

# MUSIC THERAPY, COGNITION AND COMMUNICATION: CREATIVE IMPROVISATION IN A SINGLE CASE OF A CHILD WITH UNSPECIFIED INTELLECTUAL DEVELOPMENTAL DISORDER

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**Musicoterapia, cognición y comunicación: Improvisación creativa en un único caso de un niño con trastorno del desarrollo intelectual no especificado**



## Resumen

La improvisación musical se aborda en diferentes tipos de disciplinas y una de ellas es la Musicoterapia, en la que bajo determinadas condiciones se ha visto que tiene un efecto positivo en la mejora de las funciones cognitivas y la comunicación. El objetivo de este proyecto fue usar la improvisación creativa con un niño de seis años con un trastorno del desarrollo intelectual no especificado durante tres meses para la mejora de las funciones cognitivas y la comunicación. Las sesiones se dividieron en dos partes; una rítmica para trabajar la atención y la concentración con ritmos premeditados e improvisados y otra parte melódica en la que se trabaja la comunicación a través de palabras conocidas para el niño para poder llegar a crear un diálogo musical entre el musicoterapeuta y el paciente. Tras el análisis de datos, se observó que, tras once sesiones de trabajo rítmico-musical a través de la improvisación creativa, los datos obtenidos fueron positivos, habiendo conseguido todos los objetivos propuestos para el proyecto.

## Palabras clave

musicoterapia, trastorno del desarrollo intelectual, musicoterapia creativa, improvisación, cognición

## Abstract

Musical improvisation is addressed in different types of disciplines and one of them is music therapy, where under certain conditions it has been seen to have positive effect on the improvement of cognitive functions and communication. The aim of this project was to use creative improvisation with a six-year-old boy with an unspecified neurodevelopment disorder for three months for the improvement of cognitive functions and communication. The sessions are divided into two parts; a rhythmic part to work on attention and concentration with premeditated and improvised rhythms and a melodic part in which communication is worked on through words known to the child to create a musical dialogue between the music therapist and the patient. After the data analysis, it was observed that after eleven sessions of rhythmic-musical work through creative improvisation, the data obtained were positive, having achieved all the objectives proposed for the project.

## Keywords

music therapy, neurodevelopment disorder, creative music therapy, improvisation, cognition

## INTRODUCCIÓN

People with intellectual disabilities and in general with some developmental disorder, have a greater vulnerability than people with other types of needs, since the cognitive, psychomotor and communicative or affective functions make them unable to adapt to the demands of society, a society that is designed for people with a standard development, which leads to even greater, more significant limitations. The intellectual development disorder is characterized by a deficit in general mental abilities, such as: reasoning, problem sol-

ving, planning, abstract thinking, judgment, academic learning and experimental learning. These individuals do not reach the level of absolute independence, including communication (DSM-5, 2014). Lack of language, communication or motor/sensory function, may affect test results, so that in these cases they may be diagnosed with an unspecified intellectual disability if under the age of six.

In cases of severe disability, attention problems are present from early childhood, since this is the time in which learning and development begins: Therefore, developmental

problems can become noticeable from an early age. According to Jauset and Soria (2018), attention is necessary for memory and for communication. For this reason, it is necessary to work on it autonomously through specific interventions. The sounds produced by a musical melody maintain a temporality and sequencing that can help in the creation of temporal patterns in cognitive functions and facilitate information processes in the brain (Conway, et al., 2009).

Since the persons are born, they are in a social world, where attention and concentration are developed through the socialisation of others, therefore, interaction and communication are the basis for development (Escudero et al., 2013). In the case of children with a normal development, in the infant stage is very difficult to maintain attention on an action for a long period of time, and they will be quickly distracted by another object or activity that is of interest to them. At the age of four, they begin to execute an action for a longer period of time, between 30 and 50 minutes, while from the age of five, it can increase up to an hour and a half. In relation to our project, H. is unable to keep the attention in an activity more than two or three consecutive minutes.

