Attachment and Depression: Communication and Perception of Emotion Through Song

by

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A thesis submitted in conformity with the requirements for the degree of Masters of Arts
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Abstract

Communication and perception of emotion were assessed in order to determine whether the expression or perception of emotional involvement through vocal cues differs according to adult attachment representation and/or the presence of depressive symptoms. Forty-six mothers were recorded singing the same song in their infants’ presence and absence. Fifty undergraduate students rated the degree of emotional involvement for each song. Mother and rater attachment style and depression status were assessed to determine the independent and combined effects of attachment and depression on the communication and perception of vocal emotional cues. Overall, mothers were rated to be more emotionally involved when singing in their infants’ presence than in their absence. Ratings of emotional involvement, however, were not found to differ significantly based on either the mother’s or the rater’s attachment representation and/or the presence of depressive symptoms. Directions for future research investigating emotional involvement within the mother-infant relationship are discussed.
Acknowledgments

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Chapter 1

Introduction

Young infants repeatedly experience arousal that exceeds a level that they are able to modulate and therefore depend on their mothers (primary caregivers) to read and respond to their emotional cues in a manner that will recapture emotional equilibrium (Sroufe, 1996). It is this type of daily affective exchange that is thought to be internalized by the infant and ultimately represented in the form of infant attachment security (Haft & Slade, 1989). Mothers, however, differ in the degree to which they are emotionally available which affects their ability to communicate, perceive, and respond to emotional cues when interacting with their infants. As a result, mothers experience varying degrees of success in regulating their infants' emotional state (Cassidy, 1994; Goldberg, MacKay-Soroka, & Rocehester, 1994; Haft & Slade, 1989).

Recent research has highlighted maternal attachment representations and the presence of maternal depression as factors which may influence the degree of maternal emotional availability and the manner in which mothers perceive, respond to, and communicate emotion when interacting with their infants. Maternal attachment representation and depression are particularly salient for mother-infant interaction and infant emotion regulation given that the infant’s daily experiences with his/her mother during the first year of life are pivotal to the formation of a secure attachment (Sroufe, 1996) and due to the high prevalence of depression (15%) in mothers during the postpartum period (Downey & Coyne, 1990).
Maternal Attachment Representation and the Communication and Perception of Emotion

The manner in which mothers interact with their infants is thought to be influenced by the mother's own internal representation of attachment (van IJzendoorn, 1995). It is thought that this representation, which is a product of maternal thoughts and feelings about past attachment-related experiences, influences the perception of attachment-related information and the communication of emotional cues in general (Cassidy, 1994). The mother's attachment representation, therefore, may have the ability to restrict and/or enhance the processing and expression of emotion during interactions with her infant.

The Adult Attachment Interview (AAI: George, Kaplan, & Main, 1985) is a semi-structured interview that taps into the mother's state of mind with regard to attachment. The interview probes for memories of attachment-related experiences during childhood, such as memories of feeling loved or unloved, being ill or upset, and loss and separation (Cassidy, 1994). Being asked to recall these memories is thought to activate the mother's attachment system affecting her concrete informational response as well as the overall coherence of her discourse. It has been suggested that mothers who cannot integrate their own attachment experiences and feelings tend to restrict the processing or alter the perceived quality of attachment-related information. These restrictions are apparent at both the levels of discourse and behaviour in the forms of speech inconsistencies and insensitive responding to infant cues (Main, Kaplan, & Cassidy, 1985).

