Musical communication among parents and their children: an analysis tool to study their interaction

Abstract. Musical communication between adults and children is a widely studied phenomenon in the field of music education and psychology. In the research carried out to date, a variety of methodological designs have been used, based mainly on the perceptions of adults, to investigate the different aspects of these musical interactions. Thus, there is little information about the characteristics of participation in the parent-infant relationship considering both adults and children's musical behaviours. The aim of the study in which this article is framed was to identify the characteristics of parent and child participation in musical interactions involving vocal expression in the family environment, with the particularity of the data having being obtained directly from their everyday communication scenarios. The participants were five families with at least one child younger than 36 months. Data was collected by means of an audio recording device (DLP) associated with LENA® software. This article describes a tool for analysis that was designed and validated according to the particularities of the data. The MICAD – *Musical Interaction among Children and Adult Descriptors* – integrates characteristics of elements of both adult-child communication and the musical content present in their encounters. Thanks to the analysis provided by the MICAD it is possible to reach a deeper understanding of participants' individual behaviours and distinguish different models of musical interaction between children and adults.

Keywords: Data analysis tool; early childhood music education; everyday life; LENA; music communication; musical interaction; participation; vocal expression.

Introduction

Early musical communication between adults and children is a recurrent research topic in the field of childhood music education. Thus, it has been examined in a variety of studies, and these describe a series of features that typify this phenomenon. On the one hand, there are those aspects that are directly associated with music, such as notable rhythmic patterns, high intonation, a defined beat, reduced tempo and melodic contours in the speech of parents and other adults (Malloch & Trevarthen, 2009), and, on the other hand, there are those aspects associated with human communication such as the identity of the participants in the communicative process, the message to be transmitted, the orchestration of spoken and physical language, and the bidirectional responsiveness of the participants (Holler & Levinson, 2019). This last aspect has lost importance in the current debate on communication – and especially musical communication between adults and children. The fact that a baby or young child has not developed all the communicative skills of language, singing or any other kind of vocal musical expression does not mean that they are not part of a two-way communication process. This participation can occur through channels such as rhythmic babbling, emotional expressions (Welch, 2005), gestural imitations, rudimentary sounds (Trehub & Gudmundsdottir, 2015), and acoustic aspects of their vocalisations that they accompany with behaviours that make it possible to distinguish between their attempts to speak and sing. Nikolosky (2020) explains that this acoustic aspects "play an important role in the separation of music skills from verbal skills and shaping the primordial music system the infant uses to address his/her musical needs" (p. 139). On being communication mechanisms, adult-child musical interactions function through and depend on the same factors as communication itself. In other words, communication takes place to the extent that there is a sender who transmits the information and a receiver who not only receives the information but also understands it and is able to respond, thereby opening up a channel of reciprocity, and, ultimately, that there is a clear message with sufficient content for dialogue to take place, in this case musical dialogue. Therefore, music can be considered a form or system of communication similar to language (Cross, 2005; Miell et al., 2005), since like language it is a participatory,

interactive medium that provides a set of human communication tools that serve to cope with a wide range of social and emotional scenarios (Cross & Woodruff, 2009).

These early communicative musical encounters between parents and children mainly take place in the home and in those places that are an extension of the family environment (e.g. Gingras, 2012; Koops, 2014). Consequently, it can be said that parents are their children's first teachers during the early stage of child development (Trehub & Gudmundsdottir, 2015), being sensitive to their children's needs (Koops, 2019). Although many of the music teaching events that take place in the early developmental stages – activities such as singing a lullaby or humming a familiar tune so that an upset or hungry baby stops crying (Trehub & Prince 2010; Trehub & Trainor 1998; Trehub et al. 1993) – occur instinctively and naturally, by way of an almost primitive offer of music, they are not for this reason any less valid or necessary. On the contrary, this is the starting point for the enrichment that comes with quality musical communication within the home, which develops as the child, in conjunction with his or her integral development, acquires the communicative skills that allow the expression not only of biological but also musical needs. Furthermore, in addition to expressing these needs, the child gradually participates more and more actively in these interactions until finally being able to take the initiative and lead the said phenomenon of music and communication.

