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The musical dimension of daily routines with under-four children during diaper change, bedtime and free-play

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Introduction

Many studies dealing with ethnographic observations in natural settings have shown the richness of musical experiences of young children in family contexts or in communities. The project 'A Day in the Life' (Gillen et al., 2007; Young & Gillen, 2006), for example, shows how music and musical experiences are widespread in the daily lives of children, both in private games and during daily interactions with adults and peers. Furthermore, Young (2008) highlights the increasing presence of technology and mass media in this daily experience, which also affects children below the age of two. This is also shown in the data collected by Lamont (2006), concerning music listening by pre-school children at home, in the car, at school and in the supermarket. Kida and Adachi (2008) analysed the role of the musical environment at home in the field of physical and motor development, and revealed that infants raised in richer musical environments acquired gross motor skills earlier than those raised in an ordinary environment. Other studies have shown that, for young children, music represents an appropriate field of 'optimal experience', as described by the Theory of Flow (Csikszentmihalyi, 1990), including in daily activities (Addessi, Ferrari, Carlotti, & Pachet, 2006; Custodero, 2005; St John, 2006). Although present in the above-mentioned musical studies, daily routines have still not been studied in a systematic manner, as the primary focus of research. While studies in social and cultural psychology have looked into the relevant social, linguistic, motor and emotional aspects of routines, a systematic and detailed account of the musical aspects is often lacking, even when references to the child's vocalisations are made. Instead, daily routines could act as a good perspective to observe the child's musical experience. This paper, therefore, reports on an action-research project carried out in Italy, within the context of a training course for nursery school teachers, which deals with the musical dimension of the daily routines of under-four children, at home with the family and in nursery school during diaper change, feeding, bedtime and free-play.

Why daily routines?

Daily routines are defined as the cyclical repetition of daily events with variations and changes. They represent a fundamental step in the life of the child, and allow her/him to establish relationships with adults and peers. Routine gives rise to a place where emotions, experiences and memories can settle, and the relevant literature shows that children remember events and objects which they have experienced during routine better. Through routines, children learn to build events and rhythms, to perceive, recognise, elaborate and fix the sequences of actions. Right from birth, a child's life is marked by the cyclical repetition of events which depend upon the interaction between individual biological rhythms (e.g. feeding, sleep-wake), environmental rhythms (e.g. day, night) and social rhythms (e.g. interactive modes of the adult). These are repeated on a daily basis, allowing variation and changes, and establishing an early example of the concept of a cyclical time (Bruner, 1983; Sansavini, 2007). Routines, therefore, 'allow us to anticipate and predict an action, to understand it through habit, to share its meaning progressively and therefore to be able to regulate it' (Emiliani, 2002, p. 54). It is through the interpretation of gestures and of repeated actions consolidated by everyday routines that children find their place in the world of relationships, and grasp the surrounding general culture as well as the linguistic and the musical culture of the group to which they belong to. The child learns to predict events and thereby to control them. In fact, during routines, variations occur, born out of the interactions between participants, in an attempt to achieve co-regulation, in other words, a continuous reciprocal adaptation of actions and intentions (Fogel, 2000). 'Alive communication' (Fogel & Garvey, 2007) is characterised by the presence of co-regulation, normal variability (i.e. small and continuous variations within mutually reciprocal activity, or, the frames) and innovation (i.e. variability that creates the possibility of change in the communicative system). Innovation is fundamental for creating change and giving rise to new routines.

The concept of rhythmicity is considered inherent to routine and has been applied by Boyce, Jansen, James, and Peacock (1983), who believe routines to be descriptors of family styles and functioning. Ethnographic observations have shown that routines are universal characteristics of family life and that only their content and frequency alter over time. In fact, routines have been defined as ‘rhythmic behavioural units in daily life, which function as an organisational element and integrate various activities while sustaining and promoting regularity in collective family life’ (Emiliani, 2002, p. 57). Children are sensitive to the varying rhythms of the adults who take care of them, and try to adapt to these. From this point of view, it is important to underline the importance of the encounter between the child’s rhythmic reality and that of the surrounding environment and family routine: the term consonance (which is, not surprisingly, a musical term) or congruence is used to define the level at which the child and the family meet and integrate in this context and the degree of mutual adaptation which occurs (Emiliani, 2002, p. 56). The importance of routine has been shown above all in some of the most recent social psychology studies on the daily life of young children. Emiliani suggests that:

The repetitive structuring of interactive sequences with the early formation of routines that regulate and give order to the child’s biological rhythms, aims towards the goal of survival, which can only be guaranteed by the organisation of social life on a daily level – the children must master it early on. (2002, p. 54)

Routines are also represented by the spaces in which they occur, and for most children, these contexts are constituted by the home and the nursery school.

Pulse, repetition and development of the ‘Musical Self’

Routines constitute an essential moment in the interaction and communication between adult and child. Through routines, they can share the early and lasting experience of rhythm and the repetition/variation mechanism. During routines, the repetition of gestures, looks and actions structures the daily time of the child, and the adult plays a fundamental role here. Bruner (1983) uses the term format to define the repetitive sequence of the tutoring role of the adult, which structures the spontaneous activity of the newborn child, for example, by replying to spontaneous vocalisations and creating sequences of lallation-imitation of the mother-lallation of the child. The format can be seen as early routines of exchange, which repeat themselves in terms of structure while becoming progressively richer through variations. The routines of exchange are integrated and inserted into more extensive routines related to the social and cultural habits of the group, the family and the community. One of the first forms of reciprocal sensitivity to time can be found very early on through the alternation of feeding turns (Kaye, 1984; Kaye & Wells, 1980; Stern, 1998). Another example of neonatal sensitivity to aspects of time is neonatal imitation.

