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**COGNITIVE DEVELOPMENT OF THE PERSON WITH AUTISM SPECTRUM DISORDER
THROUGH MUSIC**

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ABSTRACT: Studies relating the connection between students diagnosed with Autism Spectrum Disorder (ASD) and the effectiveness of music on their brains have been increasing. Chronologically, studies on ASD began in 1911 with Bleuler. In 1972, Leo Kanner introduced the concept of Asperger's syndrome linked to autism, but ASD only entered the International Classification of Diseases (ICD) catalog in 1979. Although studies indicate that we are born with a musical brain, it has been anatomically proven that there is no specific neurological center solely dedicated to music; therefore, music assumes the role of a tool whose application methods we need to study. Statistical studies already demonstrating satisfactory results in concentration, memory, abstraction, and generalization, thus affirming the possibility of individual development if music is used appropriately. The major discussion revolves around the deficit that autistic individuals present in relation to Theory of Mind (TM). This term was introduced into cognitive sciences in the 1970s by Premack and Woodruff, considered a theory because thought is not amenable to direct observation. What promotes the development of the Theory of Mind (TM) is the relationship with others, the ability to attribute mental states and predict the behavior of other people. The mental exercise necessary for understanding music aligns with the thinking behind the TM, contributing to the development of autistic individuals. This work presents a literature review on the relationship between autism and music from the perspective of cognitive theories of mind.

Keywords: Autism, Music, Theory of mind

INTRODUCTION

In recent years, there has been significant growth in research related to the relationship between music students diagnosed with Autism Spectrum Disorder (ASD) and the effectiveness of music in their cognitive processes. Scientific advances surrounding ASD have transformed medical, psychoanalytic, and social conceptions of this condition, shifting it from a stigmatizing and reductionist view to an understanding of its neurobiological and multifactorial complexity.

Autism Spectrum Disorder (ASD) is a disorder that is highly prevalent in today's society, characterized by a set of conditions marked by the early onset of impairments in sociability, communication, and... development is marked by noticeable persistent impairment in social interaction, stereotyped patterns of interests, and altered communication (Klin, 2006). The paradigm shift in recent decades has not only enabled greater inclusion of people with ASD within the scope of social rights, but has also paved the way for research into pedagogical practices capable of promoting their cognitive, social, and communicative development.

Several studies indicate that the appropriate use of music can promote significant improvements in concentration, memory, abstraction, and generalization, suggesting the possibility of cognitive development in

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the individual (Louro, 2021: 49). More than an artistic expression, it constitutes a multimodal language, capable of mobilizing emotional, sensory, and social aspects that directly interact with functions frequently compromised in ASD, such as theory of mind, emotion recognition, and social interaction. Thus, it is evident that music has potential as a tool for cognitive stimulation, especially considering the neurological alterations associated with ASD.

Literature review studies have demonstrated that music can be beneficial from the perspective of theory of mind, while also highlighting relevant pedagogical strategies for teaching this specific audience. Literature review can help to uncover the potential of music through musical games, improvisation, and collective practices as experiences capable of broadening perception of others, stimulating communication, and fostering meaningful learning, thus pointing to the potential of music as a resource for development.

Thus, considering that cognitive theories of mind seek to understand how individuals attribute mental states to themselves and others, and that this ability is frequently affected in people with ASD, it becomes relevant to investigate how music can contribute to this process. Therefore, based on a literature review, this study examines the relationship between autism and music from the perspective of Theory of Mind, highlighting the connection between music and autism, considering the scientific evolution of knowledge about ASD, presenting the theory of mind, and verifying the effectiveness of musical application in this social context.

Scientific Evolution and the Role of the Music Educator

In the history of psychoanalysis, Oliveira (2022) clarifies that the view of autistic people in previous centuries was marked by the wordplay that the term "autism" provided, as if it were natural to the subject, as if they were turned inward and found satisfaction only in inanimate objects. Initially, people with autism were recognized as being in a primitive state of human being that did not evolve, being deprived of dignity and the right to be part of the community.

But over time we perceive a historical evolution, marked mainly by scientific evolution. In 1911, medical science showed advancements in its research, with the presence of the psychiatrist Bleuler in the literature, who popularized the term "autism" as a loss of contact with reality. Later, in 1943 and 1944, psychiatrists Leo Kanner and Hans Asperger discussed autism as a disorder or psychopathy. At this time, the concept of language was taken as synonymous with tongue, therefore the impossibility of a person with autism to communicate fruitfully was understood as an inability to produce articulate speech in their mother tongue, alleging that the mother was the causative agent of autism, since she did not offer sufficient loving conduct, preventing the child from investing in exchange relationships with others (Oliveira, 2022).

