

The Influence of the Natural Environment on Children's Language Development: A Review

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Abstract

Human development is a lifelong process of growth and development. Cognitive development is important for children to adjust to their social environment. Language development is considered as one of the primary areas of children's cognitive development. The main objective of this review is to explore the influence of natural environment and nature-based activities in children's language development. Additionally, it intends to identify the benefits of natural environment and nature-based activities in improving other cognitive skills including

sensation, attention, concentration, creativity and problem solving that are important for language development. Further, it explores physical, social and psychological benefits of natural environment. By employing qualitative method and the narrative review approach, this research explores the influence of the natural environment and nature-based activities on children's language development. The literature that discussed effects of natural environment and nature-based environment on children's language and cognitive development was selected for this review and was analyzed thematically. It is evident that natural environment, nature-based environments and nature-based activities increase opportunities for children to develop language and other cognitive skills. Both parents and educators can benefit from exposing children to natural environment and allowing them to engage in play activities in natural environments that enhance language development.

Keywords: Cognitive development, natural environment, language development, nature-based activities

Introduction

Human development is a process of growth and change that begins at conception and continues throughout the life span. It involves changes in biological, social, emotional, and cognitive domains that are inextricably intertwined. These changes are crucial for children to function successfully in their social environment. Cognitive development is considered as one of the key domains of child development. Cognition, one of the main aspects of human behaviour, refers to all systems of gaining knowledge and understanding including sensation, perception, memory, reasoning, decision making, problem solving, imagination etc. (APA dictionary, 2018). Brain development as well as the experience of social environment significantly contribute to children's cognitive development (Dissanayake, 2019).

Language Development

Language development is one of the main domains of children's cognitive development. Also, language development is crucial for not only children's cognitive development but their social development. In the process of language acquisition and development, the exposure to the environmental inputs is important for children. Prior research has highlighted that environmental influences considerably impact on different aspects of cognitive development including language development and memory. Hence, it seems that the exposure to environmental inputs and experience gathered in environment play a significant role in children's language development (Dissanayake, 2019; Smith, 2013; Tomasello, 2003).

Children interact with both natural environment and social environments, the built environments. They learn language in different social contexts including their home environment, social environment and school settings. Schools are

identified as one of the social contexts which provides rich language learning environment where children improve their language skills. Hence, attending school help children's language development (Hoff, 2006). Additionally, rich language learning environments are characterized by physical elements that enhance children's cognitive skills (e.g., problem solving, creativity and communication). These tangible elements also function as instruments for children in their play activities (Justice, 2004; Ellis, 2004). Children who are exposed to natural environment can benefit from natural materials for their activities that can help them improve their language and communication skills.

Impact of Natural Environment on Language Development in Children

Language development is considered as a complex process that depends on several mechanisms. Some of these mechanisms are extrinsic to the child such as the

environment in which the child learns the language, and some are intrinsic to the child such as the ability to concentrate and to learn linguistic patterns. These extrinsic and intrinsic mechanisms interact with one another and that influence children's language development (Smith, 2013; Tomasello, 2003).

It seems that not only the social environment, but also natural environment is important for children's language development. Natural environment refers to the natural world, which consists of both living things such as trees, animals and microorganisms and physical elements such as air, temperature, soils, water and landscapes. Social environment, in contrast, comprises of elements and processes that have been created by humans (Coppola, 2015).

Previous studies have revealed that playing in natural settings like forests, gardens, parks, and green spaces that include natural elements such as vegetation, rocks, sand,

and water have positively influenced child development such as motor development and cognitive skills like attention restoration (Dankiw et al., 2020). According to prior research evidence, children tend to play and move in different ways in natural environments compared to non-nature-based playgrounds (Dyment & O'Connell, 2013). Individuals' behaviours may be influenced by their environment. Accordingly, the exposure to natural environment can have significant impact on children's cognitive development, especially their language development.

