

MUSIC THERAPY AS A HOLISTIC APPROACH

Dr. Emilia Evgenieva, Prof.

Department of Music and Multimedia Technologies, FESA,
Sofia University ‘St. Kliment Ohridski’

Vaia Tzoka, Doctoral student

Department of Special Education, FESA,
Sofia University ‘St. Kliment Ohridski’

Abstract: This abstract summarizes a quantitative and a qualitative study that explored the typology of activities in music therapy for the inclusion of children with special educational needs. The aim of this research study is to test the possible relationship between musical acoustics and vocal discrimination in children of typical development and in children with special educational techniques of preschool and primary school age, as well as in comparison with each other. Moreover, to offer a thorough understanding of music therapy in order to explore how general school teachers perceive and approach the integration of music therapy within a single inclusive school environment.

Data were collected through demographic questionnaires, assessments of music audibility, phonemic discrimination tests and semi-structured interviews. Notably, we utilized the L-a-T-o Criterion, a psychometric test tailored for the Greek language, alongside Gordon's Elementary Measures of Music Audibility.

The findings of the research revealed that there is a positive impact of music in education and well-being of children, particularly those with special needs. Differences among groups were established (Typology), and also the research demonstrated the educators' positive attitudes toward integrating music therapy into the school curriculum. Quantitative results supported qualitative claims about the positive correlation between musical experiences and phonemic awareness. Both approaches identify challenges, such as the need for better infrastructure and trained music therapists.

The outcomes of this research confirmed the existing theory on the profound impact of Music, both tonal and rhythmic, on Children's development in Greece, highlighting that phonological awareness, a crucial skill for language development and reading, is significantly influenced by musical audibility in young children and identified positive attitudes toward integrating music therapy into the school curriculum, despite limited awareness in Greece.

Keywords: music therapy, Music Audibility, reading difficulties, language development, typology, phonological awareness

INTRODUCTION

In contemporary educational discourse, the holistic approach has emerged as a cornerstone philosophy, recognizing the interconnectedness of various dimensions of human experience within the learning process. Music, as a versatile and potent medium, has garnered attention for its efficacy in promoting holistic development among learners. This paper explores the integration of music within educational frameworks, drawing upon scholarly research and practical applications to elucidate its multifaceted contributions to holistic education.

A seminal aspect of music's role in holistic education lies in its capacity to evoke and regulate emotions. Extensive research in psychology and neuroscience demonstrates the profound impact of music on emotional well-being (Juslin & Sloboda, 2001). Through engagement with music, learners develop emotional intelligence, self-awareness, and coping mechanisms, fostering resilience in the face of challenges (Saarikallio, 2012).

Furthermore, music serves as a conduit for creativity and self-expression, facilitating the exploration of individual identities and perspectives (Burnard, 2012). By actively participating in musical activities such as improvisation, composition, or performance, students cultivate their creative potential and celebrate diversity in expression (Hargreaves, 2012).

Cognitively, music education has been linked to enhancements in language acquisition, spatial reasoning, and executive function (Kraus & Chandrasekaran, 2010). The intricate interplay of rhythm, melody, and harmony stimulates neural networks associated with memory, attention, and problem-solving, thereby augmenting cognitive development (Patel, 2011).

Moreover, music fosters social cohesion and collaboration, providing opportunities for cooperative learning and cultural exchange (Rickard et al., 2013). Ensemble performances, collaborative projects, and communal music-making experiences cultivate essential interpersonal skills such as communication, teamwork, and empathy, transcending cultural and linguistic barriers (O'Neill, 2018).

Practical applications of music within educational settings have demonstrated its transformative impact on the learning environment. Integrating music into daily routines can enhance motivation, engagement, and sense of belonging among students, creating a positive atmosphere conducive to learning and growth (Southgate & Roscigno, 2009).

In conclusion, the integration of music within educational frameworks aligns harmoniously with the holistic approach, offering a rich tapestry of emotional, cognitive, social, and creative benefits to learners. By leveraging music as a pedagogical tool, educators can cultivate holistic development, empowering students to thrive as resilient, creative, and socially adept individuals in an interconnected world.

The benefits of music education for children are significant, both during their education and even as they continue into adulthood. These benefits encompass cognitive functions as well as neuronal brain activity (Musacchia, Sams, Skoe & Kraus, 2007; Parbery-Clark, Anderson, Hittner & Kraus, 2012; Zendel & Alain, 2012). Research also indicates that musical education has a significant and positive impact on brain development (Moreno & Besson, 2005; Hyde et al., 2009; Moreno et al., 2011).