Despite the growing amount of research carried out over the last twenty years on these musical encounters between parents with their children in the family environment (e.g. Blackburn, 2017; Custodero, 2006; Custodero & Johnson-Green, 2003; De Vries, 2009; Denac, 2008; Mehr, 2014; Trehub et al., 1997; Williams et al, 2015), there is little information about the characteristics of participation in the parent-infant relationship because most of the methodological designs of these studies are based on adult reports and perceptions, discarding direct observation of the participants' everyday musical experience and running the risk of overlooking certain adult and child musical behaviours. Nonetheless, this stance is understandable since it is not easy for researchers to study these phenomena – which occur exclusively in the everyday and private lives of families – without the data being altered, biased or contaminated. Thus, only in more recent research (Costa-Giomi & Sun, 2016; Costa-Giomi & Benetti, 2017; Dean, 2017) have children's spontaneous musical experiences and vocal behaviours been document mainly as they happen in real time, using pioneering LENA® (Language Environment Analysis) and DLP audio recording technology (see the *data collection instruments* section), which has facilitated the study of children's immediate soundscapes from their particular perspective without counting on adult narratives or perceptions.

Given the lack of information about the participatory role of adults and children in everyday musical encounters, and at the same time, the lack of methodological tools needed to carry out an in-depth analysis of the distinctive characteristics of these encounters, we designed a research project in which data was collected mainly from audio recordings using the aforesaid LENA® software (Lerma-Arregocés, in preparation). This article outlines that research while focusing on the design and validation of an analytical tool whose purpose is to study such communicative and musical encounters.

Research design

Goal

The main goal of this research, which follows on from a previous study (Lerma-Arregocés & Pérez-Moreno, 2022), was to identify the characteristics of parent-child participation in everyday communicative musical encounters involving primarily vocal expression, in families resident in (Location) who had at least one child between 6 and 36 months old at the time of the research.

Data collection instruments

An explanation of the data collection instruments, and in particular the particularities of the main instrument, is needed to understand the design and development of this research.

- Audio recorder

The main tool used to collect the data in this study was a DLP (Digital Language Processor) audio recorder associated with LENA® software (Language Environment Analysis). This processor is a small portable device that fits in a child's coat pocket, custom-designed so that when the child is carrying it, they are not even aware it is in use. The device records sounds within hearing distance for sixteen continuous hours and captures them from a variety of sources as naturally as possible. This results in high-fidelity audio recordings that document and provide insight into musical interactions involving vocal expression within the family environment.

- Interview

To obtain contextual information related to the audio data, a semi-structured interview consisting of sixteen open-ended questions was conducted with each of the families, designed and validated for previous research (see Lerma-Arregocés & Pérez-Moreno, 2022) and adapted to the needs of this study. This purpose of this interview was to learn about the parents' perceptions and points of view, with regard to parenting, music and the relationship between these two concepts in their everyday lives, the importance of music education in their homes, the way they share music within the family environment with their children, the types of activities they most engage in to interact musically, and the frequency and ways in which they sing in the family, among other aspects. To facilitate the interviews, the families were invited to choose the meeting place that suited them best so that they could attend with their child/children and set aside the necessary time (around 30 minutes on average) in a favourable, relaxed environment.

- Report on families

To obtain contextual information about the days corresponding to each recording, the families communicated with the researcher via *WhatsApp* and sent a text or voice message explaining each day's chronology and most relevant events, such as the activities or routines carried out, any unusual occurrences, and visitors who may have appeared in the recordings, among other matters. This information plays an essential role in facilitating subsequent data analysis because it provides a more accurate description than that provided by DLP recordings without the relevant context.

