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The Effect of Auditory on Children's Memory and Cognitive Development

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Abstract. The majority of current research on children's cognition concentrates on how vision and touch affect children's cognition. According to this study, aural environment and stimulation play a significant impact throughout a child's vital era in the development of their memory and cognitive abilities. This paper first describes the cognitive function and the key period in children's cognitive development, then combines these concepts with measures to support children's memory and cognitive growth. This research asserts that the auditory sense is particularly significant during the key era of children's cognitive development, it offers some references for creating suitable auditory environmental stimuli for children which are beneficial to the development of their cognitive level.

Keywords: Auditory, Child Memory, Cognitive Development

1. Introduction

All facets of human social interaction and learning are influenced by cognitive function, which is the mental ability of the human brain to recognize and reflect objective things, including feeling, perception, speech cognition, social cognition, attention, memory, inductive reasoning, and decision-making.

Using sensory stimulation to stimulate children's development is crucial. The use of multi-sensory stimulation to enhance children's performance in receiving sensory stimuli and responding behaviors, as well as to foster children's interest in and capacity for active environment exploration, has been the subject of an abundance of research in recent years. This research aims to cultivate and stimulate children's motivation, skills, and performance in everyday life skills as well as academic learning. However, the majority of these researches focus on the visual and tactile environments, leaving out the auditory world. In actuality, hearing and vision are also crucial ways for kids to comprehend the real world.

According to psychological studies, preschool children's hearing continues to develop with age, especially during the process of learning a language. Exposure to music and sound stimulation can help preschoolers' hearing become more sensitive and more selective. Children's psychological traits including good mood, emotion, and persistence of attention all have advanced to varying degrees as a result of the increase in hearing level. It is clear that a good auditory environment is essential for children's growth as both physical and psychological beings, as it helps them comprehend the world around them.

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The purpose of this paper is to investigate the issues surrounding how hearing affects young children's cognitive development. The primary mode of learning in early childhood education is still visual or audio-visual integration. Few studies have been conducted in this area by established academics, despite the fact that hearing is the second most important sense channel for information acquisition after vision. Based on these findings, this paper will contribute to the growth of theories relating to children's auditory settings and can also act as a manual for relevant educators in the design of auditory environments.

2. The Effect Analysis of Auditory on Children's Memory and Cognitive Development

2.1. Cognitive Function and Children's Cognitive Critical Period

Cognitive development is the study of how the psychological process and content arise and change over time. Cognitive level changes in a person's life follow a specific life-long development curve [1]. The sensory-motor stage (under 2 years old), the preoperational stage (between 2 and 7 years old), the specific operational stage (between 7 and 11 years old), and the formal operational stage (after age 11) are the different stages of cognitive development according to modern psychologist Piaget's theory [2].

Early in a person's life is a crucial time for cognitive development. The term "critical period" describes a moment during a person's development when the brain has to be exposed to the right external stimuli in order for certain behaviors and associated neural underpinnings to develop appropriately. The ability of the individual's cognitive level to plastically change throughout time will be constrained if they do not experience the appropriate environmental stimuli and behavioral instruction at the crucial era.

The term "critical period" derives from biology and describes a period of time when children are most likely to pick up specific knowledge or abilities and develop certain psychological traits [3]. Language development is the primary way that children's psychological development takes shape during this crucial time. If this period is lost in terms of perception, it will be challenges to make up for the barriers to children's growth and future development. Because of the brain's plasticity, experts have offered numerous explanations for why there is a key period. The term "brain plasticity" describes the prefabricated, naturally variable structure or function of the brain. According to studies, the brain's plasticity changes continuously from birth until adulthood. Younger individuals have very high levels of brain plasticity, which gradually declines with age. The most essential period is from 1 to 5 years old, however the critical period is typically from birth until adolescence. Children's language development happens quickly during this time, and "hearing" is crucial during this time. According to a 1987 study by Gould and Peter on white-crowned finches, the young birds only began singing after hearing the adult birds' cries for the first time 40 to 50 days after birth. Additionally, they do not whine, hence the first 40 to 50 days after birth are crucial for the development of whining behavior in chicks. Some hearing-impaired newborns use gestures to interact with others. If they have past puberty and use hearing aids to restore their hearing, they have a tough time acquiring a language because they did not accept it during the crucial stage [4].

The crucial era is crucial for children to acquire language, but it's also crucial for them to master other subjects like music, art, foreign languages, and other subjects. As a result, allowing kids to pick up specific knowledge or abilities today will have a multiplier impact and establish a solid foundation for their future development. However, numerous instances demonstrate that not all school-age youngsters are capable of having the desired learning effect. The main cause is that young children (ages 1-5) struggle with language expression and comprehension. They occasionally lack the capacity to understand what adults are saying and to perform according to adult standards. Children's

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development eventually becomes sluggish. Therefore, children still need to put a lot of effort into their hearing skills during the time when their language development is imperfect.