Many scholars agree on the fundamental importance of the temporal contingency in mother-child interaction, that is, when the time gap between the child’s signal and the adult’s reply is sufficiently short and thus considered a casual connection (e.g. Murray & Trevarthen, 1985). Children are able to recognise temporal rhythms from as early as two months of age and can adapt themselves accordingly. Furthermore, circumstance-based temporal expectations are formed through communication with the adult. Trevarthen (2000), Malloch (2000), Stern (2004) and Imberty (2005) have provided evidence of the important role of repetition in infant-adult interaction and in child musical development and they recognised that the temporal aspect makes up a fundamental component of the adult-child interactive dynamic. According to Stern (2004), rhythm is one of the three basic elements, together with form and intensity, of affect attunement, that is, the phenomenon of sympathetic correspondence between modes of behaviour and affective intentionality that can be observed in mother-child interaction. Trevarthen (2000) has hypothesised that the ‘pulse’ is essential in interpersonal coordination, as

observed in proto-conversations (i.e. a vocal duetting of behaviour that resembles conversation between adults), between mothers and children in their first months of life. Bullowa (1979) further advanced this hypothesis, sustaining that in order to share meaning with the adult, rhythms must also be shared and that this sharing is at the basis of communication. This idea was further developed by Malloch (2000), who defined this type of exchange as ‘communicative musicality’, a term which describes the pervasive nature of musical experience in the life of the newly born child (see also the papers collected in Imberty & Gratier, 2008). The experience of pulse and repetition, therefore, not only represents the first experience of timing for the infant, but also the first experience of musical structure, shape, rhythm and intensity of movement (Papousek 1995). In his approach to the study of the musical childhood, Imberty (2005) affirms that the vocal schemes the child creates, starting from these first experiences of vocal exercise, represent the first forms of a body scheme that the child fully develops later on, during the first years of life. The mother’s voice, with its repetitions and echoing, represents some sort of sonorous mirror for the child which reinforces her/his Musical Self. As Imberty points out, during the course of this interaction the mother imitates before being imitated by the child. Anzieu (1996) calls this kind of infant experience ‘musical wrapping’ of the Self, which renders the concept particularly well.

Research questions

Some interesting questions arise in respect to the musical dimensions of the daily routines of young children. How do musical dimensions interact with children’s musical development? Do they influence the construction of a child’s daily temporal scheme? What are the constraints and the variants between the routines at home and in the nursery school? What is the role of the adult? How does the adult affect the musical experience of children during daily routines? And what is the role of routines (both in terms of social events and as events which regulate the temporal organization of the child’s thoughts) with regard to the child’s musical development, and ‘musical’ interactions with adults and peers?

The action-research project: observation as practitioner training in early childhood music education

The context of the action-research project presented here is the ‘Sound Education’ teaching, carried out at the University of Bologna, where a three-year degree course in early childhood education has been established. Most of the students who attend this course are non-musicians. The aim of ‘Sound Education’ teaching is to develop a professional curriculum in music education based on three different competences: basic competences (e.g. musical competences); professional competences (e.g. competences concerning music learning and teaching); and general teaching competences (e.g. social, psychological and educational competences, relationship skills, research tools). By means of theoretical approaches and empirical experiences, students who follow the course are able to acquire competences concerning children’s musical development as well as some basic tools for observing children’s musical conducts. Observational techniques can be used by teachers in order to understand some possible expressions of child behaviour, including those in the musical and sonorous sphere. These can then be used by adults to re-launch, develop and expand the behaviour observed, guiding them towards increased musical invention. The students also learn to interact with children in a musical way, to plan practical experiences and research protocols, to reflect on and assess their work (Addessi, 2007, 2008), and a similar experience is being carried out by Custodero and Zhuoya (2008). The action-research project presented here was born out of the above-outlined context. The coordinator/ researcher develops the observation protocols and the students follow them with under-four children during daily routines, at home and at the nursery. The action-research method allows students to learn and share knowledge and abilities that will become a part of their professional role, increasing self-efficacy and self-

motivation, and representing an important ‘turning point’ in terms of the evolution of their social representations of the musical child (Addessi, Carugati, & Selleri, 2007). The project has been underway since 2004. Up until now, it has involved eight undergraduates and two young researchers. Other external collaborators, experts in early childhood music development and professionals in early childhood services, have taken part in the project from time to time. The project makes use of an already existing partnership between the faculty, the city council and regional child services (Addessi & Mazzoli, 2007). Basically, each participant carried out videorecordings in natural and spontaneous contexts, respecting the following scheme: when (i.e. diaper change, lunch, bedtime, free-play), where (i.e. at home or the nursery school) and how (e.g. video-recordings, descriptions of all the sessions, microanalyses of video fragments, grid, check-list, diary) (see Camaioni, Aureli, & Perucchini, 2004). Each student wrote her/his thesis based on the experience. The role of the coordinator was to design the protocols, collect all the data, analyse and compare them, supervise the theses and provides participants with tools to carry out the observation and data analysis.

The focus of observation

The focus of observation was the musical conducts of under-four children. The term ‘conduct’¹ appears, above all, in the literature of countries with Latin-based languages (Janet, 1923) and is often used as a synonym of behaviour. However:

It can be distinguished from the latter in that behaviour refers to the set of habitual actions and reactions of an organism in an environment where objective observation is possible, whereas conduct refers to a deeper interior level where these actions and reactions originate. (Galimberti, 1992, p. 214)

Piaget defines conducts as the ‘(...) behaviours, including the conscience’ (Piaget & Inhelder, 1966, p. 7). In the musical field the concept has been used by Delalande as:

Reasoning in terms of conduct as opposed to behaviour means trying to understand the function of the acts. When someone picks up their instrument, prepares to play and then plays, what are they looking for, what do they expect from this set of coordinated actions? It is the purpose itself that helps us define the musical conduct (...) Observing the children from the point of view of their conducts, means concentrating on their motivations and not on their behaviour. (1993, p. 43)

In this project, therefore, the term conduct related to gestures and actions carried out by the children are observed with the aim of determining the musical intentionality (Cross, 2008; Imberty, 2008) of these actions.