Participants

Bearing in mind the characteristics of the main data collection instrument used in this research (DLP) and the huge commitment demanded of the participating families, since each recording of sixteen consecutive hours in a day implied total immersion in their private lives, the sample was recruited through professional and personal references of the researchers. Five families with children within the age range required of this study were contacted directly and agreed to take part. They shared the following characteristics: nuclear families consisting of mother, father and at least one baby or infant between six and 36 months of age, and resident in an urban area in the province of X. Furthermore, the families come from a variety of musical and socio-cultural backgrounds.

The five participating families then gave their informed consent to make a recording once a month (on a weekend day to make it easier collect data on everyday family life) for approximately nine months.

Data Analysis

Given the emergent, qualitative nature of this research, with the tools needed to tackle it developed as the research progresses (e.g. Aguirre, 1995), the data analysis process was divided into three phases. In the first phase, the large volume of data collected from the audio recordings (more than 640 hours) was indexed. This was necessary because much of the data collected during the course of the days did not necessarily include a musical activity, on being about the participants' everyday lives, which mostly consist of typical family routines and activities. Thus, the episodes in each recording that featured musical encounters were identified and this led to the second phase of the analysis, which specifically corresponded to the methodological design of the instrument for the analysis of musical interactions involving vocal expression between parents and children. Finally, in the third phase, the instrument was validated by a team of experts.

The three phases of the data analysis process are explained below:

First phase: detection of episodes

As explained above, many different situations from the participating families' everyday lives appeared in these 640 hours of recordings, such as random conversations, moments when the children acted autonomously, car journeys, play routines, meetings with other family members, rest periods and shared mealtimes. Thus, in order to specifically identify musical encounters and interactions between parents and children within the variety and complexity of everyday life, this first phase of analysis consisted of listening carefully and completely to each of the audios for the purpose of identify the musical events that occurred during the course of each day of recordings. An analysis table was used and what happened in the recordings was registered with annotations every 30 seconds. This table (see Table 1) only reports the episodes where the participation and interaction of both parties (parent and child) is identified, either through the voice and its different manifestations – primarily singing – or in some cases through the children's communicative language and expressions of emotion.

Table 1. Indexing table (sample content)

Time	Participants in the interaction	Context
00:02:00 **00:02:30**	father-daughter	Bruna hums and Gabriel answers her at supper. Gabriel sings the song "*Lluna la pruna*"

Second phase: design of instrument for analysis

Two lines of action were needed for the construction of the instrument for analysis, *Musical Interaction among Children and Adult Descriptors* (MICAD): a literature review and the saturation of emerging categories.

First, a literature review of research related to musical interaction between adults and children in the family environment was conducted in order to locate an instrument for analysis that could be applied to the data provided by this study. However, despite the existence of research on this topic, with widely varying results – which might be attributed to the age difference of the participants, the geographical region to which they belong, the musical cultures of their immediate social context, and essentially the use of quantitative methods (e.g. Blackburn, 2017; Custodero

et al., 2002; De Vries, 2009; Denac, 2008; Mehr, 2014; Williams et al., 2015), an instrument that responded to the needs of this study was not found. Numerous studies in the existing literature report on the frequency with which parents and children share music at home, but not many go into the identification of the specific characteristics of these musical interactions, nor do they stipulate specific analytical tools. This literature review served to group the concepts and categories proposed by different authors (e.g., Benetti & Costa-Giomi, 2020; Costa-Giomi & Benetti, 2017; Custodero, 2006; Koops, 2019; Nakata & Trehub, 2011; Su, 2020; Trehub et. al, 1997; Trehub & Prince 2010) so that they could be used to support aspects of the MICAD under construction.