Over time, many researchers have formulated their opinions on the connection between language and music. Aitchison (2000) argues that the origin of language can be traced back to music, suggesting that language creation might have been based on melody rather than words (Aitchison, 2000). Vaneechoutte and Skoyles (1998) also emphasize the musical origin of language, referring to humans as musical beings. They note that singing and speech share similar physical and neurorespiratory processes, and from infancy, individuals recognize words by hearing their melody, intonation, and rhythm. As a result, both musicality and the ability to produce songs underlie the origin and development of human language during infancy (Vaneechoutte & Skoyles, 1998).

An overview of research conducted over the years reveals the connection, particularly the impact of music on reading and, more specifically, on phonological awareness. Music's most essential elements are considered to be tone and rhythm, often referred to as the "syntax" of music (Thaut, 2005). Both pitch and rhythm contribute to the perception of speech prosody (Marie, Magne & Besson, 2011).

Tone perception plays a critical role in both spoken language comprehension and musical perception. In the context of language, the perception of tonality helps in understanding linguistic contrasts between words, such as stress patterns (Ladefoged, 2003). Similarly, in music, tonality is a fundamental dimension used to compose a musical system, incorporating various musical elements and facilitating the understanding of musical contrasts (Patel, 2010).

The relationship between music and tonal perception of words has been explored and supported in numerous studies. Specifically, Deutsch and his colleagues (2004a) have highlighted that individuals associate specific tones they hear with particular words through their tonal perception (Deutsch, Henthorn & Dolson, 2004; Deutsch, 2006).

Various indications from researchers suggest that music education plays a crucial role in an individual's cognitive functions, influencing memory, attention, and thinking. Additionally, it is connected to academic skills, such as language and mathematics (Yoon, 2000; McMahon, Rose, Parks, 2004; Kartasidou, 2004a).

Numerous studies have focused on the relationship between the musical elements of tone and rhythm with reading and phonological awareness (Lamb & Gregory, 1993; Bolduc & Montesinos-Gelet, 2005). Several of these studies have argued that music education has a causal effect on language skills. In particular, music education has a positive impact on tonal perception and reading skills (Moreno, Marques, Santos, Santos, Castro & Besson, 2009).

Lamb and Gregory (1993) conducted a study investigating phonemic awareness and musical skills in a sample of 18 preschool children with English as their mother tongue. The results of their research revealed a connection between the ability to discriminate musical tones and the phonemic awareness of children. Those who scored high in musical tone discrimination also performed well in tests of phonemic awareness and the reading process (Lamb & Gregory, 1993).

In another research exploring the relationship between music education and reading, the brains of twenty individuals with musical knowledge and twenty without any music experience were studied. The researchers found that musical training and experience contribute to the development and enhancement of auditory stimulus processing, which enables individuals to distinguish between different sounds effectively. As a result, this improvement in listening skills is crucial for the development of phonological awareness, leading to more effective reading development (Gaab, Tallal, Kim, Lakshminarayanan, Archie, Glover, & Gabrieli, 2005).

David, Wade-Woolley, Kirby, and Smithrim (2007) conducted research on 53 children in 1st grade, suggesting that rhythmic production ability in young children is a predictive factor for their reading performance. The purpose of their research was to examine the relationship between rhythm and children's reading ability. Their results showed a statistically significant relationship between rhythm, phonological awareness, and rapid naming stimuli (David, Wade-Woolley, Kirby & Smithrim, 2007).

Cardillo (2008) conducted research on 23 typically developing 5-year-old toddlers to explore the relationship between speech prosody, aurality, and

phonological awareness. The findings indicated that phonological awareness and listening, both tonal and rhythmic, are moderately correlated. It was also emphasized that a child's sensitivity to features of speech and music can predict phonological awareness later on, due to the use of similar auditory processing means (Cardillo, 2008).

Another study by Peynircioglu, Durgunoglu, and Oney-Kusefoglul (2002) investigated the relationship and potential interaction between phonological awareness and musical aurality. The research included 32 Turkish-speaking infants and 40 English-speaking infants. Results showed that children with high musical receptivity performed better in the phonological awareness test compared to those with low musical receptivity. Since the participating children had not acquired reading ability, it is possible that they applied a common strategy to discriminate between musical and linguistic sounds (Peynircioglu, Durgunoglu & Oney-Kusefoglul, 2002).

In a more recent study, Pei, Wu, Xiang, and Qian (2016) investigated the effect of musical training and musical receptivity on phonological awareness in four different spoken languages. A total of 128 students aged 18-21 participated in the survey. The researchers found that students with musical experience and training demonstrated higher musical receptivity compared to their peers without music training. Additionally, receptiveness was associated with phonological awareness, as students with high musical receptivity showed significant performance in their phonological skills (Pei, Wu, Xiang & Qian, 2016).

Over time, several research studies have shown interest in studying the relationship between music and phonological awareness and reading.

Children with specific language difficulties have been found to experience problems in tonal discrimination, indicating a potential link between phonemic awareness and musical ability in the domain of tonality (Mengler, Hogben, Michie & Bishop, 2005).

