

Received: May 2023 Accepted: June 2023 DOI:
https://doi.org/10.58262/ks.v11i02.172

Music Activities for Children from Birth to Three Years to Enhance Brain Development in Language and Communication in Thailand

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Abstract

From birth to three years of a child serves as a foundation for later developments in life. Among those, language development is a central skill to learning, communication, critical thinking, and even maintaining good mental health. Numerous research studies demonstrate growing evidence that there is a close relationship between music and language functions in the human brain, and that the neural and psychological processes of music and language are overlapped. Moreover, there is also evidence that language ability can benefit from learning music and vice versa. Children who participate in music lessons or music activities since a young age retain words and expressions much more effectively, more actively participate in conversations and are better equipped to acquire a second language. This study aims to analyze the relationship between music and language in the aspect of the brain, psychological, and cognitive development in children from birth to three years old, as well as the influence of music as a tool for improving such development. This research was conducted by documentary analysis and review, including interview of an experts separated into three groups which are, doctors, neuroscientists and music educators in Thailand who worked in the fields of music that coherently with the brain. The research results found that, a model for planning music lessons and music activity to enhance development from birth to three years old child was developed for music teachers and educators.

Keywords: Music Activities, Enhance Brain Development, Birth to Three Years Old, Language and Communication

Introduction and Background

By the end of the 20th century, the relationship between music and the brain had gained significant interest among music education researchers (Hodges, 2000). Music research studies also benefitted from the development of new medical tools, such as the electroencephalogram (EEG)¹ and magnetic resonance imaging (MRI)². As a result, the positive relationship between music activities such as, listening, singing, movement with music and playing musical instruments and the brain development in early childhood is acknowledged and accepted (Oliveira, Silva, Marinho, Lopez, & Castro, 2019). Thus, music education researchers proposed that learning music from childhood is likely to benefit the brain's development compared to those who have never been exposed to music from such an early age (Flohr, Miller & Debeus, 2000). It is obviously can exhilarate a person to get also peace in their mind, and that directly influences the brighter and faster learning brain. Listening is the first language skill that humans develop. Biologically and medically, listening occurs naturally even before birth, as early as 16 weeks in the womb of mothers. In addition, the parents' voices, babies can perceive musical sound (Rakluek books, 2008). Moreover, Ward & Daley's studied (2006). shows that, music in the Baroque era (e.g., J.S. Bach's and A. Vivaldi's music) significantly stimulates babies' and children's brains compared to the music from other eras.

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However, listening to music as a passive activity only generates a temporary learning cycle connection. Children actively participating in music activities such as, singing, musical movement and playing instruments are more likely to develop a long-term learning cycle for them. Participating in music activities and playing musical instruments benefits both sides of the brain. Music helps develop the brain's right side, which relates to art, music, imagination, creativity, and relationship skills. Music activities can also help develop the left brain that is related to data analysis and language skills. Researchers found that, the left brain can differentiate rhythms and melodies in the music whilst simultaneously appreciating (to make sense of) the piece with the right-brain function (Solly & George, 1997).

The primary objective of learning through music for children from newborn to three years old is not to have them play an instrument because it's not possible, but to help them understand the essential elements such as, beat, rhythm, pitch, dynamics, together with other life skills such as listening, singing or coordination (Suttachitt, 2012).

As a development-enhancing tool, introducing music activities to children is most effective when engaging in such activities voluntarily. In other words, children will benefit from such activities the most when they are happy to learn music and want to take part in music activities as world known that music is more relaxing than any other activities. Children will learn to practice music through passion and not being forced to participate in music activities, every child loves music. A positive attitude will result in the long-term benefit of children's development including, creative mindset (Ataya et al., 2019).