In parallel with the literature review, a detailed analysis of thirty randomly selected episodes from the lives of the five participating families was carried out, the aim being to develop the instrument categories and subcategories by means of saturation. This process was carried out manually by repeatedly listening to the selected episodes. To facilitate the analysis, the instrument was divided into three blocks that group together different types of information:

- Block 1. Coding of recordings
- Block 2. Contextual characteristics of the episodes
- Block 3. Key aspects of vocal musical interactions

Third phase: Validation of the MICAD

The following phase of the procedure was based on the validation of the instrument with a test. During two focus group sessions, three experts in the field of early childhood music education reviewed in detail each category and subcategory proposed for the instrument. Subsequently, the resulting categorisation table was emailed to them for individual analysis of four randomly selected episodes.

Given that Blocks 1 and 2 contain objective, descriptive, and contextual information about both the recordings and the episodes to be analysed, it was agreed to validate exclusively the categories and subcategories belonging to Block 3. Thus, once the analysis of the four episodes proposed for validation by the experts[1], was completed, the individual reliability formula for the different codifiers was applied to the results (Hernández-Sampieri et al., 2014), with which each of the experts' categorisations was related to those proposed by the researcher and the result was divided by the total number of units of analysis that varied in each case. For a better understanding, see the following formula:

$$\text{Individual reliability} = \frac{\text{Number of units of analysis correctly coded by the codifier}}{\text{Total number of units of analysis}}$$

After applying this formula to each category and codifier (see the results in Table 2), the reliability of each category had to be calculated. According to Hernández-Sampieri et.al. (2014), to do so, each of the experts' results for individual reliability must be added up and divided by the total number of experts. By performing this operation, the reliability of the instrument was obtained for the categories and subcategories in Block 3, displayed in the last column of Table 2.

[1] Expert A only analysed episode M2.

Table 2. Results – validation of Block 3

EPISODES ANALYSED		**Episode M2**			**Episode C1**		**Episode B3**		**Episode G**		**Reliability**
Experts		*A*	*B*	*C*	*B*	*C*	*B*	*C*	*B*	*C*	
Type of vocal expression	Adult	1	1	1	1	1	1	1	1	1	1
	Child	1	1	1	1	0	1	0	1	1	0.77
Type of interaction		1	1	1	1	0	1	0	1	1	0.77
Repertoire	Existing	1	1	1	/	/	/	/	1	1	1
	Improvised	/	/	/	1	1	1	1	/	/	1
Continuity of discourse		1	1	1	1	0	1	1	1	1	0.88
Musical support material		0	1	0	1	1	1	1	1	1	0.77
Explicit expressions of emotion	Adult	/	1	1	1	1	1	0	1	1	0.87
	Child	/	1	1	1	1	0	1	1	1	0.87
Observations'		/	/	/	/	/	/	/	/	/	/
Total											**0.88**

Table 2 shows how there was total coincidence in some categories (type of vocal expression among adults, and existing and improvised repertoire) and a wider variety of categorisation in the rest of the categories. Below the reliability threshold we find two categories (Type of vocal expression among child and musical support material). This score is caused because the experts did not fill the category, leaving it empty (these cases appear underlined in the table). Being aware that the category Type of interaction does not meet the reliability threshold for very few points, the experts suggested after a discussion rewording some of the keywords to make it clearer. These changes are included in the final version of the MICAD. However, in the overall, the figures in which the test moved were well within the range of high reliability, which is considered to be anything over 0.85 according to Hernández-Sampieri et al. (2014), with a total reliability of 0.88.

Results

Having completed the design and validation phases of the analysis instrument, the final version of the MICAD was obtained (see Appendix 1). The definitions of the categories and subcategories of the three blocks that comprise it are set out below:

Block 1 – coding of the recordings

The categories in this block were intended to catalogue, code and organise the chronology of the recordings made of each participating family; and, in addition, to label the episodes in which a vocal musical interaction between parent and child was identified.

1. Number of recordings: in the boxes corresponding to this category each recording of each family was labelled with the numbers 1-9, according to the corresponding order.

