

Pre- and postnatal music education for early mother-child interaction

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ABSTRACT

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Successful communication underpins the success of human interaction. Music education and early interaction are well known as separate phenomena. In the research reported here, music was considered as communication. The focus of the study was aimed at the gap between the connections of music education with interaction, supporting development through musical nurture. Multiple strategies methodology: qualitative and quantitative measures, theoretical, data, investigator and methodology triangulation were employed in this investigation. Systematic video analysis, however, was used as a main method. The philosophical background was phenomenological, while the empirical study was conducted as an adaptation of an action study. The musical-emotional communication in the groups of mothers and babies were compared by separating the participants in three groups: 1) for both pre- and postnatal musical sessions (E); 2) only for postnatal musical sessions (C1); and 3) for no musical sessions at all (C2). Strong, multiple connections between music and interaction were found in the early behaviour of the mother and the baby, and in the infant's development. Based on vocal, visual, bodily and emotional evidence, especially the prenatal musical experiences were found to be significant for the mother-infant-bonding. In conclusion, early interaction can be musically supported. Keywords: Early interaction, fetuses, infants, mothers, music

Introduction

An African story tells about a young woman, who decides that she wants to have a child. She goes away from the village, and sits under a tree all by herself. She sits and waits – until she can hear the song of the child that wants to come. After memorizing the song she returns to the village and teaches the song to the man who is to be the father of the child; and while the child is being conceived, they sing the song together, to welcome the child. The song will be taught to the midwives and the old women of the village, so that they will be able to sing this welcoming song at the moment of birth, and eventually

to all the villagers. That song is present throughout the child's life, in joy and in sorrow. Finally, it is sung to this person as a farewell, around the deathbed¹.

Music is a mode of communication: human interaction includes musical features and qualities (Dissanayake 2000). In this study, by the name of *The Belly-Button Chord*, the possibilities of music education in supporting very early mother-child interaction, throughout musically supporting the attachment, were explored. The effects of music are most powerful on a small child, and when it comes to foetuses, the impacts can be supposed to be even more powerful.

Music has been found to effect on attachment (Ukkola et al. 2009). Are pregnant mothers or fetuses better attuned to music than the rest of us? How will prenatal musical experiences reflect to the infant's interaction behaviour? Does and should the mother-child interdependency strengthen through prenatal, shared experiences? Emotions can be considered as interface between music and fetuses. Emotional features and their effects are fundamental for a fetus, soaking up the mother's feelings chemically, physically and mentally (Chamberlain 1994). Music, in this study, was investigated as a bond between the mother and her newborn, enhancing the quality of postnatal life. In this study, the focus is on the phenomenon of early interaction as a whole, and the connections of music education with it.

Musical communication

Musical abilities are considered as a resource passing on through generations. Those who have the possibility to both, domestic musical experiences and education, will naturally be in the best position to receive art (Bourdieu 1985: 138-141). Musicality as an inherited capability is affected by the environment. (Roiha 1965: 140, 143.) In this study the Ethological theory and the Relationships approaches (Hinde 1997) formed a basis for the infant's development within the network of social relations. Both, the development of musical abilities as well as the holistic development begin prenatally. Foetuses have been found out to express and experience feelings very deeply, which can be observed from the foetus' movement (Chamberlain 1988: 8-9).

According to Stephen Malloch (1999/2000) three elements of communicative musicality can be observed: 1) pulse: regular expressive events through time; 2) quality: melodic and timbral vocalization contours and 3) narratives: individual companionship experiences². (Malloch 1999/2000: 32-45.) Communicative musicality is vital for combinable parent – infant communication (Malloch 1999/2000: 29).

First exposures to human world consist of whatever his/her mother actually does with her face, voice, body and hands. This provides his/her emerging experience with the stuff of human communication and relatedness for the baby. (Stern 1977: 9.) Perception of emotion is one of the skills that appear even prenatally. A fetus is strongly

affected by the mother's emotional states, shown as physical responses in our bodies. Even chemical mother-fetus communication exists. (Chamberlain 1996.) Music plays an important role in emotional communication. The emotions strongly correlating to music are happiness, sadness, anger, fear and tenderness (Juslin 2001:315). The happy and sad tones of emotions tend to be among the easiest ones to communicate in music. They are expressed by similar structural features across musical styles and cultures (Peretz 2001: 113-114).