Following the chronology of scientific evolution, in 1972, Leo Kanner noted the affective difficulties that autistic individuals presented with people in everyday situations, considering that this characteristic was a result of the parents' professions, since they performed activities not related to human interaction, defining the parents as cold. This theory lost its strength in the mid-1960s, when autism was identified as having a multifactorial and neurobiological cause. A database provided by the Stela Maris Institution supported, at the time, that even after mothers invested in the affective relationship, they were not reciprocated (Oliveira, 2022).

We know that the brain transforms in collective life and language undergoes transformations, but parents are not the agents causing this transformation. We, as vertebrate beings, due to the expansion of our repertoire of movements in relation to invertebrates, have a large framework of sounds, making communication much more sophisticated. We have the lengthening of the larynx, widening of the oral cavity, and freeing of the hand for support, all of which enable facial expressions, gestures, and sounds (Fonseca; Parizzi, 2025: 19). Therefore, it is understood that language is an organized system of signs that allows the exchange of information and/or subjectivities and the coordination of behaviors between people. Thus, it is understood that our main languages are auditory and gestural, such as speech, music, mimicry, and bodily gestures.

Even in the mid-1970s, neuroscientific studies demonstrated that children with ASD possessed sensory sensitivities, exhibiting hypersensitivity to the following sensations: acoustic, visual, tactile, olfactory, or gustatory. In 1976, Lorna Wing presented Wing's triad theory, outlining the basis for autism within a spectrum, where three areas were compromised: imagination, socialization, and communication. Two years later, Rutter added another compromised area, the onset of these characteristics before 30 months of age.

Psychoanalytic research began to defend autistic children as great strategists of communication, stating that people who live with them needed to "hear" the sounds, gestures, tones, movements, and gazes as an expression of language, multimodal language. This theory is still accepted today, affirming that there must be detachment from form because the body also speaks, and when we manage to communicate with it, creating a bond with its complete presence, communication occurs. Considering music as a language, Suzart (Parizi, 2022) states that

"from the encounter came meaning, from meaning feeling, from feeling connection, from connection bonding, and from bonding music."

With advances in science, society is beginning to access knowledge and, consequently, to see others as individuals with rights and responsibilities. Generally, it is beginning to understand that the pursuit of standardized behaviors hinders the diverse existence of each being, without labels, thus limiting existence itself. These differences enrich us as humans. This entire body of studies has marked fundamental advances for medical science, which has strengthened the current definition of the disorder.

Regarding this analysis, Oliveira (2022:71) describes that the transformation of perspective on autistic individuals should occur in the same way as with Down syndrome:

The radical shift came through discourses constructed within the culture, which began to recognize these individuals as capable and no longer as a result of a code that determined their actions and even their longevity.

It was then, stemming from these social concerns and advances in medical science, that autism was included in the International Classification of Diseases (ICD) in 1979 and in the Diagnostic and Statistical Manual of Mental Disorders (DSM) in its third edition in 1980. Science has only begun to unravel this condition in depth in the last two decades.

The discussion goes beyond the terminology that has been assigned; in fact, it revolves around the moment when people with disabilities were truly considered citizens and allowed to access their rights as human beings. From access to the right to education, to education and governmental public policies, inclusive practices emerge and require professionals to adopt approaches that integrate people with disabilities.

Several researchers postulate theories and lead investigations in order to find the causes of autism; however, there are still no markers that can objectively identify the agents that generate the disorder, because although the discussions are the same, the results are diverse.

In this way, music education emerges as a practice that adds value to the lives of these people, without resorting to rigid methods, but ensuring the right to accessibility. As Soares (2018) reminds us, accessibility goes beyond structural issues, encompassing communicational, programmatic, methodological, and instrumental dimensions.

The evolution of medical science contributes to the fight against prejudice, manifested through generalizations that make it seem as if all people with the same diagnosis behave in the same way, a view that Soares (2010: 253) identifies as ableism. This scenario is reflected in the field, when "there is an expectation of specific methodologies for music teaching according to diagnostic data" (Soares, 2010: 254).

If we consider that music education aims to develop perceptions that allow the individual to become consciously aware of their musical experience, naming and conceptualizing their experiences (Soares, 2010: 48), a rigid methodology based solely on diagnosis is not justified. Understanding the evolution of science corroborates the understanding that the right to music education must be respected, and musical practice should be present at all stages as a social practice, promoting a dialogue of ideas that transforms into sonically rich experiences.

