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Using Music and Movement to Enhance Cognitive Development

Bobbie Jo Pogue

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Abstract

This literature review explores the research done in the use of music and movement in enhancing cognitive development, focusing mainly on the early childhood setting. The demand on preschool students has increased over the years and many even say preschool is the new kindergarten. For many years, young students have been taught through song, movement and actions, listening to music, and how to play an instrument. These are all interrelated to helping enhance a child's cognitive development. Teachers tend to be so focused on just the academic part of teaching, even in preschool, that they forget the importance of music and getting students to move around while they learn. The literature review will consist of scholarly-based articles and other reliable sources found to show a more detailed look at the effects of using music and movement to enhance cognitive development.

Using Music and Movement to enhance Cognitive Development

Music is a universal language and it is important to understand how it can help children learn. All teachers have their own way of teaching and what they think works best for their students. How does music and movement help young children learn and how can we help enhance cognitive development using these techniques? There has been little research that focuses on this question. Most research out there has been focused on the connection between cognitive development and musical training. However, more recently researchers have been working on understanding the link between song and learning.

There has been research to support the use of song to teach phonological awareness in the last two decades, with focus on rhyming and phoneme skills. Still little research is out there on the actual use of children's songs to teach these skills (Walton, 2014). In many children's songs, there is rhyming and repetition. This is the draw children have to these songs and enhance their memory and cognitive development. "Young children's music learning processes are similar to those in language acquisition; therefore, it is important for teachers and parents to combine books and stories as this promotes a reciprocal process of learning for language and music literacy" (Cooper, 2010, p.26). There has also been research in the area of creating child-centered learning programs and helping bridge the two concepts. Many schools around the world in last few decades have taken notice to the difference that music and movement can take in early on in a child's life and education.

"The music education profession has long recognized the importance of early childhood music. Due to the recent explosion of research in neural development and its connection to early childhood music, the media is reporting on research studies that support a link that music educators have long suspected-exposure to music at an early age benefits children's musical and

cognitive development” (Turner, 1999, p. 30). This article was published almost 20 years ago and there has been more research in this area since then. For many years, it has been taught to integrate everything into teaching children early on and music and movement has not been an exception. The content or curriculum may have changed in the classroom, but the concept and ideas of teaching early childhood still seem to be the same. Children in this type of setting, early childhood, do not compartmentalize their thinking or working, instead they learn through their experiences that are interconnected (Manins, 1994). In much of today’s research, the focus is on the link between the integration of music into the classroom or curriculum and the cognitive development of young children. The guiding question for this paper is how does music and movement enhance the cognitive development in young children?

Literature Review

Music can be found everywhere in the world. Music has become such an important part of life, that there is bound to be research on the effects that music can have, focusing on early childhood cognitive development. Educators, parents, researchers, and scholars are interested in learning about the effects of using music to enhance children’s’ cognitive development; such as phonemic awareness, rhyming, letter sounds, and language. There are many aspects of music that researchers are focusing on, such as using song and movement to teach literacy and math skills, teaching music to children to help enhance their cognitive development, or even just listening to music. Music is a way of life for many and young children are always listening and dancing to their favorite songs. There are so many benefits to listening to music, aside from the fun aspect, but fun is a huge motivator to get children engaged and learning and should not be simply looked at as only fun. “Children who are immersed in music and language are more prepared to listen, more receptive and alert, and more active in their responses” (Cooper, 2010, p.25).

For so long teachers and parents have used music to teach children. Most children's shows have music and catchy tunes that kids sing along to and learn along the way. The power of song is strong, while helping children retain information and memorizing patterns. Music not only has the power to entertain but also to teach. Kids today are singing along to shows such as Sesame Street, Bubble Guppies, Paw Patrol, and many others. "Strong evidence was found to support the claim that learning to read can be enhanced by using songs and movement to teach children to read, especially if the first words that children learn are words they already know as lyrics in a song" (Walton, 2014, p. 68).