Natural environment offers a context that supports cognitive functioning of children (Dankiw et al., 2020). For example, in natural environment, children can observe natural elements in nature such as waterfalls, and movements of animals, explore some physical elements such as soil, water, and plants, walk through the forests, and experience various changes in natural environment

like wind, rains, sounds produced by animals, trees, and waterfalls. The development of cognitive skills such as sensation, attention, perception, language and communication, imagination, creativity and problem solving can be facilitated by these experiences in natural environment. Previous studies have also highlighted that nature-based playgrounds have features such as vegetation, trees and stones that provide children with different play and learning opportunities compared to non-nature-based playgrounds with paved surfaces and artificial play features such as climbing frames and sandpits (Prins et al., 2022). This suggests that natural environment has rich learning opportunities for children's cognitive development.

Theories Related to the Link between Environment and Children's Language Development

The Usage-based Language Approach

Several theoretical approaches have attempted to explain the relationship between environment and children's language development. The Usage-based Language Approach proposed by Tomasello (2003) describes three social-cognitive skills that help children's language development. These social-cognitive skills include: (1) joint attention (the ability to share and follow others' attention on objects and events), (2) intention reading (the ability to comprehend others' communicative intentions), and (3) cultural learning (the ability to imitate others). These social-cognitive skills are important for children to learn lexical labels and identify grammatical patterns when using language. It seems that natural environment may have positive effects on the use of these social-cognitive skills. For example, prior research has suggested that

natural environment encourages higher levels of attention between individuals and that may influence the way they interpret each other's communication intentions (Cameron-Faulker, Melville, & Gattis, 2018). According to the Usage-based Language Approach, the core of language learning is the comprehension of communicative intentions. Hence, natural environment may enhance greater levels of attention in individuals which help them understand the intentions of their communication.

The Cultural-historical Activity Theory

According to the Cultural-historical Activity Theory, which was developed based on the work of Leont'ev and Vygotsky, tool use is considered as an important component of the socio-cultural environment (Van Oers, 2013). Natural environment provides various natural objects and elements including stones, sticks, leaves, water, sand, feathers and mud that can be used as tools (Prins et al., 2022). Interactions with these physical

elements may help children to improve their cognitive skills including language and communication skills. For example, children must use language to express the meaning they attach to these natural elements while they are playing with them. As a result, they improve their communication and language skills. Accordingly, natural environment offers many natural elements that create opportunities for children to communicate and thereby promote their language development.

The Affordance Theory

The Affordance Theory proposed by Gibson (2014) explains that certain aspects of physical environment can be considered as affordance that encourage and challenge children to interact with and explore while offering play activities and learning opportunities that are appropriate for their developmental stage. For example, a tree can afford climbing it for a five-year-old child who can climb a tree but not for a child who starts walking. Also, a

preschooler will be able to learn new words and expressions from plants and flowers that they see, but an infant will not benefit from it. These interactions and activities in a natural environment will also help children improve their language.

The functional opportunities for meaningful play in natural environments differ from those in non-natural settings (Prins et al., 2022). Unlike the play elements of a non-nature-based playground, the objects and elements in a nature-based playground (e.g., feathers, shrubs, rocks, and water) do not have an intentional meaning. According to the Affordance Theory, the affordances of a nature-based playground influence the quality of children's play as well as the quality of their language use. Especially, children need to talk about and cooperate how to use natural objects and elements for play. For example, a child needs to explore a shrub before using its "house function", which may involve using spatial and temporal terms. Additionally,

he needs to agree on this new functionality and share the meaning he added to the shrub with a playmate to play in the shrub. As a result, playing house in a shrub has a different conversational context than playing house in a playhouse (Prins et al., 2022).

Objectives

The main objective of this review is to explore the role of natural environment in language development in children. Particularly, it aims to identify the benefits of natural environment and nature-based activities in improving language and communication skills and other cognitive skills such as sensation, attention, concentration, creativity, and problem solving that are important for language development in children. Further, it intends to identify physical, social and psychological benefits of natural environment that contribute to cognitive as well as language development.