Like attention, concentration is essential for learning when we are taking in new concepts or procedures, that will be carried out with a certain habit and become unconscious. If we talk about music and communication, we can say that in the history of humanity there is already an origin of expression and communication of emotions through music. In the past, archaic societies already offered the opportunity to express feelings on all important occasions of life through rituals or dance (Zahler, 2006). On the other hand, hearing system is also involved in essential cognitive processes such as behavior, learning, cognition and memory. Zahler (2006) discusses in his study how emotional and musical information have a common processing in the right side of the brain, both in the perception and expression of emotions, as well as in the processing of music.

Communication skills of these children is sometimes not developed and becomes very limited, so it is important to find a way of communication, which in this case will be music. This could be very rewarding for them and their families; the parents find a way to communicate with the children and the children in return feel heard and understood through the sounds they reproduce (Benezon, 1981). Thompson and McFerran (2015), provide research on the impact of music therapy on communicative behavior in youth people with an intellectual development disorder. After four case studies, they come to the conclusion that music therapy creates motivation to communicate with others. Music is a multimodal stimulus that exchanges auditory, motoric and visual information with the brain and has its own processing network, although not exclusive. This is connected to others such as temporal, frontal and parietal lobes; hence music therapy is highly considered to be helpful during the process of the rehabilitation of cognitive dysfunctions.

When a child with or without disabilities is able to play an instrument or learn a song, attention, verbal imitation, memory, hearing and fine psycho-motor skills are al-

ready being improved (Ortega, et. al., 2009). Because of that, music therapy could be a perfect treatment with children with this kind of disabilities, like H. According to a study by Sabatella and Mercadal-Brotons (2014), the field where music therapy is most practiced in Spain is in special education, thus helping in the recovery or improvement of quality of life. Chase (2014), conducted a study involving 207 music therapists in the United States, all of whom work with children with special needs. Data was collected according to their behavior and improvements were seen in motor skills, vocal communication skills, socialization, cognitive skills and musical responses. This project has been designed based on the creative improvisation methodology of Nordoff-Robbins. When we talk about improvisation, in any field, the first thing that comes to mind is to create something new, to be spontaneous, to listen or to invent things, thus seeking creativity.

The founders of creative improvisation were Nordoff and Robbins. This therapy is based on the theory of the musical child who was founded on the concept of the "individualized musicality innate in each child" (Nordoff and Robbins, 2007, p.3). Music is used here to develop the inner personality of the human being with disabilities attending these sessions, thus focusing on music to achieve goals in motor or cognitive skills (Aigen, 2014). According to Nordoff and Robbins, children often show improved responses to music therapy, so that they can respond to music, despite having a disability. The way in which the child plays, including the use of instruments, rhythm, dynamics, tempo, phrasing, is vital to helping the music therapist understand about the internal or external world of the child. (Nordoff, et. al., 2007). According to Jansen and Thaut (2018), creative improvisation activates certain neuroanatomical and physiological characteristics that other branches of music therapy are not able to stimulate.

In this method, relationship between the child and therapist is created by achieving musical communication, and obliterating the need for a verbal one. This is part of the process of change experienced by the patient. This relationship is carried out in two dimensions: the relationship itself and the degree of participation. These are expressed in the form of resistance, i.e., if resistance decreases, the child-therapist relationship improves and the patient's participation increases. With children like H., or in general with people with disabilities skills, it is very important that they feel understood, in order to create a music therapist-patient bond. The quality of the relationship between music therapist and patient will have a bearing on the final result and effectiveness (Scharff and Scharff, 2011).

By prolonging and organizing the musical sounds and their efforts, there is a possibility for the child to maintain the musical elements, using first the elements exposed by the music therapist, followed by a musical independence of the patient. In this way, tempo and dynamic constants appear. Thus, with intensifying the expressiveness, we were able to increase the duration of the musical activities. The concept of intersubjectivity appears in many of the investigations of communication and developmental disorders, so we began to

investigate the similarity that this could have with the creative improvisation method of Nordoff-Robbins.