Cassidy (1994) identified three patterns of maternal affective expression and perception (open, minimized, and heightened) associated with Autonomous, Dismissing and Preoccupied classifications on the AAI (George, Kaplan, & Main, 1985) respectively.
Interactions in which mothers respond consistently and sensitively to a range of infant emotions, accept negative emotions, and are present and provide assistance in regulating emotions are characteristic of Autonomous mothers. Studies have found that these mothers are more responsive and offer more warmth and affection to their infants (Crandell, Fitzgerald, & Whipple, 1997; Haft & Slade, 1989). Mothers classified as Dismissing tend to deny negative experiences and/or emotions or dismiss their significance. Studies of mother-infant interaction indicate that these mothers tend to exhibit a more restricted range of emotional expressiveness and increased withdrawal from interactions involving negative affect (Haft & Slade, 1989). Communication of an overemphasized, heightened, and incoherent focus on attachment relationships and emotion is characteristic of mothers classified as Preoccupied. The emotional availability of these mothers tends to be dictated by their own needs resulting in inconsistent communication and perception of emotional cues (Haft & Slade, 1989).

Maternal Depression and the Communication and Perception of Emotion

Similar to research that has been conducted looking at the associations between adult attachment representations and emotional availability, research in the area of depression has also probed the relation between maternal emotional availability and mother-infant interaction characteristics. Given that depression is partly a disorder of the control and regulation of affect (Rosenblum, Mazet, & Benony, 1997), that decreased levels of emotional availability are characteristic of depressive episodes (Field, 1994), and that depression in the postpartum period has been shown to have a medium to large effect on the quality of mother-infant interaction during the first year of the infant’s life
(Beck, 1995), interaction patterns of depressed mothers and their infants appear to be particularly salient to research looking at the communication and perception of emotion.

In terms of communication of emotion, research has indicated that mothers experiencing depression during the postpartum period communicate lower levels of affective expression and either display withdrawn behaviour coupled with flat affect or intrusive, hostile behaviour while interacting with their infants (Beck, 1995; Cohn, Campbell, Matias, & Hopkins, 1990; Cohn & Tronick, 1989; Downey & Coyne, 1990). Emde (1990) has suggested that the most reliable indicator of emotional availability is the presence or absence of positive emotion. Numerous studies have found that mothers who are depressed communicate lower levels of positive emotion and spend less time matched in positive affective states when interacting with their infants (Cohn et al., 1990; Field, Healy, Goldstein, & Guthertz, 1990). Emotional withdrawal and low levels of positive emotional communication associated with maternal depression therefore appear to increase the probability of ineffective mother-infant emotion regulation (Field, 1994).

Perception of affect and emotional attunement also appear to be negatively effected by the presence of maternal depression. Tronic and Gianino’s (1986) Mutual Regulation Model states that “the ‘depressed’ mother, because of her own emotional state, fails to respond to her infant’s other-directed regulatory signals and thus fails to provide the infant with appropriate regulatory help” (p. 9). Mothers with depression often have difficulty contingently responding to emotional cues and matching their infants’ emotional state. Field et al. (1990) found that depressed mother-infant dyads spent less time in matched behaviour states in comparison to non-depressed dyads. Mothers diagnosed with clinical depression also tend to be less responsive and accepting of their
infants' emotions. They interact less and exhibit lower levels of dyadic co‐ordination and positive affect and behaviours during interactions (Gelfand, Teti, Seiner, & Jameson, 1996). Mothers with Bipolar depression are likely to be perceived by their infants as unpredictable or inconsistent, unresponsive, and physically and emotionally unavailable (Radke-Yarrow, Cummings, Kuczynski, & Chapman, 1985; Radke-Yarrow, McCann, DeMulder, Belmont, Martinez, & Richardson, 1995). Mood fluctuation and affective unresponsiveness, which are characteristic of Bipolar depression, may in part explain why these mothers experience difficulty regulating their infants’ emotional state and why their infants often develop insecure attachment strategies.

Given that research supports the contention that maternal attachment representation and the presence of maternal depression may limit maternal communication and perception of emotion, the purpose of the present study was to further elucidate the independent effects of attachment representation and depression on the communication and perception of emotion in the context of mother‐infant interactions. A second purpose of the present study was to look at the interactive effects of attachment representation and the presence of depressive symptoms on the communication and perception of emotion.

