

“BABY BONDING”

An evaluation of the effect of singing lullaby on maternal behaviours associated with secure attachment.

Debi Maskell Graham* BA (Hons) MA MBACP

* big toes little toes, Ranch House, Bottesford Business Park, Normanton Lane, Bottesford, Nottingham, NG13 0EL – www.bigtoeslittletoes.org

Abstract: This study evaluates the effect of singing lullaby and authentic movement on maternal behaviours associated with secure attachment in a sample of mother-infant dyads. Specifically, the study tests five dimensions of maternal sensitivity within dyadic interactions; sensitivity, co-operation, availability, acceptance, and connectedness. This comes from the hypothesis that infant-directed lullaby practices have the potential to evoke a special state and felt connection between the dyad. Three research methods are used; Massie Campbell (A-D-S) observations; maternal symbolic sandtray analysis; and the Maternal Observation Scales for Evaluating Sensitivity (MOSES) designed by the researcher. Mothers are white British; of middle socio-economic status; and breastfeeding. Infants are first-born; delivered normally; of both genders; and aged between two and four months. By the end of the study, results demonstrate a clear improvement in maternal behaviours associated with maternal sensitivity and secure attachment in all dyads. This indicates that the use of lullaby and authentic movement practices within a therapeutic group setting is effective in supporting the early attachment relationship between mother and infant.

KEYWORDS: maternal sensitivity, attachment behaviours, mother-infant interaction, primary relationship, lullaby and authentic movement practices, group therapy.

Introduction

Every culture throughout history has had special songs for infants and young children and the ancient symbolism of the great mother and the babe in arms is to be found in abundance across all cultures.

This study looks at the synergy between these ancient traditions and modern attachment theory in order to evaluate the creative use of lullabies to enhance maternal behaviours associated with secure attachment. In addition, it tests the hypothesis that a specially contextualised opportunity to sing simple playful lullabies – a safely contained therapeutic group - may evoke a deeply “felt” sense of connection between mother and baby, an embodied sense of the mother-child unity.

Singing as a cultural and social phenomenon has declined so rapidly in the UK that the government appointed a National Ambassador for Singing in January 2007. He

asserts that songs are integral to ritual of every kind and are particularly important for “a vital bond between mother and child in the earliest years of life” (Goodall, 2007.)

Additionally, the Children’s Plan Conference in November 2008, released the “Children and young people in mind: the final report of the national CAMHS (Child and Adolescent Mental Health Services) Review.” In 2004, 10% of children in Great Britain had a clinically diagnosable mental disorder. Maternal mental health, stressful family situations, and physical illness are identified as the predisposing factors. Hence, short-term, practical and effective early attachment interventions are well worth investigating.

One may consider a lullaby to be a certain melodic structure or timbre or tempo. However, it is the “infant-directed” nature of a lullaby that infants consistently respond to (Trehub, Unyk, & Trainor in Custodero, 2002.) This study examines what this might

mean for the actual experience of the attachment process.

Theoretical context

“Mothers become able to put themselves into the infant’s shoes ... they develop an amazing capacity for identification with the baby ...” (Winnicott, 2002, p.33.)

Lullabies, movement, neurology, attachment, group therapy, and kinship are intertwined in this study and find synergy through a number of theoretical ideas.

The basis of Winnicott’s quotation above is easy to recognise yet difficult to define. Many theorists have determined that a profound connection exists between mother and infant. Indeed, according to Neumann (1973), there is no such thing as a baby rather a mother/infant unit. Mothers “tune in” as a result of a special state beginning in the weeks leading up to birth and continuing for some time in the post-partum period known as primary maternal preoccupation (Winnicott, 2002.)

Neurologically, the human infant is the least “hard-wired” mammal born in the animal kingdom (Gerhardt, 2004.) As such, she is an “external foetus” whose neural networks are critically unfinished and therefore vulnerable during the first year of life (Siegal, 1999.) In order to protect this fragile development of neural systems, the infant must be protected from prolonged intense and overwhelming affective states.

In Cozolino’s (2006) terms, the infant must “borrow” the prefrontal cortex of the parent whilst at the same time model her brain on what is borrowed. The implication of the failure or absence of this borrowing and modelling from the parent are easily extrapolated. Dysregulated affect and prolonged stress result in critical neuron loss within the cortical limbic circuits. The infant has no experience, control or memory of transition states. There is no encoding of implicit memories of positive state transitions. In psychoanalytical terms, there is no inner “good object” to ensure emotional regulation (Cozolino, 2006.)

