HIGH SCHOOL EDITION
Journal of Student Research
Volume 13 Issue 3 (2024)

Interventions of Art & Musical Therapy on the Cognition, Development & Imagination of Children

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ABSTRACT

This research publication will highlight the cognitive development in children and how a child's surroundings can affect said development. Through the review of neuroplasticity and researching how the brain reacts to different changes, this publication also analyzes the influences of art, music, literature, and imaginative play. Using this information, it delves into how incorporating these different aspects into a child's early life can have a positive impact on them when they are older, such as strengthening problem-solving skills, improving creativity, and creating better ways to healthily unleash emotions. This publication will also evaluate the positive interventions of art and musical therapy from a neuroscience perspective in exemplifying optimal findings related to neuroplasticity, as well as from a microbiological lens that will be complemented by studies alluding to fMRI and brain imaging results. Finally, this publication discusses the limitations and ethical issues that come along with the research on children and their development and lends future researchers ideas on how to improve and progress in this particular field of research.

Introduction

Researchers have been analyzing the various scope of cognitive, social and developmental aspects to brain development by analyzing the implications of musical and art therapy. Historically, researchers have seen the progression in which musical and art therapy has captured the attention of neuroscientists when throughout the 20th century, art and musical therapy have become integrated into recent research that has highlighted the prominence of creative modes of expression for children to be exposed to, from an earlier age. While both musical and art therapy have positive implications in the research field, after the civilians' exposure to trauma after World War II, many institutions like the Menninger Foundation witnessed the positive effects of art and musical therapy as a therapeutic intervention to bolster the well-being of those enduring from trauma. However, today, musical and art therapy have emerged in various diverse settings, ranging from community centers, clinics, schools, prisons to hospitals, where technicians and therapists continue to leverage the positive implications of psychological healing on the brains of children, where both psychiatrists, art instructors and music instructors are implementing the effects of such forms of therapy to also help contribute solutions to children diagnosed with autism, ADHD, or even adults diagnosed with neurodegenerative diseases or chronic diseases like cancer.

Comprehensive Analysis of Cognitive Development in Childhood and Adolescence

Researchers analyzed the efficacy of how fMRI and other brain imaging tools could be utilized to analyze the brain functions and components within children's premature development. (Brown et al., 2012) Researchers looked into premature brain development during preschool years with a solid foundation in the pediatric neu-

ropsychological perspective. When analyzing brain pattern processes, researchers looked at in vivo brain imaging of infants and children to look into the specific biological processes of brain growth. (Brown et al., 2012) By using the forefront of neurodevelopmental research, one group of researchers used MRI to analyze changes in the structural components of the tissues associated with postnatal brain growth; specifically, they witnessed a growth in the white matter regions of the brain when exposed to external stimuli. Additionally, they discovered that a part of the brain called the "gray matter" as associated with the cerebral cortex and memory functions have grown, in conjunction with the "white matter".

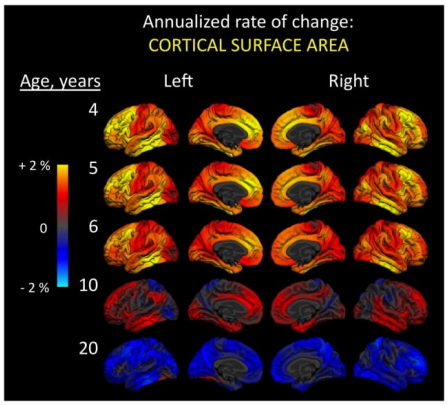

Figure 1. Brain Mapping and Representation of Growth in Children for the Cortical Surface Area