However, it has been discovered that primary auditory difficulties experienced by children with reading difficulties are primarily related to rhythm perception (Corriveau, Pasquini & Goswami, 2007; Hämäläinen, Leppänen, Torppa, Muller & Lyytinen, 2005; Hämäläinen, Leppänen, Eklund, Thomson, Richardson, Guttorm, Witton, Poikkeus, Goswami & Lyytinen, 2009; Lorenzi, Dumont & Fullgrabe, 2000; Muneaux, Ziegler, Truc, Thomson & Goswami, 2004; Richardson, Thomson, Scott & Goswami, 2004; Surányi, Csépe, Richardson, Thomson, Honbolygó & Goswami, 2009; Thomson, Fryer, Maltby & Goswami, 2006). Specifically, these children's reading difficulties are related to their phonological awareness. Proponents suggest that this relationship between rhythm and phonological awareness could be influenced by prosody, which plays a key role in a child's phonological development (Goswami, Gerson & Astruc, 2010; Vihman & Croft, 2007).

In children diagnosed with dyslexia, rhythm and meter are predictive factors for difficulties in phonological awareness, suggesting that dyslexia may stem from challenges in processing the structure of speech sounds (Tallal & Piercy, 1973; Benasich, Choudhury, Friedman, Realpe-Bonilla, Chojnowska & Gou, 2006; Huss, Verney, Fosker, Mead & Goswami, 2011).

In research conducted by Hämäläinen and colleagues (2009), the relationship between listening comprehension and reading was studied in 30 children with reading difficulties and 30 typically developing children aged 9 years. The research results suggested that auditory processing ability could impact speech perception skills, leading to phonological deficits (Hämäläinen et al., 2009).

Richardson and colleagues (2004) conducted research to study the relationship between listening ability and phonological awareness in children with dyslexia. The results showed that listening skills are related to phonological awareness, spelling, and reading in general. Additionally, it was found that children with reading problems had difficulty distinguishing between two sounds that differed in intensity. Furthermore, another similar study showed that these children with reading difficulties struggled when listening to pairs of sounds that differed in duration (Thomson, Fryer, Maltby & Goswami, 2006).

Forgeard, Schlaug, Norton, Rosam, and Iyenger (2008) conducted research to determine whether musical discrimination ability is related to reading. Primary school children with typical development and primary school children diagnosed with dyslexia participated in the research. The findings showed that in typically developing children, musical discrimination ability is related to their phonological awareness, which, in turn, is related to reading. This relationship appears to be stronger in children who have received prior music training. As for children with dyslexia, their performance on the two subtests of Gordon's IMMA test was quite low. Research has shown that musical discrimination in children with dyslexia is related to their phonological awareness skills and, to a large extent, their reading ability (Forgeard et al., 2008).

METHODS

The research approach combines quantitative and qualitative methodology. This dual-strategy ensures a holistic exploration and deeper understanding of the impact of music therapy on children with special educational needs. Through interviews and observational studies, we gain insights into the contextual dynamics and personal experiences involved, while the quantitative aspect allows for cross-validation of findings, adding robustness and richness to our data. This combination not only enriches the research but

also strategically addresses existing gaps in the literature, ensuring a well-rounded investigation that can inform future practices and policies in the field of inclusive education and music therapy.

The Quantitative Research Approach, was designed to empirically test hypotheses and derive statistically significant conclusions about the impact of musical acoustics on vocal discrimination in children with special educational needs (SEN). During the 2021-2022 school term, we collected data from 94 children in Larissa and Magnesia, comprising both typically developing individuals and those with SEN.

The sample comprised 44 typically developing children between the ages of 5 and 8 years old and 51 children aged 5 to 9 years old with special educational needs from public elementary schools. Specifically, the special educational needs group included children who had been diagnosed with learning disabilities, ADHD, behavioral problems, or mild mental disability.

Regarding the gender distribution within the sample, out of the 94 participating children, 53.2% were boys (50) and 46.8% were girls (44). The age range of the sample spanned from 5 years to 9 years. Within this group, 3 children were 5 years old (3.2%), 9 children were 6 years old (9.6%), 45 children were 7 years old (47.9%), 30 children were 8 years old (31.9%), and 7 children were 9 years old (7.4%).

In terms of grade, the distribution of children in the sample was as follows: 3 children were in the toddler age group (3.2%), 11 children were studying in the first grade (11.7%), 45 children were enrolled in the second grade (47.9%), 29 children were in the third grade (30.9%), and the remaining 6 children were in the fourth grade of primary school (6.4%).