The breaking of the fundamental bond between mother and infant has been portrayed as a “primal wound” with particular reference to adoption. However, infants who experience a severing, whether temporary or

permanent, of the mother-child unity are likely to remain with their birth mother. Premature birth, maternal post-natal depression or mental illness are examples of how the mother-infant unity may be endangered.

Research findings have demonstrated a link between secure attachment and healthy functioning in a number of areas. Secure attachment offers a “buffer” against the psychological stress response. However, early insecure-avoidant attachment has a strong association with later aggression, anti-social behaviour and negative affect. Early insecure-resistant attachment is linked with later anxiety and passive withdrawn behaviour. Early insecure-disorganised attachment is strongly indicative of later hostility, aggression and dissociation (Prior & Glaser, 2006.) It would appear foolish to ignore the paramount importance of those earliest secure attachment experiences and the profound consequences of their absence.

Another key concept is that of “mind-mindedness” (Meins et al, 2001.) This is the term used to describe the mother’s capacity to relate to her infant as a unique individual with her own mind. This is a profound shift from the mother regarding the infant as a “creature” with needs that must be satisfied. Thus, this study tests a measure of proclivity to make the mother-infant connection. It examines an *experience* of “connectedness” in dyadic interactions. This is perceived through *qualities* of the interaction rather than statements pertaining to connected mind-state. These qualities are seen as *authenticity, delight, respectfulness, and playfulness / joyfulness*. The nature of the connection is seen as open-hearted, equitable, peaceful, contented, warm, reciprocal, collaborative, honest, and empowering.

Previous studies

Four key research studies have been identified which relate directly to this research;

- Meins et al’s (2001) study which reconceptualised maternal sensitivity as the capacity to make “mind-related” comments as to infant mental states and processes. This research showed that higher scores in maternal proclivity to make such

comments related to a secure attachment at 12 months.

- True (2006) presented a Paper to the annual meeting of the XVth Biennial International Conference on Infant Studies in Japan detailing research into maternal delight, as viewed by the infant, as correlating to secure attachment. Research with indigenous mother-infant dyads in rural Mali showed that mothers of securely attached infants showed higher levels of maternal delight in their infant.
- Dozier et al (2001) looked at the relationship between foster mothers' attachment state of mind and foster infants' attachment quality. This study showed that even following a disruption in the first 18 months of life, babies were capable of organising their attachment behaviours in line with maternal availability. This study is profoundly important as it strengthens the notion of the non-genetic transmission of attachment.
- Caine (in Custodero et al, 2002) studied the effect of music on premature infants in neonatal care. Results showed that the use of lullabies reduced neonatal stress behaviours, increased calorific intake and weight gain. Infants also left hospital on average five days earlier than the control group.

Attachment

Bowlby's attachment theory (1969; 1973) together with his and Ainsworth's (1969) ethological and observational methodology provided developmental psychology with both an empirical and theoretical framework in behavioural biology (Grossman; Grossman; Waters; 2005.)

Ainsworth's Strange Situation became the main empirical tool for the study of infant-parent attachment patterns until the mid 1980s. Her notion of maternal sensitivity in promoting infant security is a key concept for scrutiny in this study.

Main, Kaplan, and Cassidy (1985) then began to study attachment relationships in terms of representation with their Adult Attachment Interview (AAI) and the first representational attachment measure for children, the Separation Anxiety Test (SAT.)

Main et al (1985) considered the effects of early experience on subsequent brain organisation relating to attachment and made two fundamental observations. Firstly, that there was no predictability in outcomes of any individual whose earliest attachment experiences were unstable. Secondly, that where there was no "single strategy" representing attachment-related brain organisation in the first 18 months, this resulted in unpredictability in adolescence (Grossman et al, 2005.)

Steel and Steel's (ibid, 2005) London Parent-Child Study is fascinating, notably the phase one infancy assessment results. This study showed that the AAls, collected before the baby was born, provided a robust indicator of mother-infant attachment security at 12 months (Grossmann; Grossmann; Waters; 2005.) Thus, adult internal working models of attachment are critical in the subsequent development of mother-infant attachment.

Meins et al (2001) sought to rethink the concept of maternal sensitivity by examining maternal capacity to accurately read the mental states concerning infant behaviour. By measuring mind-related comments made by mothers to their 6-month old infants, it was possible to accurately predict the nature of the dyadic attachment relationship at 12 months. The accuracy of this measure to predict later secure attachment at one year led the researcher to want to find out if mothers could actually feel and enter the infant "mind-state." Can the mother successfully enter a somatic, non-verbal and musical state with the infant? Can this be measured by observations indicating appropriate delight, authenticity and joyfulness?