The concept of intersubjectivity is the adjective that unites what happens in the communication of human beings from the time of birth and what happens during the intellectual or affective communication between two or more people, in order to improve the process of learning (Calderón, 2019). Muratori (2009), in his work on the effect of a disorder of primary intersubjectivity in autism, talks about the fact that this can be caused by intersubjective dysfunctions already present in the first years of life. This is why an early diagnosis is so important in order to start appropriate therapies as soon as possible. One of the similarities found between the theory of intersubjectivity and the Nordoff-Robbins's method is that the music therapist begins to know the patient by reflecting the patient's musical qualities (Birnbaum, 2014).

This raises the hypothetical question of if it is possible to create a musical communicative dialogue, through creative improvisation between music therapist and a patient, working on attention and concentration during the sessions? The general objective for this project were to improve the child's communicative levels and seek to improve attention through concentration work during the sessions using creative improvisation.

## MATERIALS AND METHODOLOGY

### Participants

This project consists of 11 music therapy sessions with a six-year-old boy with an unspecified intellectual development disorder, who we will call H. During the process his mother, M., attended all the sessions, participating in some activities when requested and when necessary, in relaxation periods. H., is a Spanish child living in Augsburg (Germany). He attends a special education school where he had received music therapy sessions for a short period of time, after noticing that he did not improve and the music therapist did not have enough time, he decided to give the place to another child. At this moment it was decided to start this project, looking for him to be accepted again in the music therapy sessions of the school, since at the end of the project, all the material will be passed on the music therapist so that he can continue with the work.

The speech therapist who during this period of time treating H. privately, also participated in the project externally. She was asked for her opinion in order to observe the changes and improvements in H. after the end of the project, especially in communication skills. A survey was drafted to be filled out before starting the project, in order to take into account some aspects of H.'s communication, and to be able to better design the objectives and sessions. After the end of the project, she filled out the survey again in order to be able to compare the answers with the pre-survey.

### Stimuli and measures

To measure attention and concentration all sessions were videotaped, noting how long H. maintained attention and concentration in the rhythm activities. The time difference was recorded based on the first session and the same activity. At the end of the project, it was observed whether the time had increased, decrease or remained the same. Communication data was collected through surveys conducted by the speech therapist, H.'s mother, and log sheets filled out weekly. During the eleven sessions, different scales, tonalities, melodies and rhythms were used. In the part where communication was worked on, melodies known to H. were utilized, such as the melody and harmony of the song "martinillo" or "twinkle twinkle little star" introducing words that H. constantly repeats, to make him understand the meaning of this. For the improvisation the tonalities used were, C Major, D Major, A major or G major, using basically I, IV, V, VI grad.

### Procedure

The project was planned with twelve sessions, but due to H.'s health and the pandemic it was not possible to carry out the last session, so the data was analyzed with the eleven sessions that were possible. Small percussion instruments, a ukulele and dance handkerchiefs were used in the sessions. For data analysis, a video camera was installed to record all the sessions so that they could be analyzed later. To collect different data on a weekly basis, recording sheets were implemented and prepared according to the objectives to be worked on in each session. The sessions were planned for half an hour per week looking for different objectives to work on every week and designing different activities, although if it was observed that the child was very receptive and the session had a very good development, the time could be extended. The development of the sessions always followed the following model:

**Table 1**

*Part of the sessions*

Part of the session	Explanation
<b>Welcome Song</b>	Own elaboration; It was repeated in each of the sessions
<b>Rhythmic part</b>	In this part we worked on attention and concentration with rhythmic improvisation
<b>Relaxation</b>	It was not always necessary. When it was carried out, the patient's mother participated in this part
<b>Melodic part</b>	Communication is worked on with songs already known by the child, improvising the lyrics or modifying the melody according to the patient's needs in each session.
<b>Farewell song</b>	Song of own elaboration; It is repeated in each of the sessions

*Elaboration by author*

In the rhythmic improvisation part, small percussion instruments were used, such as a xylophone on which the tones could be separated as well as a drum, a cymbal and dance handkerchiefs. The activities were repeated weekly adding some new instrument or rhythmic element. The activities that were worked on to improve attention and concentration were the following:

**Table 2**

*Activities for attention and concentration work*

Activity	Explanation
Activity 1	It starts with a single instrument, in this case it would be the drum, starting with a very simple rhythm, looking for the patient's reiteration.
Activity 2	It starts with the same instrument and rhythmic element of the previous week, each time adding new elements.
Activity 3	We added the cymbal, or any other small percussion instrument that is easy for the patient to handle, and a new rhythmic element with the new instrument
Activity 4	From the beginning, several instruments are used, adding each time new rhythmic elements
Activity 5	The respect of turns is worked on with a dance handkerchief. A handkerchief is given to the patient, looking for him to understand that when he has the handkerchief it is not his turn and vice versa.
Activity 6	A song is performed with the word "Bitte" (Please in German) for the understanding of not taking the drumstick when the other person is playing

*Elaboration by author*

The second part of the session is dedicated to the work of communication by working on melodic improvisation. Here we used a Ukelele, maracas and colored dance scarves. The activities carried out for the work of the communication were the following ones (see Table 3).

After the completion of the eleven sessions, we proceeded to the collection and analysis of data obtained during the sessions which we compiled through pre-post surveys, weekly record sheets and video recordings.

### Ethical approval

The procedures carried out in this project were performed in accordance with the ethical standards established in the Declaration of Helsinki and the author declares that she has followed the protocols on the publication of patient data and has in her possession the informed consent of the patient's legal guardian referred to in this article as H.

**Table 3**

*Activities to work on communication through melodic improvisation*

Activity	Explanation
Activity 1	Walking around the room freely, while improvising a song to the ukulele with simple chords and adding words or gestures that the patient makes. When the rhythm of the song is increased, the step will be quickened and vice versa.
Activity 2	It is the same as the previous activity, but the patient is allowed to take control of the activity. When H. taps on the music therapist's back the step and the rhythm of the music is accelerated
Activity 3	Improvising songs to the melody of the song "Brother John" including words that H. uses.
Activity 4	Introducing the xylophone and let H. play alone while accompanying him with the Ukulele imitating the intensity and rhythms.
Activity 5	A maraca was used so that H. could communicate when he wanted it to play faster or slower. When H. raises the maraca, the tempo is increased, when he lowers it to the floor it decreases.
Activity 6	A dancing handkerchief is given to the patient and we teach him to throw it up and drop it without catching it. When he understands it and begins to perform without the help of the music therapist, he is accompanied by the ukulele and as the handkerchief falls, the intensity and tempo of the music decreases.

*Elaboration by author*

### DATA ANALYSIS

For the measurement of attention and concentration, an exhaustive review of the videos made during the sessions was undertaken thus being able to observe if there had been and progress and an increase in the duration of the activities. Since these activities were repeated weekly, adding some variations were necessary in order to measure the time of attention and communication during the activities, comparing them with the previous weeks.

After measuring the time in the eleven sessions, it was observed that the increase from the first session to the last was 9.7 minutes. Regarding communication, the data obtained had been very positive if was either similar or higher than attention and concentration data.

After the evaluation of the surveys carried out with the speech therapist and H.'s mother, an improvement was observed in the communication they have with H. When analyzing the record sheets together with the videos, it was seen that there had been an improvement since H. had felt understood. At the beginning of the sessions H. only ran and shouted around the room until the moment that he began to imitate the sounds, words and gestures that he made, thus managing to make music together.

## DISCUSSION

The basis of the work on attention was the improvement of concentration, working on both the rhythmic and melodic parts using improvisation. By repeating words, sounds or rhythms that the child reproduced, the child felt happy and understood, thus achieving greater participation in the activities proposed for each session.

According to Agudo (2015), music makes people react internally both physically and emotionally. This movement that is activated within the human being, emotional, physical or the development of expression, helps people in cognitive and communication aspects.

The rhythmic work, both improvised and planned, helped to improve concentration and attention levels. During the whole project the same method was used in the rhythmic part, starting with very simple rhythms and on a single instrument and implementing movements and rhythms that were performed during the activity. It is thought that the increase in difficulty and instruments made H. maintain his level of attention and concentration, since although starting with the same rhythmic pattern as the previous week, it continued with a new one. Music and different rhythms were used in order to reach our goals and improve cognitive skills and to develop H.'s inner personality, as Aigen (2014) discusses in his study.