2.2. Children's Perception of Auditory Environment

Focus group interviews with 36 young children were conducted through using the grounded theory method by some academics to better understand the children's perceptions of sound, knowledge of the sources of sound, and coping mechanisms [5]. The results imply that a sound's plausibility, understandability, manageability, descriptiveness, and psychoacoustic properties may influence how children perceive emotional responses to auditory surroundings. Young children's perception of noises is upsetting and stressful when they are unable to control them, and they exhibit dissatisfaction when they are less aware of the sources of common sounds. When noises are appropriate for the circumstance and they are familiar to them, toddlers experience delight and happiness. The primary methods used by youngsters to deal with noise were evaluated and described by the researchers. These methods included hiding and avoiding attention, trying to limit listening, asking the teacher for aid, and cognitive attention-diversion techniques.

Studies have also used lab tests to let young toddlers experience the replicated aural environment and provide their subjective assessments. The three components of sound perception that the researchers split into were pleasantness, tranquility, and regularity. Regularity is split into familiar and changeable auditory environment perceptions, peacefulness is a descriptive element, and pleasantness includes value attitudes and emotional arousal that constitute the basis of emotional responses. Young children are more likely to produce a tranquil soundscape in a regulated environment, and a nice and serene experience has a favorable attitude towards strengthening the preference for the entire listening environment [6]. Other researchers have examined how preschoolers describe the voices around them using focus groups and interviews. This study demonstrates that toddlers are already capable of expressing how noise affects them emotionally and physically, and that their perception of background noise is closely tied to their daily experiences [7].

2.3. The Influence of Auditory Environment on Children's Development

Researchers concentrate more of their attention on a group of youngsters with special needs in their research on auditory environment perception. It has been discovered through the use of eye trackers to code and track their data that children with hearing impairments need aids like cochlear implants to help them recognize the auditory environment through visual compensation [8]. Children with special needs who have impaired hearing also struggle to recognize the auditory world. According to certain researchers' studies, various tools do not perceive the same aspects of the aural environment [9]. In contrast, humans' ears are more likely to pick up speeches than the cochleas, which excels at picking up on silent situations. According to some research, aural distraction can interfere with auditory recognition and is influenced by individual variances. The more working memory mistakes that children with auditory distraction make, the harder it is for them to identify the auditory environment. When children are exposed to random noises, their hearings decline noticeably.

Likewise, some researchers have discovered a connection between early language development and the surrounding acoustic environment. Through front and back trials, scientists have discovered that children with stronger auditory system development develop their language more quickly [10]. There is evidence from several research that children's language understanding can be impacted by noise in actual classroom settings. Children's speech experiences a perceptual deterioration phenomena in noisy classroom settings. The youngest children are most sensitive to noise and have a harder time understanding language when classroom noise hits 65 dB [11]. When young children are in a calm classroom environment, language comprehension is improved. A 5-year follow-up

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study's findings revealed that musical instruction influences how children's brains respond to stimuli, with musically trained kids displaying improved pitch shifts and brain sound processing maturity in comparison to untrained kids [12]. Training your auditory system with music is an excellent idea. Children who receive musical instrument training are found to be more proficient in language than children who receive music appreciation, according to a comparison of students who actively learn music through the use of musical instruments and students who choose to study music in music appreciation classes. Their literacy skills are improved by the neural responses, which are quicker and more precise and can be connected to their previous reading capabilities [13].

Similar studies that mimic classroom settings have looked at how varied soundscapes affect young children's sustained attention and short-term memory recovery. The findings demonstrate that some noises, such as music, birdsong, fountains, and streams, are more likely than others to result in memory retrieval. Young children have superior short-term memory when listening to the sound of fountains and streams than they do when listening to music or bird singing, according to a phenomenon [14]. This demonstrates that the noises that young children hear actually improve their memory and cognitive function. Some academics have also concentrated on how kindergarten environments affect young children. According to studies, ambient noise can make young children emotionally distressed, produce some physical symptoms, and even make them experience pain. Teachers are more likely to be weary, irritable, and even distressed when in a quiet setting than those in a noisy environment. As a result, physical and pedagogical measures should be taken to improve the kindergarten's auditory environment and reduce noise [15]. In conclusion, the aural environment can influence how early children learn to communicate, think, remember, and feel.

3. Conclusion

Hearing is a crucial sensory organ for kids, and it plays a crucial role in how they perceive and comprehend the outside world as well as how they learn and gain knowledge. Young children's language development is greatly influenced by hearing. Young children often relay information and express feelings through language and music due to their limited cognitive development. Due to their limited ability to write, youngsters now rely heavily on hearing as a source of knowledge. Children's intellectual and aesthetic development is significantly influenced by their aural environment. Children's perceptual development, aesthetic taste development, and curiosity in exploring and discovering beauty can all be enhanced by the auditory environment. At the same time, the auditory environment can compensate for children's limitations in linguistic expression, emotion, and aesthetics because it is a sound environment. Children can use language to express themselves more clearly and use music to convey their feelings. Children's learning and development can be aided by the musical environment by helping them develop their aesthetic sense.

As was already noted, if the function of children's cognitive development is not understood, the significant significance of auditory in children's cognition of the objective world may be disregarded. The plasticity of an individual's lifelong cognitive development will be constrained if they do not get the appropriate environmental stimulation and behavioral training experiences during the critical cognitive era. Therefore, in order to promote children's complete and harmonious development physically and psychologically, it is vital to examine the relationship between auditory input and children's healthy emotions, emotions, and persistence of attention from various angles.

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