Because the ability to perceive sounds is the foundation of language learning, researchers have concluded that learning music is closely related to learning a language (Trehub, 2015). The main objective of early childhood music teaching such as, the methods developed by Kodaly, Dalcroze, Orff Schwerk, and Suzuki, is not to have children become successful musicians, instead, it is to develop physical, cognitive, emotional, and social skills for them (Suttachitt, 1989). With the right learning tools, children can realize their potential and music is one of those tools, as illustrated by the quote:

"Food is important to the growth of the body as much as music is important to the growth of brain" (Collins, 2015). This quote inspired the research project "Model of Music Activities to Enhance Brain Development in Children from Birth to Three Years" (Techaaphonchai, 2020).

This research was a study of role of music activities in enhancing children's brain development during the early period of their life. The results from this research can benefit those who teach birth-to-three years old child as well, the aim is to assist children in realizing their potential about music to language and communication in eventually.

Encouraging children to take up lessons or hobbies during the birth-to-three years period used to be considered as non-conventional parenting. People perceived that, it was better to let children naturally develop their learning until they reached the age to attend school and begin a formal learning process. However, research has shown that, brain cells in children from eight months to three years old, will start to spread out and form synapse connections, the site where electric nerve impulse transmission occurs (Kubota, 2016) (Shi, Chen, Shi, Hu, & Wang, 2013).

During this period, the synapse development is at maximum capacity and can create brain networks of 1000 trillion connections, which is twice compared to the adults' amount. The synapse connections develop rapidly at this early stage as a child continuously learns new things and encounters new experiences. With this development process, the synapse increases to the standard 140 million brain cells by connecting the brain cells and forming neural networks. This high frequency of synapse connections will start to dissipate after three years old and decrease over time. Some cells that are not stimulated before three years old will become extinct and unusable, this process is commonly called Pruning. Therefore, from birth-to-three years old period is critical for brain development and is the most effective time to introduce brain development activities to a child to get to know things mostly in life.

This research aimed to study the function of music that benefits the development of language and communication from birth-to-three years old and, ultimately to develop guidelines for music educators to plan their musical activities and lesson to benefit language development in children learning.

Methodology

The research employed documents analysis and review, together with interviews of experts separated into three groups which are: doctors, neuroscientists and music educators in Thailand who worked in the areas of music and the brain including related fields.

Analysis of Documents and Research: The research study sources comprised textbooks and other academic online informations such as, journals and published texts, both Thai and international publications related to musical activities that could potentially develop the brain of young learners. It was found that, Music and Brain, Music with Brain Development, The Benefits of Music for Brain Development, Music and Neuroscience, Music Education and Neuroscience, Neuroscience of Music and Neuron-musical are the key important to interest all researchers (Erickson, Thogmartin, Russell, Diffendorfer, & Szymanski, 2014).

The data for this part was collected by analyzing and summarizing the documents related to the effects of music on brain development for young learners (newborns – three years old). The analyzed contents were recorded carefully into Microsoft Word in narration, pictures, diagrams, and tables.

Collecting and Analysis of Experts' Interview Data: Expert groups working on the connection between music and the brain in Thailand were interviewed about their experiences and work relating to music and the brain. The open-ended questions were developed from the researcher's analysis and review of the literatures. The researcher selected three sampling groups consisting mainly of, doctors, neuroscientists and music professors (Wentz, Oldson, & Stricklin, 2014).

For the Doctors: The interview sessions with doctors aimed to gain more understanding of the relationship between brain development and music skills. The interviews focused on musical activities that can affect brain function with a medical approach to measurement and evaluation. The qualification criteria of the medical experts for the interview sessions were as follows:

Qualification Criteria

Participants must have neuron-musical experiences in either academic or practical training for more than three years. Participants must agree to participate in this research by signing the consent form stipulated by the Human Research Protection Unit, Mahidol University Thailand (Sobamowo, 2020).

For the Neuroscientists: The interview sessions with neuroscientists also aimed to understand the relationship between brain development and music skills. The interviews explored different models of musical activities that can affect the brain, supported by a neuroscience approach to measurement and evaluation. The required qualification criteria for the neuroscience experts were as follows:

Qualification Criteria

- Participants must be post-graduate with a Ph.D., in a related field.
- Participants must have a degree in a field related to the brain.
- Participants must have more than three years of experiences in either academic or practical training about neuro music.