When using music paired with movement, children are engaging and focused on the content. In the classroom, teachers use music starting in the early childhood years. They use music to start the day and greet each other, to learn names, letters, and numbers. In early childhood classrooms, individuals will often walk into a room to hear songs to transition from one activity to another, to get students attention. When children are engaged and participating, they are more likely to retain the information being presented. As researchers are looking more into this area, they have found there is a lack of research that focuses on the specifics of using music and movement in song form. Many articles refer to the fun factor of using music with children and do not see the potential that is there to use it as a tool to teach major skills and concepts with young children. Many articles refer to teaching children a musical instrument or the effects of just listening to background music. Very few talk about how teaching children's through song and actions.

In 1998, the term Mozart Effect was coined. The Mozart Effect focuses on the effects of children listening to music while learning or practicing a skill (Walton, 2014). This effect discussed how preschoolers' spatial-temporal reasoning can be enhanced simply by just listening

to music that was composed by Mozart (Walton, 2014). However, there is very little actual conclusive data that supports this idea. Many studies address using music to teach, but few look at doing it through song. “Although there were frequent recommendations over the previous two decades to use songs to teach phonological awareness and reading- in particular rhyming and phoneme skills- there is little empirical research that examined the effects of using children’s songs to teach these abilities” (Walton, 2014, p. 54). In recent years, there has been more research that is showing connections between music and speech/language.

There has always been talk about the connection between music and language development. “It was not until the 1970’s, however, that a strong argument was made regarding the nonmusical effects of music in the regular classroom” (Wiggins, 2007, p. 56). In relation to musical training or learning how to read music in order to play, there have been connections between similarities in learning how to read for young children. When we teach children to read, we teach them to read from left to right and from the top to the bottom, which is the same for reading music. The relationship between emergent reading and music is apparent and can be very beneficial in the early childhood setting. Adding music and movement to every day learning helps make these connections for students. In these cases, they are going beyond just listening to music but teaching music.

Music plays a meaningful part in education and our national curriculum, which supports the traditional singing youth movement from the age of 6. The use of song was noted as significant to language growth in the NAEYC expectations for preschoolers (Wiggins, 2007). Using music and songs in the classroom builds vocabulary and self-expression, which are two goals of literacy and can work together to promote growth in both areas. Reading and singing

both have very specific structures and sounds that can provide students with the opportunity to enhance memories, attention spans and language skills (Cooper, 2010).

Using song and movement can help enhance literacy skills. Shelly Cooper states that songs and stories have a strong relationship to each other and have the capacity to boost brain development, increase vocabulary, and promote future academic success. The sounds and foundational structures of reading and singing give early childhood students advances in language skills, increasing memory, and promoting emerging literacy (Cooper, 2010). In her article about lighting up the brain by using songs and stories, she talks about how to connect stories we teach to young children to songs and reading skills. She believes that songs and stories have strong connection to each other, to families, and cultures that all help promote brain growth in children (Cooper, 2010). “Songs, stories, and storytelling-especially for young children-are social learning environments, and it is the social interaction that promotes bonding between individuals while supporting and extending learning” (Cooper, 2010, p.24).

Cooper (2010) also refers to the research on brain connections. “Scientists and researchers are finding new ways to explore how children learn. Modern technology now allows for intrauterine photography and brain imagining. There is research in the fields of fetal aural stimulation, audiology, and infant brain response” (Cooper, 2010, p. 24). There is starting to be more interest and research in these areas of brain development in young children. Cooper states that singing and reading have the ability to enhance brain development, increase vocabulary, and promote academic success. Through exposure to these types of stories, such as nursery rhymes and chants, children begin engage in this musical environment and it can nurture the musical conversations of children. Engaging in this type of activity can help promote language, attention span, and memory skills. Children’s books can have more unique vocabulary that children are

not exposed to on a daily basis, thus proving the importance of high exposure to quality literature (Cooper, 2010).