In our study, conducts of both children and adults were observed, with particular attention to adult-child interaction. Another topic for observation was the conduct of sound exploration of objects including any possible secondary intersubjective phenomena. Particular attention was given to the description of musical parameters, both in terms of vocalisation and in terms of the sounds produced with objects (e.g. pitch, rhythms, intonation and intensity).

The grid for observing young children’s musical conducts during daily routines

Two types of video analysis were made: a qualitative data analysis of selected video fragments and a quantitative analysis of the duration of each musical conduct. For each observation, we first started with a general description of the video including time, context, subjects and objects. A more detailed microanalysis was then made on the basis of the musical conducts shown in Table 1. This was a basic

grid used by the student/researcher to elaborate more appropriate grids or check-lists for each protocol. This was the first attempt to create a model of a grid for observing musical conducts in everyday routines. It is an exploratory grid and the observations carried out will help to test its efficiency. Several protocols were followed by each project student/collaborator. The data collected so far documents a variety of observable musical conducts in children. In this paper I will report on the results concerning the analyses made so far on diaper change, sleeping and free-play routines.

Table 1. Grid of child musical conducts in daily routine.

Adult-infant interaction, peer-peer interaction	Repetition/variation, baby-talk, babbling, turn-taking, timing, pulse, attunement Mirroring, modelling, scaffolding Role of the practitioner Relational Coding System (Fogel, 2000) Co-regulated communication: symmetrical, unsymmetrical, one-sided, disruption, not-involved
The voice	Sensory-motor exercises Musical babbling Proto-narrativity Vocal games, communication, expressiveness
Exploration/invention	Object exploration: from 'material object' to 'sound object' (Delalande, 1993) Repetition, variation, contrast, alternation, sequence
Listening	Her/his products Adult products Other child/children products
The Flow experience	Focus attention, concentration, clear-cut feedback, involvement, change in the perception of time, clear goal, intrinsic motivation, control of situation, excitement Flow indicators: self-assignment, self-correction, deliberate gesture, anticipation, expansion, extension, awareness of adults and peers (Custodero, 2005)
Music analysis	Time system Sound system Frequency system Form system

Diaper change

Taking care of the body is one of the most important moments of the relationship between parent and child. The ritual nature in which diaper change is carried out, together with the security offered by the parent's care, guides the development of the child's concept of temporality. Diaper change represents an excellent occasion to observe adult-child face-to-face interactions. Even when secondary intersubjectivity in the mother-child relationship begins to be predominant and face-to-

face interaction decreases (i.e. after 21–24 weeks after birth), this phenomenon is still present when the child is lying on her/his back – as it happens during diaper changing (Fogel, Dedo, & McEwen, 1992).

The observation

The observation took place for two consecutive weeks during diaper change, which was carried out by the mother (31 years old) and the father (32 years old) with their single infant (nine-month-old boy). The observation took place in the bathroom of the house, where the child is usually changed, in two moments of the day: the first change in the morning, with one of the parents (one week with the mother, one week with the father), the second change in the evening, with both parents present. A fixed videocamera was positioned opposite to the changing table, in order to record as many of the various movements during the change as possible. The first recordings began some months before the actual data collection. This allowed the parents to become accustomed to the presence of the video-camera.

Data and discussion

During diaper change, we observed interesting phenomena of face-to-face mother-infant and father-infant interactions, and also triadic interactions between mother-father-infant (see Figures 1–3). In particular, it was possible to observe the strong presence of the vocal play between adult and infant. Changing times were quite constant, but there were significant differences between the mother's changing time (average time of 8'57") and the father's (average: 10'04"), and between the change carried out in the morning with just one parent and that carried out in the evening with both parents (average time: 7'07") (see Gastaldelli, 2006).

The father-child and mother-child dyads

Episodes of imitation/variation were apparent, as well as turn-taking, attunement, vocalisation, speaking and singing, and games in which the rhythm of the interaction was gradually modified (see the example 'I'll catch you now' in Stern, 1998). Modelling was also present and could be seen, for example, when the father 'caught' a sound made by chance by the child when trying to suck its thumb: he then re-launched the sound back with his own voice and a mouth-hand gesture, and then helped the child to reproduce the same sound, guiding the movement of the child's hand.



Figure 1. Diaper change: interaction face-to-face and vocal improvisation father/child.



Figure 2. Diaper change: interaction face-to-face and vocal improvisation mother/child.



Figure 3. Diaper change: triadic vocal interaction mother/father/child.