- Participants must agree to participate in this research by signing the consent form stipulated by the Human Research Protection Unit, Mahidol University Thailand (FRICKE, 2016).

For the Music Professors: The interviews with music university professors aimed to comprehend the relationship between brain development and music skills and learn about the most beneficial musical activities model that can develop brain functions. Issues such as measurement and evaluation were also discussed. The qualifications criteria for the experts were as follows:

Qualification Criteria

- Participants must have a doctoral degree in a related field.
- Participants must have more than three years of experiences in academic or practical training related to music and the brain.
- Participants must agree to participate in this research by signing the consent form stipulated by the Human Research Protection Unit, Mahidol University Thailand.

Data analysis: Inductive analysis was applied by summarizing the key points collected from the interview data, analyzing the content for classification of key issues, and comparing the perspectives of each expert group by analyzing, reviewing and editing all the data in a narrative form.

Analysis of the Function of Music to Enhance Language & Communication:

The data from the analysis of documents and the interviews concerning the role of music to enhance language & communication in children was divided into three age groups: 0-1, 1-2, and 2-3 years. The research was conducted using experimental studies and quantitative evaluation of the processes involved when learning language during the period dating August 5, 2019 – May 31, 2020 (Ren & Li, 2017).

The researcher discovered ten relevant studies. The analysis covered the relationship between the method and frequency of musical activities and brain development. Finally, the data was summarized in commentary and diagrams.

Results

Analysis of Documents and Research

Traditionally, music and language were treated as different skills, and music functions were thought to be contained within the right hemisphere of the brain, and language functions were believed to be localized in the left hemisphere. However, improvements in the understanding of neurophysiology using modern brain imaging techniques have now shown that music and language functions have many aspects in common. There are several similarities in neural processes and functions involved in music and language (Tallal & Gaab, 2006). Throughout the review of documents, there was reference to a closer relationship between music and language. For example, Dege and Schwarzer (2011) and Loui et al. (2011) report findings that there is a close relationship between phonological awareness, which is pivotal for reading and writing skills, and pitch awareness and musical expertise. Several studies also indicated that although there are some differences between music and language processing, the processing of both has an overlap (Giuliano et al., 2011; Hosch et al., 2011; Omigie and Stewart, 2011; Peretz et al., 2011).

Table 1: Analysis of research studies involved with the usage of music in improving the development of language and communication in birth to three years old children.

	Listening	Singing	Play	Movement
Birth – 1 year old	7	-	2	2

1 – 2 years old	1	1	1	1
2 – 3 years old	2	2	2	2

In the studies that were reviewed, several musical skills were seen as being related to certain aspects of brain development. Those musical skills are listening, singing, playing percussion instruments and movement. The number of research studies focusing on musical skills and related to brain development is summarized in Table 1.

The research emphasized listening; the sense newborns first develop. In one experiment, newborns and infants listened to the Twinkle Twinkle Little Star song on CD players, followed by the maternal singing voice and an instrumental song (Cirelli, Jurewicz & Trehub, 2019). Research on singing skills had not been found for the age range focusing on children's growth from birth to one-year-old, as this skill would be impractical for young children who could not speak a sentence or communicate like older children.

For children of this age, research mainly focused on cognitive processes in language. So for this age group, memory is developed through language by remembering vocabulary words, gestures, and pronunciation. The number of research studies using musical activities to enhance brain development through language and communication for ages two to three years was relatively limited. In these studies, they focused on musical multiskilling and experiments with musical activities at home over the longer term (Williams, Barrett, Welch, Abad & Broughton, 2015; Putkinen, Tervaniemi, & Huotilainen, 2013).

Since birth, parents had regularly performed musical activities, such as music listening, singing, instrument playing, and movements to music with their children. The results were measured by three methods; parents' behavioral records, the international standardized test of multiskilling competency, and brain imaging techniques, together with records and tests to provide calibration.