Lullabies and authentic movement

A lullaby is universally understood to be a soothing song sung to infants. A higher pitch and a distinctive use of phrasing seem to be common in lullaby across all cultures (Custodero et al, 2002.) Trainor and Zacharias (Custodero et al, 2002) describe the essence of the lullaby as infant-directed. In other words, it is not just the type of song that is crucial. In a lullaby, the voice is melodically higher than other songs and the tempo is slower and more measured. A loving tone of voice is used by the mother towards the infant. Thus, an infant-directed lullaby is a musical form which is friendly, calming, reassuring, and non-threatening.

Lullabies are inextricably linked with movements like cradling, stroking, gentle rocking, patting and caressing. The use of touch and movement is a powerful tool in perinatal and preverbal experience as seen in the theory and practice of Body-Mind Centering, developed by Bainbridge-Cohen (1986; 1993); and Authentic Movement, originated by Whitehouse (Palarro et al, 1999), and further developed by Chodorow (ibid, 1999) and Adler (ibid, 1999; 2002.) Both of these approaches invite a dialogue between consciousness and the unconscious through movement, body awareness, and touch. Movement patterns embody important developmental tasks with which the infant is engaged in the process of developing a sense of self and a healthy psychological core.

Neuroscience of human relationship

The neuroscientific basis of the developing social brain has been the most recent contribution to this field. Schore (1994), Panksepp (1998), Siegal (1999), Gerhardt (2004), and Cozolino (2006) address the earliest experiences of relationship in a fusion of neurology, psychology, psychoanalysis, psychiatry and biochemistry.

Neurobiological responses of the infant and the social construction of the brain in the earliest relationship are fundamental to our understanding of emotional and psychic development, in particular Gerhardt's notion of the "external foetus" (2004) and the role of the limbic system.

Recent neurological developments corroborate the link between mind states and accompanying neurobiological and chemical processes. The dyad ideally engages in a "mutual co-regulation of resonating states" (Siegal, 1999, p.88.) This sits very well within Neumann's mother-child unity and the uroboric phase. In Neumann's terms, this mutual co-regulation and resonance is the "participation mystique" (Neumann, 1973.)

Paradoxically, it is important to grapple with the concept that the individual brain does not actually exist. Perhaps it is better, as Cozolino (2006) suggests, that we forget we have brains, to accept that there are no single brains. Indeed, the brain only exists in interaction with others as an adaptive organ (Cozolino, 2006.)

Theories of mother- child relationship

Winnicott (1965) developed the notion of the "good enough" mother; a mother who responds and changes according to the needs of her infant. His term "primary maternal preoccupation" (1965) is important to this study as a special state between mother and infant, one that may be supported by lullaby practices.

Mahler et al (1975) posit that the infant begins life in undifferentiated symbiosis with the mother evolving to a period of normal autism (birth to four weeks) and a symbiotic relationship (from one to five months.)

Kernberg (1976) asserts that it is relational experience that creates structure within the psyche as opposed to the id structuring reality. Kernberg's emphasis is interesting in the context of current neuroscientific thinking, particularly Cozolino's (2006) work on the social synapse.

Kohut's self psychology (1977) rebuffed any association with psychoanalytic theory, rendering instinctual drives only to a fragmented self. Kohut's reconceptualising of traditional psychoanalytical constructs is taken still further by the erudite Mitchell (1988) whose atheoretical approach makes a paradigm shift from object relations to a relational model. Thus, relationships configure the mind. Infants are intrinsically seeking relationship as the very expression of being human. This is the relational matrix paradigm.

Neumann (1954; 1973) charts the earliest phase of development as the primal relationship whereby the child has no sense of self and other. The mother takes the role of the compensatory self. In other words, she protects the infant from over exposure to difficult and overwhelming feelings. These things come not only from external sources but also from within the infant herself, for example, rage or fear.

Neumann identifies these maternal capabilities as compensation and appeasement. The mother's constancy and consistency in regulating these very intense and difficult feelings and experiences support the infant to invest "in its ego the positive integral tendency which the mother exemplifies and which she embodies over and over again in her contact with the child" (Neumann, 1973, p.58.)

Group and kinship theory

"It takes a village to raise a child." (African Proverb)



Figure 2
A group of women and infants: Samburu tribe in Kenya,
West Africa
(researcher's photograph)

Yolam (2005) states that individuals entering therapy are often deeply afraid that they are "unique in their wretchedness" (ibid, p.6.) Thus, a group which effectively "disconfirms" this is powerful and liberating. Yolam identifies this process as universality. In addition, the notion of vicarious learning, ie. learning through the experiences of others in the group; and imitative behaviour, ie. the effect of modelling of desirable behaviour, are powerful group processes. Yolam states that even if imitative behaviour is short-lived, "it may help unfreeze the individual enough to experiment with new behaviour, which in turn can launch an adaptive spiral" (ibid, p.18.)