Methodology

By employing qualitative method and the narrative review approach, this research explores the influence of the natural environment and nature-based activities on children's language development. For this review, relevant scholarly articles were sourced from Google Scholar, Science Direct, ResearchGate and other electronic databases. Literature search was limited to journal articles and other materials that are related to the relationship between natural environment and language development as well as cognitive development published in the period 2004 -2025. The literature that discussed effects of natural environment and nature-based environment on children's language development (e.g., improving vocabulary, communication skills and utterances) and cognitive development (e.g., sensory development, attention, concentration, creativity and problem solving), and psychological, social and physical benefits of natural

environment was selected for this review and was analyzed thematically. The significance of natural environment and nature-based activities were discussed in relation to the development of children's language and cognitive development.

Analysis and Discussion

Benefits of Natural Environment in Children's Language Development

Enhancing Vocabulary

Natural environment helps children to improve their vocabulary. Particularly, natural environment provides children with rich environment to have diverse experiences to enhance their language and communication skills. Children can increase their vocabulary by interacting with natural objects such as trees, plants, flowers, water springs, acorns etc. Additionally, it motivates children describe their experiences and to

express their inner feelings, which helps them to learn new words and thereby improve language use.

Materials in natural environment have unique qualities including weights, shapes, sizes and textures that provide an opportunity for children to learn new concepts and new words. For example, learning different concepts or phenomena related to natural materials (e.g., decay) and different words for changes in natural materials (e.g., changing colors and textures of leaves when decaying) allow children to expand vocabulary and improve language use (Brodie, 2025).

Improving Communication Skills and Language

Communication skills are vital for children's development. Natural environment provides opportunities for children to improve their communication skills. Walking through natural environment such as forests, gardens, and parks, create opportunities for them to explore the natural world

and express their thoughts and feelings based on their observations in the natural environment. Additionally, children's communication skills can be enhanced by playing in natural environments and utilizing natural materials in play such as using trees, rocks, and other materials to represent different characters in their play, incorporate them into play activities and use them to develop their own stories (Brodie, 2025).

Furthermore, involvement in nature-based environment may facilitate children to improve their communication skills. Previous studies have revealed a significant correlation between nature-based environment and language use (Cameron-Faulkner et al., 2017; Richardson & Murray, 2016). A study aimed to examine the link between language use and the standard of the physical environment in early childhood settings has revealed a significant relationship between the play characteristics in the nature-based playground of the forest school and the

richness of the children's language (Richardson & Murray, 2016). The direct experience of nature (e.g., being in a natural environment) also resulted in a wider range of nature words during parent-child communication compared to indirect exposure to nature (e.g., photos and books of nature elements) (Cameron-Faulkner et al., 2017). This suggests that the exposure to natural environment significantly contribute to the development of communication skills and language.

Moreover, it is evident that outdoor play activities significantly contribute to children's language use (Shichida Australia, 2023). Compared to indoors, outdoor play provides a different environment which stimulates children to gain diverse experiences and thereby develop their language and communication skills. A study by Prins et al., (2022) have found that children's meaning making processes benefited from the characteristics of nature-based playgrounds, which elicited more utterances

and greater semantic complexity. These meaning making processes depend on the positive social-cultural context of any outdoor play condition, the particular context of the nature-based playground, as well as its elements and objects. These findings further highlight the impact of natural environment on children's language development.

One reason for the value of nature-based playgrounds in children's language development is its restorative effect on children's attention (Taylor & Kuo, 2009). According to Tomasello (2003), joint attention enables children to read the other person's intention in conversation. He further suggested that both joint attention and intention reading are two fundamental components of language use. Consequently, children can use linguistic symbols in communication. This may be the reason for the higher amount and complexity of children's utterances during play in a natural setting (Cameron-Faulkner, Melville, & Gattis, 2018).