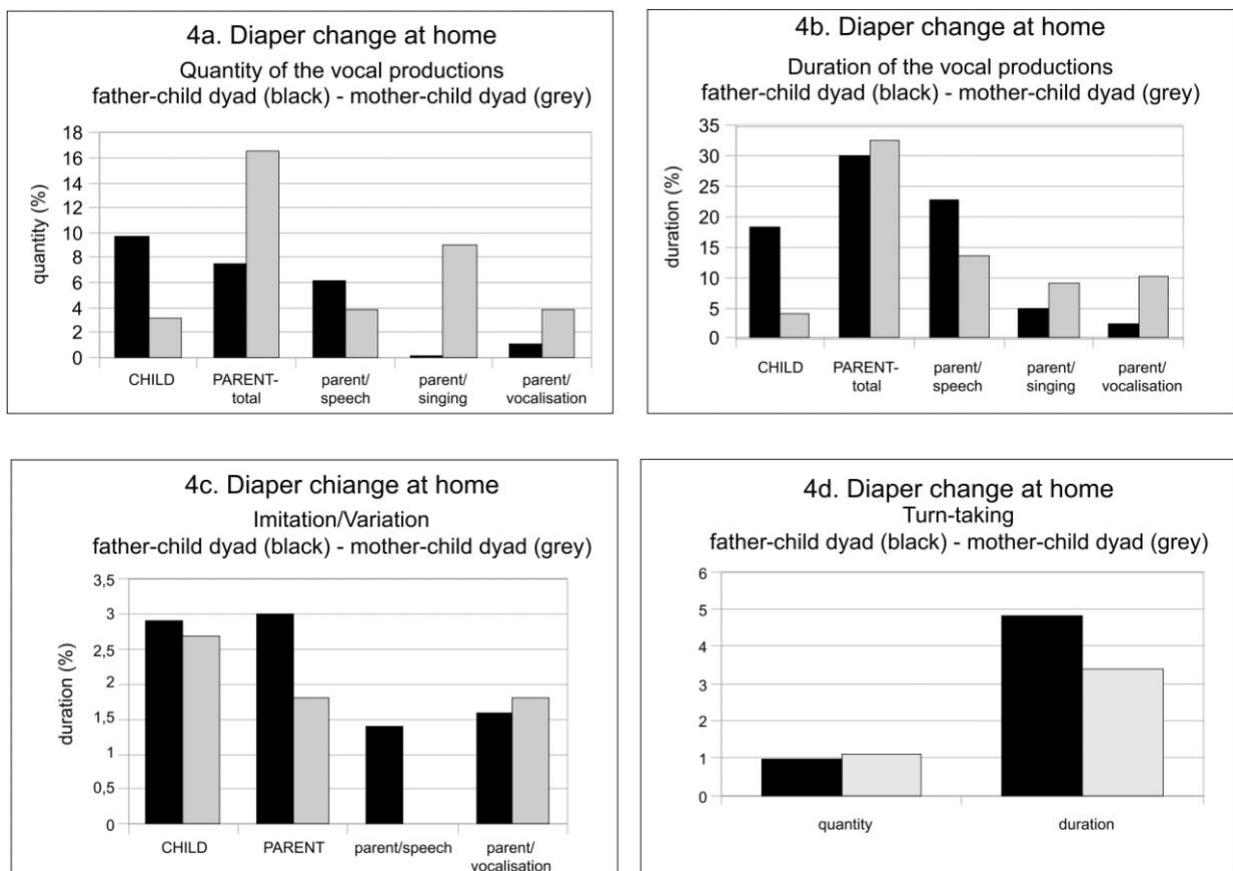
A first observation of the video shows that the father-child interaction was characterized by lots of musical play, which led the two partners towards constant affect attunement. During interactions with the mother, there appeared to be fewer moments of attunement; the interaction seemed to be more often guided by functional causes like language learning. In some moments, for example, the mother's effort to teach the child to repeat some 'pre-linguistic' sounds was clearly visible. One of the explanations which we have given to these two differing musical interactions was the different intentionality of the adults. Whereas the father was more motivated to use this moment as a personal private game time with his son, the mother, who had time during the day to share other private moments with the child (e.g. during feeding), regarded diaper changing more as a functional moment in the routine, that is the need to change the child. We wished, however, to observe the interactional and musical aspects of these two types of interaction more analytically so that we could identify the structural elements which, over time, determined the greatest musical 'attunement' as observed during the child's interaction with his father. To do this, we created a new grid to measure the quantity and the duration of the child's and parents' vocal productions, as well as the duration of both imitation/variation and turn-taking. The first diaper change of every dyad was then analysed. Surprisingly, the following results were obtained.

As we can see in Table 2 and Figure 4 there was a high percentage of vocal interaction in both dyads. Nevertheless, it should be noted that in the session with the mother, the child appeared to be more vocally passive. As shown in Figures 4a and 4b, the quantity and length of the child's vocalisations were greater during the interaction with the father than the mother. Instead, the quantity and the duration of mother's vocal productions were higher than those of the father. The mother sang more than the father. The father spoke and vocalised more than the mother. The father imitated the child more than the mother (see Figure 4c). The turn-taking was longer in father-child dyad (see Figure 4d). The mother tended to overlap the voice of the child and consequently the child's participation faded out. There was also less effort and respect in terms of turn-taking with her. With the father, the imitation/variation episodes were longer and the turn-taking was respected, as he waited for the end of the child's intervention, leaving him the necessary time to finish. Furthermore, we observed that the father's gaze was directed towards the child for longer than that in the mother-infant dyad. Vocal interactions with the father were present throughout the entire duration of the diaper change. During diaper change with the mother, however, this was grouped into different episodes, where both the partners produce vocalisations, which were separated by long moments of silence.

In conclusion, the child's increased vocal passivity which was observed in the mother-child dyad could have been caused by the greater presence of the adult's vocal productions, the limited presence

of turn-taking and imitation by the adult, and the intervention of the adult during the turn-taking that disrupted the child's vocalisation.

Some of these results confirm findings from previous studies, which observed that in the presence of maternal stimulations that are non-contingent (i.e. the mother does not respect the timing of the interaction), lacking in emotional sharing, or are excessive and intrusive, the behaviour of the child is characterised by passiveness or disorganization (see the results of the Double Television communication set-up used in Delavenne, Gratier, Devouche, & Apter, 2008; Murray & Trevarthen, 1985; Papousek, 2007). From a pedagogical point of view, these results suggest that in order to enhance the vocal production of the child, adults/educators should not vocalise too much, but rather find a balance between their vocalisations and the vocalisations of the child, leaving her/him time to vocalise respecting turn-taking, imitating the child rather than trying to be imitated, following the nuances of the child's voice, giving preference to musical play and the pleasure of musical interaction.