**Measurement of Vocal Affective Expression**

Discrete emotional states are known to be associated with distinct and perceptible facial expressions (Ekman, 1989). A number of theorists have proposed that an analogous relationship exists between emotion and the acoustic properties of vocalizations (Bachorowski & Owren, 1995; Scherer, 1986). Facial gestures, such as smiling, can change the shape of the vocal tract and the acoustic features of the
subsequent vocalization resulting in mothers’ emotions having audible consequences (Bachorowski & Owren, 1995; Trehub, Hill & Kamenetsky, 1997; Tartter, 1980). When mothers interact with their infants, their speech tends to be characterized by elevated pitch, simplified pitch contours, expanded pitch range, decreased tempo, and repetitiveness (Fernald, 1991). Given that speech consists of complex patterns of semantically meaningless sounds from the infant’s perspective, these characteristic changes, often referred to as “motherese” or “baby talk”, are thought to provide infants with insight into their mothers’ emotional state (Trehub, Hill, et al., 1997). The meaning associated with maternal utterances is therefore primarily in the melody, and the melody is affectively salient to the infant (Fernald, 1989).

Lullabies and play songs are the musical analogues of motherese (Trehub, Hill, et al., 1997) and singing these songs to infants transverses both culture (Brakeley, 1950) and historical period (Tucker, 1984). Singing to infants is often used as a means of attracting the infants’ attention, communicating emotional information, and ultimately regulating their emotional state (Trainor, 1996; Trehub, Trainor, & Unyk, 1993). Play songs are sung during playful interactions and child care routines to heighten emotion and increase stimulation whereas lullabies are used to soothe infants and promote sleep and state regulation. In order to facilitate infant emotion regulation, mothers often deviate from the strict musical structure or score of the song and imbue their vocalizations with affective cues (Trehub et. al., 1993).

Similar to motherese, play songs sung in an infant’s presence are often characterized by acoustic differences. Trainor, Clark, Huntley, and Adams (1997) found that songs sung in an infant’s presence tended to be slower, have more energy at lower
frequencies, lengthened inter-phrase pauses, more pitch variability, a higher pitch and jitter factor, and a more exaggerated rhythm in comparison to the same songs sung without an infant audience. These differences are further exemplified by the ability of naive adult raters to identify when a mother is singing to her infant and when she is singing without her infant present by vocal cues alone (Bergeson & Trehub, 1999; Rock, Trainor, & Addison, 1999; Trehub, Unyk, et al., 1997).

Correct identification of performances sung in the presence of an infant have been shown to be highly correlated with ratings of emotional engagement suggesting that a mother’s emotional involvement with her infant while singing may aid the listener in determining whether or not the infant is present (Trehub, Unyk, et al., 1997). Studies comparing mothers’ performances of songs sung in their infants’ presence have demonstrated that mothers’ performances are typically rated as more emotionally engaging (Trehub, Unyk et al., 1997) and loving (Trainor, 1996) in comparison to performances of the same songs sung in their infants’ absence.

Characteristics of maternal vocalizations also tend to be altered when a mother’s level of emotional availability is decreased, such as when a mother is depressed. Bettes (1988) found that mothers reporting high levels of depressive symptoms were slower to respond to their infants’ vocalizations, had more variable utterances and pauses and were six times less likely to use exaggerated intonation contours which are characteristic of motherese. Bettes (1988) suggested that audible disturbances in maternal vocal expression play a critical role in determining the quality of mother-infant interactions. The affective state of the mother can significantly influence the prosody of her speech to her child (Scherer, 1986) and these prosodic features can play an important role in the
infant’s cognitive and emotional development (Papousek & Papousek, 1983). Therefore, mothers who are less emotionally available to their infants appear not only less likely to respond to their infants in a sensitive responsive manner, but also less likely to imbue their utterances with affective information that is essential for the regulation of infant emotion.