As Soares explains:

Musical creation concerns the relationship between humans and the sound element, which is produced by different sources: musical instruments, body sounds, everyday objects, toys, furniture, sounds of nature, etc. [...] musical creation also implies creating with others, listening to them, giving voice to their ideas (Soares, 2010: 42).

This panorama leads to the need to investigate pedagogical practices that respect individual characteristics, allowing for meaningful musical experiences appropriate to the neurological development of each student. Similarly, there is a demand for reflection on which musical teaching methodologies truly favor participation and the construction of meaningful experiences for children with ASD, respecting their cognitive functions, so that the evolution of medical science is reflected in the active participation of these individuals in the musical universe.

Music and Social Cognitive Function

Among the functions of social cognition are social perception skills, such as recognizing and understanding emotions, maintaining a global view of situations (central coherence), and the so-called theory of mind. These skills are frequently impaired in people with ASD, since they are related to brain structures such as the limbic system, frontal cortex, and executive circuits, and these, in turn, have neuroanatomical alterations (Rosário and Morais, 2022: 26).

It is important to clarify that the term "theory of mind" can be used in different ways. In lowercase, it refers to the psychological phenomenon, that is, the human capacity to understand the thoughts, intentions, and feelings of others. When written as "Theory of Mind," in uppercase, it refers to the scientific concept developed by cognitive sciences to study and explain how we acquire this ability. Furthermore, "cognitive theory of mind" (singular) designates a specific line of cognitivist explanation about how this process occurs, while "cognitive theories of mind" (plural) refer to the set of different cognitivist approaches to the same topic.

The theory of mind refers to the ability to attribute mental states and predict the behavior of others, distinguishing between objectivity and subjectivity, the truth of the mind and the truth of reality (Louro, 2021). When this ability proves to be irregular, it directly hinders sociocognitive development, interfering with language development and the acquisition of complex and abstract content. It is understood that human learning is motivated, elaborated, and realized according to neurological and socio-historical aspects; therefore, a deficit in this ability negatively influences human development.

Maturana (2001) states that it is the coincidence of two factors—the interaction between a living system and its environment—that selects which changes of state will occur. Thus, we start from the idea that learning—structural change in the organism—occurs from the individual's relationship with the environment and that the connection between the individual and the musical environment can stimulate the effectiveness of social cognitive skills. In collective musical games, for example, there is encouragement for small decision-making processes in the act of improvisation. In this context, the student with ASD can begin to perceive the environment in which they are immersed, feeling the need to create increasingly complex things. The process of musical improvisation demands precisely this skill from the student, since it is first necessary to observe the sounds that another person is producing, then to compare what was observed with what they have in mind, thus creating a sound image. Immediately afterwards, the individual decides whether or not to actually produce that sound, needing to create an idea of an immediate future of how that sound will sound together with others.

From the perspective of a cognitive theory of mind, processes such as observing, comparing, and creating sounds involve internal representational mechanisms that support the attribution of mental states. When individuals continue to interact with one another, we have a linguistic domain. Continuity with coherence, adapting to the environment, will lead to changes in particular structure (Maturana, 2001).

In the world of childhood, before the development of cognition comes the development of emotion (Louro, 2021: 44). When we study the brain, we notice that the physiological, cognitive, and emotional integration is an inseparable set of reason, emotion, and action, because what I am feeling influences what I think and do, what I am doing influences what I feel and think; and what I think influences what I think and do. An uninterrupted circle (Fonseca, Parizzi, 2025).

Therefore, playful games connect with emotions, generating a solid foundation for cognitive development, as they relate playful functions such as fun and pleasure, while also possessing an educational function, that is, teaching functions that complement knowledge and understanding of the world. Musical games provide the need for learning about oneself, about others, and about the game itself. Musical games are structures that allow individuals with ASD to anticipate, prepare, and improvise, expanding their capacity for group perception, the development of theory of mind, and decision-making. It is worth emphasizing that music should be presented as a magical world, blending rhythms, harmonies, timbres, and phrasing, leaving the student free to fantasize, improvising freely with sounds, just as they do with their colored pencils when creating their own drawings (Teles and Parizzi, 2025).