Environment Functionality and Improving Communication Skills

The kind of play that a physical environment can provide depends on the reciprocal relationship between the environment and the child who uses it (Gibson, 2014). The functionality of the physical environment to support children's play and language use may be one explanation for this. The functionality of the physical environment is determined by the way children experience the environment as well as the way they interact with its elements. For example, a tree trunk offers several affordances.

The functionality of nature-based environments, for example, nature-based playgrounds, can be more adaptable and flexible. A tree, for example, can provide an opportunity for children to climb. In the meantime, it can be a covering place them to play hide and seek. Also, it can be utilized for pretend play (e.g., a pretend tea party).

In order to participate in these activities or to make use of these opportunities in the natural environment, children must converse and exchange their views with others. This may help explain the link between the functionality of nature-based environments and the volume of communications.

Facilitating the Use of Complex Language

The conversational environment in nature-based settings offers children a space to use complex language (Deunk, 2009; Hoff, 2006). Previous studies have suggested that the conversational environment that characterizes outdoor play—which includes greater freedom for children in selecting playmates and activities and less interaction with adults—significantly affects the quality of language use (Deunk, 2009; Pellegrini & Bohn, 2005). According to a recent study, the nature-based playgrounds significantly strengthen the conversational setting of outdoor play (Prins et al., 2022).

Increasing Utterances

Play activities help children's language development, particularly when they involve object play in nature-based environment. A recent study has suggested that object play in the nature-based playground allow more utterances, particularly when children attribute meaning to the objects according to their materiality and properties during their play activities (Prins et al., 2022). It has motivated children to use semantics of the language during their play. For example, discussing the strength of a stick in relation to its use during object play in nature-based playgrounds. In addition, the physical environment used for children's play activities can be transformed from unfamiliar to familiar using language. Some conversions provide evidence for children's perception of the living character of the nature-based playground (Prins et al., 2022).

Nature Exploration as a Means of Enhancing Language

Previous studies have suggested that nature fosters autonomy and adventure in addition to providing a source of sensory play and flexible tools or materials for pretend play for children (Chawla, 2015; Ellis 2004). According to the findings of a recent study, the materiality of natural pieces such as stones, sticks, acorns and mud influences communication skills and language use of children (Prins et al., 2022). This suggests that nature offers materials that help children engage in play activities and thereby improve not only their autonomy and adventure but their language use. Research finds that, compared to non-nature-based playgrounds, nature-based playgrounds provide opportunities for children to examine objects in the environment, so that they get used to them and use them in children's play activities. Hence, the sensory richness and diversity of nature-based environment facilitates to develop semantic complexity of children's language use (Prins et al., 2022).

Nature as a Space to Improve Scientific Concepts

According to a recent study, nature-based environment influences children's language use, particularly in understanding concepts such as gravity and the circle of life (Prins et al., 2022). The utterances used by children to count or measure objects and exploring natural phenomena like gravity and the circle of life also provide evidence for the effects of nature-based environment on children's language development. Findings have suggested that when children are playing in the nature-based playground they tend to use these utterances. It seems that children use language to predict and examine the numbers or measures of the objects (e.g., sticks) they used in these environments. Further, they tend to inquire about the circle of life of some objects that they see in nature and engage in some activities (such as examining the impact of gravity on speed) that help them understand certain natural phenomena (Prins et al., 2022). Accordingly, the

nature-based environment seems to be more suitable setting for children to develop scientific thinking, since it is important to improve knowledge and language about scientific concepts (Gelman, 2006; Hoff, 2006).

Benefits of Natural Environment in Developing Cognitive Skills Important for Language Development

It seems that nature provides ample opportunities for children to improve certain cognitive skills that are important for their language development. For example, natural environment provides natural materials such as stones, sticks, pebbles, water, leaves, etc. that create opportunities for children to explore natural world and to involve in activities that help improve their cognitive skills. In addition, the exposure to a variety of natural environment changes like wind, rains, sounds produced by animals, trees, and waterfalls help children develop different cognitive abilities including sensation, attention, perception, language and communication, imagination,

creativity and problem solving that are crucial for their language development.

