

“*The baby relies on the sound of my voice.*” Maternal perceptions of musical singing interactions between mother and child

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Abstract. The musical interaction between mother and child, present in all civilizations and consisting of expression and communication through the different manifestations of the mother’s voice has been focused on in various previous studies. This article continues this line of research by documenting the perspectives of nine mothers (in the province of Barcelona, Spain), and their babies up until the age of 18 months, regarding their musical interaction, specifically the singing and types of intervention through the mother’s voice. This qualitative study utilizes a semi-structured interview with open-ended questions for data collection. In the process of transcription and analysis, open and manual coding was used to define specific categories: pregnancy, repertoire, origin, frequently used activities actions, and affective experiences. These categories reflect the most important characteristics of the musical interactions described by the mothers in their narratives. The results indicate that the participating mothers used communicative mechanisms of musical expression that went beyond the act of singing, thus showing the baby that it was being cared for, protected, and loved through the cognitive, affective, and physical domains.

Keywords: musical activities; singing; maternal voice; communication; affective experiences.

[es] “Es dependiente al sonido de mi voz.” Percepciones maternas de las interacciones musicales cantadas entre madre e hijo

Resumen. Las interacciones musicales entre madre e hijo son fenómenos de expresión y comunicación que han estado presentes en todas las civilizaciones por medio de las diferentes manifestaciones de la voz materna y han sido el objeto de estudio de diversas investigaciones. El presente artículo sigue esta línea de investigación documentando las perspectivas de nueve madres de un bebé de hasta 18 meses de edad en la provincia de Barcelona (España), sobre las interacciones musicales relacionadas específicamente con el canto y la intervención de la voz materna. Este estudio cualitativo utiliza la técnica de la entrevista semiestructurada con un guion de preguntas abiertas para la recogida de datos. En el proceso de transcripción y análisis se empleó la codificación abierta y manual para definir las categorías: embarazo, repertorio, procedencia, acciones frecuentes y experiencias afectivas; las cuales pudieran agrupar las características más importantes de las interacciones musicales descritas por las madres en sus narraciones. Los resultados indican que las madres participantes utilizan mecanismos comunicativos de expresión musical que van más allá de la acción de cantar para manifestar al bebé que está siendo cuidado, protegido y querido.

Palabras clave: actividades musicales; canto; voz materna; mecanismos comunicativos; experiencias afectivas.

Summary. 1. Introduction. 2. Methodology. 3. Discussion of the results. 4. Conclusions. 5. Acknowledgements. 6. Bibliographic References. 7. Appendix.

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1. Introduction

Numerous studies have focused on the different types of musical interaction occurring between the adult/caretaker and the child in the family environment. However, said research shows a greater interest in musical activities where

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the sound of the maternal voice, such as in infant-directed speech and singing, plays a leading role in maternal-infant musical communication not only during the first stage of the child's development, but also during the prenatal period (Custodero et al., 2002; Filippa et al., 2019; Gingras, 2012; Hallam, 2015). Most of the methods used in this type of research are based on quantitative designs (Blackburn, 2017; De Vries, 2009; Denac, 2008; Mehr, 2014; Williams et al., 2015), which provide very valuable information regarding how much children and parents share music at home, but there are few details of the activities and interactions that take place.

The goal of this study, which is part of an international research project, was to provide a qualitative vision of the topics explored in the aforementioned research, based on the stories and experiences explained directly by the nine mothers of children under 18 months of age.

1.1 The importance of the maternal voice and its manifestations

In Western culture during pregnancy many expecting mothers provide a variety of stimuli that ensure the general short- and long-term well-being of the fetus. The impact of the maternal voice merits special consideration, not only as an internal sound stimulus, to which the unborn child is constantly exposed and is able to both perceive and respond (García-Hurtado, 2015), but also as a means of communication with the fetus in the intrauterine environment. This innate musical and auditory potential could be a determining factor in the future musical interactions between mother and child (Gordon, 2003).