In the Belly-Button Chord study, because of the musical choices that were made for musical activities, it was assumed that happiness and tenderness would dominate in mother-infant interaction, to be observed through reactions. Besides the reactions, emotions and changes in them were noted, along with facial, bodily and vocal expressions (cf. Dissanayake 2000, Papousek 1996:37).

The brain functioning

In this Chapter, the main ideas of the brain functioning are described as the functions and the development of the brain can be effected through music. It has been suggested that consciousness is a property of a fetus. Cheek (1986) talks about a kind of consciousness, and Chamberlain (1994) even of a sentient pre-nate. According to Prechtl (1974), an infant's eye, body and respiratory movements allow 5 states of behaviour to be identified: two sleep states (non-REM, REM), and three states of wakefulness (cited by Parncutt 2006: 14).

The brain is ultimately involved in the production and control of all thoughts and feelings. Music affects cognitive capabilities and certain general abilities, such as attention (Huotilainen 2011). The brain controls movement and coordination, stores memories, allows us to interpret sensory input, and gives us powers of creativity, imagination, and rational thought (Thompson 2009: 152-153). Neural responses to multiple sensory inputs of processing have been reported at early stages (Thompson 2009: 154-155).

The essential parts of the cerebral cortex are functioning between 20 and 28 weeks g.a. Messages are carried to special receptor sites throughout the body and brain by neuropeptides as early as 30 days after conception. Even stress in the body can be stated being present in the blood-stream from seven weeks g.a. A bi-directional communication network is functioning (Chamberlain 1995: 3-4). There are twelve fetal senses to receive information (Chamberlain 2003). All cranial nerves lead to the ear, which makes it our primary sense organ. Embryonically, the skin can be thought as differentiated ear, we all listening with our whole body (Thaler 1994).

Continuous connection between the brain and the body is sustained, supported by emotions and processed in the limbic system of the brain, working together with the

body, and eliciting bodily signs of the emotions, like the smile of joy. The complex connections in the limbic system demonstrate that to be able to learn and remember we need feelings, a personal and emotional relationship to the thing to be learned and a movement: each experience is an event for the unity of mind and body. (Hannaford 2004: 42-43.)

Theories behind early childhood music education

The Ethological theory and the Relationships approaches (Hinde 1997) complemented with *the Musilanguage theory* (Brown 2000), constructivist learning approach (Tynjälä 1999), Hannaford's theory of holistic learning (2004) and early childhood music education principles (Wood 1982), created the theoretical background for the curriculum and its implementation in the study. The elements of body, emotions and reason were underlined (c.f. Hannaford 2004: 6-7) in the empirical part, as an adaptation of the action study.

Music is able to touch all areas of development: physical development, emotional development, intellectual development, social development, creative response and development, and finally, it may lead to experiences of fun and happiness (Wood 1982: 26). These areas of development were treated from the viewpoint of the curriculum and goal setting. Gardner's MI-theory (1993, 1996) is pointing out to the same direction with the ideas of Wood's. David Chamberlain (1998) describes the connections of this *Theory of Multiple Intelligences* to the foetal development in detail.

The capacity of thinking and feeling the other is connected to the capacity of dancing and singing in smooth, predictable rhythm with each other in our talk. Teachers tend to be understood better through a mutually shared musical signalling system for the coordination of attention and action in talk (Erickson 2009: 461).

Music and development: from fetus to child

According to Hinde, children enter from before birth into networks of relationships that are crucial to their subsequent cognitive, social and emotional development (Hinde 1985: 114). The effects of music on a child are strong (Gardner 1993, 1996; Wood 1982). The influence on a child is at its peak prenatally (Chamberlain 1994). Music and language can be understood as deriving from the same net (Brown 2000). Musical elements, such as rhythm, sound and melody are used as elements for language producing, in speaking and shown in one's expression, intonation, tones and duration (Marjanen 2009).

Exposure to intrauterine sounds makes newborns calmer and more self-regulated (DeCasper & Sigafos 1983). The origins of a child's musical skills may be found on the prenatal level (Parncutt 2006: 1). Infants possess a wide range of skills that can be described as musical, such as musical taste, and listening skills (Trehub 1996: 33). The development of musical abilities begins prenatally. There are three aspects of early musical experience:

1) A prelinguistic alphabet or code in the form of musical elements that both infant-directed speech³ and infant vocal sounds have in common. Those are the most salient features for both, the mother and infant.

2) The presence of a common elementary musical code in the social care-giving environment. Parents adjust their vocal, visual, facial and tactile stimulations in the ways that correspond to the baby's capacities and thus support the infant's early musical competence.