Schneider (Parkin & Stone (Eds.), 2004) redefines the potential function of the group as kinship in the 1970's. His monumental declaration that kinship was a "non-subject" owing to its non-existence in any culture, stripped anthropology of a fundamental premise. Kinship changed from a focus on social organisation to a focus on "culture, human agency, and process" (ibid, p.243.) This fundamentally challenges a view focused on kinship as genealogy. Indeed, "blood as a fluid has nothing in it which causes ties to be deep and strong" (ibid, p.268.) Thus, the therapeutic group has the potential to be a surrogate kinship group in Schneider's terminology and the sharing of a set of intimate experiences and beliefs around attachment parenting may create a powerful and cohesive kinship dynamic between new mothers.

Methodology

This is a hermeneutic systematic inquiry into the relationship between lullaby and movement practices and parental attachment behaviours. The methods used comprise:

- Massie Campbell (A-D-S) dyadic observation questionnaire.
- Maternal Observation Scales for Evaluating Sensitivity (MOSES) observation statement matrix.
- Maternal sandtray representing the nature of mother-infant relationship. (Mothers make a picture representing their relationship with their baby in a large box of sand using miniatures (figures, animals, scenery, sealife, shells, fairytale characters, etc, from several hundred made available. The mother may tell a story about the picture and this is recorded together with photographs of the tray).

During individual interviews at the beginning, middle and end of the study, the Massie Campbell Scale (A-D-S) (Massie & Campbell, 1991) was completed by the researcher together with photographed sandtrays per dyad made by the parent. Ten weekly lullaby and movement sessions were conducted with a co-researcher collecting data via the Maternal Observational Scales to Evaluate Sensitivity (MOSES) representing the primary research method.

The study involved a sample of ten mother-infant dyads. Mothers were White British, of middle socio-economic status, having experienced normal delivery. Infants were first-born with no known or ongoing health issues, of both genders aged two to four months at the start of the study. Infants were breastfed as the primary feeding method.

Parents showed no post-partum psychiatric symptomology as described in both the DSM-IV-TR (2000) and the ICD-10 (1992.)

The lullaby and movement practices planned for the research study were carefully designed to maximise enjoyment and benefit to mother-infant pairs and to minimise the risk of adverse experience during the vulnerable post-partum period.

Practices consisted of simple lullabies and gentle authentic movements such as rocking, stroking, cradling, and massage. The

lullabies were adapted from multi-cultural and traditional versions and chosen for their propensity to be truly infant-directed.

Ethics

PTUK (The United Kingdom Society for Play and Creative Arts Therapies) Ethical Framework and the BACP (British Association for Counselling and Psychotherapy) Code of Ethics provided the ethical framework for the study including a complaints procedure. The research study design was guided by the principles of beneficence, non-maleficence, autonomy and fidelity in the context of legally valid and fully informed consent.

Use of clinical supervision

Much illumination was given in supervision to the complex transference and counter-transference issues that arose. It was particularly useful to discuss the transference of anxiety around the group as infants became distressed. It became clear that the role of holding and containing these intense moments was critical in the survival of the dyad to continue through the group experience of the study.

Study findings

As a result of the sessional observations and associated interviews, a total of 156 datasets have been compiled.

A-D-S

A total of 30 A-D-S datasets were collected comprising beginning, middle and end scores for ten dyads. The A-D-S yields a score from 0-5 across seven categories. It is essentially a measure of the intensity of the avoidance or attraction between parent and infant on the indicators below.

A score of 3-4 is considered a normal healthy indication of the level of intensity of avoidance or attraction between the dyad. A score of 5 represents a hypersensitive interaction and a score of 1-2 indicates a dissonance or lack of engagement between mother and infant. Parameters through which this intensity or avoidance of interaction are gauged as follows: holding, gazing, vocalising, initiating touch, the withdrawal of touch, affect, and proximity (Massie & Campbell, 1991.) The A-D-S is useful as a tool to examine the *relationship* between the mother scores and infant scores.

Figure 3 represents the average A-D-S scores taken at the beginning and end of the study across the whole group.

