecting on these experiences remember the sense of freedom and fun, a chance to be creative, develop physical confidence and social skills and an opportunity to connect with nature. These play memories and growing research in outdoor play draws attention to important ways that outdoor play differs from play occurring indoors.

While scholarship on play has a lengthy history, interest in outdoor play specifically has rapidly gained the interest of scholars across diverse fields, as they grapple with the importance and meaning of these experiences for children. Papers in this chapter summarize the latest research regarding the influence of outdoor play on development and learning, as well as the important ways that caregivers, educators, policy makers, communities and cities can support children's play. Notable findings include the diverse and important benefits of outdoor play on children's development, health, wellbeing, and potential benefits for families, early childhood centres, schools, communities, and cities that support regular and repeated access to high quality outdoor play opportunities.

Research and Conclusions

Outdoor play is unstructured, freely chosen, intrinsically motivated play that takes place outside. It can often include risk taking and risky play[5]. Authors in this chapter express concerns about patterns that suggest successive generational declines in children's engagement in outdoor play, and discuss key reasons for the decline, such as adult risk aversion, an academic focus, accessibility of screens and technology, diminishing availability and quality of outdoor spaces, limited accessible training for early childhood educators in outdoor play pedagogy, and a deficit in policies that adequately support children's outdoor play in communities and early childhood

centres[5–13]. James, Dragon-Smith and Lahey[6] also point to how the pervasiveness of Euro-Western approaches in Canada's educational system have turned children away from play and the land, and towards controlled and regimented environments.

Research highlights a clear relationship between time spent in outdoor play and children's physical activity[7]. In addition, research suggests the importance of regular and repeated exposure to high quality outdoor play opportunities for fostering creativity, socio-emotional learning, executive functioning, mental health, a sense of self, motor skills and risk negotiation skills, building the immune system, as well as providing an ideal venue for scientific enquiry[5–13]. Increased access to green spaces has also been linked to variations in children's gut microbiota, in turn influencing cognitive and social development[11]. Further, benefits to the broader community have been identified, including promoting children's feelings of engagement with the world and sense of environmental stewardship[8–10,13,14].

Risky play, which involves activities with elements of challenge and uncertainty, supports the development of children's coping skills, manages physiological arousal and builds confidence[5,15]. Although not all outdoor play is risky play, playing outdoors facilitates risky play. However, modern societies' increasing risk aversion has reduced children's opportunities for such play15. Children routinely express enjoyment in risky play and a desire greater freedom and more challenging play settings[15]. Research links more risky play to better mood, lower anxiety, and improved prosocial behaviour[5,15].

Outdoor play now occurs in the context of rising ambient air temperatures, air quality alerts, and extreme weather events, often resulting in reduced time outdoors[14]. In the face of these challenges, outdoor play can serve as a pedagogical tool for fostering children's understanding of nature and climate change through enhanced environmental engagement and scientific enquiry and hands-on engagement with the natural world[13]. Early experiences in nature are linked to greater environmental stewardship in adulthood[14]. Moreover, given the many negative health impacts children will face from climate change[14], the well-documented physical, mental, and social benefits of outdoor play may be even more critical to support their resilience and well-being.

The authors raised concerns regarding predominance of small scale and qualitative studies, with diverse methods and definitions of key concepts. These studies have provided a promising foundation for research on outdoor play and opened many avenues of enquiry. Current evidence

on children's outdoor and risky play often depends on parent reports. There is a need for systematic large-scale and longitudinal studies using universally acceptable measurement tools that would help identify causal links between outdoor play and children's outcomes, as well as ways to support children with multiple needs, and in different cultural and geographic contexts, to access and engage in high quality outdoor play. There is also a need for experimental studies to clarify the cause-and-effect relationship between children's risky play and mental health. Furthermore, our understanding of the role of technology, both as an inhibitor, as well as a potential facilitator of outdoor play is in its infancy. Recent work has focused on developing more precise coding frameworks to classify the types of activities children engage in outdoors[11]. Likewise, coding schemes have been created to assess the degree to which outdoor play takes place in natural settings[11].