3) From the beginning, vocal production and perception of musical elements are embedded in multimodal patterns of preverbal communication: in tactile, kinesthetic, and vestibular forms of stimulation (Papousek 1996: 90).

Aim

The aim of the study was to find out, what kind of connections were there between pre-/postnatal musical experiences and early mother –child –interactions and how did music education affect the mother and the baby, when observing certain phenomena by detail.

Method

This dissertation focused on clarifying the connections between music education and interaction. For both of these a large body of research already exists, as a solid basis for the investigation. The intention was to explore the possibilities of music education in supporting very early mother-infant interaction, with the particular emphasis on the emotional connections between pre- and postnatal musical experiences (cf. Bowlby 1957). Pre- and postnatal music education was also used to support mothers in their growth towards parenthood. In addition; the aims and targets of the selected musical activities were connected with the babies' interaction behaviour.

The study was based on phenomenological philosophy and implemented by practical music education periods, consisting of: 1) a prenatal study, 2) a postnatal study and 3) a questionnaire at children's age approximately 16, 2 months. A short preliminary study was conducted for a start. The mothers of group E (n=7) attended the pre- and

postnatal parts, and the mothers and babies of groups E (7+8) and C1 (n= 7+7) participated the postnatal part. All the groups answered the questionnaire. Group C2 (n=7+7) mothers and babies only participated in the study procedure. Because of the heterogeneous nature of the objectives and research questions, multiple methods (Brewer et al. 1989, Bryman 2008, Cresswell & Plano 2007, Layder 1998) were used.

Systematic video observation and analysis was the main method in this study. The mothers participated the interaction episodes with their babies in front of two video cameras every second week. The task they were given was to spend time with the baby as usually, as normally in the domestic surroundings⁴. Information about the emotions, types of presence and reactions, musical features, voice types, density of communication and about the ways of communicating was gathered.

Results

Prenatally shared experiences have a very clear postnatal effect on the attachment of the mother and the child (Marjanen 2009). Especially prenatal music education would seem to improve ways of expressing one self, listening skills and sensitivity of responding, be of help in abilities of being present, make mother-child bonding stronger, *improve interaction activities and vocal development*, and have effects on more positive attitudes for music, and as a reflect of that, *musical tools were better used in communication* (Marjanen 2009). Music is “meaning before words” (Trevarthen 2011) and even more than that: it is meaning between and after words as well. Linguistic abilities begin in holistic ways of communication.

In Figure 1, the impact of prenatal musical activities and experiences is very clearly shown. The total amounts of mothers’ experiences and babies’ responses in the domestic interaction situations are compared on the basis of the follow-ups (A). The dark red line stands for group E, the light yellow line for Group C1 and the dark yellow line describes the communication activities in group E2. A very clear difference can be seen between E and the control groups both in the babies’ activity levels and in the mothers’ positive feelings about their domestic interaction situations. The E babies’ show a higher activity level around than those in control groups, including “negative” reactions like “tired, crying” (14) and “no contact” (17), which is also revealing about the high activity levels of the domestic interaction situations. It could also be a question of more eagerness to report in group E than in the control groups, where the amounts reported are closer to each other; however, the task that the mothers were given was exactly the same in all the groups. When comparing the lines, it is easy to notice the difference: both yellow lines go side by side mainly, but the dark red line is separated from those.