Regarding the educational needs of the children, the diagnoses were as follows: 13.8% of the subjects (13 children) had been diagnosed with Mild Mental Retardation, 25.5% (24 children) with Learning Difficulties, 3.2% (3 children) with Behavioral Problems, 5.3% (5 children) with ADHD, 5.3% (5 children) were categorized as 'other' or unspecified. Additionally, 46.8% of the children were typically developing.

To further analyze the data, the children categorized under "other" were specified to have Speech Problems. Subsequently, the categories of Behavioral Problems and ADHD were combined, while the sample with speech problems was merged with the group of children with learning difficulties. The categories of Mild Mental Retardation and Typical Development remained separate.

From the entire sample, 13.8% (13) were students with Mild Intellectual Disability, 30.9% (29) were students with learning disabilities, 8.5% (8) were students with behavioral problems, and 46.8% (44) were typically developing children.

Our tools included a demographics questionnaire, assessments of music audibility, and phonemic discrimination tests. Notably, we utilized the L-a-T-o Criterion, a psychometric test tailored for the Greek language, alongside Gordon's Elementary Measures of Music Audibility. The data underwent rigorous statistical analysis using SPSS 23.0, employing methods like t-tests, ANOVA, and Pearson's correlation coefficient to ensure comprehensive and reliable results.

On the other hand, the qualitative exploration was crucial for understanding the practical implications and educators' viewpoints on the effectiveness and feasibility of music therapy in educational settings. I engaged with 15 teachers from Greek public primary and secondary schools, including music educators, using a semi-structured interview format.

To address the primary research question, qualitative research tools were employed. The choice of a qualitative methodological approach was deemed essential for this study, given the need to delve deeper into teachers' perspectives on the implementation of novel educational techniques, the support of students with Down syndrome, and the integration of music therapy into the educational curriculum.

In this particular study, the interview method was selected as the means to gather teachers' opinions. Individual semi-structured interviews were conducted, with a predetermined set of questions serving as a helpful guideline during the interviews, although they were not strictly binding. Data collection occurred through face-to-face interviews with the participating teachers.

The qualitative approach is deemed suitable when there is a dearth of information on the subject of investigation or when seeking a fresh perspective on a well-established topic. Despite the relatively small number of cases (or individuals) involved, the data obtained from qualitative research enabled the collection of detailed and insightful information. Consequently, the research cases could be comprehensively understood, although the research findings cannot be generalized (Bird, Hammersley, Gomm & Wood, 1999).

In this instance, the specific methodological approach was chosen due to the research's objective to address a field that had hitherto received inadequate attention—namely, recording and examining the opinions of general education teachers regarding the incorporation of music therapy methods into the school curriculum.

These interviews, conducted between November 2022 and May 2023, were designed to last around 30 minutes each, providing rich, detailed data. Ethical considerations were paramount, with a focus on transparency, voluntary participation, informed consent, and participant anonymity. The research's validity and reliability were ensured through meticulously formulated questions, a clear and structured design, neutrality in inquiries, and systematic analysis of the collected data.

RESULTS AND DISCUSSION

The correlations within different child groups. For children with learning disabilities, significant moderate correlations were observed between their phonemic discrimination abilities and both the Tonal part and the Total score of the Primary Measures of Music Audibility (PMMA). In contrast, children with behavioral problems showed extremely strong correlations between phonemic discrimination and all assessed aspects of PMMA, including the Rhythmic part, Tonal part, and the Total PMMA score. Typically developing children exhibited a small correlation between phonemic discrimination and the Rhythmic part, and moderate correlations with the Tonal part and Total PMMA score. These findings highlight the nuanced ways in which music perception and phonemic discrimination interrelate, varying significantly across different groups of children and pointing towards tailored music therapy interventions.

Table 1

	Rhythmic	Tonic	Total PMMA
Total Phonemics	.319	.532**	.472**
Rhythmic		.648**	.902**
Tonic			.913**
	Rhythmic	Tonic	Total PMMA
Total Phonemics	.860**	.819**	.850**
Rhythmic		.950**	.988**
Tonic			.987**
	Rhythmic	Tonic	Total PMMA
Total Phonemics	.356*	.478**	.468**
Rhythmic		.649**	.877**
Tonic			.935**

Reading the table 2 Horizontally, when there are different colors it means that there are statistically significant differences in the scores among the groups/types; and the darker the color the higher the score.

So for the phonemic discrimination, there is no difference between TD and BP but both of them are higher than the scores achieved by LD and MID; and the LD score is higher than the score by MID.

For the rhythmic, there is no difference among TD, BP, LD but all of them are scoring significantly higher than those in the MID group.

For the tonal and the total PMMA, there is no statistically significant difference among the groups/types.

Therefore, interventions to enhance the performance of SEN students should be aware that if applied across all the above-mentioned group they will not achieve the same results.

Therefore, a different stroke for different folks' approach is required, to overcome the nuanced influences types of disabilities have on children's music perceptual abilities.