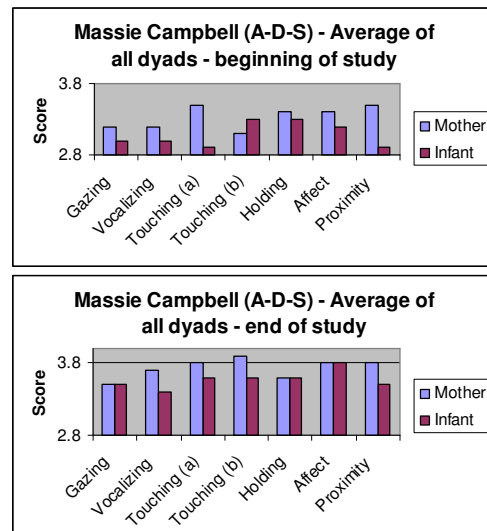


Figure 3
A-D-S Average Scores

The changes in the scores by the end of the study are marked. Average scores have increased generally and show a trend towards synchronicity. All scores are a healthy 3-4 indicating a generic increase in the prevalence of mutually regulating attachment behaviour across the dyads.

However, any analysis of *average* scores in the A-D-S masks the complexities and subtleties in the changes in synchronicity in individual dyads. For example, a consistent maternal score of 5 when linked to an infant score of 0-2 in the same parameter would be of concern indicating a high level of dissonance in the relationship.

Another way to explore the data is look for the pattern in attachment indicators as a guide to the nature of the interaction within a given dyad. In the context of this study, the following general observations can be made as a result of assessing individual dyads:

- Convergency of scores *within* parameters specific to individual dyads.
- Increased synchronicity in scoring indicating reduction of dissonance.
- Reduction in maternal behaviour scoring 5, seen as hypersensitive behaviour indicating anxiety across all domains.

MOSES

A total of 88 datasets were collected from a possible maximum of 100 representing an study attendance rate of 88%. Observation statements were graded over seven parameters from strongly agree to strongly disagree with corresponding digital scoring of +3 to -3 generating a total score per dyad per session. Observation statements were also allocated to five observation scales: sensitivity, co-operation, availability, acceptance, and connectedness. Aggregated results are shown in Figure 4:

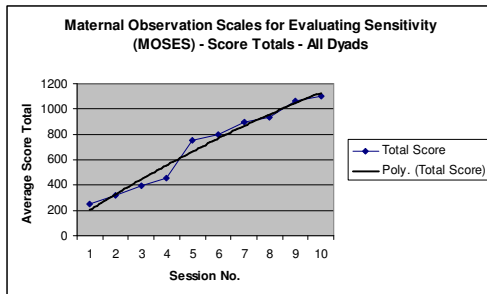


Figure 4
MOSES total scores with trendline

The total scores show an increase over the life of the study and then show signs of levelling off. This may indicate that the optimum length of this type of intervention is 9-10 weeks. Additionally, infants were approaching six months and becoming more mobile and less focused on their mother's face.

A "dip" in scoring was observed at around week 3-4 of the study as illustrated in Figure 4. This is followed by a sharp increase in score in week 5. Over weeks 6-10 there is a steady rise in scoring that may eventually level off if the trend were projected onwards.

Total scale scores were also generated per scale per session presented in Figure 5.

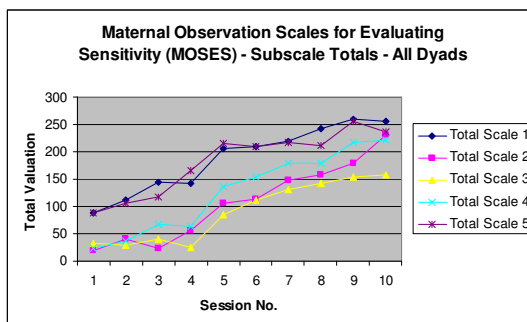


Figure 5
MOSES subscale totals all dyads

Scores totals are shown as follows:

- Scale 1 = sensitivity
- Scale 2 = co-operation
- Scale 3 = availability
- Scale 4 = acceptance
- Scale 5 = connectedness

Scale 1 shows a steady increase in score to week 3 followed by a slight dip in week 4. There is a dramatic increase in score week 4-5 followed by an upward trend over the rest of the study period. This shows that maternal sensitivity increased significantly over the life of the study but most specifically from week 4-5.

Scale 2 starts with the lowest ranking score and ends as the second highest scoring scale by the end of the study. There is a drop in score at week 3 followed by a sharp increase over weeks 4-5. This pattern in the scoring is almost precisely mirrored in the scale 5 scoring. It appears that an increase in connectedness (scale 5) between mother and infant therefore results in an increase in co-operation (scale 2) in the dyad. Thus, increasing connectedness specifically reduces interfering/controlling behaviours in the mother.

Weeks 3 to 4 show a drop in Scale 3 to its lowest score total followed by a sharp rise to week 5 followed by a steady increase to week 9. This scale refers to maternal physical and psychological availability to the infant and was at its lowest in weeks 3-4 followed by a significant increase.