Thus, the fetal perception of the maternal voice, in terms of auditory clarity when the hearing system has reached its full development in the last trimester of pregnancy, creates a special connection between the fetus and the mother. This has decisive consequences in the full development of the fetus (Tomatis, 1996), such as language acquisition and learning, maternal voice recognition and preference, regulation of the baby's emotional state (Filippa et al., 2019), and development of neurological potential in certain aspects of memorization and learning (Federico, 2001; Mustard et al., 2003; Verny & Weintraub, 2002). Consequently, this close connection between the mother's voice and the fetus is a phenomenon that supports the good health of the future child and the well-being of both parties (Roberts, 2010). The sound stimuli are present in a variety of ways, such as whispering, speaking, singing and the classic sing-song baby talk known as infant-directed speech. It has been shown that these manifestations of the mother's voice offer numerous benefits during prenatal interaction and in the future relationship between mother and child, especially regarding the emotional attachment developed between mother and baby (Carolan et al., 2012; Loewy, 2011; Shoemark, 2011; Standley & Whipple, 2003).

However, for the child to develop this series of emotional bonds with the mother, various repetitive experiences must occur resulting from the mother's constant presence and availability, so that the baby develops mental representations that indicate it is being cared for and protected (Bergeson & Trehub, 2002; Grimalt & Heresi, 2012; Nakata & Trehub, 2004). Maternal-infant musical interactions form part of these repetitive experiences, since they are considered instinctive communication mechanisms innate to human beings. They include means of musical production, organization, reception, and expression that occur in numerous everyday situations in the home, such as when changing nappies, at moments of inconsolable crying (Hallam, 2015), during car journeys (Koops, 2014), at sleep time to create an atmosphere of peace and calm (Grimalt & Heresi, 2012), and while playing (Custodero et al., 2002).

Since the baby's most frequent interaction is generally with the mother, these interactive experiences provide the baby with clear-cut information about the motives and intentions that surround these communicative moments. Thus, the baby is able to express itself, initially through imitation, according to the information it receives, and as a product of this exchange of expressions and feelings in which the mother transmits her emotions to the baby (Malloch & Trevarthen, 2009; Trevarthen, 2005). On constructing these emotional and affective experiences in which communication occurs mainly through the rhythm and intonation of the voice, the mother, and the baby experience moments of enormous empathy during which they connect, bond, and interlink, thereby ensuring the control and regulation of the emotional state of both (Trevarthen, 1997).

Given the above, it may be affirmed then that a kind of spontaneous multimodal performance surges throughout the interaction and communication with babies. This involves the various senses (auditory, visual, kinesthetic) where speech, song, movement, physical contact, and eye contact give rise to musical expression through practices that not only consider sound production in the form of speech, but also songs, ditties, lullabies and infant-directed speech. These arouse the baby's interest, regulate emotional exchanges, furthermore, introducing aspects and components of the adult's own culture (Arabin & Jahn, 2013; Dissanayake, 2000; Martínez, 2017).

The maternal-infant musical interaction and communication at a cultural level contain important enculturation processes through which the baby naturally acquires the cultural traits of the ethnic heritage of the community to which it belongs, especially when different manifestations of the maternal voice are involved. These traits are a set of transmissible behaviors that appear unconsciously and automatically during upbringing, so that the child is also able to acquire a cultural identity with defined internal structures marked by the community. According to Simon Frith, "music can position, symbolize and offer the immediate experience of collective identity" (2001, p. 422). Moreover, this identity enables the infant to instinctively enter the immediate cultural context provided initially by the mother or primary caregiver and, secondly, by all surrounding people who participate in this cultural teaching and construction (Dissanayake, 2000; Fritz et al., 2013; Nettl, 2010; Shiffres, 2008; Vila, 1996).

