

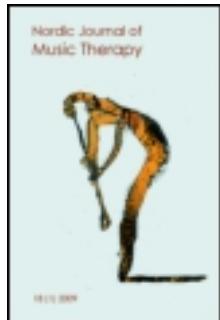
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Friederike Barbara Haslbeck ^a

^a Faculty of Health , Witten/Herdecke University ,
Germany

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The interactive potential of creative music therapy with premature infants and their parents: A qualitative analysis

Friederike Barbara Haslbeck*

Faculty of Health, Witten/Herdecke University, Germany

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Findings of a previous video analysis of creative music therapy (CMT) with premature infants indicate that music therapy in neonatal care may contribute to more than the infant's stabilization and relaxation, as predominantly recognized in the literature to date. The aim of this paper is to further investigate the interactive potential of CMT, by comparing a larger number of cases. Video footage of music therapy sessions with 18 premature infants (and their parents) with a broad range of social and diagnostic diversity, as well as interview data derived from their parents, have been analysed in a qualitative grounded theory-based study. The results confirm that CMT may actively assist premature infants to uncover their communicative musicality, which in turn may promote self-regulation and development. CMT also may empower parents by supporting their well-being, self-confidence, and quality of interactions with their infant through music. However, high-level awareness, responsiveness, and the professional use of CMT by a specially trained music therapist are recommended to continuously adjust to the changing individual needs of both the infant and parents.

Keywords: creative music therapy; interaction; parents; premature infants; video analysis

Introduction

Over the last few decades, there has been a shift in neonatal care from not only helping premature infants to survive, but also improving their quality of life (European Foundation for the Care of Neonatal Infants [EFCNI], 2009/2010). There is growing awareness that premature infants need individualized nurturing interactions with their caregivers to support healthy development, particularly when the infants have to spend months in a hospital and may suffer from medically necessary isolation (Als, 1983; Tooten et al., 2012). Premature birth also can affect the mother–infant attachment process, since it disrupts the dyad too early. Reconnection may be compromised due to the parents' lack of self-confidence

*Email: friedericke@haslbecks.info

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and autonomy as primary caregivers in the unfamiliar environment of an intensive care unit, and due to other psychological stress factors: e.g. feelings of fear, guilt, grief and confusion (Baum, Weidberg, Osher, & Kohelet, 2012; Borghini et al., 2006). Parents are challenged to *read* their premature infant's behaviour, yet to not overwhelm them, since premature infants suffer under arousal; they are more stressed and often exhibit less positive effects and facial expressions than full-term healthy infants (Bozzette, 2007; Udry-Jorgensen et al., 2011).

The inter-professional focus of the neonatal intensive care unit (NICU) appears to be shifting from standardized interventions to more individualized relationship-based approaches that include involving parents in the care of their infants (Als, 2009). For instance, programmes promote the parent–infant attachment process and intend to “Create Opportunities for Parent Empowerment” (COPE) from the very beginning (Brisch, Bechinger, Betzler, & Heinemann, 2003; Melnyk & Feinstein, 2009; Tooten et al., 2012).

Not only has neonatal care advanced dramatically in recent decades because of technological as well as medical improvements and new concepts of care, but the clinical practice of music therapy in the NICU also has moved from simply receptive approaches towards more active ones that incorporate live music or singing (Hanson-Abromeit, Shoemark, & Loewy, 2008; Haslbeck & Costes, 2011; Malloch et al., 2012; Teckenberg-Jansson, Huotilainen, Pölkki, Lipsanen, & Järvenpää, 2011). These interactive approaches take into account the complex systems of infants, parents and the NICU environment; e.g. by engaging and encouraging parents to sing for their infants and thereby augment the infant–parent attachment process (Loewy, 2011; Schlez et al., 2011; Shoemark, 2011).

Interestingly, to date, only a small number of studies have addressed interactive and individualized music therapy approaches in the NICU. The methods used in those studies were exclusively quantitative (Malloch et al., 2012; Teckenberg-Jansson et al., 2011), except for a single study in a related field with high-risk, full-term infants (Shoemark, 2010). The question arises as to whether the complex phenomena of interactive music therapy with premature infants and their parents can be addressed with the currently existing focus on evaluating effectiveness solely via quantitative methods (Cevasco, 2008; Whipple, 2008). What we currently know from research is that music therapy has beneficial effects on premature infants, particularly on the infants' physiological and behavioural outcomes, as well as relaxing and supporting tendencies for the parents (Haslbeck, 2012a). But a plethora of questions are still waiting to be addressed: What characterizes a successful music therapy session with a premature infant (and their parents)? Which therapeutic changes occur, when, how and why? What is the parents' perspective? What are further advantages of music therapy in neonatal care and, of course, what are its limitations and contraindications?

There is a call to move beyond the prevailing focus on the effectiveness of music therapy in neonatal care. Research also should strive towards a deeper understanding of the clinically relevant therapeutic phenomena of more active

approaches, their interactive potential, parental perspectives, and individual premature infant responses (Ans dell, Davidson, Magee, Meehan, & Procter, 2010; Haslbeck, 2013; Shoemark, 2010).

CMT with premature infants and their parents

CMT with premature infants and their parents is an interactive, resource- and needs-oriented music therapy approach that is based upon principles developed by Paul Nordoff and Clive Robbins (1977). Nordoff–Robbins' music therapy was adapted to the specific needs of premature infants and their parents in the NICU setting (Haslbeck, 2004) and combined with principles of CMT used on comatose patients (Aldridge, Gustorff, & Hannich, 1990). With this approach, the music therapist establishes human contact with the comatose patient through improvised “wordless singing based upon the tempo of the patient's pulse and more importantly, the patient's breathing pattern” (Aldridge et al., 1990, p. 345). Using CMT in neonatal care, also the “music” of premature infants is carefully assessed: their breathing pattern, the most fundamental rhythm of a human being, together with their facial expressions and gesticulations are closely observed. The therapist carefully assesses this “music” and transforms it into infant-directed improvised humming that is constantly adjusted to the fragile rhythms and subtle expressions of the premature infant. CMT with premature infants is based upon the premise that infants should be neither overwhelmed nor over-stimulated. The parents, if available and willing, are involved individually in the therapeutic process; e.g. by supporting them in singing to their infant and fostering an intuitive parent-infant interaction, so as to strengthen the bonding process (Edwards, 2011).

The objective of this article, then, is to attain a deeper and more comprehensive understanding of an interactive music therapy approach in neonatal care – “creative music therapy with premature infants and their parents”. It is based upon the findings of previous qualitative video analysis (Haslbeck, 2011a, 2013). Analysis of video footage of two premature infants was conducted to identify preliminary categories to serve as a phenomenon-oriented starting point. Three central interaction categories in CMT with premature infants were identified: *responsiveness* of the therapist, *communicative musicality* between therapist and premature infant, and *empowerment* of the infant as a consequence of responsiveness and communicative musicality. Responsiveness is understood as the therapist's ability to listen, understand, and respond adequately with perceptive, reflective and musical adaptive capacity (Jacobs, 2005). Communicative musicality is based on the “theory of how human vitality acts, regulates itself, forms intimate relationships and grows in friendships, and also how it defends itself when the physical or social environment is threatening, and how it can be undermined by illness” (Trevarthen, 2008, p. 37). Empowerment is understood in the sense of letting the power out, to help the premature infant discover and use his/her innate ability to regulate, orientate and engage (Funnel, 2004). The

theory emerged that CMT encourages an active role for the infants, helping to unleash their communicative musicality, sensitivity to music, and meaningful relatedness that, in turn, may promote their stabilization and development (Haslbeck, 2011b, 2013).

More specifically, the aim of this paper is to confirm, advance or refute the previously identified categories of therapeutically relevant changes and interactions in CMT. Special attention is given to therapeutic changes and interactions between the therapist and infant, as well as those interactions that include the parents. It is of particular interest to look at sessions where music therapy has been stretched to its limits in order to identify possible limitations and contraindications of music therapy in neonatal care.

Methods

Study design

This study is part of a qualitative, multi-perspective, longitudinal study that applies the principles of grounded theory (Glaser & Strauss, 1967; Strauss & Corbin, 1998) and therapeutic narrative analysis (Aldridge & Aldridge, 2002), as outlined in greater detail in the methodological paper by Haslbeck (2012b). The focus of the current study is to test the findings of the previous qualitative video analysis (Haslbeck, 2011b, 2013) by comparing a larger number of contrasting cases, and by including the parents' perspective oriented towards the principles of grounded theory and therapeutic narrative analysis. A fusion of narrative and micro-video analytic methods is used to explore the potential benefits and limitations of CMT with premature infants and their parents from multiple perspectives (Aldridge & Aldridge, 2002; Polit & Beck, 2004; Ridder, Wigram, & Ottesen, 2009; Wosch & Wigram, 2007). Memos, protocols and physiological data of the infants, as well as interview data gleaned from the parents, were applied to data triangulation (Polit and Beck, 2004; Ridder et al., 2009). Ethics approval for the entire study was obtained from the Ethics Committee of the Medical Council Westfalen-Lippe/Medical Faculty at the University of Münster (2008-311-f-S).