Figures 4a–d. Diaper change at home – 1st change, mother/child (total time: 9'13") and father/child (total time: 10'26") dyads. The quantity and the length of the child's vocalisations were greater during the interaction with the father (a and b – black column) than the mother (a and b – grey column). Instead, the quantity and the duration of mother's vocal productions are higher than those of the father. The mother sings more than the father. The father speaks and vocalises more than the mother. The father imitates the child more than the mother does (c). The Turn-taking is longer in the dyad father/child (d).

Table 2. Changing the diaper: first session vocal interaction.

	Father-child dyad	Mother-child dyad
Total time	10'26"	9'13"
<i>Quantity (%)</i>		
Child	9.7	3.2
Parent/vocalisation	1.1	3.8
Parent/speech	6.2	3.8
Parent/singing	0.15	9.04
Parent	7.5	16.6
<i>Duration (%)</i>		
Child	18.2	4
Parent/vocalisation	2.4	10.1
Parent/speech	22.8	13.6
Parent/singing	4.9	9.04
Parent	30.03	32.7
<i>Imitation/variation (%)</i>		
Child	2.9	2.7
Parent/vocalisation	1.6	1.8
Parent/speech	1.4	
Parent	3	1.8
<i>Turn-taking (%)</i>		
Quantity	0.95	1.1
Duration	4.8	3.4

The musical quality of vocal interactions

The quality as well as the quantity of vocal output is important. The vocal exchanges with the father were characterised by a greater temporal fluidity. The vocalisations were evenly distributed over time and had greater melodic and rhythmic variety, which is the result of the elaboration of a pattern made up of two rhythmic accents, the first of which is strong, followed by a weak accent on a descending glissando of about an octave. With the mother, there were a greater number of culturally codified and repetitive vocalisations (i.e. Ba Ba Ba, Ta Ta Ta, Ma Ma Ma) than with the father and they were almost always proposed by the mother. Also, when the mother imitated the child, she tended to codify the expressions of the child rhythmically and melodically in the form of word games or songs, while the father continued to extend the pitch and the rhythmic and expressive dynamics of the child's vocalisations, leaving space for the development of more original and less culturally codified vocal expressions. These elements lead to a greater fluidity and timbral richness, and also to the presence of attunement, which was clearly observed in the father-son dyad. We therefore consider the musical quality of the interventions themselves to be an important element in influencing the level of vocal passivity observed in the child. More repetitive vocalisations with culturally codified rhythms and pitches seem to stimulate the child less than vocal games that follow and tune into the child's still unpredictable and improvisational vocal style.

Differences between the father and the mother

Over the last years, interest in the father-child dyad has increased, following some widespread social and cultural changes that have affected parental roles in families. Various aspects of the father's role in children's care and education are highlighted in the studies collected by Evans and Jones (2008). In the musical field, in a laboratory experiment in which fathers were asked to sing a song in the presence or in the absence of their own child, O'Neill, Trainor, and Trehub (2001) noted that fathers tended to modify their way of singing and were more 'loving' in the presence of their children, as had already been observed earlier in a study with mothers (Trainor, 1996).

However, infants showed greater visual attention when listening to fathers' than to mothers' singing, and the former was, in general, highly engaging to infant listeners (O'Neill et al., 2001). In the experiments carried out by Trehub, Hill, and Kamenetsky (1997) the parental singing styles differed depending on the sex of singer and listener, and both parents sang more playfully for same-sex infants than for opposite-sex infants. Observations in a natural context such as those made in our study, on only two parents, do not offer sufficient quantitative data for determining whether the differences observed in the two dyads were due to differences in parental roles. The data observed do, however, support the results of previous studies, and allow us to put forward some hypotheses, which further studies with more subjects may be able to confirm. These hypotheses concern:

- The different intentionality that guides the two parents during diaper change that opens up a socio-cultural perspective in the study of musical interactions between parent and child (e.g. play for the father, functional for the mother).
- The different modalities of temporal interaction (i.e. temporal contingency, affect attunement, imitation, turn-taking).
- The different musical quality of the vocalisations.

Routine as cognitive and affective frames for improving young children's music know-how

One of the most significant episodes was observed in the last diaper changing session with the father. During this session, the synchrony between parent and child seemed to have reached its peak with frequent episodes of affect attunement, during which vocalisations were emitted together, displaying remarkable anticipation and synchrony. Father and son 'played', improvising like two musicians playing together. Their eyes were focused and directed towards one another, while imitation further encouraged interaction, and above all, affect attunement. The most extraordinary aspect of this sequence is that we are not dealing with a 'natural' behaviour here; on the contrary, we observed how the situation is co-constructed over time as a result of co-regulation, in Fogel's (2000) terms. Father and son reached attunement step by step, constructing a series of shared and co-regulated actions, day after day, which allowed them to learn to anticipate the other's gestures and to regulate their own actions in relation to their expectations of their partner. During this process, in which gestures were always 'the same but different', the child learned to share gestures, sounds, and at the same time to control them. This is precisely the function of routine, to construct a type of format, or frames, allowing children to control time and its content, made up of gestures, emotions, and actions (Bruner, 1983; Emiliani, 2002). Children can thus learn to vary and insert new elements, thereby developing their consciousness and co-constructing, in this case through sounds, new knowledge on how to act.

Bedtime

Falling asleep in the nursery school is another very important routine in children's daily life. It is a moment of interaction among peers, but also a period of very interesting individual situations that can be observed from the point of view of vocal output, above all in 'autotelic' vocalic games (i.e. during which the motivation is centred on the act itself, without any external reference). Children make these games alone just before closing their eyes in their cots and falling asleep. The presence of an adult is also important in these moments.

The observations

Observations were carried out in the dormitory of an Italian nursery school, with seven children aged from 13 to 19 months. The filming was carried out when the children were going to sleep. Each child was in its own bed and left free to vocalise. Two women educators were present, and put on the strategies of mirroring, modelling and scaffolding into practice, as normally occurred during this moment of the day. Filming sessions did not have a fixed duration but followed the development of the spontaneous outputs and rhythms of the children. The aim of the observation was to carry out an analysis of the way the children use, explore and discover their voices before falling asleep.