Using all three measurement methods would be the most reliable where this is practical, although most research only uses some of the methods due to practical limitations. (Williams, Barrett, Welch, Abad, & Broughton, 2015; Putkinen, Tervaniemi, & Huotilainen, 2013)

Analysis of Experts' Interview Data

The research data was collected from the three different expert groups: two doctors, three neuroscientists and two music professors. During the interviews, the researcher raised key issues, based on the document reviews. All three groups of doctors, neuroscientists, and music professors had different methods, concepts, and perspectives, but they all had experience in musical and neurological science, so had consistent opinions on the musical effects of brain function.

All of the experts had previous experience and accomplishments relating to music and the brain. These were classified into two purposes; firstly, they were classified as music and the brain for therapy purposes, and secondly, for human potential development purpose. They seemed to be aligned that neuro-music studies in Thailand were rarely found, in fact, Music was innately equipped with all humans from birth and regarded as a mediator to enhance brain development in all aspects, because the brain would grow progressively in the right environment.

From all expert's experience, they believe that language learning resembled music learning, which was directly relevant to pitch and rhythm. Moreover, when the sound had access to the emotional processing or limbic system, the brain would produce the dopamine that caused pleasurable feelings and concentration. It is effect for improved the brain's memory mechanisms and also to memory words and language. Then, music activities should also play a part in children's everyday life from birth in all five senses' stimulation (ARUNACHALAM, CHINNARAJA, & MAYDEN, 2016).

Music played a mediate role in developing the brain because music can be deconstructed into elements used to make everyday activities more comfortable and not so complicated or difficult in several levels commonly used in daily activities. Then, the most important person for this success is teachers or leaders of the music activities a crucial role in leading parents and children in engaging in music activities, especially in the primary stage. Moreover, the activities should focus on children's use of multi-skills, include the musical elements of pitch and rhythm so that children could use many senses in the activity. Activities should also start from familiar or uncomplicated to unfamiliar materials.

The Function of Music to Enhance Language and Communication

Language is a crucial mechanism of communication for humans in society. Communication abilities are innately equipped with humans from birth. Newborn babies start baby-talk by making sounds like 'ooh' and 'aah' and the sound of crying to communicate with their mothers and gain attention from their mothers.

This would start with the children speaking the words they could imitate or ways to say and posture, recognizing the emotional communication from speaking or singing voices of their mothers, and then developing language in the next stage (Trehub, 2013; Trehub, 2002). Besides, music is well known as tone color in the language (Trollinger, 2010). Regarding the study by Mr. Stephen Malloch, babies and mothers would engage in proto conversations through communication modes other than speech, namely sounds and movements of their own, inside which the music elements, e.g., rhythm and melody, were indeed cached. During their proto-conversations, children could beat within the rhythm and decipher it into music notes.

The proto conversation could also be developed to all communication modes, such as speaking, reading, performance, and musicality (Pejarasangharn, 2020). As a result, both the adults and the babies who could not speak yet could use rhythm and melody or well-known "Communicative Musicality" for interactions and relationship building. By this mode, both could share empathy, companionship, and expressions through the physical motors, the memories, or the prior experiences across time and space.

Moreover, music was an efficient enabler for children's pitch recognition (Nan et al., 2018), including discrimination of duration, dynamic and speech patterns, and the children's ability to identify the musical sounds, namely rhythm, melody and perform impacts on the Broca area of the brain (Trollinger, 2010), in which information was transferred through from learning to language skill (Kraus et al., 2014; Brandl, 2011; Plitakul, 2020).

In conclusion, the newborn babies' musicality could be naturally developed in the same way as language development (Trehub, 2015). Rhythm and pitch are significant musical elements of language. For instance, when listening to music, we can feel a rhythm. When listening to music more often, the brain can collect more rhythmic patterns, and listening to music often led to efficient listening of vocal sounds in language.

Based on Kraus's (2015) research, musicians could learn speech more quickly than the others, but by comparison among musicians, drummers had the best ability to learn rhythmic patterns. For the latter influential element, the pitch was often found in the Thai language or other tonal languages, in which a change of mark tones could vary the meaning of a word.