Participants

Access to study participants was obtained through the research-therapist from the neonatal care units (levels III + II) of the project clinics¹ where the research-therapist also was employed as a clinician. Inclusion criteria were the same as for the in-depth analysis (Haslbeck, 2013). Between July 2001 and May 2002, between November 2006 and July 2008, and between January and July 2010, 18 premature infants (and their parents, if available), who received CMT as

¹Essen University Hospital, Germany and Children's Hospital Bielefeld, Bethel, Germany.

standard clinical practice and who displayed as contrasting characteristics and diagnoses as possible, were included in the study. The gestational age of the infants at the beginning of the therapy ranged from 26 weeks to 41 weeks, their birthweight varied from 408 g to 2080 g. Female and male participants were characterized by various diagnoses (e.g. hyperbilirubinemia, apnea, bradycardia, respiratory distress syndrome, necrotizing enterocolitis, drug withdrawal and sensory deprivation). The background of the families varied in nationality and education level (1).

Data collection

To follow the empirical collection and analysis strategies of grounded theory data collection, selection and analysis were performed in a most intertwining way, based upon the principles of contrastive case selection and the systematic search for control groups (Charmaz, 2006; Glaser & Strauss, 1967). Data collection, selection and analysis took place during the first part of the study and were continuously conducted and refined for the current part of the study. In the period of data collection only most contrasting cases have been included in the study. The research-therapist videotaped sessions and collected additional data (detailed reflections on methodical and therapeutic procedures, environmental circumstances, the infants' physiological monitor data, comments by staff and parents) in almost the same manner as in the previous part of the study (Haslbeck, 2013). Sessions in which the parents observed, participated or sang for their infants were videotaped only if the parents gave informed consent, so as not to infringe upon their privacy rights. In total, 122 sessions involving 18 premature infants (and their parents) were videotaped (Figure 1). From 2010 onwards, the infants' physiological data (monitor data: heart and respiration rate, oxygen saturation) also could be collected in printed form due to technological advances at NICU level III (Web Appendix 1).

Given the need to expand the focus of the study to include parents, their individual perspectives on CMT were obtained in narrative interviews (Cevasco, 2008; Hopf, 2000). In accordance with informed consent and preference, the interviews occurred in the parents' room within the project clinics, shortly before discharge. Not all parents were available for an interview (e.g. due to language barriers). In total, verbatim-transcribed interview data from two parent couples, five mothers and one father were available for data triangulation. For publication, the author translated the parents' comments and quotes into English.

Data selection

The research-therapist selected data that were relevant to further refine the identified categories of therapeutic change and interaction (Holloway, 1997). The focus was on further investigating the identified tendencies of dialogue, as well as on refining the findings of the previous video analysis that smiling occurs

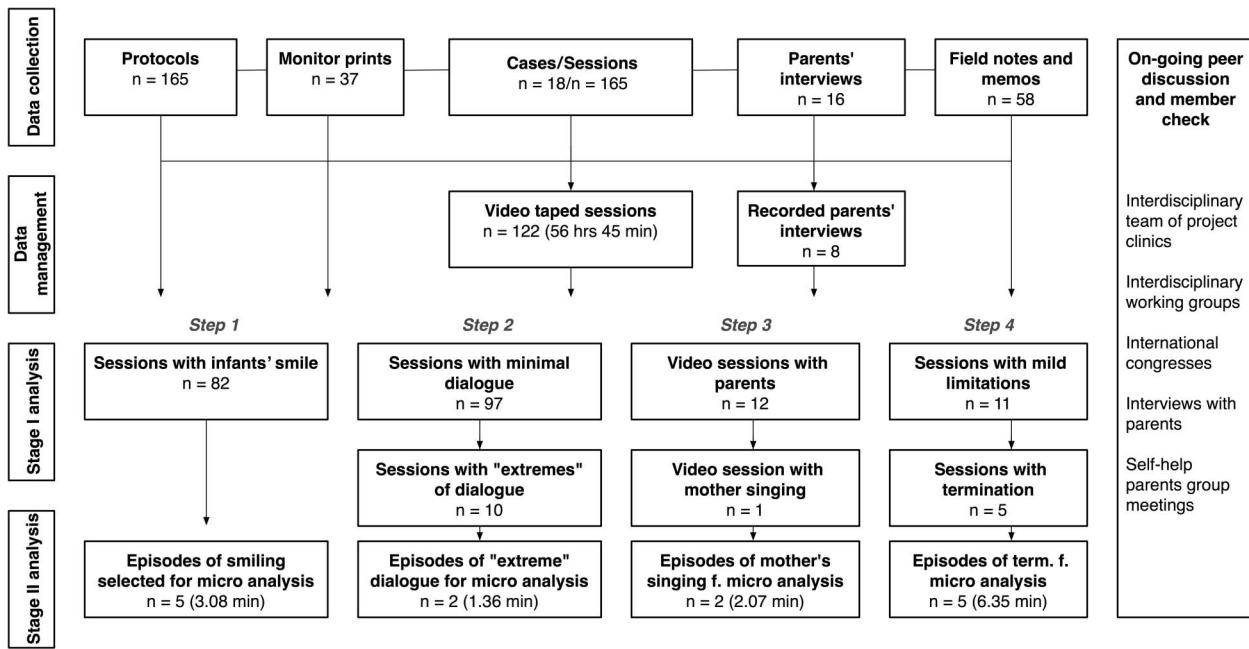


Figure 1. Selection process.

as a sign of well-being during episodes of interactional synchrony. Drawing on the need for multiple perspective video material, that represented the inclusion of parents in the therapeutic process as well as cases where music therapy was only of limited use, was of special interest. The selection process was guided by the search for similar episodes retained from contrasting cases, but also for contrasting material within similar cases (Creswell, 2007; Lincoln & Guba, 1985).

In Step One, the research-therapist scanned 82 identified sessions where the infants smiled. Out of these 82 sessions, five smiling examples of five different premature infants were selected for in-depth transcription and analysis. The research-therapist chose these final episodes because they represented the best and most clearly significant smiling moments that were as contrasting as possible, relative to the participant's characteristics (e.g. age, weight, gender, visiting hours of the parents) as well as to their smiling behaviour (e.g. smiling at the end of musical phrase versus smiling during therapist's humming) (Aldridge & Aldridge, 2002; Elliott & Shapiro, 1992; Trondalen, 2005) (Web Appendix 2; Figure 1).

In Step Two, the focus was on episodes of minimal dialogue. In the back and forth moving analysis of video footage and protocols (comp. Haslbeck, 2012b), it became apparent that there are various types of dialogue; e.g. in the form of infant gestures, facial expressions or sucking behaviours. Since the infant's rhythmic, alternating sucking was seen as the most unexpected and contrasting form of minimal dialogue in 10 cases, two examples drawn from 10 identified episodes demonstrating rhythmic, alternating sucking were selected for in-depth analysis. These final examples represent the clearest and longest rhythmic alternating dialogue in the form of alternating infant sucking and therapist humming (Aldridge, 1996; Strauss, 1994) (Figure 1).

In Step Three, once again the research-therapist selected the most contrasting episodes of parental involvement out of the 12 identified and scanned videotaped sessions in which the parents observed or participated. The research-therapist chose two episodes of interaction and therapeutic change within the only session in which a mother² explicitly wished to be videotaped while singing intimately to her daughter (Figure 1).

In Step Four, the focus was on data that reveal the limitations of music therapy. In this back and forth analysing process, the research-therapist scanned 11 sessions in which some kind of limitation was apparent. Again, the most contrasting limitation examples were selected for more detailed analysis: 5 sessions that had to be terminated by the therapist (Figure 1).

Moreover, the research-therapist chose interviews, comments and memo quotations, protocol notes and monitor prints that referred to the selected video episodes and were relevant to further confirm or confute the identified categories of interest. Trustworthiness of selected data was established via ongoing presentation and discussion of video footage and its triangulating data by the

²The mother opted in for publication of the material as it is for scientific purpose.

interdisciplinary team of the project clinics, and in interdisciplinary, international working groups, workshops and conferences³ (Aldridge, 1996; Holloway, 1997; Wosch & Wigram, 2007) (Figure 1).