Furthermore, these modes of musical interaction between mother and child have been identified in all the world civilizations, particularly in the way lullabies and cradle songs are sung which express distinctive, recognizable qual-

ities of the respective culture (Trehub et al., 1993; Trehub & Schellenberg, 1995; Trehub & Trainor, 1998). They play a fundamental role in linguistic enculturation and the transfer of a traditional musical culture to the child (Campbell, 1996; Shifres, 2008). It furthermore facilitates the acquisition of expressive modalities, the regulation and control of the affective domain, the capacity for perceptual discrimination, phonetic categorization, and the use of the musical manifestations of the culture to which the child belongs.

2. Methodology

2.1. Contextualization

As mentioned in the introduction, this study forms part of an international research project. It seeks to find out whether babies are more exposed to a variety of world musical cultures and potentially less involved in the musical production of their own community's ethnic culture, as a result of the trends of movement and urbanization among the world's populations along with the technological resources available to mothers today (Given et al., 2016). The project is being carried out by a team of international researchers led by Dr. Sheila Woodward and has been authorized by the Ethics Committee of Eastern Washington University. The aim is to identify the origin of the musical activities that modern-day mothers living in urban areas carry out with their babies during pregnancy and up to eighteen months of age, and the nature of the maternal-infant bonding that takes place during these encounters.

Participation in the research implied acceptance of a common data collection protocol, which included an interview script (see appendix) and the participating mothers' informed consent (see section 2.5).

2.2. Goal

This study aims to identify the types of musical activity used by mothers living in urban areas and the ways in which they are carried out with their babies. For a deeper understanding, emphasis was placed on identifying musical interactions exclusively related to singing and use of the mother's voice.

2.3. Method

This study is based on empirical evidence for a descriptive model. It aims to identify the structures and ways of thinking shown by the participants' different communicative behaviors, through the observation and analysis of episodes and experiences that can unveil new perspectives (e.g. Arthur et al., 2012). This model also generates detailed descriptions and/or explanations of a specific phenomenon, the nature of musical activities that mothers currently carry out with their babies through song.

2.4. Participants

The sample from Catalonia that took part in this international research project consisted of nine women who, at the time of the study, had given birth to at least one child up to 18 months of age and who lived in an urban area within the province of Barcelona. The sample was recruited through professional references: a Kindergarten in Cerdanyola de Vallès (Escola Bressol Municipal Montflorit – MF) and the Hillsong Church School in the city of Barcelona (Iglesia Cristiana Hillsong – IH), along with personal contacts (CP) of the researchers. To guarantee the confidentiality of the information, the mothers who joined the study with their respective babies were categorized by first name, baby's gender and age, each mother's number of children, and the source of the contact (Table 1).

Table 1. Descriptive characteristics of the participants

Mother's name	Baby's name	Baby's gender	Baby's age	Number of children	Source of contact
Alba	Bruna	Female	7 months	1	MF
Maria	Iris	Female	17 months	1	MF
Merxe	Dani	Male	17 months	1	MF
Miriam	Inara	Female	8 months	2	CP
Ingrid	Oliver	Male	12 months	1	MF
Dana	Luca	Male	13 months	1	IH
Clara	Liam	Male	10 months	2	CP
Angela	Samuel	Male	9 months	1	IH
Claudia	Rodrigo	Male	12 months	1	IH

2.5. Instrument

For purposes of data collection, a semi-structured interview technique was used with a validated script of fourteen open-ended questions that covered all the specific goals of the project (the script can be consulted in the Appendix). This type of interview emphasises interviewer-interviewee interaction, establishing a person-to-person relationship through which it is possible to understand the detailed experiences of each of the participants (Luca & Berrios, 2003). Furthermore, the formula of open-ended questions is clearer and more effective, so that the main idea of the central theme of the research is always expressed and reflected throughout the interviews (Vargas-Jiménez, 2012). To facilitate the meetings, the two researchers travelled to venues chosen by the mothers so that they could come with their babies, making for a relaxed atmosphere, and ensuring the mothers were able to dedicate the necessary time - about 30 minutes on average - without worrying about having to leave the baby in someone else's care.