Table 2: Different Strokes for Different Folks

	MID Mild Intel. Dis.	LD Learn. Dis.	BP Behav. Probl.	TD Typical Dev.
Phonemic Discrimination	Light Green	Light Green	Dark Green	Dark Green
Rhythmic	Light Orange	Dark Red	Dark Red	Dark Red
Tonal	Dark Purple	Dark Purple	Dark Purple	Dark Purple
Total PMMA	Dark Blue	Dark Blue	Dark Blue	Dark Blue

Moreover qualitative research methodology, highlighted the beneficial effects of music and music therapy in the education of children with disabilities. Teachers reported that music serves not just as a tool but also as a method and a distinct field of study, enriching the educational landscape. Its multifaceted uses allow it to alternate and complement different educational strategies within lessons or therapy sessions. Specifically, in special education, music's effectiveness shines through its support for multisensory learning, facilitation of non-verbal communication, and its motivational qualities that engage students deeply, enhancing learning across various domains. Furthermore, the distinctive features of music therapy in special education underscore its universal benefits, providing valuable support that transcends the specific

nature of individual disabilities, thereby advocating for its widespread application to foster an inclusive educational environment.

Based on the information provided, the effects of music, particularly music therapy methods, in the education of children with disabilities are beneficial. Music, as an art of sound and rhythm, serves to express human emotions and thoughts. The impact of music on individuals is unquestionable, known to influence the human brain, body, energy levels, mood, and ideas. Music can both inspire and calm, energize and relax, and liberate individuals.

Music exists within the realm of education as a means, method, and an entire field of study. Alongside using music as a teaching tool and medium for individuals with special needs (music education) and as a means of education (education through music), the therapeutic aspect of music is undeniable. Various uses of music are intertwined, and they can alternate and complement each other within lessons/sessions. Given that creativity is a powerful teaching tool and music is rich in creative interaction, it becomes an ideal teaching tool, particularly for children with special needs. Music helps these children learn to engage in various ways, as opposed to a traditional classroom environment (auditory or visual). Instead of speaking or writing, a child can use music to communicate their experiences. This type of learning is effective in several ways:

- a) **Multisensory learning:** Music provides a multisensory experience that engages a child's tactile, auditory, and visual systems, offering a holistic bodily experience. The more senses involved in the learning process, the better.
- b) **Non-verbal communication:** For many children with disabilities, words can be a significant challenge. Some struggle to express themselves or their emotions, while others find it difficult to communicate or process words. Music plays a crucial role in bridging the communication gap and eliminates the obstacle of converting their internal emotions into verbal expression. It offers freedom of expression and relief, allowing children to communicate without using words.
- c) **Provides motivation:** Music can serve as a powerful motivator for children with special needs. It can push children beyond their comfort zones and have positive behavioural effects on how children learn and develop new skills.
- d) **Enhances learning:** The use of music in an educational setting is an excellent way to improve learning for children who do not respond well to traditional methods. For example, singing can enhance communication skills and speech, rhythm can improve motor skills, and listening to music can increase students' concentration, and more.

Music therapy in special education differs from music education in its emphasis on acquiring non-musical skills, using music as a symbol of emotional and personal development rather than a set of cognitive skills that need to be learned and practiced. Music therapy is defined as a systematic intervention process conducted by therapists with the aim of promoting and maintaining health by achieving individualized goals through the use of music or its elements (such as sound, rhythm, melody, and harmony) to facilitate and promote communication, learning, mobilization, expression, organization, etc., to satisfy physical, emotional, mental, social, and cognitive needs.

Everyone, regardless of disabilities, can benefit from music therapy. Through music therapy, trust-based relationships can be established and developed between the therapist and the client. Music therapy interventions help individuals discover and utilize their creative abilities, which are inherent in all individuals, as well as develop other skills. These interventions can also contribute effectively to the development of basic skills (cognitive, communicative, social, motor skills, etc.) of individuals with disabilities or disorders. This educational dimension of music therapy can facilitate the inclusion of children within an inclusive school environment and society at large.

Regarding the attitudes and opinions of educators regarding the implementation of music therapy in inclusive education, the research indicates a generally positive climate. However, knowledge in this field is significantly limited. Despite the fact that music therapy has been studied worldwide with scientific rigor for over 70 years, this field is still developing in Greece.

CONCLUSION

The two research studies shed light on the profound impact that music can have on the development and well-being of children, particularly those with special educational needs. The first study focused on the relationship between phonemic discrimination and musical audibility in young children, demonstrating a moderate correlation between these factors. This finding suggests that musical experiences, both tonal and rhythmic, can significantly influence a child's phonemic awareness, a crucial skill for language development and reading.