Data analysis

Analysis of video-recorded material attempted to explore, through microanalysis of short fragments, some aspects of the vocal production of children and tried to find an answer to some questions regarding modality, timing and characteristics of child vocal exploration. We observed the imitative vocal games among peers, and an interesting ‘autotelic’ musical play of a young girl singing just before she closed her eyes. The melodic contour of her voice showed tension/distension, alternation and the repetition of a descending melodic pattern.

Vocalisation among peers

An example of the microanalysis carried out is shown below. In this episode it is possible to see children who took part in musical games based on the elaboration of some vocalic sounds. These started with the cry of one child, and were subsequently varied by the other children as they ‘threw the sounds’ back and forth to one another.

Duration of the fragment: 3'41"

Children present: Alice (15 months), Angela (16 months), Antonio (19 months), Mattias (18 months), Lisath (17 months).

Description: *Angela, probably stimulated by the sound produced by another child, started her vocalic game, producing and repeating a long and upward rising sound on the vowel ‘a’. Alice began to cry and joined in with Angela’s vocalic game, making long and staccato sounds while producing variants around the vowel ‘a’ (‘ahi-ahi-ahi’, which became ‘Eeee’ and finally ‘ia-ia-ia’). Lisath took up the simple ‘a’ again, without particular pitch or consonants/vowel combinations. Mattias re-launched the sound, combining a rhythmic element in the vocalic production, with regular hops and skips on his bed, holding on to the railing with his hands. In this way, the sound gained a marked rhythmic variant, thanks to the rhythm of the movement that the child produced and that he introduced into the collective elaboration, giving a very gestural rhythmic variant. Antonio re-launched this variant when Mattias and Lisath stopped. Alice seized Antonio’s proposal and re-launched it to the whole group with greater intensity and energy, and the whole group started producing a chorus of ‘Aaaa-Aaaa-Aaaa’ again. (Panzetti, 2008, p. 140)*

Interestingly, all this happened without any adult intervention. The children showed great competence. They picked up on a stimulus, each one re-elaborated it in their own way and found a communal solution. Their ability to pass from one to another, to elaborate a stimulus coming from other children rather than just simply imitating it, was noteworthy. They seemed to have found an idea, concentrated on it and then shared it. It is clear that the children gained pleasure from the experience of imitating and varying, by giving voice to the movements of their bodies through their own voices, expressing a sort of vital energy, which was released through the voice.

Methodological problems in the study of interaction among peers

The phenomenon of vocalisation among peers is one of the most interesting and complex phenomena studied in the psycho-pedagogical and musical literature (see Ferrari, 2008). The study of ‘infants in groups’ has become an experimental paradigm for studying child development and it has been contrasted with the adult-child dyad paradigm (Selby & Bradly, 2003). Recent research undertaken by Malloch, Crncec, Adam, and Bradley (2005) used quantitative methods to analyse the number of vocalisations, the movements and the frequency of gazing in a group of 3 eightmonth- old children, sitting in their prams, arranged in a triangle. An ethnographic method, however, was chosen by Young, Street, and Davies (2006) to observe in a natural setting, how children interact among themselves and with educators during musical activities. One of the most relevant problems encountered during the observation of interactions among peers in natural settings is the methodological difficulty of observing a large number of subjects and variables at once. New technologies can be very useful in this case, in particular software that is specifically designed for ethological observation, which offers the possibility of watching a large number of variables at the same time. This is the direction that the current project followed. An observation, therefore, was carried out with the aim of systematically observing some aspects of vocal interactions among peers, and the data are currently undergoing analysis with the support of specific software (Ferrari & Addressi, 2008).

Pedagogical implications

In a situation of high concentration and interaction among peers, as the one observed in the ‘bedtime’ protocol, adult intervention can be very important. The intervention does not always have to be structured and intentional; as we have been able to verify more than once, even a song that is sung by chance or the mirroring of some vocalisations can act as a stimulus for subsequent games. The educators present in the setting used mirroring strategies, modelling and scaffolding (Bruner, 1983; Vygotsky, 1962), through which it was possible to welcome the children’s proposals making the most of them, and extending them to the group, encouraging the circulation of individual ideas and reciprocal exchange, proposing vocal games or taking up those of the children again, and launching them back to the group. Furthermore, when falling asleep, the children found an acoustic environment that allowed them to rediscover attention to a single sound, to a single noise that was lost in the chaos that usually surrounds and invades their living areas and often their educational structures as well. A favourable acoustic environment allowed them to find a space where the vocalisations were easily distinguishable, and where the sounds and all their nuances could be clearly heard. As one of the students who followed the protocol commented:

The training has been a positive experience and fundamental in allowing me to understand an important aspect of the child’s life in more depth. The experience also allowed me to discover in the first person, how easy it is to overlook the potential of the vocal game, which is often not given importance or not picked up on. At the same time, I have observed how both the child and the adult benefit from its development, in terms of their abilities, relationships and communication. I hope to have acquired an eye and an ear that can read, hear and see the children’s vocal and sound exploration, which I will now look out for. I hope to be able to retrieve this important dimension of communication and exchange in my daily work, without confining it to just a few moments. (Panzetti, 2008, p. 142).

Free-play at home

The adult-child interaction has different connotations according to the context in which it takes place. A very important context is that of play which, unlike the other routines that were analysed (i.e. diaper change, bedtime and feeding time), does not have any practical function and no aim to fulfill. Play is characterised by pleasure, and by being together and having fun (Sansavini, 2007). A first protocol was done with a two-monthold baby girl during her free-play in the drawing-room, for one month, three times a week. One of the most interesting things observed was the presence of a proto-

conversational vocal expression. As an example, a young girl imitated the pitch and rhythm contours of her mother when she was speaking on the phone (Finotti, 2007).