In Thai language, one word consists of a flat tone or either a mark of low tone, falling tone, high tone, or rising tone, such as the consonants of gaa(ก) in a flat tone, gaa (ก) in a low tone, gaa (ก) in falling tone, gaa (ก) in high tone or gaa (ก) in a rising tone, thus the different pronunciation of each word depended on the

tone marks per the music element of pitch. Similarly, the Thai words between **หม่า** (mǎa) and **มา** (māa) had different pronunciation and definition. Still, both could be mistaken as the same word by the foreigners who used English or other non-tonal languages (Sittiprapaporn, 2020).

Body language had originated the development of language and communication through perception and expression of gestures and emotions from birth to one year. After that, children started to communicate with the spoken language, by which the auditory cortex took charge of perceiving sounds while the motor cortex took control of the movement.

Besides, the forebrain associated with memory and thinking played the crucial role of brain development in language because it took charge of keeping information about words and sentences for communication, by which the brain had to build neural networks from the collaboration of listening, sight, speaking and movement to extend its capacity to use language and communicate with the others. In particular, Broca's area was a region in the brain's frontal lobe with functions linked to speech production, vocabulary, and grammar.

Besides, music activities that included songs with lyrics in several languages, accents, rhythms, and melodies along with singing and movement with the others, self-movement or playing of percussion instruments could stimulate the production of axons within the brain and lead to the synapse of many parts of the brain that was important to brain development.

Discussion

According to the data analysis and various researches, there is a relationship between language and music development coherently. Moreover, introducing music during the development period plays a non-biological role in differentiating the language skills between musicians and non-musicians.

Music could enhance brain development when applying various music elements and skills that precisely align with the appropriate age ranges. The best-fit model (Figure 1) for applying music in enhancing children's language and communication development is developed as the following.

All humans have been innately gifted with communicating either through speech or body language from birth. Studies asserted that every language could be deconstructed into the music elements of pitch and rhythm.

We could also exclude the elements out of the speech-language, pronunciation of mark tones, or even babies' crying for interpretation based on the fact that everyone could use rhythm and melody for communicative musicality in every age group. In other words, the musical ability could develop naturally as well as language development.

The forebrain associated with memory and thinking played a crucial role in dealing with brain development concerning language and communication (See Figure 1). It took charge of keeping information about words and sentences for communication.

The brain had to build neural networks collaborating with listening, seeing, speaking, and movement to extend its capacity to use language and communicate with others. In particular, Broca's area was a region in the brain's frontal lobe with functions linked to speech production, vocabulary, and grammar.

In addition, self-movement or playing of percussion instruments could also stimulate the production of axons within the brain, which leads to the synapse of many parts of the brain that are important to brain development.

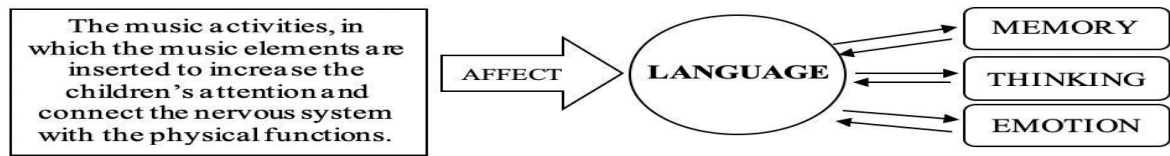


Figure 1: Function of music to enhance language and communication.

In conclusion, music could play a key role in enhancing brain development by applying various music elements, and skills that align with specific age ranges precisely. The model for music lessons and activities to promote language development was developed (Figure 2).