The second study explored educators' perspectives on integrating music therapy into the school curriculum, revealing a generally positive attitude toward this approach. Educators recognize the potential of music therapy to benefit students emotionally, cognitively, and motorically. However, several challenges, such as the need for better infrastructure and trained music therapists, must be addressed to make this integration a reality.

The intersection of these two studies underscores the importance of music in education, especially for children with special needs. Music therapy has the potential to serve as a powerful tool for enhancing the lives of these children, promoting communication, socialization, emotional well-being, and cognitive development. The findings also highlight the readiness of educators to support this endeavor, recognizing the positive impact it can have on their students.

To fully harness the potential of music therapy in education, it is essential for governments, educational institutions, and communities to collaborate. Legislative recognition of music therapy as a profession and the provision of resources for training and implementation are crucial steps. Educators can play a pivotal role in advocating for the inclusion of music therapy in schools and supporting students with diverse needs.

In conclusion, these studies emphasize that music therapy is not just a creative outlet but a valuable therapeutic and educational tool, with the potential to transform the lives of children, especially those with special educational needs. It is a call to action for stakeholders to come together and create a more inclusive and enriching educational experience for all children.

REFERENCES

- Aitchison, J. (2000). *The seeds of speech: Language origin and evolution*. Cambridge University Press.
- Benasich, A. A., Choudhury, N., Friedman, J. T., Realpe-Bonilla, T., Chojnowska, C., & Gou, Z. (2006). The infant as a prelinguistic model for language learning impairments: predicting from event-related potentials to behavior. *Neuropsychologia*, 44(3), 396-411.
- Bolduc, J., & Montésinos-Gelet, I. (2005). Pitch Processing and Phonological Awareness. *Psychomusicology: A Journal of Research in Music Cognition*, 19(1), 3.
- Burnard, P. (2012). *Musical Creativities in Practice*. Oxford University Press.
- Cardillo, G. C. (2008). Relationships among prosodic sensitivity, musical processing, and phonological awareness in pre-readers. *Speech Prosody: Campinas, ISCA Archive*, 595-598.
- Corriveau, K., Pasquini, E., & Goswami, U. (2007). Basic auditory processing skills and specific language impairment: A new look at an old hypothesis.
- David, D., Wade-Woolley, L., Kirby, J. R., & Smithrim, K. (2007). Rhythm and reading development in school-age children: A longitudinal study. *Journal of Research in Reading*, 30(2), 169-183.
- Deutsch, D., Henthorn, T., & Dolson, M. (2004). Absolute pitch, speech, and tone language: Some experiments and a proposed framework. *Music perception*, 21(3), 339-356.

- Deutsch, D. (2006). The enigma of absolute pitch. *Acoustics Today*, 2(4), 11.
- Douglas, S., & Willatts, P. (1994). The relationship between musical ability and literacy skills. *Journal of Research in reading*, 17(2), 99-107.
- Forgeard, M., Schlaug, G., Norton, A., Rosam, C., Iyengar, U., & Winner, E. (2008). The relation between music and phonological processing in normal-reading children and children with dyslexia. *Music perception*, 25(4), 383-390.
- Gaab, N., Tallal, P., Kim, H., Lakshminarayanan, K., Archie, J. J., Glover, G. H., & Gabrieli, J. D. E. (2005). Neural correlates of rapid spectrotemporal processing in musicians and nonmusicians. *Annals of the New York Academy of Sciences*, 1060(1), 82-88.
- Gordon, M. V. W. (1977). THE EFFECT OF CONTINGENT INSTRUMENTAL MUSIC INSTRUCTION ON THE LANGUAGE READING BEHAVIOR AND MUSICAL PERFORMANCE ABILITY OF MIDDLE SCHOOL STUDENTS. Teachers College, Columbia University.
- Gordon, E.E. (2006). Handbook: Primary Measures of Music Audiation and Intermediate Measures of Music Audiation, (rendition in Greek by L. Stamos). Thessaloniki: University of Macedonia Publications.
- Goswami, U., Gerson, D., & Astruc, L. (2010). Amplitude envelope perception, phonology and prosodic sensitivity in children with developmental dyslexia. *Reading and Writing*, 23, 995-1019.
- Hämäläinen, J., Leppänen, P. H. T., Torppa, M., Müller, K., & Lyytinen, H. (2005). Detection of sound rise time by adults with dyslexia. *Brain and Language*, 94(1), 32-42.
- Hämäläinen, J. A., Leppänen, P. H., Eklund, K., Thomson, J., Richardson, U., Guttorm, T. K., ... & Lyytinen, H. (2009). Common variance in amplitude envelope perception tasks and their impact on phoneme duration perception and reading and spelling in Finnish children with reading disabilities. *Applied Psycholinguistics*, 30(3), 511-530.
- Hargreaves, D. J. (2012). *The Social and Applied Psychology of Music*. Oxford University Press.
- Hodges, D. A., O'Connell, D. S., Teachout, D. J., Haack, P. A., & Asmus, E. P. (2005). *Sounds of Learning The Impact of Music Education*. International Foundation for Music Research, 1-171.
- Huss, M., Verney, J. P., Fosker, T., Mead, N., & Goswami, U. (2011). Music, rhythm, rise time perception and developmental dyslexia: Perception of musical meter predicts reading and phonology. *Cortex*, 47(6), 674-689.
- Hyde, K. L., Lerch, J., Norton, A., Forgeard, M., Winner, E., Evans, A. C., & Schlaug, G. (2009). Musical training shapes structural brain development. *Journal of Neuroscience*, 29(10), 3019-3025.
- Juslin, P. N., & Sloboda, J. A. (Eds.). (2001). *Music and Emotion: Theory and Research*. Oxford University Press.