**Pilot Study**

In order to assess the efficacy and efficiency of using song as a measure vocal communication of emotion, a pilot study was completed looking at the relation between attachment representation and vocal communication of emotion through song. A stratified sample based on attachment classification, which included thirteen mothers from the larger sample used in the present study, was used. Mothers’ attachment representation was determined prenatally using the AAI. The sample consisted of 4 Autonomous, 2 Preoccupied, 3 Dismissing, and 4 Unresolved mothers. Twenty-three naive adult raters listened to 13 pairs of song segments sung by mothers in their infants’ presence and absence. Raters decided which song version the infant was present for and rated how loving and emotionally involved that version was.

Similar to past studies, raters were able to successfully identify the infant-present version 87% of the time. Maternal attachment representation did not significantly differ in terms of identification accuracy. Analyses of variance (ANOVA) were completed in order to determine if ratings significantly differed based on maternal attachment classification. Despite a small sample size, a near significant relationship was found for ratings of lovingness and maternal attachment classification ($F (1, 12) = 3.788, p = .08$) and ratings of emotional involvement and maternal attachment classification
(F (1, 12) = 2.852, p = .11). Correlational analyses revealed a highly significant
correlation between ratings of emotional involvement and lovingness (r=.84) suggesting
that listeners used similar vocal cues when making their ratings for each. This is in
accordance with past studies that have used terms, such as “loving tone of voice” and
“emotional engagement” as reflective of emotional involvement (Bergeson & Trehub,
1999; Trainor, 1996).

Overall, the pilot study suggested that the way in which mothers communicate
emotion to their infants through song differs according to their attachment representation.
Mothers classified as having a secure attachment (Autonomous) on the AAI received
higher ratings of emotional involvement and lovingness compared to those classified as
having insecure attachments (Dismissing, Preoccupied, and Unresolved). These results
suggested that differences in emotional expressiveness were audible to naive listeners and
that song might be an effective means of measuring the effects of maternal attachment
representation on the communication of emotion.

Present Study

Song was used to determine the independent and combined relations between
attachment representation, depression, and the communication and perception of emotion.
Based on the findings of the pilot study and past research, ratings of emotional
involvement were used to assess communication and perception of emotion.

Hypotheses: Communication of Emotion. In accordance with past research
looking at maternal communication of emotion through song, it was hypothesized that
songs sung in the infant’s presence would be rated as more emotionally involved than
those songs sung in the infant’s absence. It was further hypothesized that the differences
between ratings of emotional involvement for songs sung in the infant's presence and absence, would be largest for mothers with Autonomous attachment representations and for those who reported low levels of depressive symptoms and smallest for mothers with Dismissing attachment representations and for those who reported high levels of depressive symptoms. Similarly, it was thought that ratings of emotional involvement for songs sung in the infant's presence would be highest for mothers with Autonomous attachment representations and for those who reported low levels of depressive symptoms and smallest for mothers with Dismissing attachment representations and for those who reported high levels of depressive symptoms.

The present study also addressed the interaction between attachment and depression. It was hypothesized that the differences between ratings of emotional involvement for songs sung in the infant's presence versus absence, would be largest for mothers with Autonomous attachment representations reporting low levels of depressive symptoms and smallest for mothers with Dismissing attachment representations reporting high levels of depressive symptoms. Similarly, it was thought that ratings of emotional involvement for songs sung in the infant's presence would be highest for mothers with Autonomous attachment representations reporting low levels of depressive symptoms and smallest for mothers with Dismissing attachment representations reporting high levels of depressive symptoms. Given that mothers with Preoccupied attachment representations tend to exhibit inconsistent emotional availability, no specific predictions were made for this group.
**Hypotheses: Perception of Emotion.** Studies of mother-infant interaction have not only suggested that mothers who are less emotionally available communicate utterances with fewer emotional cues, but also that the attachment representations held by these mothers and the presence of depressive symptoms may affect their ability to correctly perceive emotional cues. In order to ascertain if adult attachment representations and the presence of depressive symptoms affect one's ability to perceive emotional cues, naive adult raters were asked to rate the degree of emotional involvement of song samples sung in the infant’s presence and absence. Raters were also asked to complete self-report questionnaires in order to identify their attachment style and the presence of depressive symptoms. It was hypothesized that the differences between ratings of emotional involvement for songs sung in the infant’s presence and absence, would be largest for raters with Secure (similar to Autonomous) attachment representations and for those who reported low levels of depressive symptoms and smallest for raters with Avoidant (similar to Dismissing) attachment representations and for those who reported high levels of depressive symptoms. Similarly, it was thought that ratings of emotional involvement for songs sung in the infant’s presence would be highest for raters with Secure attachment representations and for those reporting low levels of depressive symptoms and smallest for raters with Avoidant attachment representations and for those reporting high levels of depressive symptoms.