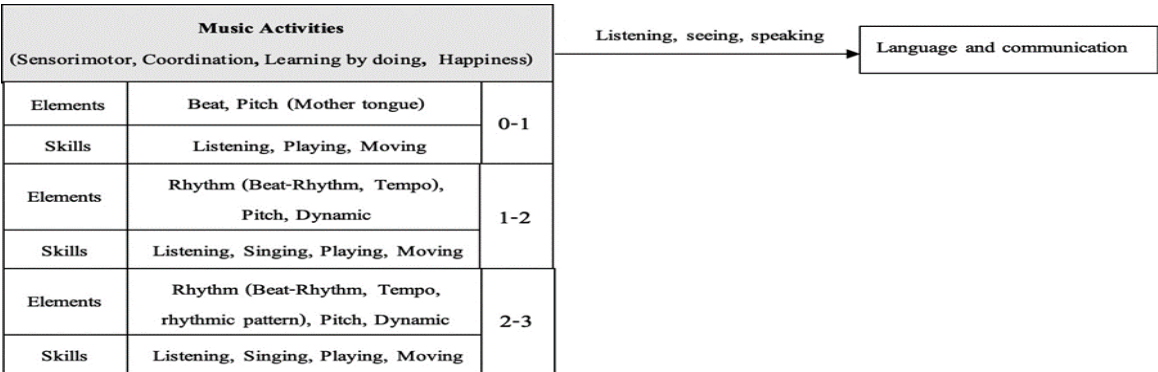


Figure 2: Synthesis of the function of music to enhance language and communication.

The period of birth to one-year-old

In the past, it was believed that newborns could not communicate and comprehend any languages. Although they couldn't use language or the meaning words for communication in the same way as adults, they could interact with parents through bubble consonant sounds like 'ooh,' 'aah,' 'bahboo,' and crying sounds. According to the study from Wermke & Mende (2009) on the infant's crying sounds, the spontaneous cries of infants exhibit melodic features, which is one of the musical elements and language structures. At one month of age, their crying sounds are at the most complex by using a variety of tone colors, and the other words, infants had the ability of transposition since birth. It was also noted that infants' crying sounds transposed a constant interval of respiration to generate rhythmical elements and timing. There were also primitive rhythmical and melodic elements in those sounds. Emotion also played a crucial role in changing sound patterns and had a direct effect on language speaking. Between the ages of two to five months old, infants would learn modes of interactions from the message recipient's emotional imitation. These were usually known through touch, acts of nodding, shaking their heads, smiling, and gazing. Sign language and physical motors could also be used to comprehend and adapt to maternal language and culture. At the age of seven months old, infants would start short and straightforward speeches used in daily life. Phrases such as Bye Bye, Papa, Mama, or Mum ('eat' in Thai) and try to communicate with their parents with pointing or other postures. In the meantime, parents should support their language development and change from interactions to simple speeches so that infants understand language or essential vocabulary words. In summary, all children had the innate ability to learn to build language structure since birth by starting from making sense of sound and rhythm (Malloch & Trevarthen, 2018) and developing to the learning of vocabulary words in the same ways as music learning. The more often they listened to music or had musical experiences, the better they could recognize sounds, rhythmic patterns, melodies, and words. There was a lot of experimental research, by which infants listened to

speeches, the children's songs sung by mothers, motherese and other languages, including classical and instrumental music, and the findings of those research based on the brain imaging measurement show that the temporal lobe related to listening ability and the prefrontal cortex related to the executive functions such as memory, thinking and inhibitory control in the brains of infants stimulated by listening activities become more massive than those of the control group who hadn't been enabled by the listening activities because children could acquire language through the music elements of rhythm and pitch, which are the main components of language development as well (Webb, Heller, Benson, & Lahav, 2015; Lordier et al., 2019; Zhao & Kuhl, 2016; Hannon & Trehub, 2005; Bergeson & Trehub, 2006).