Scale 4 shows a sharp drop in scores week 3-4 suggesting a decrease in maternal acceptance of the infant equating to an increase in rejection of infant need. Again, acceptance behaviours improve drastically from week 4-5.

Scale 5 shows an interesting *increase* in score in weeks 3 and 4 whereas the total MOSES scores generally drop in these weeks. It appears that mother-infant connectedness is increasing whilst other aspects of the relationship are experiencing greatest stress. Or it may be that owing to increasing connectedness critical shifts are stimulated.

It can be concluded that the trend in overall mother-infant bond response is mirrored by the scaled components of the process with

the notable exception of scale 5 which shows an inverse relationship during week 3-5.

Sandtray

Dyadic sandtray sets were photographed and analysed. Analysis was made of each individual tray and the changes in each series of trays over the life of the study. This analysis comprised of:

- The mother's own interpretation of symbolic use and "story" of the tray.
- The researcher's direct observations of this process.
- The researcher's setting of the tray within the theoretical context of the early mother-infant relationship in symbolic sandplay.
- The researcher's interpretation of symbolic themes emerging.

Sandtrays were analysed from theoretical standpoints from Winnicott's (1974) primary maternal preoccupation to Mahler's (St.Clair, 2004) first month as natural autism transitioning to symbiotic oneness to Neumann's (1973) Vegetative stage (2-3 months to 6-7 months) characterised by primary unitary reality to the static feminine stage of Hill (1992) to the symbolism of Anima/Animus (Jung, 1959) as the feminine is energised and supported by the masculine to enter the participation mystique (Neumann, 1973.)

Changes in the sandtrays of individual dyads can be described as follows:

- Mothers' own representation of self strengthening as seen through the change from symbols such as misappropriated Hero (strongman) to fairy godmother (Magician) to Queen (symbol of Anima strength) (Hill, 1992.)
- Increased emergence of Anima/Animas symbolism between mother and partner as they begin to work together to care for their infant.
- Increasing protection provided by the dynamic masculine, releasing the mother into mother-child unity, eg, transformation of father from anonymous blue soldier to Prince (Hill, 1992.)
- The subjugation of dominant figures in the close maternal circle who are undermining the mother's ability to merge with her baby, ie. the

negative swan (symbol of the loss of soul or True Self (Cirlot, 2002) fenced in.)

- A shift from ideal home being seen as unobtainable to obtainable (use of house representing both the ideal family and the Self (Becker, 1992; Cirlot, 2002.)
- A move towards individuation and acceptance of negative aspects of mother in the negative spider or multi-headed dragon.
- A releasing of "warrior" (Anima) energy in the mother as the partner evolves taking the protective role.
- Changes in final trays to representations of the symbiotic relationship between mother and infant. For example, the portrayal of the relationship as a boat or ship.
- The use of crystals as the symbol of the manifestation of spirituality in matter, ie. a fulfilment of life's dream or ideal of the true Self (Cirlot, 2002.)
- Shift from literal to abstract symbolism in some trays indicating a deepening and soulful connection between mother and child.

Changes in synchronicity between mother and infant

The findings point to an increasing attunement or "connectedness" between mother and infant.

Certainly, they provides compelling evidence for Neumann's phallic-chthonian phase; that first year of non-duality with the mother. He cites this as the critical period of mother-child unity; a non-duality between mother and infant whereby the infant does not know she is separate from the mother (1973.)

The death of the "as-if" mother?

The study findings show a clear pattern in both total MOSES scores and individual dyadic scoring; the dramatic drop in score in week 3-4 followed by a sharp rise in the week following; with subsequent steady improvement across all scales.

This phenomenon could be explained as a moment of maternal crisis heralding the death of the "as-if" mother. The notion of the "as-if" personality is put forward famously by Miller (1987) and is essentially an adaptive or maladaptive defence mechanism. Jung would describe it as a persona (1959.)

Mothers in this study often described the pressure of the myth of the idealised mother in her myriad forms. Within the sessions and during individual interviews, they described the feeling that they “should” or “ought” to know what to do with their baby and times of feeling under scrutiny from those around them.

Mothers described how painful it was within the baby bonding lullaby sessions and more widely when their baby cried and they could not console or comfort her. They also described a “letting go” of this ideal and its accompanying relief. This moment of letting go was associated with a difficult session of intolerable tension between them and their infant. This “crisis” week was identified as week 3-5. It is possible that these difficulties heralded the death of the “as if” mother whereby the idealised mother falls away to reveal the good-enough mother (Winnicott, 1965.) This falling away is visibly accompanied by relaxed and calm maternal affect during subsequent sessions.

Whilst the death of the “as-if” mother is an interesting theoretical idea warranting further research, it does reveal a concerning anomaly within the research study model. If this difficult moment or crisis does exist then there is a real danger that a less robust or resilient mother could reach this vulnerable point in the process and exit.