- Kartasidou, L., & Stamou, L. (2006). Music Pedagogy, Music Education in Special Education, Music Therapy: Contemporary trends and perspectives. *Contemporary trends and perspectives. (Conference Proceedings)*, University of Macedonia, 30-72.
- Kartasidou, L. (2004). Music education in special pedagogy. Athens: Print.
- Kartasidou, L. (2004b). Learning through movement Thessaloniki: University of Macedonia Publications.
- Kocabaş, E. Ö., & Özeke, S. (2012). using music and musical activities in special education: developments in Turkey. *International online journal of primary education*, 1(1), 73-79.
- Kraus, N., & Chandrasekaran, B. (2010). Music training for the development of auditory skills. *Nature Reviews Neuroscience*, 11(8), 599-605.
- Ladefoged, P. (2003). Phonetic data analysis: An introduction to fieldwork and instrumental techniques. (No Title).
- Lamb, S. J., & Gregory, A. H. (1993). The relationship between music and reading in beginning readers. *Educational psychology*, 13(1), 19-27.
- Lorenzi, C., Dumont, A., & Fullgrabe, C. (2000). Use of temporal envelope cues by children with developmental dyslexia. *Journal of speech, language, and hearing research*, 43(6), 1367-1379.
- Marie, C., Magne, C., & Besson, M. (2011). Musicians and the metric structure of words. *Journal of cognitive neuroscience*, 23(2), 294-305.
- McClellan, R. (1997). The healing powers of music. Fagotto editions.
- Mitchell, E. (2016). Therapeutic Music Education: An Emerging Model Linking Philosophies and Experiences of Music Education With Music Therapy. *Canadian Journal of Music Therapy*, 22(1).
- Moreno, S., & Besson, M. (2005). Influence of musical training on pitch processing: event-related brain potential studies of adults and children. *Annals of the New York Academy of Sciences*, 1060(1), 93-97.
- Moreno, S., Marques, C., Santos, A., Santos, M., Castro, S. L., & Besson, M. (2009). Musical training influences linguistic abilities in 8-year-old children: more evidence for brain plasticity. *Cerebral cortex*, 19(3), 712-723.
- Moreno, S., Bialystok, E., Barac, R., Schellenberg, E. G., Cepeda, N. J., & Chau, T. (2011). Short-term music training enhances verbal intelligence and executive function. *Psychological science*, 22(11), 1425-1433.
- Muneaux, M., Ziegler, J. C., Truc, C., Thomson, J., & Goswami, U. (2004). Deficits in beat perception and dyslexia: Evidence from French. *NeuroReport*, 15(8), 1255-1259.
- Musacchia, G., Sams, M., Skoe, E., & Kraus, N. (2007). Musicians have enhanced subcortical auditory and audiovisual processing of speech and music. *Proceedings of the National Academy of Sciences*, 104(40), 15894-15898.
- Nordoff, P., & Robbins, C. (2007). Creative music therapy: A guide to fostering clinical musicianship (2nd ed.). New Hampshire: Barcelona.