Musical Function for Language Development from Birth to One Year Old: Music activities were used to stimulate senses that would impact long-term memory. The songs in the activities should be composed of the lyrics and vocabulary words around the children (Zhao, 2015; Benavides-Varela et al., 2011). These should primarily be added with the music element of rhythm so that children could know when they would begin and how they would break at the interval for listening and responding. The children who were skillful in rhythm would also be capable of speaking and communicating efficiently (Kraus, 2016). Plus, other music elements, namely pitch, were indispensable for the Thai language, in which a word could be defined and pronounced differently by the change of tone. For this reason, the pitch could result in the children's ability to recognize sounds and comprehend the difference in words and develop language skills. Music lessons and activities that are suitable for this age range include listening to songs that consist of a steady beat and pitch was the most appropriate music activity for this age range, but the songs should be varied by social contexts. The best song was a child's mother singing a lullaby, by which the mother had to sing happily so that the newborn could perceive love through that lullaby (Nakata & Trehub, 2004). Moreover, the listening skill might be used along with other skills as movement or playing percussion instruments to align with children's ages. An example of a music activity: In "Rhythm," parents engage their children by singing "B-I-N-G-O" while clapping or tapping rhythms over their children. Each time the "B-I-N-G-O" part is sung, the child learns to play and stop, incorporating rhythm (Ta Ta TiTi Ta) and Pitch-related activities, such as parents holding their children up and down. Another activity involves the "plane pose," where parents lie down and raise their legs, and the child lies down on the shin area and lifts it up and down according to high and low music. This activity can be enhanced with the use of musical instruments like a Piano or Xylophone to quickly chase intonation etc.

The Period of One to Two-Year-Old

The language development for children of this age was mainly in the pre-speech stage (Igarashi, 2019). The children also become talkative, accumulated vocabulary, and responded through voices, postures, emotions, and comprehending communication as it was an important period for language development. However, the children frequently experienced rhythm and pitch from music activities that would be progressively linked with speaking. This was because they could identify the spoken words to explore the connection between their visions and definitions. In addition to this, they could also use spaces between sentences accurately. This was partly thanks to the basic knowledge gained from the rhythmic pattern. The rhythmic pattern of songs in maternal language resembles the rhythmic speech segmentation pattern in the spoken language. Furthermore, the learning of different pitches in music can contribute to the articulate pronunciation of words. In conclusion, music acts as a crucial facilitator for children, playing a vital role in the process of language learning. Musical function for language development from one to two years old: Besides stimulating physical senses by music activities, the key focus was to interact reciprocally with the speeches that had been transformed from the children's actions to words or sentences. For example, suppose we would like children to learn new vocabulary, we could create a new lyric using those words input into the familiar melody (Suppalarkbunlue, 2020) to motivate

language learning, memory and thinking. Rhythm and pitch music elements should be used in the activities so that the children can listen, sing, play, and motion (Rocca, 2015). In this period, it is the best opportunity for parents and all people surrounding the child to input what's include brain sustainable, especially musical compress, science of playing musical instrument. The most appropriate music activities were linked to listening, singing, playing percussion instruments, and movement with the songs or verses that contain rhythms (beat-rhythm, tempo). They also included pitch, which should be dynamic to develop memory, emotion, language and communication that aligns with the children's ages. Using various tones of songs and verses could be primary practice for the pronunciation of marking tones. Besides, children would enjoy using various collaborative skills in music activities and feel happy that their brains release dopamine or endorphin substances that increase concentration and boost brain development. Example of a music activity: Sing along with your child, leaving the last word for the child to sing. Initially, parents may gesture and hum a melody as their child sings the last words. This encourages both vocabulary and pitch. Then, they may introduce familiar songs with repetitive rhythms, such as "Twinkle Twinkle Little Star," "B-I-N-G-O," and "Rain Rain Go Away," to compose new lyrics using vocabulary that children already know or vocabulary from everyday life, in order to create a story.

The Period of Two to Three Years Old

During this period, children would ultimately come of age and speak responsively with phrases and sentences. This was due to sufficient repositories of vocabulary knowledge for communication. Parents were also in charge of rectifying their children's grammar patiently, without any blame that might impact language learning development (Plitakul, 2020). Language development will make most progress when the children are in a safe environment. Music played a crucial part in inspiration, memorial support, self-confidence, and communication regardless of profound knowledge theory. Children could perform activities repeatedly with recreation (Putkinen, Tervaniemi, & Huotilainen, 2013) as a result of the musical elements of pitch (Collins, 2017) and a variety of rhythmic patterns. Referring to the findings of Kraus's (2015) research, brain signals are working similarly whenever the children synchronize the beats in music or synchronize the speech rhythm in language. They could fulfill communication by these essential musical elements, capture words or sentences, recognize sounds efficiently, all of which were achievable despite the loud distractions, therefore, adapting the listening skills to promote speaking, reading, and writing in the future (Bird, 2007).