Before starting each interview, the participating mothers were reminded of the goals of the study and were asked to sign the informed consent, where they gave their permission for the conversations to be recorded in audio files. They were informed of their right to access the data whenever they so desired.

2.6. Data analysis

Data analysis was carried out using the transcriptions of the interviews. Categorization and subcategorization techniques were employed to organize the information in an analysis table designed with a spreadsheet application. Subsequently, open, and manual coding was performed to identify the concepts and the particular properties of each of the participants' descriptions. For the international study, three dimensions were provided in the analysis table (singing, listening and production/experimentation) to group these descriptions clearly and precisely according to the different types of musical activity that mothers share with their babies (Strauss & Corbin, 2002). In addition, the data was broken down to examine it in detail and thus be able to compare trends and disparities. This resulted in analysis categories which revealed the modes of application of these activities, the cultural styles, their origin, and the musical characteristics, among other questions. The two researchers carried out the analysis individually and then contrasted their results.

Table 2 shows the categories resulting from the analysis process belonging to dimension 1 (musical activities involving singing), which were relevant to the goal of this study.

Table 2. System of categories of analysis

DIMENSION 1 "Singing"	
Categories	Definitions
Pregnancy	Musical activities carried out mainly in the last three months of pregnancy.
Repertoire	Genre, musical cultures, and list of songs appearing in the musical activities.
Source	Source of learning, acquisition, and origin of the repertoire used by the mother.
Frequent Actions	More recurrent situations or routines where the mother used musical activities.
Affective experiences	Moments when there was an emotional exchange between mother and baby resulting from the musical activities.

3. Discussion of the results

The results are presented in categories to relate them to the different authors and the theories cited above, using a narrative style of description. This method revealed the unique, individual character of the descriptions in each case, as well as the distinctive and specific components of the phenomena of musical communication and interaction that occur between mother and child while singing. Therefore, fragments of narratives are presented in which mothers described their musical, communication and affective experiences with their babies. In these narratives, they talk about themselves, their musical perceptions when they became mothers, their emotional experiences when using song within the mother-child relationship, and the way their babies reacted during the different musical encounters.

3.1. Pregnancy

As explained in the introduction, the different manifestations of the maternal voice, particularly singing during pregnancy, have been the object of study, with authors such as Garcia-Hurtado (2015) and Tomatis (1996) postulating that these manifestations are of vital importance for the full development of the future infant, since the baby is not only constantly exposed to stimuli but also perceives and responds. This ability of the fetus to respond to the internal sound stimulus of the maternal voice is explained by the fact that memorization and learning mechanisms begin to

develop in the intrauterine environment, enabling the unborn child to recognize the voice of its mother as the main primary caregiver, and later the sounds of its immediate social environment, so that once the baby is born it has the capacity to make some kind of communicative response (Mustard et al., 2003; Verny & Weintraub, 2002). The music therapist Gabriel Federico (2001) argues that “the fetus learns and senses (memorizes, responds, recognizes, and discriminates), the fetus looks for the source of the sound when it already knows what it hears” (p. 56).

One participant, Dana, confirmed in her account that because of her baby Luca’s constant exposure during gestation to music and particularly to singing, he responded to stimuli through movement:

*I sang a lot to him throughout the pregnancy, but during the last three months I did two very specific things. First, there is an application called “La Totuga”; it is a mobile application where you can download all the songs with your baby’s name. I always played them to Luca, and we sang them to him. **We also put it on my belly so that he could listen to the songs, and he always moved**³. Second, we always sang two songs to him: “Elena la Ballena” and “Se va la Barca”.*