Promoting Sensory Development

Nature provides provide opportunities for children to improve their sensory development (Shichida Australia, 2023). Nature offers some natural materials and conditions, such as flowers, fruits, and also the smell of natural environment that help children to improve other sensations such as smell and taste. All these sensory inputs in natural environment contributes to children's sensory development, which is vital for their cognitive development. In addition, natural materials such as trees, leaves, sticks, rocks, stones, and water springs help children identify the qualities of these materials and the sense of different textures in natural environment. Furthermore, nature's symphony including birds singing, water streams flowing, wind, leaves rustling, sounds of trees, etc. promotes children's sensation, listening and attention.

Improving Attention and Concentration

Cognitive skills such as attention, memory, creativity and problem solving are related to children's language development. It is evident that playing in natural settings like forests, gardens, parks, and green spaces that include natural elements such as vegetation, rocks, sand, and water have positively influence children's motor development and cognitive skills like attention restoration (Dankiw et al., 2020). Previous studies have further suggested that children tend to play and move in different ways in natural environments compared to non-nature-based paved playgrounds (Dyment & O'Connell, 2013). For example, in natural environment, children can observe elements in nature such as water springs and bird movements, explore some physical elements such as soil, water and plants, walk through the forests, and experience various changes in natural environment like wind, rains, sounds produced by animals, trees, and waterfalls. The development of

cognitive skills such as sensation, attention, perception and imagination can be facilitated by these experiences in natural environment.

Unique features of natural environment and natural materials also help children to improve their attention and concentration. For example, natural materials such as water springs, leaves, acorns, roots of trees, plants and stones and sounds produced by animals and birds catch children's attention. They can improve their attention and concentration skills by interacting with these natural materials such as observing different colors and shapes of leaves, water spring and roots of trees and spending time in a natural environment (Brodie, 2025).

Previous studies have revealed that the characteristics of nature-based playgrounds influence the quality of play in children (e.g., Kuh, Ponte, & Chau, 2013; Luchs & Fikus, 2013; Fjørtoft, 2004). Nature-based playgrounds have significant effects on attracting and maintaining

children's attention in different types of play activities (e.g., constructive play and motor play) (Kuh, Ponte, & Chau, 2013). Similarly, children's attention can be improved by natural environment and the natural materials they use in play activities.

Improving Creativity

Natural environment stimulates other cognitive skills such as imagination and creativity in children. In natural environments, children have the freedom to use their imaginations based on their observations and experiences in natural environment and to engage in activities (e.g., play or explore nature) that help foster creativity. Activities like imaginative play help them improve their creative thinking. Also, natural environment fosters a calm and relaxed mood for children. The inner peace they experience will enable them to use their imagination and provide them an opportunity to develop their creative thinking based on their experiences and the natural

materials found in natural environment (Shichida Australia, 2023).

Improves Problem-solving Skills

Natural environment offers a range of opportunities for children to improve their problem-solving skills. Also, there are many unpredictable changes in the natural environment. Children need to apply cognitive skills such as creativity and decision making to find solutions for the challenges they encounter in natural environment (Shichida Australia, 2023). For example, if children want to cross a stream, they need to carefully examine the best way to do it. They need to consider the shallowest area in the stream, whether they can use steppingstones or whether they need to make a makeshift bridge to cross it. In these situations, children need to carefully observe, identify the options based on the nature of the challenge, evaluate their options by considering pros and cons, comprehend the cause-and-effect linkages and explore the

natural materials available for them to find a better solution for it. These experiences help children to improve cognitive skills such as creative and rational thinking, negotiation, effective communication, decision making, planning and creativity that are essential for successful problem solving, which contributes to language development.