Based on a literature review of national and regional publications, as well as journals affiliated with the Brazilian Association of Music Education (ABEM), there is a predominance of reports of experiences in which practitioners make intensive use of musical games. Various cognitive theories of mind offer different hypotheses about how children with ASD construct an understanding of mental states and benefit from collective musical experiences. Games are great allies in the teaching-learning process, especially when dealing with people with ASD, as they induce logical and abstract reasoning, spatial orientation, and social thinking, without losing the essence of musical elements, such as the memory of timbres, notes, instruments, and rhythms (Louro, 2021: 71).

In one of the experience reports, Nascimento (2017) claims that through the presentation of musical games, great results were observed in the inclusion among the children, because even though some presented limitations, the students interacted and helped each other, even alerting the professionals to the needs of their peers. From this practice, the presence of social communication and interaction among the children is noted, fundamental skills that are deficient in many people with ASD.

Another account is described by Pinho and Alenquer (2024), who describe the richness of elements that can be worked on in an inclusive classroom. They teach sound movement, listening, improvisation, note names, and inner ear through a single song, presented to the children in every class as a form of welcoming. The physical, mental, and emotional experience of musical elements through musical games directly contributed to the predictability, waiting time, and length of stay necessary for a person with ASD.

Even though children with ASD have difficulties receiving, integrating, and responding to sensory information due to neurological alterations and deficits in theory of mind skills, Pacheco and Velho (2024) present interesting results. In four musical games developed in a class with children diagnosed with ASD, they managed to generate fruitful results in sensory integration, regarding the stimulation of sensory perception, drawing attention to a particular musical game that encouraged the habit of developing freedom and bodily expression.

Regarding the impact of music education through games on human development, especially for students with ASD, Xavier and Botelho (2024) draw our attention to musical movement games applied in a project for autistic children, which stimulated the understanding of laterality, spatial orientation, alternation of sounds and silence, pulse, and temporal regulation. The authors note that the most surprising fact for them was the frequent babbling during the performance of the music, which ceased as the music fell silent, clearly demonstrating the influence of musical games on active listening and sound production in the brain areas of speech, stimulating connections and communicative skills.

According to Parizzi and Broock (2022: 21), actions, ideas, and thoughts are generated through a repertoire of memories that, the more diverse they are, the more possibilities for choice they offer. In childhood, encouragement and support are necessary for learning to occur, as imitation does not happen automatically; it depends on intellectual capacity. This analysis corroborates the understandings of other authors regarding the essential nature of musical games in music teaching and learning. When children with ASD engage with musical elements and experience the possibilities of making music, it generates sufficient repertoire for them to access later, directly influencing the future of a critical adult with a framework of meaningful experiences and cultural diversity.

What makes a being sensitive and receptive to the phenomenon of sound is active and meaningful musical practice, based on Paulo Freire's ideas that transformation, reflection, and adaptation of content to the group are necessary, going beyond the transfer of knowledge (Bloock et al, 2022, p. 60). Thus, musical games directly engage with musical practice, allowing for a variety of experiences in creating, appreciating, and performing.

Musical composition through games should be part of the learning process, as it is strongly related to active auditory appreciation, directly impacting cognition with motor, affective, and even aesthetic responses. These modalities of musical experiences— composition, appreciation, and performance—and their sum, promote greater human development (Parizzi and Broock, 2022: 25). The subject's connection with the musical environment, therefore, can stimulate the effectiveness of the social cognitive function—theory of mind.

FINAL CONSIDERATIONS

Based on the literature review conducted, it is evident that scientific advances surrounding Autism Spectrum Disorder (ASD) have significantly transformed how society and science understand this phenomenon, overcoming reductionist and exclusionary views. The understanding of autism as a multifactorial and neurobiological condition has been consolidated, opening space for inclusive practices that recognize the uniqueness of each individual. In this context, music education acts to promote cognitive and social development, especially when considering the theory of mind as a function of social cognition that is essentially compromised in people with ASD.

Studies indicate that music, through games, improvisation, and collective practices, fosters the development of sensory, social, and communicative repertoires. Musical practices mobilize functions related to perception, social interaction, and decision-making, while simultaneously promoting pleasure, emotion, and meaningful experiences. Music proves to be a mediating resource that transcends linguistic barriers and stimulates fundamental cognitive connections, especially those related to social cognitive functions.

Thus, it can be concluded that music, from the perspective of cognitive theories of mind, not only contributes to the development of social and communicative skills in people with ASD, but also consolidates itself as an instrument of inclusion, accessibility, and recognition of human diversity. Musical creation is reinforced by the articulation between science, cognition, and musical practices; it is a space for the construction of subjectivities and interaction with the world.

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