Data analysis

The research-therapist subsequently synthesized emerging codes into categories to test and refine the preliminary categories of the in-depth video analysis, as well as to synthesize additional abstract categories. In Stage I, the research-therapist analysed all selected episodes in an overriding way, as outlined in Web Appendix 2. These results were synthesized with the findings of the previous analysis and guided data selection for analysis in Stage II (Figure 1) (Haslbeck, 2012a).

In Stage II, the research-therapist performed detailed transcription into conventional music notation to make interactions within the therapeutic process visible using Finale 2011 notation software (Haslbeck, 2013) (Appendices 2–10). The transcription included several layers over the same timescale: environmental circumstances (noise, if occurred), infant behaviour (musicality), and therapist (and or mother) behaviour (singing). A conventional notation system was selected for transcription, because it allows for detailed musical and interactive analysis with musical parameters of rhythm, tempo, phrasing, dynamics and tonality by displaying the musical and temporal activity inherent in the therapeutic process. Environmental circumstances, if occurred, included machine noise and background noise. Drawing on the work of Als (1983; Als et al., 2005), the infant's behaviour reflects four layers: the premature infant's overall state; its gestures; its mimicry; and, if visible, its breathing pattern. Following recommendations made by Hanson-Abromeit (2006), description and interpretation of premature infant behaviours were conducted using the Naturalistic Observation of Newborn Behaviours (NONB) sheet (Als, 1995), which is an assessment tool for the Assessment of Preterm Infant Behaviours (APIB), specifically designed to document the spectrum of a premature infant's neurobehavioral functioning by focusing "on the assessment of mutually interacting behavioral subsystems in simultaneous interaction with the environment" (Als et al., 2005, p. 94). Documentation of the therapist's (mother's) behaviour mainly focused on the therapist's (mother's) singing (Appendices 2–10).

An interdisciplinary panel of experts (one musician/composer/music therapist, one neonatologist, one neonatal nurse and two experts on cultural issues) reviewed all transcriptions to confirm their accuracy. Member checks and discussions in interdisciplinary working groups, workshops and parent groups were

³E.g. World Congress of Music Therapy 2011, Seoul, Korea; International Summit of Music Therapy in the NICU 2010, New York, NY, USA; International Congress of the Association of Infant Mental Health 2010, Leipzig, Germany; Best Practice Day, 2011, Krems, Austria.

used to re-examine the results (Holloway, 1997). Over the entire analysis process, the research-therapist compared all emerging categories with previously elicited categories and theories of CMT in neonatal care, as well as with concepts applied in previous analysis (Haslbeck, 2013); e.g. the theory of communicative musicality by Malloch, Trevarthen et al. (2009; Trevarthen & Malloch, 2000). These sensitizing concepts were broadened by the concept of “neonatal moment of meeting (NMM)” (Bruschweiler-Stern, 2009). Bruschweiler-Stern outlines NMM as a special moment of meeting between mother and infant after birth that is vital for the mother–infant attachment process. In the final analysis stage, Stage III, the research-therapist pieced together the refined categories via multiple-perspective analysis to create a holistic picture of CMT in neonatal care: to explicate the therapeutic narrative of creative music therapy with premature infants and their parents (Aldridge & Aldridge, 2002).

Results

Results from the full data set confirm the conceptual model that CMT can facilitate empowerment through communicative musicality resulting from responsiveness. Smiling is affirmed in CMT as a sign of well-being in episodes of shared communicative musicality and the minimal tendencies of dialogue are enhanced. Again, the therapist’s overriding attitude of responsiveness giving tone via improvised humming, entrained and attuned to the infant’s breathing rhythms, gestures and facial expressions, facilitated communicative musicality. As a result, infants were capable of achieving self-regulatory balance, orienting and engaging in subtle relatedness. These findings confirm the previous analysis results from the parents’ perspective. In this sense, responsiveness in CMT also means being responsive to the individual changing needs of the parents. By promoting the parents’ sensitivity during interactions with their infant through music, the parents may also be empowered to respond and be sensibly attuned to their infant’s needs. However, results also indicate that parental interactions and empowerment are restricted to cases in which the infants are medically stable and alert enough, and the parents are available and receptive to participating in music therapy (Figure 2).

Communicative musicality during episodes of infant smiling

Results of the overriding analysis in Stage I demonstrate that all included premature infants smiled during CMT (Web Appendix 2). These smiles took place during episodes of *self-regulatory balance*, as documented in Appendices 2–6 and Web Appendix 2, and confirmed by obtaining objective monitor data (Web Appendix 1). The infants predominantly were in a state of quiet and alertness. They smiled predominantly with subtle mouth opening combined with smooth finger movements and/or facial expressions in self-synchrony and *interactional synchrony* with the therapist. In some cases, the infants smiled

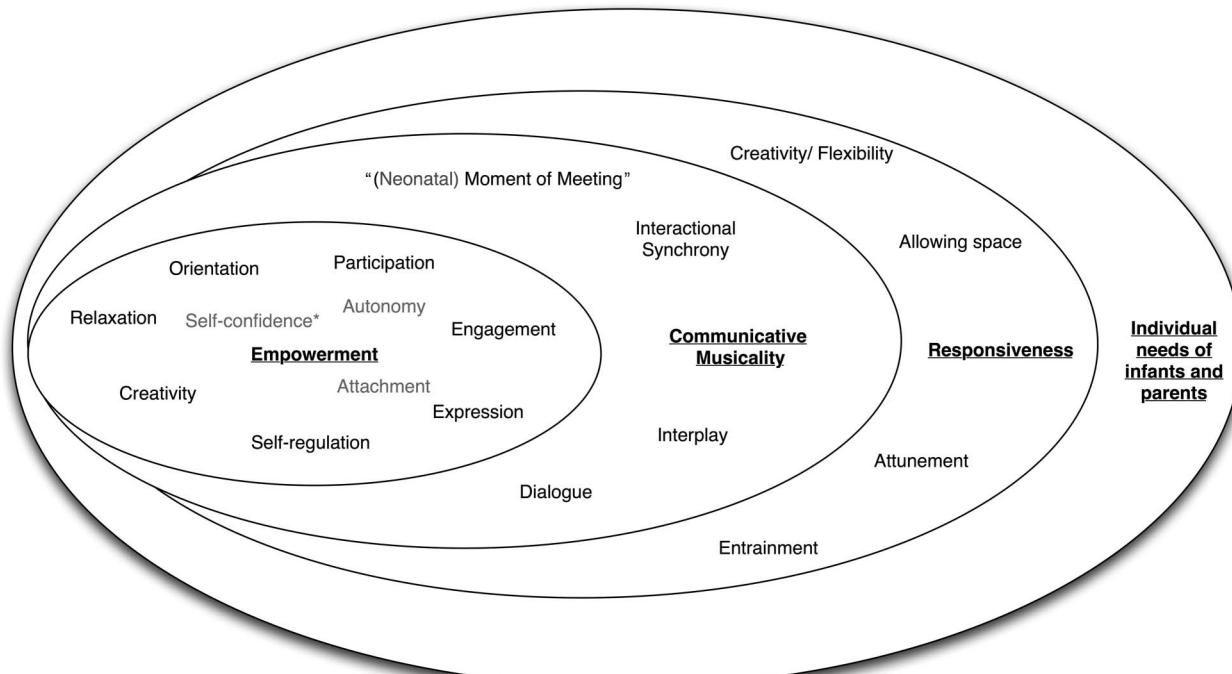


Figure 2. Refined logic diagram of categories.

during episodes of communicative musicality within 29 weeks of gestational age (GA) (Appendix 2). Findings of the in-depth analysis in Stage II support these results. The shared sense of time, rhythm and tension between therapist and infant took place either in a simultaneous way or in an alternating “responsive” form of *interplay*, as seen in all five video examples (Appendices 2–6; videos 1–5). Interaction and self-synchrony in tension, time and rhythm can be observed in a multi-layered way in the example of Anne,⁴ who moves her right arm, hand and finger smoothly upwards, and opens her left eye and her mouth into a smile at the same time the melody rises (Figure 3; Appendix 5; video 4: 0:30–0:38).

A more responsive, *dialogical* way of interactional synchrony is demonstrated in the example of Paul. During bar 9, he smiles during a pause in the musical phrase after an episode of simultaneous interactional synchrony in a multi-layered form of gesture, mimicry and breathing (Figure 4; Appendix 4; video 3: 0:18–0:36).