Patrick Walton is well known for his research in the area of using music and movement to teach pre-reading skills. He has written several articles and been part of exploratory studies. One of those studies in 2014, dealt with using singing and movement to teach these skills with kindergarten students. In this study, kindergarten classrooms were randomly given song groups that used choral singing and movement to teach phonological skills, letter sounds, and word reading, or to a control group where children received their regular language and literacy programs for equal amounts of time (Walton, 2014). The kindergartners were tested on these skills before they started and then after in 12 week intervals. As a result of this they found children in both groups made about the same increase in rhyming and identifying phonemes. However, the group that had songs was able to read words easier that were not given to them before. In their discussion of this study, they found that their research has helped fill some gaps in the effects of singing and movement to teach literacy skills. Unlike other research out there, they used songs and movement to focus on the skills and not just looking at the link between reading in general and music in general. In conclusion, of this study, the findings support the idea of using that singing can be used directly to teach pre-reading skills (Walton, 2014). He is looking into further research that will help better understand the cognitive and neurological reasoning's behind the link of singing and reading skills.

In another article, Salmon (2010) looks at how using music can promote thinking and increase literacy skills. "Music is inherent to children's experiences and is related to sounds heard every day, which facilitate mental imagery. Music is a language of learning that eventually involves children in talking, reading, drawing, and writing" (Salmon, 2010, p. 67). In this article,

Salmon (2010) conducts another action research project that takes place in pre-kindergarten to first grade summer camp setting and in a Reggio-inspired school. Both groups had teachers that went to workshops on applying music to children's thinking, reading and writing skills. Teachers kept journals of the progress, videotaped, and photographed as well. Salmon (2010) states that according to Gardner, "Musical intelligence is the first intelligence to develop, and the use of music, soundtracks or soundscapes to learn is attributed to the individual's musical intelligence. Musical intelligence is ascribed not only to those who are proficient at playing an instrument or singing, but also to those who prefer to use sounds and music for understanding or expressing themselves" (Salmon, 2010, p. 938). In conclusion, Salmon (2010) found music and soundscape engage children in creative and imaginary journeys in their mind. When children are exposed to music and the teaching of language and literacy skills early on, we can scaffold their listening, written, and verbal language (Salmon, 2010).

While Walton and Salmon (2010) focused on these study's to show connection between music and movement with literacy skills such as rhyming and other pre-reading skills, Manins (1994) looks into the connection between language and music through integration in the curriculum. "There is an obvious link between music and language because both depend on the perception, reception, and production of sound patterns" (Manins, 1994, p. 38). Manins (1994) addresses the reading process and the role of the teacher and the student. Starting with the teacher reading to the students, perhaps in a big book so the text is larger for them to see and illustrations as well. His focus in this article is on the story telling process that the teacher partakes in. The teacher is reading expressively, repeating words, and inviting the children to participate in the story. Children are paying attention to the sounds and expressions in both the teachers' body and voice. These are similar to musical skills. Through storytelling, we are

working on being in tune, moving in time, pitch, rhythm concepts, loud and soft, fast and slow, and even high and low (Manins, 1994).

Aside from the literacy skills be enhanced through music and movement, research has found profound connections between music and movement and mathematics. Two researchers, Kamile Geist and Eugene Geist (2008), look into the use of music to support emergent mathematics. Emergent mathematics is very similar to emergent reading or emergent literacy skills. They are ideas and concepts picked up or taught very early in life. The state that music is one of a child's first forms of communication and typically is their first interaction with mathematics. In their research, they found that math and music have a link to the brain when exposed very early in life. "We know, for instance, that music contains numerous mathematical constructs within its basic structure. Musical elements such as steady beat, rhythm, tempo, volume, melody, and harmony possess inherent mathematical concepts such as spatial awareness, sequencing, counting, patterning, and one-to-one correspondence" (Geist & Geist, 2008, p. 21).