Musical Function for Language Development from Two to Three Years Old: This includes activities that promote listening, singing, playing percussion instruments or movements, in which the music elements of pitch (tone or dynamic) and rhythm (beat-rhythm, timing, pattern, and slow-fast) are inserted along with looking and memorizing signs, numbers or alphabets. Subject to Hallam (2017)'s study, if children either individually or as a group joined in music activities and participated by either singing, playing pitched or unpitched percussion instruments and games, or dancing in rhythmic movements, they had more of a chance to remembering longer-term than only listening to music. The crucial media, namely songs in these activities, were represented by songs in various languages or by using meaningful songs so that children could accumulate vocabulary and perceive rhythms and vocals through the practice of articulating each word in singing, especially in the Thai language, in which there are tone rules and the different sounds between the consonants of Lor Ling (ล) and Ror Ruea (ร) The most appropriate music activities for this age group interpret listening, singing, playing percussion instruments, and movement. Songs that include music elements, such as rhythm (beat-rhythm, tempo, rhythmic pattern), pitch, dynamic to language, and communication are also essential skills. This skill depends on many parts of the brain's simultaneous functioning, so it should be developed after other aspects of the brain. As a result of those appropriated activities, the brain and the nervous system could connect neurons of the listening, physical, singing sensory system, or other sensory systems so that the brain can receive and convey information more

rapidly. The connection of many nerve cells extends the full efficiency of the executive functions (Chinnapong, 2563). Examples of music activities, at this age, lyric writing activities can still be used to emphasize grammar. This can be done by encouraging children to continue the story through their own lyrics, paying attention to correct sentence structure and language use. Another activity can involve letting the children create the rhythm and melody of a song themselves through a game of arranging note cards. They can start with the black solid line and the hook as the base, and then add pauses, white lines, and curved lines in the future to create more complex rhythms. The melody can start with Sol-mi and gradually incorporate additional pentatonic steps to increase the complexity and range of the sound up to 7 notes, which may use games or other media such as using dice where numbers represent different notes, etc.

Conclusion and Recommendation

This research aimed to study the function of music that benefits the development of language and communication from birth-to-three years old and found that, whether it is communication in the form of sound or movement in particular, actually in languages that have Tonal Language, elements of music as rhythm and pitch were hidden in there. The ability to process sounds that are similar or different, high or low, loud or soft, short or long has an impact on the Broca region, which plays a role in transferring information and learning patterns to a child's language skills. When children are engaged in musical activities that stimulate their sensory system and involve movement, it can have a positive effect on their spoken language and communication development. Furthermore, it is essential to develop guidelines for music teachers and educators to design their musical activities and lessons in a way that enhances the language development of children and directly influences changes in the nervous and brain systems. This research aims to contribute to the development of a model of music activities that can effectively promote brain development in children from birth to three years of age, which has also studied on various other developmental benefits that arise from music learning. It has been found that, in addition to language development, music learning can have a positive impact on children's physical, emotional, social, and intellectual development. Particularly, music learning has been linked to improvements in areas such as intelligence, memory, and cognitive abilities, which are fundamental for overall childhood development. These skills are especially valuable for children in the 21st century, as they contribute to their growth and success in various aspects of life. If parents wish to nurture their children's brains to develop wisdom and creativity as real artists, it is important to engage children in music activities that stimulate their brains in various dimensions. Music activities created by caregivers and music teachers, utilizing different elements and skills suitable for different ages (as depicted in Figure 2), can help prepare children for learning and unleash their true abilities to the fullest.

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