More examples of *interactional synchrony* while smiling (combined with facial expressions, gestures and synchronous breathing patterns) can be seen in the videos (1–5) and in the transcriptions into conventional music notations (Appendices 2–6).

Communicative musicality in cases of rhythmic alternating sucking patterns

The preliminary sub-categories of communicative musicality – *interplay and dialogue* – could also be confirmed by the results of the Stage I analysis in

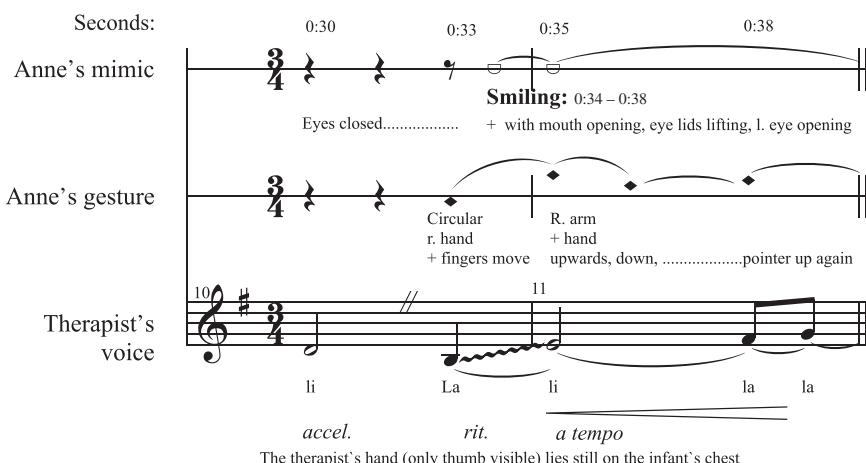


Figure 3. Smiling in interactional synchrony.

⁴All names in the paper are pseudonyms.

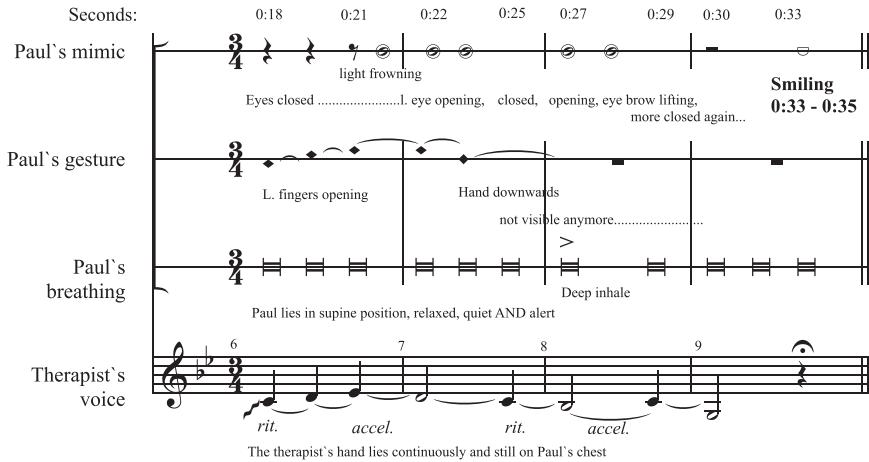


Figure 4. “Dialogical” smiling with Paul.

Step Two (Figures 1 + 2). This more dialogical way of *interactional synchrony* manifests itself in the infants’ gestures, facial expressions or breathing qualities, as already seen in videos 1–5 and their transcripts; e.g. Paul’s sighing during a pause in the music (Appendix 4; bars 4–5; video 3: 0:06–0:16). Additionally, some premature infants exhibited alternating rhythmic sucking in a shared pulse with the therapist’s rhythmic humming at 33 weeks GA. The findings of the analysis in Stage II expand upon these results. Feline’s rhythmic sucking pattern alternates with the therapist’s hummed phrases. Feline sucks in a *dialogical*, responsive way at the end of the musical phrase for over a minute, even though the therapist’s musical phrases and pauses vary in their length. Additionally, Feline’s sucking periods diversify in duration and intensity (Appendices 7 + 8; videos 6 + 7). Despite these variations, Feline sucks in self-regulatory balance in self- and *interactional synchrony*. Three rhythms are mostly synchronous: Feline’s breathing rhythm, her sucking rhythm and the therapist’s humming rhythm (Appendices 7 + 8; videos 6 + 7). Because of these multiple facets of synchronous rhythm and pulse, despite multiple concurrent variations in these rhythms, it is argued that the identified, rhythmic “taking of turns” is not random, but rather a subtle, finely attuned, rhythmic *interplay* between the infant and therapist.

Communicative musicality from the parents’ perspective

The central category of communicative musicality is enhanced by the parents’ perspective (Figure 2). Analysis results in Step Three demonstrate how the parents who observed or participated in CMT experienced communicative

musicality in an overriding way. They focused on their infant, and adapted and became *attuned* to their infant's behaviour, both communicatively and musically. They reported that CMT helped them to *relax* and intensify their *attachment* to their infant. One such mother, who often experienced music therapy during kangarooing,⁵ said:

I notice when I can relax that I am much more *connected*, much more intense, much more *closely connected* with my daughter because of the *music*, because of the *singing*. (MP16⁶)

The results of Stage II support these tendencies. Whereas, in the first video episode, communicative musicality is seen in the triad of mother, infant and therapist, in a later episode of the same session, it manifests itself in greater detail and with increased intensity within the intimate meeting between mother and infant via music. At the beginning of the session, the mother starts to sing to her daughter, along with the therapist (Appendix 9; video 8). It is a song that the therapist created to promote Emila's suck-swallow-breath rhythm, because Emila had troubles coordinating these rhythms and, thus, problems being fed. The song also was created to assist and motivate the mother to engage with her daughter, because she experienced her child's feeding difficulties as stressful and frustrating and reacted by withdrawing.

In the selected first episode, the previously stressed and distanced mother sings in self-synchrony and *balance*, as well as in *interactional synchrony* with the music, the therapist and her daughter. She *engages* in communicative musicality in pulse and quality; e.g. by nodding her head in strict time to the upbeat of the song, and with audible inhaling like a professional musician (Appendix 9, video 8). She focuses on her daughter and adjusts and reacts to her signals; e.g. holding her closer and being more attentive after Emila's signs of discomfort (Appendix 9; bars 15–18; video 8: 0:33–0:43). Mother and daughter meet in a special moment of communicative musicality in shared pulse and quality. They make full contact in a mutual gaze at the end of the musical phrase; the mother smiles, followed by an open space (Appendix 9; circle in bar 21; video 8: 0:46–0:52): they meet in a *neonatal moment of meeting* (Bruschweiler-Stern, 2009).

Later in the session, these facets of communicative musicality intensify. In the second selected episode, the mother not only engages by nodding, but also by rocking Emila to the rhythm of the music. She adapts her singing to her cultural background and herself creates a Turkish lullaby-like song in the moment for her daughter, characterized by musical expression and "motherese" (e.g. in a loving tone, free voice, *engaging* with gestures and facial expressions). Her lyrics are

⁵During kangarooing, premature infants are held skin-to-skin on their parents' chests in order to provide physiological and psychological warmth and bonding.

⁶M = mother (F = father); P = participant; number = participant code.

filled with good wishes for her daughter and her musical phrasing is in *interactional synchrony* with her daughter's sucking pattern (Appendix 10; video 9). Emila starts to suck at the beginning of her mother's musical phrases, except in bar 19 (Appendix 10; video 9: 0:26). However, at that moment, the mother immediately *attunes* to this moment of mismatching: she sings very quietly and then terminates her singing to start the phrase again – this time again in interactional synchrony with the sucking pattern of her daughter. After this successful moment of “repaired interactional asynchrony”, the relationship moves along at a more intense level of inter-subjectivity: the mother smiles and engages more intensely with her body and voice while Emila sucks in synchrony with the overriding pulse of the music (Figure 5; Appendix 10; video 9). Communicative musicality of the dyad in shared pulse, quality, and overall narrative form is obvious (Malloch & Trevarthen, 2009; Trevarthen & Malloch, 2000).

This mutual experience of communicative musicality in interactional synchrony can be understood as a milestone for mother and daughter. The mother was referred by the neonatal team for therapy due to “insensitive interactions with her daughter” and Emila was referred because of troubles coordinating her suck–swallow–breath rhythm. The mother expressed this experience of attachment immediately after her singing: “If I would not have so much love, right? Then my daughter” (MP18). For the next few weeks, the mother sang the song whenever she fed Emila, and Emila improved the coordination of her suck–swallow–breath rhythms.