In the book *A Music Learning Theory for Newborn and Young Children*, Gordon (2003) explains that “the level of musical aptitude with which children are born, their innate potential, may to some extent be the result of their prenatal ability to respond to music, as well as the quality of the mother’s musical environment during pregnancy” (p. 14). Another participant, Alba, explained that she was involved in the academic musical field because she had studied early childhood education, and her partner, Bruna’s father, had close contact with music through composition, singing and playing the guitar. Consequently, Bruna’s immediate family environment meant that she was not only constantly immersed in and exposed to the sound stimulus of her mother’s voice through singing during pregnancy, but also to a quality musical environment. Alba described their case as follows:

*When we found out that I was pregnant with Bruna, after only 12 weeks or so, around Christmas last year, Gabri wrote me a song for Bruna called “Ocell” (Bird) because we still did not know whether the baby was a boy or a girl. **It’s a song we sang a lot during the pregnancy**⁴. Later, we made a sort of video clip where we recorded ourselves at different times after Bruna was born. Since then, we’ve sung it a lot to her. It’s as if we felt that it was her first song⁵.*

However, although these descriptions concur with the aforementioned theories about the importance of stimulating the fetus, and that even in the womb the baby can begin to develop musical aptitude, descriptions by other participants who have more than one child, indicated that even when there was a tendency to want to include music for daily prenatal stimulation, they did not intentionally or meaningfully set aside or devote time to such musical encounters. This issue was much more evident when the baby was the mother’s second child. They explained that the use of music was not always possible due to various factors. This is how the participant Clara put it:

*It is hard for me to talk about this, especially with the second child because it was complicated. I had two very difficult pregnancies, due to not feeling well and being sick a lot; I have a syndrome that causes this. So, I spent a lot of time lying or sitting down, unable to do my usual activities: I had to give up choir and a lot of other things. Yes, I continued listening to music, **but the truth is that I really wasn’t in the mood to sing or do activities in the way I would have liked to**⁶, along with prenatal exercise and all that stuff. So, during pregnancy I can’t say I did anything in a very organized way. I didn’t do any very specific activities.*

This was corroborated by another participant, Claudia, who commented that it was Rodrigo’s father who was interested in providing musical stimuli during the pregnancy, and not her:

Well, I didn’t try to sing very often. The fact is that my husband was more interested in this idea of singing; he began to sing to the baby, to play music to him, to talk to him while he was in my womb.

3.2. Repertoire

Regarding the repertoire used by the participants in this study when singing to their babies, the trend concurs with the studies carried out by Trehub et al. (1993), Trehub and Schellenberg (1995), and Trehub and Trainor (1998) in that mother and child interacted musically through the singing of lullabies or cradle songs which show distinctive, recognizable qualities of their culture. The participants reported that they commonly used children’s songs, traditional songs and lullabies that contain the characteristic traits and identity of their own sociocultural context.

One participant, Maria, indicated that she was influenced by a variety of genres and musical cultures since the family and sociocultural context to which she belongs is quite diverse. She is originally from Valencia, was raised by

³ Highlighted by the authors to draw attention to the message.

⁴ Highlighted by the authors to draw attention to the message.

⁵ Translated from the original in Catalan.

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Greek parents, and had lived in the province of Barcelona for two years. She explained the type of repertoire that she used to sing to Iris according to her cultural experiences as follows:

We have some repertoire of our own, three or four Valencian songs and then a lot of Greek songs as well, which have more lyrics and are for children [...] I prefer other songs, for example the typical ones that have always been around, more traditional folk songs, and more of the old songs from here (Catalonia) such as “Cargol treu banya”, “Sol solet”, and “Mareta”, which is a lullaby and I sing it to her when she gets nervous, and also the song “Luna la pruna”. Then in Greek there’s the “Kalamatianos” dance, which is in ternary rhythm, and I like that because I am very interested in not just using quaternary music. I play it a lot⁷.

The previously mentioned participant, Clara, explained that although she did not necessarily sing lullabies or cradle songs, the repertoire she used to interact musically with her baby contains distinctive qualities from her own sociocultural context because they are songs that have had an impact on her since she was a child.