Mother-child musical co-regulation

A third protocol involved a musician mother (pianist) and her three-year-old son, playing together with several toy-instruments during free-play at home.

Procedure

On a weekend, a mother and her nearly three-year-old son were filmed in a spontaneous context at various moments such as routine, free-play or relaxing times. The entire session (circa one hour) was filmed with a hand-held camera by a non-participant relative; some of it was carried out in the presence of the researcher while in other moments the mother and child were left alone with some short and rare interventions by the father.

Data analysis

A microanalysis was carried out on selected excerpts, in which the situation was ‘normal’, that is, without significant influences from external elements on the mother and child, and the activities carried out were also as ‘normal’ as possible. Selected video fragments (i.e. approximately eight minutes long) showed the mother and child interacting while playing with instruments/toys and the voice. The analyses were carried out according to the five communication categories of the Relational Coding

System Proposed by Fogel (2000). This allowed us to observe and analyse the musical game between the mother-musician and her child, so that we could thereby reveal the communicative style in the dyadic interaction. Substantial ‘unsymmetrical’ co-regulation (48%) was observed in which the mother introduced new musical elements during play (e.g. a new way to play the instrument/toy, or to make a rhythmic pattern, etc.) (see Figure 5). In two moments a ‘symmetrical communication’ was present (24%) (see Figure 6). In this case the child showed a particular interest in the musical experience and ‘asked’ to repeat it while in the ‘unsymmetrical communication’ he expressed enjoyment, but caused ‘disruption’ when his mother introduced new features that were too different from his own and that were too difficult for his abilities, especially when she did not accept the innovations he proposed (12%) (see Figure 7). Over a shorter period, one-side communication was also observed (16%), that is when the child played with instruments without involving his mother, who just observed and only occasionally spoke some words to him, in this case mainly to do with his playing (Piras & Addessi, 2008).



Figure 5. Free-play at home. ‘Symmetrical communication’: mother and child playing a

tambourine. The co-regulation is based on the creative and coordinate communication.



Figure 6. Free-play at home. ‘Unsymmetrical communication’: mother introduces strategies of playing, and the child observes and repeats.



Figure 7. Free-play at home. ‘Disruption’: the mother introduces a new element in the action that causes the rejection of the child. He resolutely moves away from the toys and from his mother, and orients himself to another place.

Socio-cultural implications and research perspectives

The most important result of this particular protocol was the correlation observed between the mother's professional role (pianist), and the style of communicative coregulation. We can see from the data how the mother tried to 'teach' the child the correct position of the fingers on the little keyboard, sometimes interrupting the spontaneous (and much more creative) exploration that the child was producing. This type of co-regulation between partners not only generated very long moments of unsymmetrical communication, but also elicited a period of disruption during which the child stopped interacting with the adult. The question that arises spontaneously is whether this type of communication is caused by the personal interactive style of this particular adult or whether it also depends on her professional role. In other words, does the mother's musical professional role affect communicative co-regulation? In a study on maternal beliefs and uses of music with infants, Ilari (2005), for example, found that maternal occupation and previous musical experiences were determinant in mothers' uses of music with their babies. More recently, Matsuda and Adachi (2008) observed how the degree of professional musical activity of the mother influences their capacity to transfer their own tensions to their children. 'Musically active' mothers, that is, mothers who are more active in listening to music daily, singing to themselves or to the baby, playing an instrument, also wish to expose their child to music and the arts more strongly than 'musically passive' mothers (i.e. mothers who are less active in the same actions). The theory of social representations (Moscovici, 1981) can be useful here to analyse and better understand this type of phenomenon.

Mugny and Carugati (1989), for example, have found a significant correlation between the professional role and social representations of the 'intelligent child' possessed by three different social categories: the mother, teachers and motherteachers. In a study that was recently carried out in the musical field, it was observed that the concept of 'musical child' held by university students who were preparing to teach in the kindergarten was different from that of those who were preparing to teach at primary school (Addressi et al., 2007). Similarly, the question arises as to whether the professional musical role of the mother (i.e. musician/non-musician; musicianteacher/ non-musician teacher) can influence her representations of the 'musical child', and whether this could therefore be at the basis of different styles of co-regulation in the mother-child dyad during free-play with musical instruments. In order to find an answer to this question, a new series of observations have been planned with the mother-child dyad, while they play together with musical instruments in their free time. In this case, the maternal musical role constitutes the variable to be examined. In this study, observation will be supported by the use of a questionnaire which will aim at investigating the social representations of the 'musical child' held by the participating mothers.

Conclusion

The data collected so far document a variety of observable musical conducts of children, also when they are engaged in other activities. It shows that musical dimensions are part of the daily routines of the child, marking time, giving a rhythm and temporal organisation to her/his experiences. They also show that children tend to carry out some interesting and personal vocal play just before they close their eyes, which we called autotelic vocal play. Musical experiences also mark the interactions between the child, the context and other people, be they adults or children. In order to encourage children's vocal inventions, the adult should create a stimulating space, making themselves available for the musical play and interaction, for the vocal dialogue, and above all, should pay attention to the children's discoveries so to sustain them and re-launch them. The observations undertaken so far have been of an exploratory nature and have allowed us to: (1) document some aspects of the musical dimension of the routines examined, (2) create a grid for the observation, (3) confirm some of the theories on infant musicality, and (4) plan a data collection procedure that is more systematic and focused on the more interesting aspects that have emerged. These include: (1) the correlation between the vocalisation of the adult and the more or less passive behaviour of the child in the dyadic interaction with mother and father; (2) the influence of the professional role of the musician mother

on the communicative co-regulation in the mother-child dyad during the moment of free musical play; (3) the elaboration of a grid to observe the vocal interactions between peers that takes into consideration musical parameters so to describe the musical quality of the interactions and, lastly, (4) the observation of vocal autotelic games at bedtime. Finally, the data collected and the video analyses showed that the students participating in this project have acquired some scientific tools to observe and analyse the musical conducts of young children.