Review of Neuroplasticity

Research that has been bolstered in the areas of neuroscience and genetics has further exemplified the brain's potential in rewiring itself as a result of exposure to environmental stimuli. Specifically, research behind the brain's dynamic changes and development has been bolstered by significant research in neuroscience and psychology that helps to articulate how the brain responds to changes and environments around. (Mundkur, 2005) A particular neurophysiologist, Donald Hebb proposed that neuroplasticity is a result of when "neurons that fire together wire together." Specifically, it is noted that since at birth, the brain is considered to be relatively immature, the plasticity of the brain is crucial in ensuring that certain particular environmental exposure leads to significant changes in neuronal connectivity. For instance, the brain's critical period for the visual cortex is up to 7 years, and a cochlear implant for early deafness has been demonstrated to have the most potential during the first 7 years. (Mundkur, 2005) Because of this, the implications of neuroplasticity are significant in the context of human behaviors, brains and cognition – because the developmental stage has significant potential, the influence of neuroplasticity can greatly mold an individual's ability to recover from stroke, drug addictions or other psychiatric disorders. (Mundkur, 2005)

Analysis of Art and Musical Therapy on the Brains of Children

Researchers have been analyzing the applications of art and musical therapy by having the common agreement that educational environments can positively enhance children's mental, cognitive and spiritual health, which mirrors the results established by the Education Sciences and Special Psychopedagogy. (Petruta-Maria, 2015) In the various forms of creative arts, both art and musical therapy results have seen positive results on education. For example, in the study behind art therapy, a group of researchers at the Transilvania University of Brasov looked into how children exhibit creativity during their early school ages, ranging from age 8 to 11. (Petruta-

Maria, 2015) Results alluded to how children were able to develop a better sense of their sentimental, intellectual and spiritual perspectives as a result of their exposure to art therapy. Additionally, children who were exposed to the musical therapy methods were able to bolster their personalization abilities, especially for children struggling with special needs conditions like autism, which further elevated their ability to be integrated into society. When researchers analyzed the effects of art and musical therapy on adolescents, they also witnessed through clinical trials that children are affected by non-pharmaceutical interventions that can reduce depression symptoms by analyzing a group of 24 depressed adolescents, utilizing both the Beck Depression Inventory and the Children's Depression Inventory. When results were derived from these results, researchers uncovered the positive effects of merging both art and music therapy together, to significantly decrease depression in adolescents. These results showcase how experiencing and exposing youth to various forms of creative therapy can be beneficial to the positive development of one's brain and neural functions. (Rahmani et al., 2020)

Analysis of Literature and Reading on the Cognitive Development of Children

Researchers argue that children formulate specific perceptions and perspectives towards the world, as demonstrated by three central theories — theory, modular theory, and simulation theory, that articulate how the absorption of information follows a very post infancy development of children's particular understanding about "visual perception, attention, desires, emotions, intentions, and beliefs." (Flavell, 1999) Particularly, in better unveiling how children formulate complex beliefs and thoughts about the world, it is essential to note that there are various stages — specifically, known as the sensorimotor stage that happens between 0-2 years, preoperational stage that happens between 2 and 7 years, concrete operational stage from 7-11 years, as well as the formal operational stage that happens beyond 11 years of age. (Klausmeier et al., 2014) Children's brain is an incredibly delicate organ that inherently receives the genetic code from parents that affect their cognition, emotions, and behavioral outcomes, as bolstered by neuroscience-backed theories that articulate neurogenesis. However, what's crucial to note is that children's experiences and what they go through has a significant impact on the ways in which their brain is molded and shaped through experience-dependent plasticity. Specifically, early exposure to enriched environments can help lead to optimal brain development, whereas adverse and negative experiences and exposures can disrupt the neural circuits and impair the cognitive functions of individuals. Researchers have argued that infants and children show accelerated rate of improvement, notably seen as earlier success in social cognition through GLM analyses. At the same time, children have demonstrated earlier adaptation to social tasks and have great proficiency in understanding other people's intentions and goals — bolstering how children have a remarkably complex interpretation of the world, relationships and people before them. (Klausmeier et al., 2014)

Imagination, Creativity, and Social Implications of Personal Relationships on Children