Implications for Development and Policy

The papers in this chapter list the many benefits associated with children's regular and repeated access to high quality outdoor play opportunities[5–13]. Gill[8] suggests an urgency to the need for action and change, raising the spectre of collective generational amnesia as children who grew up with restricted outdoor play opportunities become parents themselves and view this as the norm. He also raises the rapid pace of development, particularly in low- and middle-income countries; the opportunities this provides, but also the potential threats if planning neglects children's needs and does not prioritize provision of accessible and high quality and natural play spaces.

James, Dragon-Smith and Lahey[6] discuss the importance of learning from Indigenous perspective on outdoor play, which consider humans as part of nature and consider time spent playing and in nature as necessary to protect and to promote life-long learning. Acknowledging and honouring Indigenous philosophies and approaches, the "energy and medicines" of the land, Elders, and cultural families, can help provide a more holistic approach and children's understanding of the ecosystem and their place within it[6].

Daly and Corcoran also propose strategies for designing play spaces that lessen the adverse effects of climate change and extreme heat[14]. Materials such as rubber, gravel, and artificial turf tend to absorb and retain more heat than natural surfaces, especially when exposed to direct sunlight. Increasing shade coverage, especially through tree canopy rather than artificial shade structures, can significantly reduce surface temperatures. Replacing concrete or rubber with

natural elements can also improve a play space's ability to absorb rainwater during storms, helping to reduce flooding and runoff. Schoolyard greening, environmental learning, and the inclusion of Indigenous ways of knowing can strengthen children's connection to nature and eco-centric perspectives[6,14].

The collective role of parents, educators, policy makers, communities and municipalities in supporting outdoor play is reflected in the key implications for development and policy:

- Parents, caregivers, and early childhood educators: Parents and early childhood educators are often regarded as gatekeepers, carrying the responsibility for enabling children's access to outdoor play[11]. Consider children's opportunities for regular and repeated outdoor play in varied natural and built outdoor environments. Strike a balance between scheduled activities, screen time and free time. Resist the urge to limit risky play and adopt benefit–risk analyses instead of solely risk-minimization approaches[16]. Seek out environments that balance safety with opportunities for challenge and recognize the importance of outdoor play in supporting children's learning, development, health and well-being[5,11,13]. Consider the cross-section between environmental education and outdoor play within early childhood provision[13].
- Post-secondary institutions: Provide early learning students, as well as educators already working in centres, with accessible training in outdoor play pedagogy. Support educators in understanding their role in outdoor play provision and developing a playful pedagogical approach[13]. Embrace and integrate Indigenous philosophies and ways of knowing[6]. Establish an outdoor-based practicum within Canadian post-secondary early childhood education programs to enhance early learning educators' skills in outdoor pedagogy[9].
- Policy makers: Develop policies that support regular and repeated access to high quality outdoor play opportunities in early learning programs[11]. The current licensing and regulatory systems tend to be indoor-centric or focused on provision of fixed play equipment. Provide opportunities for licensing of outdoor programs. Support policies that that encourage risky play while preventing serious injury. Incorporate evidence-based design guidelines for the outdoor environments of early childhood education centres, including the importance of access to nature and loose parts and risky play opportunities[5,12]. Encourage daily outdoor time in all weather7, while balancing the need to protect children from negative health impacts of climate change[14]. Address risk aversion through implementation and support of risk benefit assessment frameworks[16].

- Municipalities: Recognize the needs of children and their caregivers as central to master planning, and the importance of widely and equitably accessible outdoor play provision. Engage children in participatory design. Explore designs that limit the dominance of traffic and encourage multi-generational social encounters[8,10] Heighten play-friendly principles as a strategic municipal focus through a designated official with an explicit child-friendly planning focus[8].

Children can and should be able to play throughout their communities. Addressing the barriers and creating a supportive culture and environment is a collective responsibility. Individuals, such as parents, and educators, and even children themselves, can make meaningful improvements in outdoor play opportunities. A collective approach that also involves institutions, governments, municipalities and the broader community would be exponentially more powerful in fostering lasting change and ensuring children's equitable access to high quality outdoor play spaces and opportunities.

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