2. Episode: these boxes indicate the exact time at which each vocal musical interaction between parents and children began and ended over the course of a recording day (about sixteen hours). Category proposed by Su (2020) for a longitudinal study of parent-infant musical interactions in a Chinese family.

3. Episode code: a code was assigned in this box to each episode in alphabetical order (A, B, C...). It should be pointed out that different types of vocal musical encounters occurred within the recordings but on the same timeline since they were part of the everyday life of each participating family. For this reason, it was decided to assign an alphanumeric code (A, A1, A2, B, B1, B2...) to those episodes that took place on the same timeline, even though they had to be analysed separately because they displayed different musical characteristics.

4. Duration: this box indicates the length of the episode.

Block 2 – contextual characteristics of the episodes

The categories in this block display the contextual data collected from each episode for analysis, i.e. the information obtained from a complete and meticulous listening of the family recordings, plus the interviews and reports about the families on the day of each recording, which was used to identify the general framework of events in which interaction took place and the participants in this interaction.

1. Description of the context: since the volume of data is spread across many hours of recordings, to facilitate the analysis of each episode this box gives a brief explanation of what happens in that particular moment when a vocal musical interaction between parents and children is identified. Adapted category proposed by Su (2020).

2. Adult participant: parent who takes part in the musical interaction with the child (subcategories: *mother and/or father*).

3. Order of participation: intervention of the participants in terms of who initiates and who ends the musical interaction (subcategories: *initiates and/or ends*). It is necessary to distinguish between the participation of the adult and the child by using different boxes. This category is taken from the research carried out by Dosaiguas and Pérez-Moreno (2021).

4. Place: space in which the musical interaction takes place (subcategories: *own or someone else's house, street, park, car, other, unverifiable*). Category proposed by Su (2020).

5. Situation: particular moment in which the musical interaction takes place (subcategories: *breastfeeding, waking up, changing nappy or clothes, sleep/nap time, playtime, going for a walk, emotional regulation, mealtime: breakfast/lunch/snack or supper, bath, car journey, others*). Situations analysed in different research (Custodero et al., 2002-2003; Grimalt & Heresi, 2012; Hallam, 2015; Ilari, 2005; Koops 2014).

6. Probable function: reason why the parent uses and participates in the musical interaction (subcategories: *soothing, entertaining, seeking attention, sleeping, accompanying play, others*). Category designed based on the concepts proposed by Koops (2019): *parenting musically*, which she explains that is "the intention of a parent in a situation involving parenting and music (using music to accomplish nonmusical goals. e.g to support social, cognitive, or emotional development) and *musical parenting*, consisting of directly supporting children's musical development through activities at home, at school, and in the community" (p. 13).

Block 3 – key aspects of vocal musical interactions

In this block we find the central axis of the instrument for analysis and the main contribution made by this study, i.e. the categories that characterise the vocal musical interactions involving parents and children.

1. Type of vocal expression: the way in which the adult and the child vocally manifest their musical discourse. In this category it is necessary to distinguish between the adult's and the child's vocal expressions by using different boxes.

    a. Melody with lyrics: singing an existing or improvised melody with clear lyrics.
    b. Humming: producing an existing or improvised melody without using words.
    c. Melisma: singing one syllable with different consecutive notes.
    d. Bocca chiusa: producing an existing or improvised melody with the mouth closed and transferring the resonance to the nasal region.
    e. Individual sounds: singing syllables or words while keeping to a single sound.
    f. Individual intervals: repeatedly singing syllables or words with one or more musical intervals.
    g. Representative sounds: producing a sound or set of sounds representing a word, an action, an animal or an object.
    h. Vocalisations or rhythmic/melodic babbling: production of vowel sounds with doubled syllables that are usually associated with the infant's first signs of vocal expression (Dolata et al. 2008), but which may also be used by the adult to communicate with the child.
    i. Syllabic rhythm: producing syllables, words or texts associated with rhythmic figures or groups without a defined pitch.
    j. Whispering: singing or producing sounds almost imperceptible to the ear.
    k. Speech: adult vocal expression giving some indication during the interaction, or the child's musical interest put into words.
    l. Infant Direct Speech (IDS): A type of speech with musical properties lying somewhere between speech and song, used solely by adults when addressing babies or toddlers (e.g. Bergeson & Trehub, 2007).
    m. Whistling: producing sounds, such as an existing or improvised melody, through the lips by consciously controlling the flow of air.