Group as container and surrogate kinship

The convergence of dyadic scoring from a disparate beginning to a homogenised end is striking. Yolam’s (2005) concepts of vicarious learning and imitative behaviour offer a compelling explanation of this phenomenon. Towards the end of the study, dyads are scoring very similarly. Maternal behaviours have homogenised and sessions have become very calm.

Transference around the group became much less complex over the life of the study. In the early weeks, it was chaotic. Each week became calmer.

The notion of the formation of a kinship group through shared values and life-stage also finds some substance. Schneider’s (Parkin & Stone (Eds.), 2004) assertion that it is not genealogy that is the stuff of kinship but rather shared symbolic meaning appears validated in these findings. Further enquiry into this fascinating concept is warranted.

This strong group bonding dynamic may be particularly helpful in any rolling out of this research into a therapeutic community-based intervention. An early mother-infant therapeutic intervention appears to have the potential to act as a bridge between health service-based antenatal care and community-based family support agencies.

Maternal sensitivity and “connectedness”

“... there was no I and you ... only the third, unrealised wonder, the wonder of existing not as oneself, but in a consummation of my being and her being in a new one, a new, paradisaic unit regained from the duality. (D H Lawrence, Women in Love)

Study findings indicate that a mother who can be sensitive to her baby’s cues and signals is associated with a mother who can *authentically delight, become engrossed in, intrinsically trust, become immersed in a feeling state* with her baby and experience the mother-child connection. It would appear that it is indeed possible to facilitate a felt experience of the mother-child unity through singing lullaby, a feeling state that is difficult to convey.

Changes in mother’s voice and affect

Observations relating purely to voice (tempo, volume, modulation) were teased out and studied. The results are shown in Figure 6.

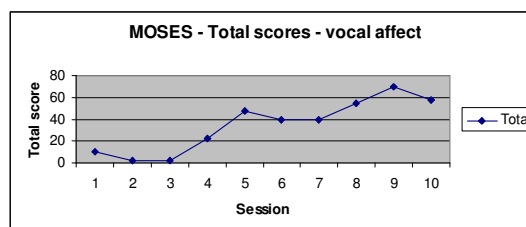


Figure 6
Changes in vocal affect:
MOSES total scores across all dyads

These results show that the practice of singing lullabies markedly improves a mother’s vocal attunement with her infant. In other words, mothers who regularly practice singing lullabies with their babies become more skilful at modulating their voices, tempering their volume to the sensitivity of their baby; changing the tone of their voices; and softening the quality of their voice towards their infant.

MOSES observations relating to affective attunement were also evaluated in a similar manner. The researcher was interested in

evaluating changes in facial expression, animation, smiling and joyful expression. The results are shown in Figure 7.

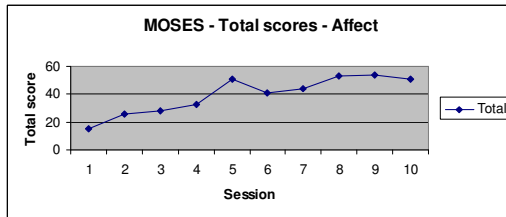


Figure 7
MOSES total scores: facial affect

These results show a significant change in mothers' facial affect relating to delight and joyfulness in interactions with their infants.

Given that it is the mother's face and voice that evokes the attachment response in the infant (Stern, 1990), this is a vital finding of the study. It suggests that the practice of lullabies evokes a joyful and delightful emotional connection between mother and infant. Also, that the therapeutic use of lullabies evokes a neurochemical "cocktail" conducive to the healthy development of the infant's brain and creating a calming effect on the mother.

Lullabies as indigenous "soul-songs"

Mothers expressed a positive experience of singing the lullabies. Further research is planned to consider the cultural and anthropological aspects of traditional lullabies. It became clear that the paucity of indigenous material to sing was linked to a white British culture. Mothers expressed a preference for lullabies associated with North American, Native American and African cultures.

Data sensitivity

Population samples are subject to external influence and need to be large enough to ensure that overall trends are not masked by unrelated factors. Factors that could potentially affect the mother-infant evaluations include:

- Maternal or infant health.
- Personal issues affecting the mother (e.g. relationships, work, sleep, etc.)
- Health and contentedness of the researcher delivering the sessions.
- Health and contentedness of the observing co-researcher.

- Naturally occurring processes within dyadic relationships.

Statistical validation of this study was achieved through confirmation of a normal distribution (Figure 8); and a simulation of the projected results over a data set of 140,000 observations with a 30% random element factored in.