Empowerment

As seen in the previous case, the central category of empowerment can be confirmed and expanded by the findings of the current analysis. Both parents and infants may be empowered to *self-regulate*, to *orientate*, to *participate* and to

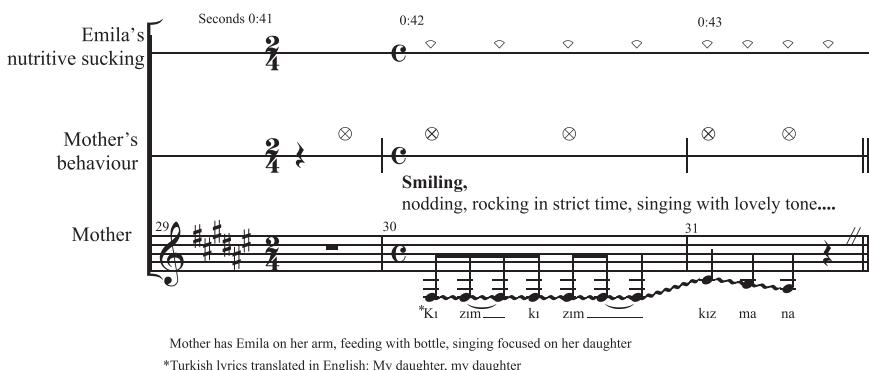


Figure 5. Communicative musicality between mother and daughter.

engage in interactions through communicative musicality in CMT (Figure 2; Appendices 2–10; videos 1–9).

This facet of empowerment manifests itself during episodes of smiling. The infants are *relaxed* and *stable* and, based upon this state of self-regulatory balance, also capable of *expressing* and *engaging* with facial expressions and gestures (Appendices 2–6; videos 1–5). Results in Step Two expand this understanding of empowerment via the emerging theory that CMT also may promote the infant's sucking ability. While, in the first example, Feline sucked softly in short sucking bursts (three to seven bursts over 1:03 minutes: Appendix 7; video 6), two weeks later she was able to suck stronger with more periods of sucking over a longer time span in a well-coordinated interactional pulse and rhythm (six to 11 brief periods of sucking, combined totalling over 1 minute, 13 seconds in the video example, stretched over the 3:50 minutes of the entire session: Appendix 8; video 7). In the meantime, it was possible to feed her by mouth (comp. video 7: Feline without a stomach tube in her nose). The results of the analysis in Stage II confirm this cumulative promotion of sucking over time across several sessions. Such cumulative development also was observed in the infant's smiles. Over the course of the sessions, also inherent within a single session, the infant smiled longer, more intensely and more often (Appendix 2, video 1).

In addition, parents may be empowered in the quality of their interactions with their infants and, thus, in their *attachment* process, as well as their *self-confidence* (Figure 2). They may be motivated to *engage* with their infant via singing within an intimate, joyful interplay, as seen in the example of Emila and her mother (Appendices 9 + 10; videos 8 + 9). Emila's mother, whose depressed, flat voice and previous withdrawal during interactions with her daughter were obvious, was empowered to *engage* in "motherese". She even spontaneously created a song for her daughter filled with incantations that the *cizmana* (dead) will not get her. She experienced a joyful time in full contact with her daughter (e.g. smiles by the mother, and a neonatal moment of meeting in Appendices 9 + 10; videos 8 + 9). Immediately after singing, she expressed her sense of empowerment via the image of a lion. The sentences' causal dependence indicates that the mother experienced both *self-confidence* and a sense of *autonomy*: "If I would not have so much love, right? Then my daughter would have no chance to survive. I am like a *lion*" (MP18).

Other parent quotations underline these characteristics of empowerment, confirming the sub-category of relaxation or enhanced empowerment via a long-lasting perspective:

Thanks, that [CMT] did me a *world of good* (FP2). "... these moments, when she [her daughter] was lying on my belly and we had music therapy, I experienced this for us both as really *relaxing* and *supportive...*" (MP5). "You develop *skills for when you go home, too*. Later at home, I want to sing for my baby, to sit down for a

while, dawdle with her, *relax* with her and *sing* for her or just listen to some lullabies together" (MP8).

Responsiveness

Drawing on these results, empowerment takes place through experienced and shared communicative musicality. But how can communicative musicality emerge? Again, the research-therapist synthesized the central category of responsiveness as the basic requirement for this formation of inter-subjectivity. The therapist was responsive by *entraining* the improvised humming rhythm to the breathing (and sucking) rhythm of the infant in a readjusting way to make interactional synchrony possible (Appendices 3, 4, 7, 8; videos 2, 3, 6, 7). The therapist steadily used *affect attunement* by, for example, making the melody rise when an infant smiled and/or lifted their fingers, as already described in the episodes of smiling. *Tonal attunement* to the environment occurred through humming in the key or pitch of the monitor beeps (Appendices 3–5, 7 + 8; videos 2–4, 6 + 7). In general, the therapist's singing was characterized by *under-attunement* (e.g. simplicity, slow tempo, repetition, calmness, predictability, melodic fluency with glissando, and moving along in waves) in order to facilitate predictability (Haslbeck, 2013) (Appendices 2–8, videos 1–9). Finally, responsiveness involves *allowing space*; e.g. giving time for an *answer*, as seen in the examples of alternating sucking and responsive smiling (videos 2, 3, 5, 8, 9), as well as pausing and holding notes to have time to readjust and steadily attune to the infant's signals.

To refine this central category from the parents' perspective, responsiveness includes being responsive to the individual parent's needs in *creative*, multi-faceted and *flexible* ways; e.g. by conducting music therapy during kangarooing. In the example of Emila, the therapist was responsive to the mother's needs by creating a song to facilitate feeding time, as well as by choosing a melody that was suggested by her mother. Later in the session, the therapist was responsive by not joining the mother in her singing – by *allowing space* – in order to support the mother's autonomy. Also, the mother was responsive to Emila's behaviours in a finely attuned readjustment process. From the moment when the mother exhibited such responsiveness, communicative musicality evolved between mother and daughter.

Limitations of creative music therapy in neonatal care

To address the limitations of CMT in the NICU, it must be stated that all described characteristics of communicative musicality and empowerment only could arise starting from the premise that the premature infants were medically stable and mature enough, and not too heavily sedated.

In the included cases, infant engagement in the form of smiling had not been seen before 29 weeks of GA; and, in the form of alternating sucking, not before

33 weeks of GA. In the sessions that were conducted at an earlier age or when the infants were sleeping more deeply, relaxation and stabilization were observed, but shared communicative musicality was not as clear in video footage. In some very young and fragile premature infants (the first sessions for P8 + P10), initial touch evoked arousal, so the therapist conducted the initial music therapy sessions without touch, only humming as simply, smoothly and calmly as possible. In general, the therapist delayed therapy when premature infants were very aroused or unstable, or at times when it would be inappropriate due to environmental circumstances (e.g. an emergency in the neighbouring bed) or directly forthcoming procedures for the infant (e.g. eye surgery). Even though these contraindications were discussed in exchanges with neonatal personnel before conducting each session, the therapist still had to terminate five of the 165 sessions. In these five sessions, the infants were unable to reach a state of self-regulatory balance with calming and holding methods of therapeutic responsiveness in CMT as described in more detail elsewhere (Haslbeck, 2013). Results indicate that these sessions had to be stopped due to the infants' internally driven troubles: upcoming heavy belly arches and decreasing oxygen saturation after being off breathing support for only a short period of time, or because of an askew CPAP⁷ mask (video 10). In these cases, the therapist exhibited responsiveness by recognizing the signs of stress as signals contraindicating music therapy (e.g. heavy arching, finger splaying, decreasing oxygen saturation on the monitor; video 10), ceasing therapy, and calling a nurse for further assistance. Responsive behaviour was delegating responsibility to someone trained to deal with such medical situations.

Also, parents only directly benefit from music therapy when they are available and willing. Some parents could not participate in CMT because they were not around; e.g. due to illness or having other children to take care of at home. Other parents were sceptical at the beginning and developed interest and engagement only after several sessions. One such father stated: "In the beginning, I thought: 'what is that for?' But then I heard and saw you singing to my boy and I was so touched and saw how fine my boy was with the music ..." (FP13).

Discussion

To explicate the narrative of CMT in neonatal care, it can be summarized that already stable premature infants seek to engage in communicative musicality with a therapist and their parents, based upon needs-oriented and creative responsiveness. By experiencing inter-subjectivity in music, both infants and parents may be empowered to relax and engage in interactions. Naturally, the premature infants' (re-)actions take place in a most subtle manner.

⁷CPAP = Continuous positive airwaves pressure to assist the premature infant with breathing.