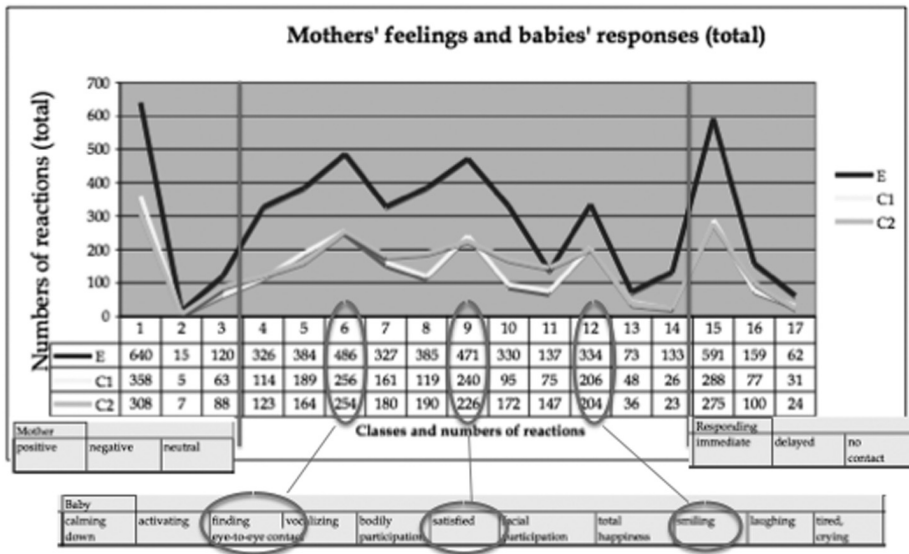


Figure 1 Mothers' feelings and babies' responses.

The class names are given in the yellow boxes in the figure, giving descriptions of the mothers' attitudes on the interaction (numbers 1-3), babies reactions (numbers 4-14) and the responding timings (15-17), as delays in reactions or immediate responding. All the mothers had positive feelings for interaction episodes, but the most positive in E. The babies with prenatal musical experiences reacted their mother's behaviour by calming down or by activating, found the mutual gaze, eye-to-eye contact, were vocalizing, participated bodily, were satisfied, participated by using their face and were smiling as a response to the mother, but also showed their negative feelings and tiredness by crying more often than the babies of the comparative groups. See Figure 1 for details.

The responses of the babies were estimated immediate by the mothers, when counting the number of reactions – as there were so many strong reactions notified, the number of immediate reactions was multiplied as well when comparing with the other groups. This kind of phenomena can be stated through a number of figures as a result of video analysis as well (Marjanen 2009: e.g. 106, 108, 112-113, 114-115, 124, 129-131).

When following the children's speech development, it could be stated that the mothers estimated both, the number of active words and passive features as highest at the child's age approximately 16.04 months (Marjanen 2009:137). For all the participants, at the end of the study, music was used as a tool of communication (Marjanen 2009: 144-145), however, used in some more consciousness ways via certain aims set in group E (Marjanen 2009: 146).

Discussion

The present article started with an African story. In African and Asian tribal practices and in Chinese culture pregnant mothers were involved in gestation rituals, including dancing to instrumental music. About 400 B.C.E. Plato asserted that vibration is the primary cosmic principle, while about 600 B.C.E. Talmudic writings referred to fetal awareness.⁵

The focus of the study was to gain information about the connections of the musical elements experienced holistically as music, emphasizing singing and a variety of vocal possibilities, including speech, but complemented with all the possibilities of the dimensions of musical activities. Language and music can be comprehended as ways of holistic communication, including bodily, emotional and cognitive dimensions. Linguistic development starts from a wide range of forms of holistic expressions. The musical activities experienced and shared by the mother and the child prenatally support their relationship. Based on the results, we should aim for creating *naturally musical surroundings for children, starting prenatally*.

The training of music educators can be developed in various directions. Through future research the possibilities and effects of music, music educators in maternity care and day care systems, systematically supporting the lives of young families within the multi-professional teams may be clarified. In strengthening maternity care and day care teams with music educators, more effort could be made to support parents; this would, at the same time, increase the work opportunities of music educators and help to diversify the profession. Interaction, beginning in the domestic environment should be supported. In this study, mother-child bonding was found to become stronger through musical support.

At the outset of this study, I could not imagine of finding such a fascinating set of theories about humans and their emotional and artistic abilities, especially in the context of music. The value of a deep, warm and secure relationship with one's mother cannot be overestimated. Music, contributing to the quality of life, should be fore grounded, starting from the youngest age.⁶

Notes

- 1 The African story was told by Sobonfu Somé of the Dagara tribe. [www.birthpsychology.com/appah/]
- 2 Gestures of vocalizations and bodily movement
- 3 Infant-directed speech, also called motherese, varies depending on the child's age and state, and the motives and emotions of the baby's partner. The mother's intuitive behaviour seems to support the infant's innate communicative capacities. ID-speech contains certain musical qualities and characteristics like playfulness and a creative way of using the voice.

- 4 In the analysis, three softwares were used to find out the results: HyperResearch, Annotation and Praat.
- 5 <http://www.babyplus.com/TheScience.php>
- 6 I want to thank the Finnish Cultural Foundation, to the Arts Council of Finland, to the Eemil Aaltonen Foundation and to the University of Jyväskylä for supporting me in this study. I also feel appreciative to my supervisors and to my family, for having strength to support me in coming to an end of this research.

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