Movement is also a part of this idea and Geist finds that children have a hard time not moving to the music, thus further engaging the child and getting their attention. Even as babies, we are being engaged through music and music to teach us these math concepts. When parents rock their child or sing to them, we are teaching them the rhythm and patterns of music and movement. "Our bodies cannot help but react physiologically to musical input. For example, it is very difficult for children to not move to the beat when they hear a song or an instrument such as a drum being played" (Geist & Geist, 2008, p. 21). This idea shows that there truly is a connection in a child's cognitive development and music and movement. Children are naturally engaged in the sounds and movements associated with music. Even when we are reading to

children, we are using patterns and rhythm through repetition and rhyming. Children are able to predict what is going to be said and repeat stories that are designed to help enhance this skill.

Geist and Geist (2008) later conducted research to further investigate the idea of children learning through the patterns of music and beat, rhythm, and melody. They teamed up with Kathleen Kuznik who helped conduct this research. In this article, the focus is more on patterns and the effects on the brain in infants and young children. Connections have been found through music therapy that suggests music and math are in fact related to brain development early in life. Music also seemed to be connected with the primal parts of the brain (Geist, 2012). “We typically process steady beat in the premotor cortex of the brain, an area also related to attention. Therefore, it is conceivable that listening to a steady beat pattern during mathematics teaching activities in the early childhood classroom could promote better attention and increased engagement in young children” (Geist, 2012, p. 74).

As the use of music and movement is being researched more, teachers are also beginning to understand the importance between the connections of it all. Wynne Shilling was first a music teacher before she got into the early childhood setting. She used her music background to steer her teaching and explore mathematical concepts through music. “As a musician, I know that music serves to stimulate language development and social interactions. It helps children learn about themselves and about other cultures,” (Shilling, 2002, p. 179). Shilling (2002) used her knowledge of music and math to teach children using both ideas together. She drew on the idea that mathematical thinking and music depend on patterns. The rhythm parts of music is paired with language and creates opportunities for exploring these math concepts through experiences with duration of sounds, beat, meter, rhythmic patterns, and tempo (Shilling, 2002).

In Shillings' (2002) research, she talks about using experiences with temporal relationships, exploring rhythmic subdivisions, inventing time-based activities, and rhythmic patterning. She looks at each area and gives examples of what she and her colleagues had done in the classrooms. One example used was using rhythm to teach children syllables in names. They would clap out their name as well as their classmates' names. In doing this, they were able to move beyond just the clapping and counting the syllables. They were able to put things together and start to compare and contrast what they were hearing. In doing this activity, the teacher was able to make extensions that led to more patterning and graphing of their findings (Shilling, 2002).

Shilling's (2002) research has come to conclude that music and math can be beneficial. "Embedding music into activities naturally into children's engagement's with mathematics and movement provides a way for children to develop their logical/mathematical and musical/rhythmic intelligences in ways we may not have considered before" (Shilling, 2002, p. 183). When children are given the opportunities to experiment and explore math ideas through using music, they are more engaged and help develop a relationship between the two. In early childhood classrooms, children come in with the background of music and the patterns and rhythms that accompany them. Children hear music in many places, like the radio or on television. They can memorize the commercial jingles or television show tunes. This shows that music is very much a natural part of a child's life before they even begin school. The more we are able to integrate the music through the curriculum we teach the more beneficial it can be to our students (Shilling, 2002).

Music can help children grow in so many areas. It is clear that it is a part of everyday life at home and is beneficial in the classroom as well. If we can learn more about using music in the

classroom, we can use this advantage to use children's background knowledge to help better develop their cognitive skills. Walton also found through his study that "the use of songs might have facilitated long term memory processes" (Walton, 2014, p. 69). When we realize the true potential of using music and movement in the classroom, we can teach our students better

The research on using music has been very clear on the benefits of helping children grow cognitively, but there is research solely focused on the movement part as well. Not only is singing a daily part of a typical early childhood classroom, but movement is as well. It is very hard for children not to move, especially when they hear music. Pairing these two actions together makes complete sense. "Movement can be enhanced through the use of music" (Gillespie, 2010, p. 801). Movement also helps foster critical thinking and problem solving in early childhood environments. Creative movement is a great way to encourage young children to develop these skills and learn to express their ideas and feelings through the movement (Marigliano, 2011). Marigliano and Russo, team up in an article that focuses on the idea of moving bodies and minds. They specifically look at the benefits of using movement in the classroom to help develop these critical thinking and problem solving skills.