2. Type of interaction: the way in which parents and children relate, communicate and participate musically during the interaction. This category and the subcategories *a, b, c,* and *d* are taken from Dosaiguas and Pérez-Moreno (2021).

    a. Imitation: repetition of the musical motif previously introduced by one of the participants, even if slight modifications or variations can be appreciated.
    b. Dialogue: participants take turns to participate, with consequent musical responses.
    c. Contrast: a musical response that is not consistent with the question previously asked by one of the participants.
    d. Synchrony: parallel musical production by the participants.
    e. Solo: performance of a complete melody without the other participant's vocal participation. However, the other party's participation may be identifiable in explicit expressions of emotion.
    f. "Fill the gap": intentional pause by an adult (or sometimes by a child) in the line of a familiar melody so that the other participant can fill in the gap with the "missing" word, which Trehub and Gudmundsdottir (2015) consider to be one of

the initial, rudimentary vocal arrangements involving adult and child before forming a duet.

3. Repertoire: musical material used by participants in their vocal discourse.

    a. Existing: list of songs, musical genre and/or musical styles that can be identified in the participants' discourse. In the case of this subcategory, the exact repertoire must be indicated when it has been verified in the audio (see example in Appendix 1).
    b. Improvised: a set of sounds, melodies or intervals created and performed at the time of interaction.
    c. Unverifiable.

4. Continuity of discourse: development of the participants' musical discourse during the episode.

    a. Continuous: a musical episode without pauses or interruptions, with a clear ending.
    b. Interrupted-resumed: a musical episode interrupted by the participants or because of the intrusion of an external event or subject and resumed to reach a clear ending.
    c. Discontinued: A musical episode that stops suddenly, without a clear ending.

5. Music support material: additional musical tools or resources that the parent or child may use within the musical interaction and that are directly recognisable in the recordings.

    a. Recorded music
    b. Musical instrument
    c. Other interlocutor
    d. Body percussion
    e. Object percussion
    f. Sound made by object or toy
    g. None

6. Explicit expressions of emotion: specific responses and reactions of an expressive nature that can be objectively identified in the recordings. In this category it is necessary to distinguish between the adult's and the child's expressions of emotion by using different boxes.

    a. Words of invitation: verbal communication coming from the adult or child that encourages the other to participate in the musical activity.
    b. Words of approval or validation: verbal communication coming from the adult or child that consists of congratulating and acknowledging the other's participation or achievements in the musical interaction. In some cases there may be specific words of warmth and affection such as "I love you".
    c. Kissing sounds: explicit demonstration of warmth and affection, in this case manifested by kissing sounds.
    d. Tickling sounds: explicit demonstration of warmth and affection, in this case manifested by tickling sounds.
    e. Giggling and/or laughter: emotion associated with musical interaction.
    f. Crying: expression of emotion by the child that may be the reason for initiating the interaction.
    g. Silence: response by the child after a moment of crying or other situation needing emotional regulation that generated the musical interaction.

h. Comfort sounds: sounds emitted by the baby or toddler that are not understandable to the adult and which are typical of the stage prior to full language development and reflect the physical manifestations of their body (Loewy,1995).
i. Shouting or screaming: vocal expression by the adult or child that can be associated with different emotions such as joy, sadness and anger, among others.
j. Other.
k. Unverifiable.