Physical Benefits of Natural Environment

Increasing Physical Activity

Compared to non-natural environments, natural environments allow children to engage in more diverse play activities (Fjørtoft, 2004; Kuh, Ponte, & Chau, 2013; Luchs & Fikus, 2013). For example, nature-based playground not only help children develop their language but for their physical well-being which indirectly contributes to their cognitive development (Prins et al., 2022). Because of the sensory-rich opportunities that

nature provides for children (e.g., watch birds, warm and bright environment) (Cooke et al., 2020), they are more likely to actively engage in nature, which helps them enhance positive feelings such as comfort, joy and interest. Experience of positive emotions and feelings may enhance their desire to play and to explore the environment which in turn, contributes to children's cognitive development.

According to Broaden-and-Build Theory, subset of positive emotions such as interest, joy, contentment and love expand individuals' momentary thought-action repertoire. For example, joy stimulates the desire to play and interest sparks the desire to explore (Fredrickson, 2004). Accordingly, positive emotions experienced by actively engage in nature will encourage children to improve their cognitive skills such as perception, thinking capacity, communication skills, and language.

Improving Active Engagement

Prior research has also revealed that nature-based environment that characterizes outdoor play, which offers space and freedom for children to select their playmates and activities contributes to their language development (Deunk, 2009; Pellegrini & Bohn, 2005). The active involvement in nature-based environment may motivate children to feel positive emotions that help them engage in play and other activities with their playmates that contribute to their language development.

Nature-based play activities provide an opportunity for children to be more active. When they engage in play activities outside, they tend to run, jump, climb and play different games (e.g., hide and seek), all of which are enjoyable and beneficial for both physical and mental health. These activities require a lot of mobility which is important for their physical growth and improving their muscles, coordination and fitness. Nature-based play

activities foster a passion for being active. Children who tend to engage in outdoor play activities tend to enjoy sports and other physical activities as they develop. They tend to be more active and healthier which make exercise enjoyable and become part of their lives (Shichida Australia, 2023).

Social Benefits of Natural Environment

Improving Social Skills

Language development is vital for children, particularly for their cognitive as well as social development (Brodie, 2025). Children's engagement in nature and materials in natural environment allows them not only to enhance their cognitive but also to improve social skills. Natural environment allows children to engage in activities that motivate them to work together. Particularly, play activities may encourage collaborative work, sharing their responsibilities and helping each other. For example,

children tend to work together to build something using natural materials (such as wooden sticks, sands and leaves). They need to cooperate and communicate with each other in order to complete the work they have planned. Hence, natural environment provides opportunities for them to improve their social interactions as well as communication skills (Brodie, 2025).

Psychological Benefits of Natural Environment

Reducing Stress and Anxiety and Improving Mental Well-Being

Natural environment offers a tranquility and peaceful atmosphere that help children to relax and calm. Walking in a natural environment, for example, provide ample opportunities such as listening to birdsong, feeling the grass, listening to the sounds in nature (e.g., water streams), observing the sky and moving clouds that help children feel calm and peace and to reduce their level of

stress and anxiety. In addition, nature-based activities will help releasing endorphins that help reduce stress and enhance mood (Shichida Australia, 2023). Also, prior research has suggested that young children would like to play in playgrounds that are surrounded by nature. They have reported that they prefer sensory-rich opportunities that nature provides such as opportunity to watch birds, sunny and bright, and softness of grass. These characteristics of nature contribute to enhance children's comfort and well-being (Cooke et al., 2020).

Conclusion

Natural environment, nature-based environments and nature-based activities facilitate children's language development including improving vocabulary, communication skills and utterances, facilitating the use of complex language and offering opportunities for exploration that enhance language and scientific concepts. Additionally, exposure to natural environment and involvement in

nature-based activities help children develop other cognitive skills such as sensation, attention, concentration, creativity and problem solving that are important for language development. Finally, they help improve physical, psychological and social health of children. Hence, it is evident that children's language, cognitive and overall development are significantly influenced by natural environments and nature-based activities. Exposing children to natural environment and allowing them to engage in play activities in natural environments that enhance their language development can be beneficial for both parents and educators to support child development. This will enable children to acquire new knowledge and improve their skills as well as attitudes that help them become socially well-adjusted and fully functioning adults.

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Biographical Note

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