Potentials of communicative musicality

Since all infant smiles during CMT were identified during episodes of self-regulatory balance, such smiles are seen as an indication that premature infants benefit from CMT in the form of relaxation and stabilization. This is in line with explanations that smiles in premature infants are a sign of well-being in modulated states (Als, 1995; Standley & Walworth, 2010), and consistent with numerous research outcomes that illustrate beneficial effects of music therapy in terms of pacifying and stabilizing premature infants (Haslbeck, 2012a). The current results indicate that the infant smiles during CMT may have social meaning, since they occurred during episodes of communicative musicality. These findings question the theory that smiles in premature infants are merely endogenously driven, as argued in certain handbooks on infant development (Cole & Cole, 1989; Rochat, 2001).

However, the current viewpoint of possible social engagement in premature infants' smiles is supported by other study results. Cecchini et al. (2011) suggest that smiles in newborns that are characterized by mouth opening in communicative states have social meaning. Miller and Holditch-Davis (1992) found that premature infants smiled more when they were with their parents than with nurses, which they attributed to more interactive stimulation by the parents. In turn, it is argued that parents respond with higher-quality interactions with their infants when the infants smile (Kawakami & Yanaiharab, 2012; Miller & Holditch-Davis, 1992).

Given that many premature infants' nourishment is hindered by uncoordinated and disorganized sucking patterns, the current results of well-coordinated and rhythmic non-nutritive sucking behaviour are of considerable relevance (Bingham, Ashikaga, & Abbasi, 2012; da Costa et al., 2010; Gewolb & Vice, 2006). CMT may help to support premature infants' development and growth by promoting their suck–swallow–breath coordination through finely attuned and entrained rhythms in music. This assumption is consistent with the findings of Standley et al. (2003, 2010) who demonstrated how the pacifier-activated-lullaby system (PAL)⁸ improved non-nutritive sucking rates and, thereby, shortened lengths of gavage feeding and hospital stay. Also, Yildiz and Arikhan (2011) revealed that playing lullabies for premature infants had a positive effect on their transition to oral feeding.

Potentials of condensing and parents' involvement

Condensing in CMT seems to be of importance, since premature infants are always at risk of being overwhelmed by interventions that last too long.

⁸In the pacifier-activated-lullaby (PAL) method developed by Standley, each infant suck of predetermined strength on a pacifier activates an electrical signal to a cassette player, and music only plays when an infant sucks; as such, the more it sucks, the more the music plays.

Communicative musicality took place in only 1 or 2 minutes (videos 1–9). In addition, for parents, condensing is of value since insecure attachment behaviour can rapidly force the relationship to spiral downward (Bruschweiler-Stern, 2009). Emila's mother became less depressed and insecure in her behaviour during interactions with her daughter just one session into an expressive and intimate interaction characterized by "motherese", and started to share affect attunement (Stern, 2010). Otherwise, depressed mothers are argued to have troubles attuning to their babies during vocal interplay (Field, 2010). It has been noted that changes in parents' sensitivity during interactions with their premature infant can take weeks or months, if they happen at all (Bialoskurski, Cox, & Hayes, 1999; Brisch et al., 2003; Flacking, Ewald, Nyqvist, & Starrin, 2006; González-Serrano et al., 2012).

Furthermore, Emila's mother intuitively adapted her singing to coincide with her own cultural background – her own fingerprint of maternal prosody – which is argued to be the most attractive and intimate auditory stimulation to a newborn (Moon & Fifer, 2000; Trehub, Unyk, & Trainor, 1993). She created her own song and sang from her soul. This is consistent with many music therapy studies that have demonstrated how supportive it is to enable clients to express themselves through their self-created songs while under burdensome conditions (O'Callaghan, 2009). Offering parents the opportunity to be creative within their own cultural identity allows them to become other than just relatives of patients; "they become expressive beings" (Aldridge, 1998, p. 11). Encouraging the endogenous abilities of parents, and supporting their autonomy, authenticity, creativity, expression and joy is particularly motivating and empowering; e.g. in optimizing child-parent interactions as warranted by various authors (Cohn & Fredrickson, 2009; EFCNI, 2011). A positive reciprocal affective interaction, as exemplified in the NMM between Emila and her mother, supports the attachment bond and the mother's (parents') self-confidence in her (their) role as (a) primary caregiver(s) (Edwards, 2011; Feldman, Magori-Cohen, Galili, Singer, & Louzoun, 2011; Tallandini & Scalembra, 2006). In the words of Bruschweiler-Stern (2009, p. 535): "When parents experience it [NMM], they are irreversibly transformed."

Finally, the infants also may benefit from shared affect attunement, since the literature indicates that a good mother (parent)-interaction facilitates the infant's later physical and psychological health (Bowlby, 1979; Korja, Latva, & Lehtonen, 2011; Newnham, Milgrom, & Skouteris, 2009; Udry-Jorgensen et al., 2011).

Moreover, parents singing for their infant may offer a "room of meeting in music", an opportunity to create and experience intimate, emotional inter-subjectivity, even in an intensive care environment lacking privacy. As Shoemark (2011, p. 175) points out: "potentially, the neonatal music therapy service creates the opportunity to reconnect mother and infant employing the otherwise naturally occurring patterns of interpersonal communication as a simple guide to protect both in their efforts towards contingency".

When therapy only takes place between the therapist and the infant, the viewpoint is that the therapist supports the social development of the infant, not as a surrogate for the parents, but rather by functioning as an additional source of experiencing shared communicative musicality (Shoemark, 2011). CMT may promote the general ability of the infant to engage in interactions and may enhance the infant's interactions with their parents and other caregivers, even when it is not possible to include the parents directly in the therapeutic process. This is congruent with the results of a recent study by Malloch et al. (2012), who demonstrated that hospitalized infants in the NICU who had received improvisational active music therapy exhibited more qualities during social interactions with adults (e.g. better maintained self-regulatory balance, more positive responses) than controls without music therapy.

Therefore, CMT may not only act as a treatment approach by reducing acute stress and empowering premature infants and their parents during hospitalization, it may also be seen as a preventative therapeutic approach, by promoting the quality of parent–infant interactions from the very beginning, thereby decreasing the risk of long-lasting problems in the parent–infant attachment process, socio-emotional difficulties in the infant, and even infant abuse (Korja et al., 2011; Muller-Nix, 2009; Tooten et al., 2012; Udry-Jorgensen et al., 2011).

Limitations and implications

Such interaction only can evolve when the infants are capable of achieving a state of quiet and alertness. In other cases (e.g. when the infants are in a deep sleep state or more immature), the aim of CMT is only to relax and stabilize, although sometimes all therapy is delayed so the infants are not disturbed or overwhelmed. General caution is warranted, because sometimes even such a finely attuned intervention as CMT can be contraindicated, as seen in the limitations section (above).

Therefore, this author suggests ensuring daily approval from the neonatal team directly before conducting each session, since any limitations of the current study could have been avoided by receiving a better assessment of each infant's state from the staff (e.g. askew CPAP, infant off-breathing assistance for hours only). If infants have only recently been taken off of breathing assistance, for example, CMT is not recommended.

To instantly recognize the limitations and contraindications of CMT and continuously attune and adjust the intervention provided to meet the individual infant's needs, the therapist should have experience with and specialized knowledge of this vulnerable population, which is less easily read and interpreted than full-term infants (McGehee & Eckerman, 1983). Special training in music therapy is imperative to guarantee that the therapist is capable of reacting intuitively and immediately to the infant's behavioural and physiological changes with subtle musical parameters, as seen in the video examples. In addition, the therapist must be familiar with the parents' psychological background, so as to identify

and address their needs in a responsive and therapeutic way (Baum et al., 2012; Jotzo & Poets, 2005). There is a call for specialized training in music therapy in neonatal care, particularly in European countries (Haslbeck & Costes, 2011). Such training opportunities may serve to further raise the quality and professional inner- and interdisciplinary profile of music therapy and, thus, establish music therapy as a widely-accepted therapeutic approach in neonatal care.

A limitation of the study is that the analysis from the parents' perspective remains preliminary and must be explored further in follow-up studies. More contrasting cases with parental involvement are needed, although it will be ethically challenging to tape such intimate moments of parent–infant interaction. One alternative possibility may be an in-depth analysis of parental interview data for more contrasting cases, oriented towards the principles of grounded theory and therapeutic narrative analysis, as outlined elsewhere (Haslbeck, 2012b). Greater insights into the potential longitudinal influences of CMT on parental well-being and bonding processes could be achieved by conducting and analysing follow-up interviews with parents.