The interaction between attachment and depression was also investigated. It was hypothesized that the differences between ratings of emotional involvement for songs sung in the infant’s presence and absence, would be largest for raters with Secure attachment representations reporting low levels of depressive symptoms and smallest for
raters with Avoidant attachment representations reporting high levels of depressive symptoms. Similarly, it was thought that ratings of emotional involvement for songs sung in the infant's presence would be highest for raters with Secure attachment representations reporting low levels of depressive symptoms and smallest for raters with Avoidant attachment representations reporting high levels of depressive symptoms. Given that adults with Resistant (similar to Preoccupied) attachment representations tend to exhibit inconsistent emotional availability, no specific predictions were made for this group.
Chapter 2

Method

Participants

Mother-Infant Dyads. Expectant mothers were recruited during the second or third trimester of their pregnancy from 79 prenatal education classes (27 at hospitals in a large urban center, and 52 run by the department of public health) as part of a larger longitudinal study investigating how mothers' attachment strategies influence the way they attend to, perceive, and reconstruct stimuli that are attachment-relevant and/or emotion-laden during the first two years of life. A member of the research team visited each class and asked for volunteers to participate in the study. Given that insecure attachment classifications occur at a lower frequency in the general population, volunteers were asked to complete the Attachment Screening Questionnaire (ASQ: Benoit & Parker, 1994) and selection preference was given to those whose scores suggested that they might be classified as Dismissing or Preoccupied. Of the 680 mothers attending these classes, 357 (52%) completed the questionnaire and 233 were asked to participate. Of the 139 mother-infant dyads who agreed to participate, 7 withdrew during the prenatal data collection, 19 before the 6-month visit and 8 before the 12-month visit. Reasons for withdrawal from the study included mother being too busy, family moving away from the city, and illness of the infant or mother. Those mother-infant dyads who decided not to continue participating in the study did not differ from the continuing participants on any demographic characteristics. There were no maternal attachment group differences in terms of demographics.
In order to create a task that would be feasible for raters to complete, a smaller random sample (N= 46) of the larger sample described above was used. Mothers were contacted by phone, informed about the present study, and asked if they would be willing to have their song samples used. All of the mothers contacted provided written consent. The mothers who participated were 24 to 36 years of age (M = 31.3, SD = 2.96) and had between 11 and 20 years of education (M = 15.4, SD = 2.66). Ninety-three percent of the mothers were married and 91% were employed outside of the home.

Raters. Fifty undergraduate psychology students from the University of Toronto served as raters and received partial course credit for their participation. The raters consisted of 39 females and 11 males, 18 to 24 years of age (M = 19.5 years, SD = 1.36). The raters had an average of 2.08 years (SD = 3.27) of musical training with 64% having no musical training.