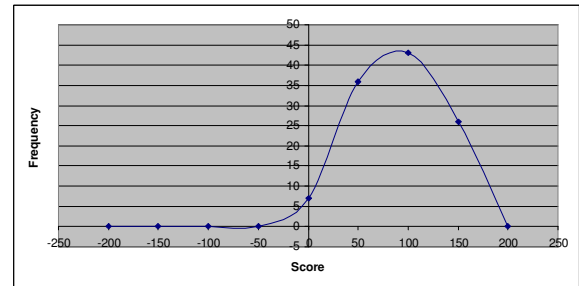


Figure 8
Normal distribution curve: MOSES scores

The principal characteristics of the data sets accumulated using the MOSES evaluation are:

Total number of session questions	63
Maximum number of observations (10 dyads x 10 sessions)	100
Actual number of observations (catering for absenteeism)	88
Maximum score possible (+3 x 63 questions)	189
Minimum score possible (-3 x 63 questions)	-189
Mean score calculated	63.8
Standard deviation	41.6

The standard error (= 4.4) has been used to calculate confidence intervals for the true population mean. A confidence level of above 95% can be confirmed as the study mean is within the range of 95% Lower Confidence Level (55.1) and 95% Upper Confidence Level (72.5.)

The distribution of scores in terms of number of standard deviations has also been mapped as shown below.

Table 1: Score distribution in terms of number of standard deviations

Quartile	Value	Frequency	%
-3 STD	-62	0	0
-2 STD	-20	1	1
-1 STD	22	24	21
Mean	64	31	28
+1 STD	106	40	36
+2 STD	147	16	14
+3 STD	189	0	0

As a result, 85% of the responses fall within one standard deviation of the mean demonstrating that the sample distribution complies with the empirical requirements for a Normal Distribution.

Monte Carlo Simulation

This is a method for analysing uncertainty propagation, in order to determine how random variation, lack of knowledge, or error affects the data generated.

Total scores for each dyad per session were subjected to a 30% random component to allow for uncertainties and a random number generated using an inherent function within Excel. A Monte Carlo add-in repeats the process over 1000 iterations for each session total and average values are plotted against the actual value observed as shown in Figure 9.

Even allowing for a 30% random influence, the projection suggests marked increase in positive mother-infant attachment indicators. Thus, the population sample collected appears representative and the underlying assumptions made in the data collection robust.

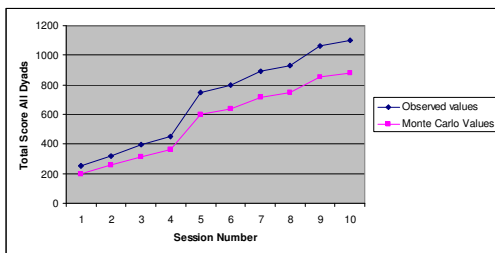


Figure 9
Comparison of MOSES total scores and Monte Carlo simulation scores by session

Conclusions

This study has shown a number of findings validated and corroborated across the methodology:

- a marked improvement in synchronicity and attunement between mother and infant across the ten study sessions.
- a marked reduction and in some cases absence of dissonance between mother and infant by the end of the study.
- The calming effect of lullaby on both mother and baby.
- a critical “event” which happens in the dyadic process in approximately week 3-5 of the study which results in a drop in scoring. This is followed by a swift and sharp increase in scores from the following week and continues throughout the rest of the study period.
- a sharp drop in all scores accompanies this event across all scales employed EXCEPT “connectedness”, which grows at its most rapid during this critical and difficult time and then continues to grow consistently.
- the major role of the therapeutic group in uniting individual dyads and moving disparity amongst early dyadic scores to homogenised scoring
- dyads becoming markedly calmer through the life of the study.
- mothers finding it challenging to articulate in words the nature of the connection that they experience in the study with their infant. They more readily describe feeling-states.
- the capacity of the group as an enduring supportive network beyond the life of the study.
- mothers’ voices and facial affect changing positively throughout the study.

Future research is now needed across specific groups of parents and infants for whom an intervention based on therapeutic lullabies and movements is considered beneficial.

The capacity for the age-old wisdom and transpersonal nature of multi-cultural lullabies and authentic movement to combine with attachment theory and the neuroscience of relationship is very exciting indeed.

The researcher plans to study indigenous lullabies further and to examine kinship (group processes and family dynamics)

between families and mother-infant dyads in these and other indigenous cultures.

It is concluded that therapeutic support of the mother-infant unity in the early post-partum period through lullabies is a gentle, practical and effective intervention.

The use of a series of lullaby and movement practices between mothers and their infants aged two to four months does indeed have a significantly positive affect on parental behaviours associated with secure attachment.

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