Drawing upon the highly reasonable assumption that the examined music therapy sessions were influenced by the personal attributes of the therapist, future researchers may want to conduct the same investigations with one or more different therapists, trained similarly to confirm or refute the categories that emerged in the current study (Malloch et al., 2012). It also might be fruitful to expand the study towards a mixed methods design, as well as to incorporate a team of interdisciplinary researchers into the process of data collection and analysis, to expand trustworthiness of the current research as well as to confirm and clarify the outcomes observed (Holloway, 1997; Ridder et al., 2009).

In essence, then, the current investigation should be seen as a starting-point. Integrating the findings of this study with similar studies should generate more comprehensive understanding and theory-building about (creative) music therapy for premature infants and their parents, potentially leading to a dynamically evolving theory offering *logical* rather than *probabilistic* predictive power (Lee, 2000; O'Callaghan & McDermott, 2004, p.170).

Conclusions

The results of this study confirm and expand the conceptual model of CMT in neonatal care, at both a micro and macro level. Responsiveness in CMT involves not only being responsive to the individual signals of the premature infant within each session, it also means being responsive to the individual needs of the infants and their parents in an overriding way. Thereby, the basic principle of creative music therapy is implemented among the triad of infant, parent and therapist: establishing and promoting communication with music – communicative musicality – (Aldridge, 1996; Ansdell et al., 2010; Cooper, 2010; Nordoff & Robbins,

1977; Trevarthen, 1997). How this takes place is contingent upon the individual needs and musical resources of the parents and infant.

Communicative musicality is realized in multifaceted, creative and flexible ways in an individualized observation- and relationship-based decision-making process to facilitate empowerment (Als & Gilkerson, 1997); e.g. by humming to the breathing rhythm of the infant to support self-regulatory balance, or by helping the mother to create her own song to promote the infant's sucking ability and the mother's self-esteem. From this viewpoint, empowerment in CMT may take place at both a micro and macro level and is intended to act in both an acute and preventative way for both infants and parents (Figure 2).

In conclusion, this study shows that young premature infants already seek to engage in communicative musicality during CMT, and that their parents are motivated to join in too. Thereby, the medical necessity of isolating a premature infant may be somewhat offset and reconnection of parents and infant supported. CMT in neonatal care is a promising, case-sensitive intervention involving emotional inter-subjectivity through music to promote one of the most essential resources of human development from the very beginning – human contact.

Notes on contributor

Friederike Haslbeck, DMtG, SFMT, Master of Music Education, Master of Music Therapy, is a PhD candidate specially trained in NICU music therapy and has implemented music therapy service in two German NICUs. She has completed her PhD at the Universität Witten/Herdecke, Faculty of Health, supervised by Dr. Aldridge, funded by the German Foundation "Ev. Studienstiftung Villigst". She is currently implementing music therapy at the University Hospital Zürich, Switzerland, and is lecturing about music therapy in neonatal care at various universities.

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Appendix 1. Table of participants

Participant code	01 "Feline"	02	03 "Melissa"	04 "Melike"	05	06	07	08	09 "Anne"
Gender	Female	Male	Female	Female	Male	Male	Female	Female	Female
Nationality	Polish	German	German	Turkish	German	German	German	German	German
GA at birth	25 weeks	30 weeks	24 weeks	26 weeks	25 weeks	27 weeks	23 weeks	26 weeks	26 weeks
GA at the beginning of therapy	30 weeks	41 weeks	31 weeks	29 weeks	30 weeks	32 weeks	32 weeks	32 weeks	30 weeks
Birthweight	815 g	980 g	1090 g	540 g	670 g	730 g	940 g	480 g	485 g
Diagnosis	Hyperbilirubinemia, apnea, bradycardia, RDS ¹	Hyperbilirubinemia, sepsis, BPD ² , RDS ¹	Hyperbilirubinemia, apnea, bradycardia, RDS ¹	Brain hemorrhages, pulmonary interstitial emphysema, hypoglycemia, RDS ² , drug withdrawal, NEC ³ , sensory deprivation	Hyperbilirubinemia, apnea, hypoglycemia	RDS ¹ , apnea, bradycardia, sepsis	Brain hemorrhages, pulmonary interstitial emphysema, hypoglycemia, brain hemorrhage, NEC	Pulmonary hemorrhage, respiratory insufficiency, hypoglycemia, brain hemorrhages, BPD ² , sepsis, NEC	Dystrophy, apnea, bradycardia, anemia, patent ductus arteriosus, osteopenia, pineal gland cyst
Parents	Low educated, high visiting hours	Low educated, low visiting hours	Middle educated, high visiting hours	Low educated, visiting hours	Middle educated, low visiting hours	High educated, middle visiting hours	High educated, high visiting hours	High educated, high visiting hours	Middle educated, high visiting hours only by the father possible 41 weeks
GA ⁴ at discharge	38 weeks	45 weeks	37 weeks	41 weeks	37 weeks	43 weeks	40 weeks	42 weeks	

Appendix 2. Smiling of Anja (GA 29) during music therapy

Participant code	11 "Matti" (twins)	11 "Paul" (twins)	12	13 "Baran"	14	15	16 "Anja"	17	18 "Emilia"
Gender	Male	Male	Female	Male	Male	Female	Female	Male	Female
Nationality	German	German	Russian	Turkish	Polish	German	German	American	Turkish
GA at birth	26 weeks	26 weeks	24 weeks	25 weeks	34 weeks	28 weeks	24 weeks	24 weeks	23 weeks
GA at the beginning of birthweight	28 weeks	28 weeks	27 weeks	26 weeks	37 weeks	33 weeks	27 weeks	29 weeks	40 weeks
Diagnosis	Hyperbilirubinemia, apnea, bradycardia, hypotonia, respiratory distress syndrome, RDS ¹ , infections	Hyperbilirubinemia, apnea, bradycardia, hyperbilirubinemia, RDS ¹	625 g	840 g	2080 g	992 g	810 g	660 g	492 g
Parents	Middle educated, middle visiting hours	Middle educated, middle visiting hours	Low educated, high visiting hours	Low educated, low visiting hours	High educated, middle visiting hours	High educated, middle visiting hours	High educated, high visiting hours	High educated, high visiting hours	Brain hemorrhages, hydrocephalus, hyperbilirubinemia, apnoe, bradycardia, anemia
GA⁴ at discharge	34 weeks (transfer to other hospital)	34 weeks (transfer to other hospital)	41 weeks	41 weeks	45 weeks	40 weeks	37 weeks	40 weeks	46 weeks

Notes:

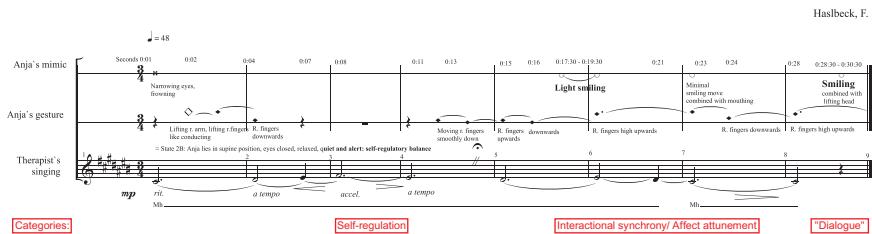
Light grey = Participant of video example with smiling

Middle grey = Participant of video example with sucking

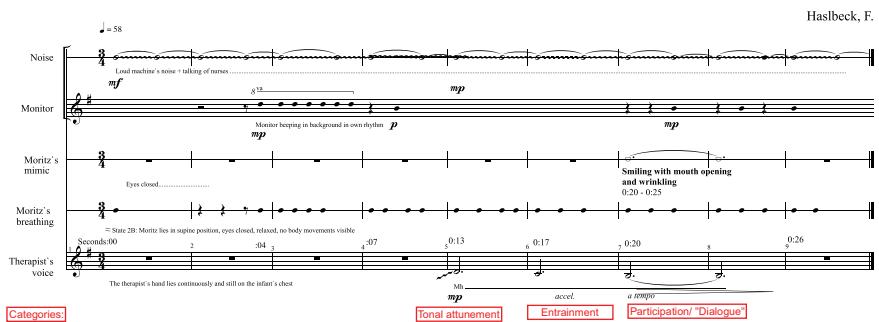
Deep grey = Participant of video example with mother involvement

¹RDS: Respiratory distress syndrome
²BPD: Bronchopulmonary dysplasia
³NEC: Necrotizing enterocolitis
⁴GA: Gestational age