- O'Neill, S. A. (Ed.). (2018). *The Oxford Handbook of Music and Social Justice*. Oxford University Press.
- Parbery-Clark, A., Anderson, S., Hittner, E., & Kraus, N. (2012). Musical experience offsets age-related delays in neural timing. *Neurobiology of aging*, 33(7), 1483-e1.
- Patel, A. D. (2010). *Music, language, and the brain*. Oxford university press.
- Patel, A. D. (2011). *Music, Language, and the Brain*. Oxford University Press.
- Pavlicevic, M. (2005). *WorkSongs, PlaySongs: Communication, collaboration, culture and community*. Paper presented at the 11th World Congress of Music Therapy: From lullaby to lament, Brisbane.
- Pei, Z., Wu, Y., Xiang, X., & Qian, H. (2016). The Effects of Musical Aptitude and Musical Training on Phonological Production in Foreign Languages. *English Language Teaching*, 9(6), 19-29.
- Peynircioglu, Z. F., Durgunoglu, A. Y., & Úney-Küsefog˘lu, B. (2002). Phonological awareness and musical aptitude. *Journal of Research in reading*, 25(1), 68-80.
- Register, D., Darrow, A. A., Swedberg, O., & Standley, J. (2007). The use of music to enhance reading skills of second grade students and students with reading disabilities. *Journal of Music Therapy*, 44(1), 23-37.
- Richardson, U., Thomson, J. M., Scott, S. K., & Goswami, U. (2004). Auditory processing skills and phonological representation in dyslexic children. *Dyslexia*, 10(3), 215-233.
- Rickard, N. S., Appelman, P., James, R., Murphy, F., Gill, A., & Bambrick, C. (2013). Orchestrating learning: Using music to enhance children's literacy development in early childhood. *Educational Studies*, 39(2), 161-173.
- Saarikallio, S. (2012). Development and validation of the Brief Music in Mood Regulation Scale (B-MMRS): A new tool for assessing the role of music in emotion regulation. *Personality and Individual Differences*, 52(3), 108-114.
- Skoe, E., & Kraus, N. (2012). A little goes a long way: how the adult brain is shaped by musical training in childhood. *Journal of Neuroscience*, 32(34), 11507-11510.
- Southgate, D. E., & Roscigno, V. J. (2009). The impact of music on childhood and adolescent achievement. *Social Science Quarterly*, 90(1), 4-21.
- Stamou, L., Humphreys, J. T., & Schmidt, C. P. (2006). The effects of instruction on self-assessed research knowledge, ability, and interest among Greek music educators. *Music Education Research*, 8(2), 175-189.
- Surányi, Z., Csépe, V., Richardson, U., Thomson, J. M., Honbolygó, F., & Goswami, U. (2009). Sensitivity to rhythmic parameters in dyslexic children: A comparison of Hungarian and English. *Reading and Writing*, 22, 41-56.
- Tallal, P., & Piercy, M. (1973). Developmental aphasia: Impaired rate of non-verbal processing as a function of sensory modality. *Neuropsychologia*, 11(4), 389-398.
- Thaut, M. H. (2005). *Rhythm, music, and the brain*. New York & London. Routledge.
- Thaut, MH, Demartin, M., & Sanes, JN (2008). Brain networks for integrative rhythm formation. *PLoS ONE*, 3(5), e2312.

- Thomson, J. M., Fryer, B., Maltby, J., & Goswami, U. (2006). Auditory and motor rhythm awareness in adults with dyslexia. *Journal of research in reading*, 29(3), 334-348.
- Tsiris, G. (2011). The state of music therapy in Greece. *Voices: A World Forum for Music Therapy*, 11(3).
- Tzouriadou, M., Syngolitu, E., & Anagnostopoulou, E. (2008). *L-a-T-o*, Psychometric Criterion of Language Proficiency. Published by the author.
- Vanechoutte, M., & Skoyles, J. R. (1998). The memetic origin of language: modern humans as musical primates. *Journal of Memetics-Evolutionary Models of Information Transmission*, 2(2), 129-168.
- Vrasidas, X. (2014) *Introduction to Qualitative Research*: CARDET PRESS.
- Weinberger, N. M. (2000). Music and the brain. *Scientific American*, 282(3), 56-65.
- Yoon, J. N. (2000). *Music in the Classroom: Its Influence on Children's Brain Development, Academic Performance, and Practical Life Skills*.
- Zendel, B. R., & Alain, C. (2012). Musicians experience less age-related decline in central auditory processing. *Psychology and aging*, 27(2), 410.

About the Authors:

Vaia Tzoka

My educational and professional experience covers competencies in the field of philosophy and pedagogy, psychology, special education, which I realize as a music school teacher.

The experience I have as a language, history and philosophy teacher is a prerequisite for the broad picture of my research interests.

I pay special attention to the techniques of music therapy interventions and the possibilities of music therapy to support the learning of students with special educational needs. I presented my research findings in the process of studying in a doctoral program in Special Pedagogy at Sofia University.

Address: Garivaldi 21 TK 41221,

LARISA GREECE

Email: tzokvaia@sch.gr

Prof. Dr. Emilia Evgenieva is a teacher at Sofia University "St. Kliment Ohridski", Department of Music and Multimedia Technologies. Her research interests are aimed at the problems of language learning and the opportunities of cultural diversity to become a center in the development process of children, students and students. Finding opportunities to structure creative processes and describe them complements the opportunity to create reflective thinking.

Contact: 1574 Shipchenski Prohod Blvd. 69A, Sofia, Bulgaria,

Sofia University, Faculty of Educational Studies and the Arts,

Email: e.evgenieva@fppse.uni-sofia.bg