7. Observations: specific and relevant aspects of the episodes that cannot be placed in the other categories.

Discussion and conclusion

As stated in the theoretical framework of this article, the phenomenon of musical interaction between adults and children needs to be approached through the observation of the actual experience itself, and not only from the standpoint of the perceptions of the participating adults. There still exists a gap in the literature as regards how to analyse the particularities of these musical encounters while taking into consideration the participant' individual behaviours. The use of the LENA® DLP recorder in music education research, pioneered by Dr. Costa-Giomi (see, for example, Costa-Giomi & Sun, 2016 and Costa-Giomi & Benetti, 2017), has generated a new early childhood research model where it is possible to directly study these interactions. On the other hand, the potential methodological designs afforded by the DLP also bring with them the need to develop analytical tools that can serve to process the peculiarities of the collected data.

This article presents the *Music Interaction among Children and Adults Descriptors* (MICAD), an instrument for analysis that achieves the goal of the study from which it emerged: to identify the characteristics of parent and child participation in musical interactions involving vocal expression in the family environment. This instrument constitutes a contribution to the field of the study of child music education because it brings to light the distinctive characteristics of musical interactions between adults and children (parents and children in the case of the data collected) by considering them as a communication phenomenon in which the participants assume different participatory roles, have a bidirectional response capacity (Holler & Levinson, 2019) and use a rich and wide array of sounds.

Descriptors appearing in previous studies, identified in an exhaustive literature review (for further details, see the results section), were taken into account during the preparation of the instrument, as well as those categories emerging from the data itself. Within the framework of the study in which the MICAD was developed, and as explained above, the data came from audio recordings of whole days in the lives of families with children aged 6 to 36 months. Therefore, the identified emerging categories are intended to reflect the reality of the phenomenon as it directly arises in the research scenarios. In addition, for purposes of their validation, three experts in the field of Early Childhood Music Education contrasted and reached a consensus on their validity and reliability in two focus group sessions.

Although each descriptor is defined in the MICAD, the complexity of the analysis must be highlighted, given that each study situation or episode simultaneously presents many or all of the contemplated categories. Moreover, each musical interaction detected in the data requires repeated listening to carry out analysis through the MICAD. This complexity of analysis is directly related to the nature of the data being processed. These data themselves are innovative because they allow us as researchers to experience real and spontaneous scenarios of the participants, they provide a representation of their daily life -i.e., each recording studied reveals

contextual information, the communicative elements, the musical richness that exists in their routines- but above all the individual behaviors of the participants within the same phenomenon captured on a continuous and extended basis. As a matter of fact, this allows to analyze everyday musical encounters from the perspective of all of those involved and not only from the reports of adults as has been done in most research on this topic as mentioned earlier (e.g. Blackburn, 2017; Custodero, 2006; De Vries, 2009; Denac, 2008; Mehr, 2014; Williams et al., 2015).

Even though the MICAD has been designed to analyze the vocal musical interaction phenomenon between adults and children, the variables of the phenomenon can take different perspectives according to the type of research, considering differences such as territory, the profile of the families, age range of the infants, expansion of the sample, pursue of one or several categories, among other variables. Also, and although the particularities of the data have been emphasized throughout this article, this specificity is precisely what facilitates that any researcher could use the MICAD to analyze musical interactions not just between adults and children, also among siblings, other family relationships or acquaintances and children's groups..

In summary, the methodology of its design has resulted in an instrument for analysis that serves to study musical interactions in depth having at least one young child as interlocutor. And, at the same time, the instrument allows each researcher to either use the MICAD in its entirety or focus attention on those aspects they consider suited to their research, i.e. depending on the goals of their study, the methodological design, the type of participants and the volume of data, among other matters, having the possibility of leaving out and/or adding elements that support the analysis.