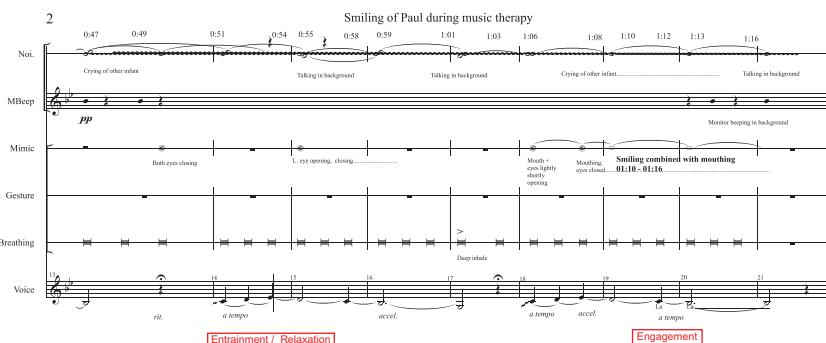
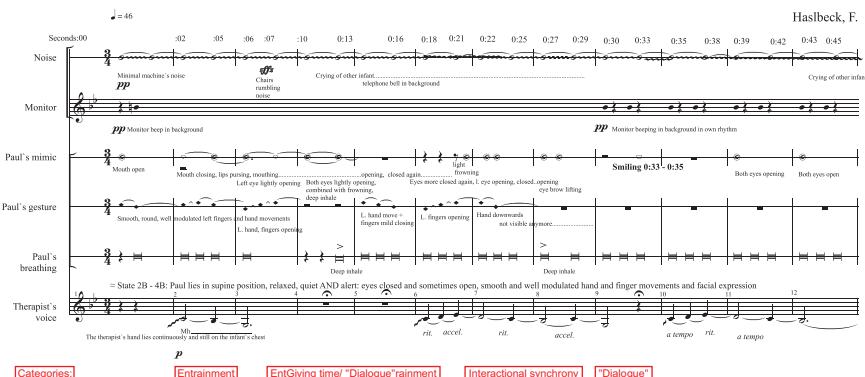
Appendix 3. Smiling of Moritz (GA 31) at beginning of music therapy



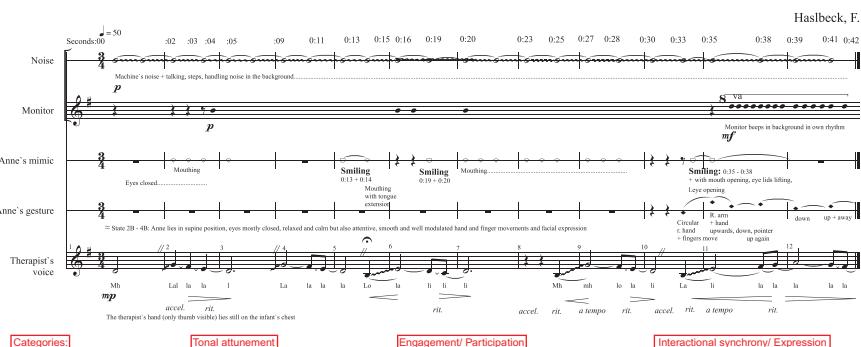
Appendix 4. Smiling of Paul (GA 33) during music therapy



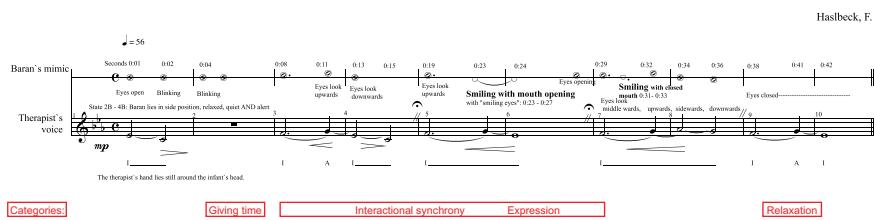
Appendix 5. Smiling of Anne (GA 35) during music therapy



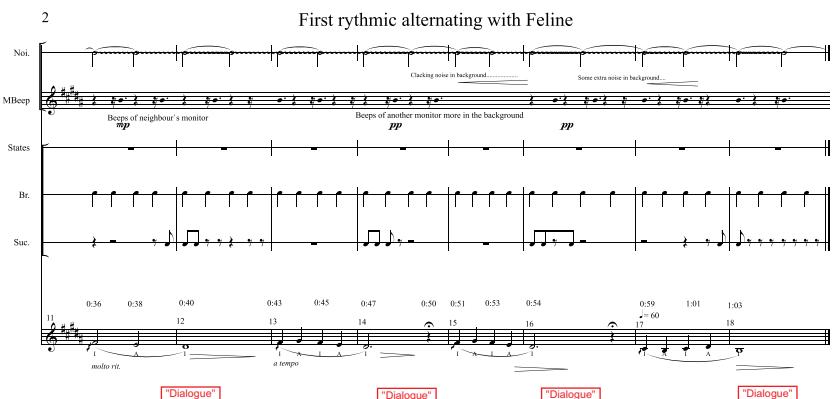
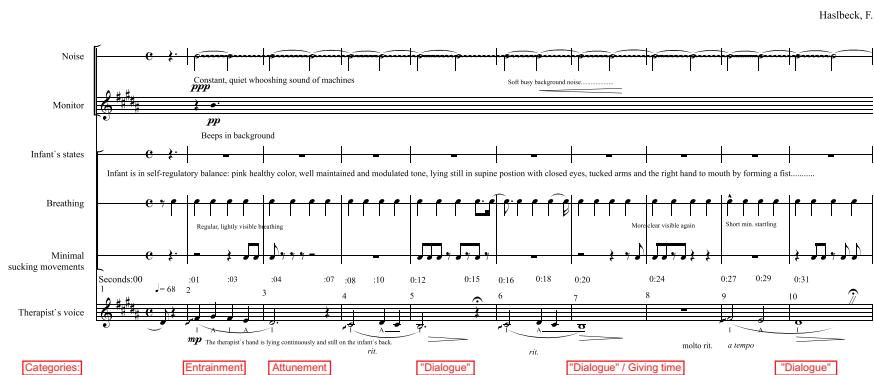
Appendix 6. Smiling of Baran (GA 41) during music



Appendix 7. First rhythmic alternating with Feline (GA 33)



Appendix 8. "Dialogue" with Feline (GA 35)

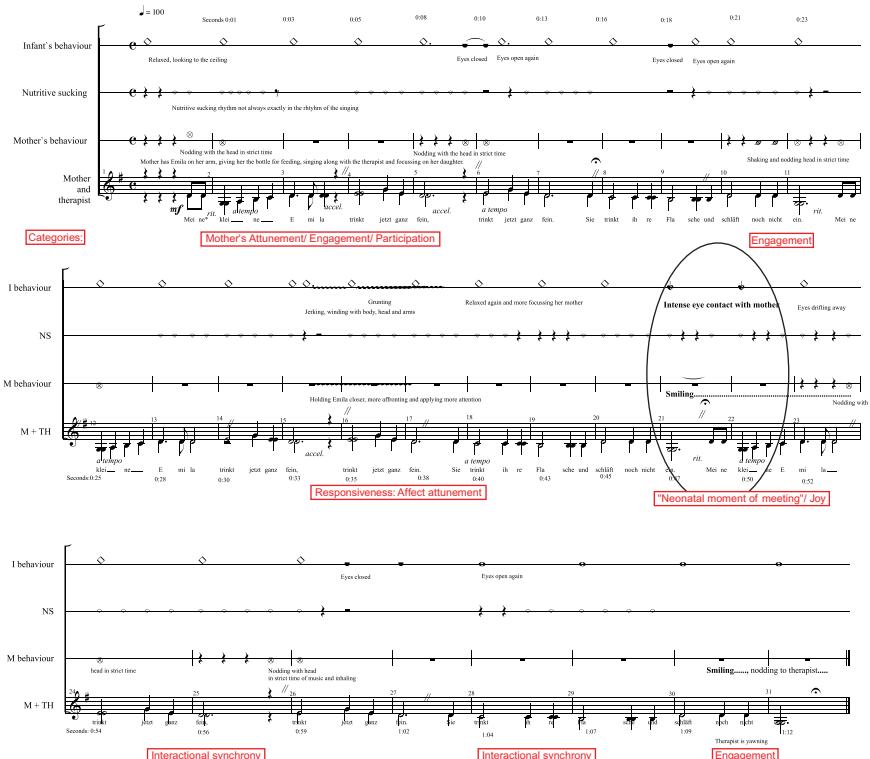


Appendix 9. Singing with mother for Emilia



Appendix 10. Mother's song for Emilia

Haslbeck, F.
based on the German children's song "All my little ducks"



Improvised song sang and created by mother in the moment, in Turkish style