*If it’s to get the baby to sleep, I make sure they are quiet songs. And it’s true that songs that remind me of my childhood come to mind, not necessarily lullabies or songs that were sung to me, but sometimes songs that I liked for some reason when I was little. For example, the other day I thought of a song, but I couldn’t remember all the lyrics, only the first verse, so I hummed it. It was a song that they sang to me in a summer camp when I was six years old, and it made a big impression on me. I went with the school to a camp in France because I went to a French school. It’s a very sad song, about a child who’s very poor. It’s a dramatic story, but it’s sort of very calming. **And I remember the song impressed me a lot. The first time I heard it, it seemed very sad, and I cried⁸.** And I don’t know why, but it’s a song that popped up one day, I started singing it to him and it calms him down and gets him to sleep.*

It should be noted that, although this category seeks to draw attention to the type of repertoire that mothers used with their babies in the musical encounters, the above descriptions also tell us the origin of said repertoire and how the mother’s different sociocultural contexts or childhood memories influenced the type of song they chose to sing to their children.

3.3. Source

Regarding the origin or source of the repertoire used by the mothers, it was found that there were still musical expressions from the ethnic cultural heritage of each family, as explained by Arabin and Jahn (2013), and Dissanayake (2000). However, it is also clear from the descriptions that, due to the contact with other societies and contexts and access to technology, mothers acquire a personal taste in music that distances them from the creation or production of music as an identifying trait.

This was explained by the participant Dana, who is originally from Colombia and has worked professionally as a children’s teacher of music education and stimulation in Barcelona:

I reckon I learned those songs at work because for various reasons I’ve always had to use them with children and parents. So, I gradually learned them, I internalized them, and then they were quite simply the ones that I came out with and which I sang to him. Because I’ve never sung him the songs I learned in my childhood. So, I think they’re the ones from my work and I’ve so deeply internalized them that they come naturally to me.

Another participant, Claudia, is originally from Guatemala, grew up in the United States, and currently lives in Barcelona. She explained that she learned the songs she used with her baby from the Internet:

*I sing him nursery rhymes that I learned when he was born. Such as “The Wheels on the Bus”, “Itsy Bitsy Spider” and “Twinkle, Twinkle, Little Star”, all the ones that are very well-known, and apart from that, songs of worship [...] **I learned what I sang to him on the Internet by searching for children’s songs on my mobile phone⁹**; literally, because I didn’t know any before he was born [...] I can’t remember any songs from my childhood.*

3.4. Frequent actions and affective experiences

The results of these two categories are presented together in this section. Although the data provide by the participant’s reports was analyzed independently, these categories appeared totally unified, i.e. as if they were in some kind of symbiosis. Without expressly requesting it, the mothers described the affective experiences derived from the regular activities they carried out with their respective babies.

Therefore, as regards recurrent activities or routines involving the mother and child, where sung musical activities were more evident, the data indicate that these took place mostly at sleep time or to cope with conflictive situations or

⁷ Translated from the original in Catalan.

⁸ Highlighted by the authors to draw attention to the message.

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uncontrolled crying, when the mother used singing to create an atmosphere of peace and quiet for the baby. Filippa et al. (2019) postulate that the emotional content of the mother's speech and song, when she addresses her baby, is modulated by the latter's acceptance behaviors.

The participant Clara explained that Liam, who was at that crucial stage of development when he wanted to explore everything, had difficulty going to sleep when he was tired due to overexcitement from all the daily physical activity. So, she tried to get him to rest through singing and rocking him:

I sing to him when I am trying to calm him down to get him to sleep. Because now he is at a time when he wants to explore everything: he wants to stand up, he's about to start walking, he touches everything. Then there are times when he is sleepy, but he gets very excited and I need him to calm down, so I often use singing to have a rhythm to rock him to, holding him in my arms and patting him gently on the back, rocking him and trying to calm him down.