In this article they look more in depth into the use of movement in moving the mind muscles, fostering movement experiences (engage, expand, and empower), and read it, move it, be it! They share ideas of activities used in the classroom that enhanced this thinking and refer to how it is connected. There is a link between movement experiences and language, both receptive and expressive (Marigliano, 2011). When building the mind muscles, children are required to think about their previous experiences and use their memory to make relationships and comparisons based on certain criteria. Inviting children to share and compare their own ideas not only encourages them to use that memory recall deeper, but they can also produce language to go

with the movement (Marigliano, 2011). “When body movements are paired with language, and language paired with sensory motor experiences, children have two ways to make meaning of their experiences. This bodily kinesthetic and linguistic connection encourages children to recall and use descriptive language and discover new types of movement” (Marigliano, 2011, p. 46).

Early childhood students thoroughly enjoy moving around to music and moving their bodies. They really seem to be excited and entertained when they are moving around to the music they hear. “The U.S. Department of education reports that many elementary school children receive only 15 minutes of recess or fewer. For many children, school is the main environment for being active,” (Hicks, 2012, p. 34). These statistics are scary and show us that physical activity and movement need to be a big part of the daily classroom schedule. Children typically learn by doing and we should be finding ways to get these children moving and learning at the same time. Aside from the fact that it is shown to help children learn, it gets them more physically active on a daily basis. Movement is also a chance for students to learn about themselves, the environment, and those around them (Hicks, 2012).

Children in these early childhood settings help build foundations for future physical movement later and help them become active. Movement gives children the opportunity to be creative and express themselves in an authentic learning environment that teachers can create. Educators should encourage a child’s imagination with music and movement activities (Hicks, 2012). In the classrooms, teachers can encourage children to walk in many different ways rather than imitate and even teach children to learn about their personal space giving them tasks that focuses on staying in their own area (Marigliano, 2011). Children are so very active at this young age and we can take advantage of this to get them engaged and focused on the music and movements while teaching them academic skills. These young children can benefit from

experience music through their senses of hearing and touch while also exploring their speech. At this age, children are much more likely to participate with music and movement and not just simply observing others. When the music and movement activity is captivating and enjoyable, children are going to join in and become more engaged (Hicks, 2012).

When children are engaged and participating in creative movement, they are promoting these thinking and problem solving skills, while interacting with peers socially. When they are engaged in these types of activities, they learn to think before they act, become more detail oriented, and start to compare and contrast their experiences (Marigliano, 2011). When children are engaged they are also able to stay focused for longer periods of time and participated at a much higher level. “Integrated music and movement activities are components of a high-quality early childhood education curriculum. When teachers and family members understand how to provide appropriate physical activities children experience the joy of music and movement. These activities offer daily opportunities for children to develop and learn in authentic environments with careful attention by adults” (Hicks, 2012, p. 38).

Research is starting to be more prevalent in the effects and benefits of using music and movement in the classroom. However, other areas are starting to be researched as well, such as the frequency of music and movement being used in the classroom and schedule. A study was done in 2010 to determine the frequency of music in the classroom and how teachers were using music and movement. Gillespie and Glider conducted this study to learn how and when teachers were using music to scaffold’s children’s learning both in academic and social skill areas, including routines and transition times throughout the day (Gillespie, 2010). They believe that children are born with natural musical abilities that are similar to natural language abilities. The full musical ability obviously varies from each individual child. “The known effects of music on

young children's brain development are actually quite limited. It can be inferred from research with animals and adults that music may increase the size of the area of the brain where music sounds are processed, even though it is still not clear whether music can produce positive effects in young children or whether these effects would carry over from early childhood to later childhood or adulthood" (Gillespie, 2010, p. 800).