Endnote

1. In French: Conduite; Italian: Condotta; German: Betragen; English: Conduct.

Annotation

In the chapter I described an action-research project which I coordinated in the framework of the course of Sound Education which I teach at the University of Bologna, within the three-year bachelor degree for Educators in childcare services. This action-research project involved researchers, educators, and the students in empirical investigations of the sound-musical dimension in the daily life of children aged 0-4. The project had not only research purposes but also that of the training of student/educators, in a socio-constructivist perspective that sees the teacher as a 'teacher-researcher'. Of particular importance was the fact that they were not music teachers, but educators in the nursery setting. This particularly innovative context developed in the Department of Education was also created thanks to the relationships established both locally with the Childcare service of the Municipality of Bologna, at national level with the Italian Society for Music Education, and through an international network. Precisely for this particular context, Bologna hosted the European Network for Music Educators and Researchers of Young Children (MERYC) 2009 conference, which had a major impact on the subsequent conferences of the network, and consequently, on the research of both early childhood musicality and researcher/practitioners' education (Addessi & Young, 2009; Young & Addessi, 2010). The focus of the project was mainly on the child's musical experience in everyday life, in order to understand how children experience music and sounds, and by observing in real time the presence and meaning of their daily sound productions with their voice, body, and objects. Namely, how the sound-musical world was present in their daily communication and interactions with other peers, adults, and caregivers. The choice to observe daily routines stemmed from the fact that these routines represented an essential 'format' in the interaction and communication between adult and child. At that time, it was among the first systematic projects in this area of research on daily musical experiences in early childhood. The research-action project is still ongoing today. Observation is the main technique used, both qualitative and quantitative (Addessi, 2017; Balduzzi & Pironi, 2017); however other techniques are used such as questionnaires and interviews. Over the years, students have been involved in various projects, carrying out small-scale enquiries in nurseries, at home, in children centres. Further projects included: Musical Interaction Relying On Reflexion (MIROR, EU-ICT), the Erasmus Plus Projects such as Learning In a New Key (LINK) and Sustaining Teachers and Learners with the Arts (STALWARTS). Moreover, our students have also collaborated in participatory action research, for example with hearing-impaired children and in a dance centre with a girl in a wheelchair (e.g., Ferrari & Addessi, 2014/2017; Gurioli, Ferrari, & Addessi, 2019; Menigher & Addessi, 2011).

In particular, the study of the vocal interaction during the diaper change routine has led to plan a more systematic data collection procedure focused on the correlation between the vocalisation of the adult and the more or less active vocal behaviour of the child. Specifically, the grid of vocal activity observation (described in the above chapter) was developed further, and more data were collected in homes and nurseries, both with educators, parents and grandparents, for a total of about 150 diaper changing sessions. The grid of vocal activism allows to register the duration of the following behaviours, for each partner, second by second: vocal productions, imitation-variation, and turn-taking. Furthermore, three different vocal productions of the adults were registered: (1) Vocalization

– the vocal productions which are neither singing, speech, nor infant-directed speech (IDS); (2) Singing – singing and IDS; and (3) Speech+IDS – both speech and IDS including a sort of intoned speech, or speech/singing.

In parallel with the development of the grid and the collection of new data, I was working on the theoretical framework of reflexive interaction. The idea of ‘mirroring’ originated in ancient Western culture (Ovid’s myth of Echo and Narcissus [43 BC-18 A.D.]; *Metamorphoseon libri XV*), and now resonates with contemporary psychological theory of musical embodiments, the link between action and perception, and the mirror system. The main characteristic of the reflexive interaction paradigm is the mechanism of repetition-variation; something is repeated and varied during the interaction, through a continuous process of imitation and variation. Turn-taking and coregulation between the partners are also fundamental (Addessi, 2014).

The results of the analysis of the new data collected during the diaper change routine showed that reflexive interaction affects the child’s vocal production. It was observed that the child is vocally more active when the adult parents and grandparents engage in imitation-variation and turn-taking (Addessi, 2020). These observations are not only in line with the current chapter (published a decade ago), but also expand previous research conducted on infant-adult vocal interaction in the daily life (e.g., Papoušek, 2007). It became even more evident that there is no difference between singing and speech. Costa-Giomi (2014) highlighted that many studies have focused on infants’ differential attention to speech and singing with different and sometimes conflicting results, and that further variables can affect infants’ preference such as the mode of presentation. The observation of vocal interaction during diaper change highlights that the interactive processes of repetition-variation and turn-taking can affect children’s preference, whether it be speech or singing, and that these interactional processes are efficient in attracting the attention of young children, specifically by stimulating their self-initiated vocal production.

These results can have some importance for the development of singing, namely the acquisition of conventional songs as well as the invention of creative songs (Barrett, 2006; Cohen, 2011; Russo, Ilari, & Cohen, 2020); children who are vocally active, who imitate and stimulate the partner to imitate her/him, who participate in vocal play, seem to develop into a child who is also active in singing. From a pedagogical point of view, the results suggest that in order to enhance the vocal production of the child, and her/his ability to imitate and to participate in the vocal and musical conversation, adults and educators need find a balance between their own vocalizations and the vocalizations of the child, leaving the child time to produce vocalization, respecting the turntaking, following the nuances of child’s voice, giving preference to musical play and the pleasure of musical vocal interaction, and imitating the child – rather than trying to be imitated.

While the last decade has seen an increasing interest of researchers in this research area, I perceive much could be gained by investigating the correlation between vocal emotional features and children’s vocal production, and perhaps the findings of such studies would have an even greater impact on the daily life of children if they involved parents and other family members in the projects themselves.

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