With the same idea in mind, Hallam (2015) affirms that parents use music to support other activities, for example, to create a calm and relaxing environment before sleep time. She also explains that joint musical activities involving parents and children improve impulse control, self-regulatory skills, and communication between the two parties. This is how Clara went on to describe it:

It helps me calm down too¹⁰, because one thing I notice is that, if I'm nervous or excited, or thinking "calm down, go to sleep", because I want him to go to sleep or have something to do, he transmits his nervousness to me, and I transmit mine to him. And this is something I realized with my first baby as well, with my daughter, that sometimes I was trying to put her to sleep but I was too nervous. It doesn't work because children notice everything, they pick up all the emotions, so I must breathe deeply and calm myself down. Even if he is still overexcited, I try to get him to calm down too. It doesn't always work, but I've found that if I'm nervous he doesn't calm down. If I'm calm, he may or may not calm down. So, I guess music helps me with that.

On the one hand, Roberts (2010) supports this participant's idea that the mother's well-being and/or basic mood directly affects the infant's well-being. She is the main person who guides and accompanies development, ranging from aspects such as the limits that are established at home and the type of food given to the child, to the moments of play and privacy that occur between the two. On the other hand, Hallam indicates that "music can significantly reduce the frequency and duration of inconsolable crying episodes, as well as improving physiological measures, including heart rate, respiratory rate, oxygen saturation and mean arterial pressure" (2015, p. 91). Miriam, another mother, adds the following related information:

*Especially at sleep time or when she is very nervous, especially during those moments of uncontrolled crying, I think that when you sing songs and they are usually the same, they are able to recognize them, and it calms them down a little and they become aware of the music [...] **In general she is quite dependent on my voice¹¹**. Maybe not so much on what I sing to her, although it's true that if I sing something happier to her, she feels happier, but at those moments it does help and calm her down. With my other daughter it wasn't immediately effective, but it is with her. It calms her down a lot when she's crying uncontrollably, she calms down and hugs me tighter. I think she feels more protected.*

The participant's account concurs with Nakata and Trehub (2004), who postulate that from the first days of life, babies prefer their own mother's face and voice to any other person or sound. On the same lines, Voegtline et al., (2013) explain that this preference for the maternal voice must be preceded both by the fetal detection of the sound stimulus and by learning through repeated exposure. In other words, the neonatal preference for the maternal voice is attributed to the unique multimodal sensory input offered by maternal speech and its different manifestations, along with the recurrent prenatal exposure that allows postnatal recognition of the maternal voice among other voices.

4. Conclusions

Due to the participant's descriptions, it has been possible to identify a series of specific characteristics of the musical activities and interactions that take place between mothers and their children, in which musical activities through singing and the mother's voice play a special role in consolidating these encounters. The nine mothers in the study used this kind of activity to communicate with their babies, who responded actively with a variety of behaviors.

Regarding the sound stimuli provided by the mother's voice, it has been stated throughout the text that they have a great impact on the relationship between mother and child due to the degree of exposure during pregnancy and following birth. Furthermore, these constitute the main source of communication and one of the most important mechanisms for the construction of a healthy mother-infant bond, which gives the young baby the ability to build and maintain close long-term relationships (Grimalt & Heresi, 2012). In the maternal narratives, it was also found that two of the participants spent considerable time providing these stimuli during gestation, due to having had direct

¹⁰ Highlighted by the authors to draw attention to the message.

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contact with music in their family and/or professional environments. However, even when this musical awareness exists, it is often impossible for most mothers to consciously provide these sound stimuli during pregnancy, or even after the birth in the everyday life and reality of today's homes. This especially occurs when it is not the first pregnancy, as explained by some of the study participants.

According to their narratives – and despite globalization – the repertoire of songs that these mothers used to interact with their children still displayed distinctive, recognizable traits of their own cultures (with the presence of traditional Catalan, Valencian, Greek and French songs). The mothers mentioned music from their own family's ethnic heritage that was the fruit of specific memories of their childhood and/or the musical learning acquired from their sociocultural contexts throughout their lives (in this case, especially from Spanish, Catalan, Greek, Colombian and North American contexts).