Apparatus and Materials

When infants were 6 months of age, mothers were asked to sing any song they wished to their infants and to sing the same song in their infants’ absence. Audio recordings of the mothers’ sung performances were collected in a quiet hospital laboratory using a Sony Electret Condenser lapel microphone (ECM-T10) and cassette tape recorder. Identical samples, between 7-10 seconds in length, of songs sung by mothers in their infant’s presence and absence were selected according to the following criteria: (a) as close as possible to the beginning of the song, and (b) little noise or extraneous cues that might influence the raters’ judgements. Samples were digitized using a Denon PMA-680R stereo amplifier and SoundScope software on a Radius 81/110 Macintosh computer. Since infant sounds were present in a number of the samples
collected, infant vocalizations were randomly added digitally to all infant-present and infant-absent samples collected to ensure that ratings would be based on maternal vocal qualities and not on infant and/or extraneous sounds. The final stimuli consisted of 46 pairs of singing samples in random order, with order of infant-present and infant-absent versions (first or second in the pair) counterbalanced. The stimuli were presented to raters on Sony CD550 headphones through a Radius 81/110 Macintosh computer connected to a Denon PMA-680R stereo amplifier.

Measures

**Attachment Representations.** Maternal attachment status was assessed using the Adult Attachment Interview (AAI; George et al., 1985) The AAI is a detailed semi-structured interview that probes memories of childhood relationships with attachment figures, attachment-related experiences during childhood, such as memories of feeling loved or unloved, being ill or upset, and loss and separation (Cassidy, 1994), and asks the adult to evaluate how these experiences have impacted on their development, current functioning, and ability to parent. Being asked to recall these memories is thought to activate the adult’s attachment system affecting his/her concrete informational response as well as the overall coherence of his/her discourse.

Mothers were interviewed using the AAI during their third trimester in order to ascertain a classification of their attachment representation. Interviews were audiotaped, transcribed verbatim, and coded using the guidelines described by Main and Goldwyn (1994) which places importance on the qualitative aspects of the narrative rather the factual information provided. Each transcript was rated on seventeen 9-point scales which assess experience with each attachment figure (5 experience scales) and current
state of mind with respect to attachment (12 state of mind scales). Based on these ratings, transcripts were classified Autonomous, Dismissing or Preoccupied. For transcripts classified as Unresolved or Can’t Classify, the alternate classification of Autonomous, Dismissing or Preoccupied was used.

Rater attachment status was assessed using the Attachment Style Measure (AAS: Hazan & Shaver, 1987). The AAS is a self-selection measure that is designed to assess adult attachment styles with respect to feelings about the self in relationships, with an emphasis placed on romantic relationships. Adults are presented with three descriptions and are asked to choose which one best describes their feelings. Each description is representative of an attachment classification. The Secure style characterizes the adult as being comfortable with intimacy, dependency, and reciprocity in relationships and low in anxiety about loss. The Avoidant style suggests a lack of trust and discomfort with intimacy and dependency. The Ambivalent style describes a desire to be close, anxiety about rejection, and an awareness that the individual desires intimacy to a degree greater than most people (Crowell & Treboux, 1995).

**Presence of Depressive Symptoms.** The Beck Depression Inventory (BDI; Beck, Ward, Medelson, Mach, & Erbaugh, 1961) was used to determine the presence of depressive symptoms in both mothers and raters. The BDI is a 21-item pencil and paper questionnaire with each item scored on a 4-point scale indicating the presence/absence and the severity of a range of depressive symptoms. The BDI is one of the most commonly used measures of depression used in research on non-clinically depressed populations. There has been extensive research completed establishing its reliability and validity (Beck, 1970; Reynolds & Gould, 1981) and it has been found to have reasonable
psychometric properties. The cut-off points used to classify depression status for research purposes have been established by Beck, Rush, Shaw, & Emery (1979) and are in accord with past research (Bettes, 1988; O'Hara, Rehm, & Campbell, 1983). The cut-off points are as follows: 0-9 normal range, 10-15 mild, 16-19 mild-moderate, 20-29 moderate, and 30-63 severe. For the purposes of the present study this classification system was simplified to 0-9 non-depressed and 10 and above depressed.