Lastly, we would like to underscore that the contribution made by this article – the MICAD – is precisely to provide the scientific community with an analytical tool that makes it possible to identify and relate the elements that characterise musical interactions between adults and children. Once the data has been analysed using the MICAD, it is possible to interpret it in several ways: contrasting it and discovering trends or disparities within the same family or between the families studied; taking note of the variety of types of interaction and factors involved; emphasising context as a key factor when it comes to understanding the circumstances of everyday life in which these musical encounters take place, identifying the value of the participants' expressions of emotion and, finally, establishing the function that these musical and communicative encounters may fulfil in the present-day family environment.

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Appendix 1. Musical Interaction among Children and Adults Descriptors – MICAD –

Blocks	**Categories**		**Subcategories**	**Examples**	
BLOCK 1	Number of recordings			3	3
	Episode			01:40:10-01:40:45	01:40:39-01:46:25
	Episode Code			K	K1
	Duration			35 sec	5 min 46 sec
BLOCK 2	Description of context			Guim's parents have just given him a bath; they are putting on his clothes and combing his hair.	
	Adult participant		Mother and/or	Mother	Mother and father
			Father		
	Order of participation	**Adult**	Initiates and/or ends	Initiates and ends	/
		Child	Initiates and/or ends	/	Initiates and ends
	Place		Own house or someone else's	Own house	Own house
			Street		
			Park		
			Car		
			Other		
			Unverifiable		
	Situation		Breast-feeding	Changing clothes	Changing clothes
			Waking up		
			Sleep/nap time		
			Mealtime (breakfast-lunch-snack-supper)		
			Changing nappy or clothes		
			Emotional regulation		
			Playtime		
			Bath time		
			Others (going for a walk, car journey…)		
	Probable function		Soothing	Entertaining	Sharing music
			Entertaining		
			Seeking attention		
			Sleeping		
			Accompanying play		
			Others (sharing music, accompanying a game…)		
	Type of vocal expression	**Adult**	Melody with lyrics	IDS Melody with lyrics	Melody with lyrics (mother and father) Whistling (father)
			Humming		
			Melisma		
			Bocca chiusa		

BLOCK 3			Individual sounds	Representative sounds	
			Individual intervals		
			Representative sounds		
			Vocalisations		
			Syllabic rhythm		
			Whispering		
			Speech		
			Whistling		
			Infant Directed Speech (IDS)		
		Child	Melody with lyrics	Representative sounds	Melody with lyrics
			Humming		
			Melisma		
			Bocca chiusa		
			Individual sounds		
			Individual intervals		
			Representative sounds		
			Vocalisations or rhythmic/melodic babbling		
			Syllabic rhythm		
			Whispering		
			Speech		
	Type of interaction		Imitation	Imitation	Fill the gap
			Dialogue		
			Contrast		
			Synchrony		
			Solo		
			Fill the gap		
	Repertoire		Existing	Improvised	Existing: "Old McDonald" – for children
			Improvised		
			Unverifiable		
	Continuity of discourse		Continuous	Continuous	Interrupted-resumed
			Interrupted-resumed		
			Discontinued		
	Music support material		Recorded music	None	None
			Musical instrument (guitar, ukulele, piano…)		
			Other interlocutor		
			Body percussion		
			Object percussion		
			Sounds made by object or toy		
			None		
	Explicit expressions of emotion	**Adult**	Words of invitation	Unverifiable	Words of approval Words of invitation Giggling/laughter Kissing sounds
			Words of approval or validation		
			Giggling/laughter		
			Shouting or screaming		
			Kissing sounds		
			Tickling sounds		
			Others		
			Unverifiable		
		Child	Words of invitation	Unverifiable	Giggling/laughter Shouting or screaming
			Words of approval or validation		
			Giggling/laughter		
			Shouting or screaming		
			Crying		
			Silence		
			Babbling		
			Others		
			Unverifiable		

	Observations		Although the father's presence is audible, he does not interact musically in this episode.	The father intervenes musically in a short phrase, but the interaction occurs mainly between mother and child.