In addition, easy access to technology and the Internet has put mothers in contact with global musical cultures that distance them from the production and creation of music with identifying traits. Nonetheless, in the specific case of two of the mothers who reported having used technological tools (mobile App and the Internet in general), this enriched the repertoire used in the musical encounters between mother and child.

The interviews also revealed that these mothers unconsciously filtered the communication modes that they used with their babies, using interactive mechanisms and a range of communication that went beyond singing. They introduced behavioral modalities governed by dimensions of verbal, corporal, auditory and visual expression, which inform the child of the intentions underlying the musical encounters provided by the mother, where facial expression in particular plays a key role in the baby's emotional state. Furthermore, the natural processes of enculturation during upbringing are determined by this set of communicative behaviors established by the mother with her child, through which she unconsciously contributes to the construction of the child's cultural and collective identity (Frith, 2001).

It should be equally noted that these mothers' stories show that all of them, through an automatic reaction to the baby's discomfort, wanted to create conditions of peace and quiet for their children, regardless of the situation or the resources they used. The goal was the same: to let the babies know through all these musical expressions that they are being cared for, loved, and protected.

This research also brought to light how these mothers activated emotional well-being strategies that were not only intended for their babies but also for themselves, and how mother and baby can give each other positive or negative feedback. It is known that music elicits pleasant emotions (e.g., Cardona et al., 2020; Mas-Herrero et al., 2013) so musical activities play a crucial role in this regulatory behavior that supports the emotional well-being of both mother and child.

Finally, while the results of this study make a valuable contribution to music education, it is important to highlight some aspects that could limit the research. On the one hand, the sample of interviewees was small, making it difficult to generalize the findings to a larger sample. On the other hand, a wider context within different areas of Spain and abroad would provide a greater variety of musical exchanges in the mother-child relationship. Moreover, the technique used to collect data (semi-structured interviews) only reflects the results from the mothers' standpoint and there was, therefore, a lack of data obtained from direct observation of the musical experience between mother and child. However, this latter limitation paves the way for further research on the musical interactions between mother and child during everyday life, by means of prolonged data collection over time. In this way, it would be possible to find out how this musical relationship evolves or is transformed to the point where aspects such as the autonomous musical behavior of the child are directly influenced, adjusting itself to the child's development. In light of this problem, the design of a study to continue this research has already begun for future publication.

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7. Appendix

Interview Guide

Demographics

1. How old is your infant and what number is this child amongst any others you might have?
2. Where do you currently live and where are you from originally?
3. Briefly describe your educational background.
4. Briefly describe your musical background – formal and informal?

Current musical practices and responses of you and your baby

1. Briefly describe any musical activities you did during your third trimester of pregnancy (whether for your unborn baby or not).
2. Describe any ways you sing to your baby, or with your baby. (Prompts: how often? how long? when? types of songs? styles? from your original cultural heritage or current cultural context and how important is that to you?)
3. How did you learn the songs that you sing with your baby? (Prompts: from childhood memories? extended family? internet?)
4. Describe any feelings you have towards your infant when you sing to him/her various types of songs and how he/she responds?
5. Describe in detail any ways you listen to music or engage in other musical activities at home with your infant and any activities you do during listening? (Prompts: live music? playing instruments? recordings? using any technology hardware/software? using any on-line platforms? how often? how long? when? where? singing along? moving? dancing? including other family members?)
6. Describe any feelings you have towards your infant when you engage in these different types of musical activities with your infant and how he/she responds?
7. Describe any other ways you participate in music with your baby outside the home? (Prompts: informal social activities, formal social activities such as religious meetings or childcare/education settings?)
8. Describe any feelings you have towards your infant when you engage in these activities and how he/she responds?
9. Is there anything else you'd like to add or comment about?
10. This is not required, but if you feel comfortable, would you be willing to show me how you sing a favorite song to your baby? (Or demonstrate another favorite musical activity you do with your baby/)