They credit recent research to the process of how music is used rather than the actual music being used to understanding how children use music in these early childhood classrooms. The Mozart effect is mentioned in this article in relation to the lack of evidence for preschool age students. The Mozart effect has not been able to be duplicated by researchers studying preschoolers and one possible reason may be the fact that their neural networks are not completely developed at this age (Gillespie, 2010). Some researchers say that during particular periods, the brain can go through critical development points and overabundance of synapses that are formed in three areas of the brain, the visual, auditory, and prefrontal cortex (Strickland, 2001/2002). It has been found that phonological processing and early pre-reading skills are directly related to music perception skills amongst preschoolers. It is not clear why this happens but researchers suggest the auditory mechanism in the brain is shared for these jobs, comparable to the theory backing the Mozart effect (Gillespie, 2010).

This particular study took place in five preschool classrooms that varied between head start schools and private preschool classrooms. In this study, they only documented when and how teachers used music in the classroom, no data was collected on the actual students. Every classroom was observed for a total of 24 hours over a four-month time frame (Gillespie, 2010). Many things came up in the study such as understanding how to categorize the use of the music and the frequency of the use of music. Over the allotted time, they had a total of 120 hours of

observation. During this time, they found that most teachers used music and movement during large group. “All teachers used music most frequently during group times) 50% of observed uses of music). The second most frequent time for music to be used varied by teacher (table 4).

During group time, teachers sang songs everyday with children about the weather, the calendar, numbers and letters. The time set aside specifically for music and movement was always used for the purpose, but on average these uses of music were only 14% of total uses of music over the course of the day” (Gillespie, 2010, p. 805).

“Teachers used music in routine ways, but also in more spontaneous ways throughout the day. These spontaneous ways reflect teachers’ use of music specifically to scaffold children’s learning and behavior, although of course scaffolding is present during teachers planned uses of music also. Teachers often turned to music to help children behave in a certain way or to help them figure out answers to such questions as: What is the weather today?” (Gillespie, 2010, p. 806). While this study is not necessarily like all typical classrooms, it does give us an idea of how teachers are using music and movement and what we can do in the classroom. The use of singing and songs can truly be beneficial as these were most of the examples of use of music and movement in this study (Gillespie, 2010).

Cooper and Bintz are two researchers that really focused on the use of songs in teaching young children. They strongly believe that incorporating singing with stories and lessons will enhance and engage children more in the learning process. Bintz (2010) is an educator who teaches a graduate course on reading and writing across the content areas. He grew up bored with reading and yet learned so much from his parents singing to him. He has explored this idea and found a way to help us promote learning through singing for young children (Bintz, 2010).

“Singing has long been used as an instructional strategy in literacy development. It supports and

enhances personal expression, builds community, and connects reading and writing easily and naturally. Singing helps students learn phonics and builds phonemic awareness” (Bintz, 2010, p.683). Cooper also believes that as educators we need to take advantage of the use of music. “As music educators, we also understand that whether young or old, singing connects us and adds meaning to our lives” (Cooper, 2010, p. 27).

Conclusion

In conclusion, it is evident that the research proves music and movement help enhance cognitive development in young children. Research shows a benefit in using music in mathematics and literacy, as well as other areas such as social emotional and behavior. There are more and more studies being conducted to continue learning about this process and understanding the effects on brain development. We have always used music to teach children and we are finding more ways to purposefully do this in the classroom and at home. Music has always been a part of the world and that is not changing anytime soon. Music and movement comes naturally to children and it is our job to use that to help promote better academic success in our young children. We must provide opportunities for our children and as educators; we can build upon the knowledge of the past to help create a better future for our children.

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