Vygotsky, a psychologist best known for his research on children's brain development, says that imagination, creativity, and social relationships significantly influence children's cognitive and emotional development. In volume 42 of the *Journal of Russian and East European Psychology,* Vygotsky emphasizes the central role of imagination in children's cognitive processes, highlighting its function in constructing meaning and navigating social interactions. (Vygotsky, 2004) Through imaginative play, children engage in symbolic representation, allowing them to explore different roles and scenarios. This fosters cognitive flexibility and problem-solving skills as they navigate diverse situations within their imaginative worlds. Moreover, creativity, as Vygotsky argues, emerges from social interactions and cultural influences, rather than being an innate trait. (Vygotsky,

2004) Personal relationships within the family and community provide a strong basis for children to express and develop their creative potential. Collaborative play and shared experiences strengthen children's imaginative landscapes, shaping their understanding of themselves and their social environment. Consequently, imagination, creativity, and personal relationships work together to shape children's cognitive, emotional, and social development. It is also noted by other researchers that play is interlinked with creative processes. This is because both play and creativity fall under the same structure of cognitive and affective processes. (Russ, 1998) This further shows a link between creativity and divergent thinking. Researcher Dansky noted that imaginative play as a child later on led to a wider range of thought processes and a more fluent flow of thinking. He also noted that by being imaginative and creative as a child, it led to higher problem-solving abilities as an adult. (Dansky & Silverman, 1973) Future research could delve into the specific mechanisms through which imagination and creativity are nurtured within social contexts, exploring potential cultural variations. Long-term studies could investigate the implications of imaginative engagement and creative expression on children's well-being and adaptive functioning. However, limitations may arise from capturing the complexity of children's imaginative processes and the diverse socio-cultural contexts in which they unfold.

Ethics, Discussion and Limitations

Although these research findings deduced from this publication highlight the prominence of exposing children in their early childhood to varying forms of art and musical therapy, there are certain limitations that come from diversifying this subset of findings towards all research experimental groups. For instance, what is key to note is that many of these findings focus upon empirical research collected from a particular timeframe, when instead, longitudinal studies would be recommended to better understand the effect of music and art on children at different age groups. Additionally, many of these studies have been experimented on children struggling from a certain form of cognitive impairment such as special needs conditions, depression or anxiety, which can make it difficult for these findings to be applied towards the general population of children who can benefit from enhancing their creative modules. Also, what is important to note is that some of these children may have not been provided appropriate informed consent and proper disclosure to the experimental groups. As creativity can be defined by various parameters, it is hard to quantify “creativity”, and many researchers report difficulty with defining elements and measures of creativity. Finally, it is also important to acknowledge that art therapy and musical therapy are very new to the psychology sector; thus, many of the research findings have been released from recent findings after the 2000’s, as this is a relatively new research focus that has only recently captured the attention of researchers. Because of this, future researchers are recommended to invest into new specialized areas of research within art and musical therapy by paying close attention to analyzing the cognitive, social and emotional development of children.

Conclusion

While the industries of art and musical therapy continue to evolve, this research publication has highlighted the positive efficacy of applying art and musical therapy on children, ranging from early youth, adolescence, to even adults. From witnessing the revolutional findings that highlight the predominant effects musical and art therapy has on rewiring the brain through neuroplasticity, it is apparent that many individuals, including those that are not in need of mental health therapy or support can highly benefit from exposing themselves to creative modules of expression. In conclusion, from analyzing fMRI brain imaging scans and other tools, it was also apparent that the musical and art therapy also contributed to improving and bolstering the social development, skills and creativity of children who benefit greatly from a wider expansion of their imaginative capabilities and creative potential. Additionally, reduced levels of anxiety and depression were also witnessed. Nonetheless,

it is imperative to consider that in diversifying these results, some of the ethical limitations must be controlled, pertaining to ensuring that participants in research studies are governed by proper ethics, informed consent and disclosure, as well as ensuring that participants that are diagnosed with certain conditions like depression or anxiety are still able to benefit from these creative modules of expression. In the upcoming years of research, researchers will be able to capture more positive implications of art and musical therapy on all aspects of children and adults – on a microscopic, cognitive, biological, social and emotional level.

Acknowledgments

I would like to thank my advisor for the valuable insight provided to me on this topic.

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