The way in which H., repeated each rhythm or reacted to a melody made it possible to get to know a little more about H.'s inner world, as Nordoff and Robbins (2007) state in their method. The improvement in communication was very evident and positive throughout the process. All the work done in the rhythmic activities was used in the melodic part, in order to increase H.'s communicative levels. Improved communication, socialization, cognitive skills and musical responses were seen to improve, as Chase (2004) stated in his study of people with disabilities.

Since H.'s disability makes his verbal communication very limited, it was decided to use words that he already knew in different contexts and with different improvised melodies or melodies that one knew so that he could understand their meaning. This helped to find, after several sessions, a way of communication between patient and music therapist, H. feeling heard and understood, making us understand with movements or songs what he wanted to share or realize at the time, as Benezon (1981) speaks in his method with children with a developmental disorder.

When analyzing the data, it was also observed that the most significant advance began when H. approached the music therapist and asked her to "Bitte" (please) to continue accompanying him and playing with him, since she was trying to move away from him to observe how he reacted to this. This was one of the key moments in the project, as his reaction was not impulsive shouting or pushing to get what he wanted, but he understood that there was another way to act in these cases.

From the music therapy point of view and according to the Nordoff-Robbins (2007) methodology, this could indicate the level of satisfaction of the child to feel understood and to find a way of communication through music without needing the use of words, achieving an optimal child-therapist relationship to be able to concentrate on the child-music relationship.

As Scharff and Scharff, 2011 said in their study, it could be said that H. feeling understood made the therapy successful despite the short time frame. In this way it could be said that all the objectives proposed for this project have been fulfilled, both the general objective and the specific objectives: having an improvement in attention, concentration and communication, which resulted in creating a musical dialogue between the music therapist and the patient.

The answer to the hypothesis posed for this project would be that it is possible to maintain a music therapist-patient dialogue, but to achieve this, it is very important that the patient feels understood in order to start creating a communicative link between the two.

## LIMITATIONS AND PROSPECTS

The room provided by the music school was very large and bright, but had many open shelves where the instruments were stored. This made it more complicated to get H.'s attention during the first sessions. The duration of this project was planned to be between 3-3.5 months, with a total of 12 sessions. After complications and restrictions due to the COVID-19 virus and H.'s health problems, only 11 could be carried out in this period of time. The project could not be closed due to a serious health problem of H., who had to be hospitalized, thus having to finish the project and analyze the data with one session less than planned. On some occasions it was necessary to rethink the objectives and activities, since for a few weeks, due to family problems, H. attended the sessions with more stress than he used to have before and the child's behavior could not be controlled. In spite of all this, and with the help of H.'s mother, it was possible to maintain the activities and objectives set, but it was necessary to add activities for the child's relaxation, and sometimes including his mother in the activities, to reduce stress and thus be able to work again on the objectives set for the sessions. For future research, it would be optimal to be able to opt for a room where only the instruments necessary for the sessions are found and not all the instruments are in sight, since as mentioned above, this was a distraction and can affect the results.

The objectives and activities of this project are designed not only to improve cognitive functions and communication at the time of the sessions, but are also designed so that they can be used and help both the child and his mother in everyday life, which is why it was important for M. to be present in the sessions. For future projects, each of the proposed activities can be used to work on cognitive functions and communication in children with different disabilities, or even be used for children without disabilities to increase school performance or group work. Since music therapy

has worked in the school where H. attends, all the data and proposals of this project have been passed to the music therapist of the center, thus achieving that he receives a weekly music therapy place when the COVID-19 restrictions allow it, using the work already done in order to continue it.

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## CONFLICT OF INTEREST

The author of this article declares that she has no conflict of interest, no financial or personal conflicts of interest that could inappropriately influence the development of this research.

## AUTHOR CONTRIBUTIONS

González-Granero was the PI of this study, designing each part of the project, as well as activities, surveys and record sheets. González-Granero was also in charge of collecting the data for subsequent analysis.

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# LA MÚSICA PONE A NUESTRO ALCANCE UN MUNDO DE COLORES