**Procedure**

Participant raters listened to and rated paired excerpts of mothers' songs (infant-present and infant-absent versions) individually in a quiet room. They rated each sample on the degree of emotional involvement on a scale of 1 to 9. A rating of 1 indicated that the rater felt that the mother was not emotionally involved at all, a rating of 5 meant that the mother communicated an intermediate level of emotional involvement, and a rating of 9 indicated total emotional involvement. Ratings were supposed to elicit the participants' subjective view of emotional involvement, therefore judgement criteria for making the ratings was not provided. Four practice trials, using 2 high and 2 low emotional involvement songs, were presented. After completing ratings of all the samples, raters were asked to complete the AAS and the BDI. The order of the questionnaires was counterbalanced.
Chapter 3

Results

In order to assess communication and perception of emotion, two dependent variables were derived from ratings of emotional involvement: (1) mean difference scores derived from the difference between ratings of emotional involvement in infant-present and infant-absent conditions and (2) mean ratings of emotional involvement for infant-present conditions. A difference score was used in order that levels of emotional communication within mother-infant interaction (infant-present condition) could be separated out from baseline levels of emotional communication for each mother (baseline/infant-absent condition). Ratings of emotional involvement in the infant-present condition were used to assess the overall level of emotional communication.

Communication of Emotion

Total Sample Findings. Mothers chose to sing a wide variety of songs (35 different songs), including both popular play songs (e.g., “Old McDonald had a Farm”) and lullabies (e.g., “Hush Little Baby”). Forty mothers (87%) sang play songs to their infants while six mothers (13%) sang lullabies. Correlational analyses revealed no significant relationships between choice of song and maternal attachment representation or depression status.

As hypothesized, mothers exhibited higher levels of emotional involvement when singing to their infants than when singing the same song in their infants’ absence. A paired samples t-test revealed a significant difference between ratings of emotional
involvement for songs sung by mothers in their infants' presence and songs sung without an infant audience (M = 1.65, SD = 1.58), t(45) = 7.037, p<.0001.

Although no specific predictions for song type (i.e., play song/lullaby) were made, a one-way analysis of variance (ANOVA) was conducted in order to determine if communication of emotion differed depending on the type of song sung (i.e., play song or lullaby). As illustrated in Table 1, the mean difference of ratings of emotional involvement between songs sung in the infant's presence and absence was significantly different for play songs and lullabies (F (1, 45)= 4.564, p = .038). The same analysis was carried out using mean rating of emotional involvement in the infant-present condition as a dependent variable in order to determine if level of emotional involvement differed depending on song type. A non-significant relationship was indicated suggesting that although mothers who sang play songs tended to exhibit greater differences in emotional involvement between infant-present and infant-absent conditions compared to mothers who sang lullabies, the level of emotional involvement for mothers who sang play songs and lullabies did not significantly differ.

**Maternal Attachment Representations.** Twenty-three mothers were classified as Autonomous, 13 mothers were classified as Dismissing, and 10 mothers were classified as Preoccupied.

One-way ANOVAs were completed in order to determine if vocal communication of emotion differed according to maternal attachment representation. Neither mean difference between ratings of emotional involvement in infant-present and infant-absent conditions or mean ratings of emotional involvement in the infant-present condition were found to significantly differ based on maternal attachment representation.
Table 1

Mean Ratings of Emotional Involvement in Infant-Present and Infant-Absent Conditions for Play Songs and Lullabies

<table>
<thead>
<tr>
<th>Song Version</th>
<th>Song Type</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Play Song</td>
<td>Lullaby</td>
</tr>
<tr>
<td>Infant-Present</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>6.21</td>
<td>6.29</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>0.98</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Infant-Absent</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>4.37</td>
<td>5.88</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>1.25</td>
<td>1.51</td>
<td></td>
</tr>
</tbody>
</table>

Note. The higher the score, the greater the emotional involvement.

Since difference scores of ratings of emotional involvement were found to significantly differ based on song type, it was thought that analyses looking at the interaction between song type (play song, lullaby) and attachment representation might further elucidate this relationship. However, since only 6 mothers sang lullabies and a sufficient cell size for each of the attachment groups was not available, these analyses could not be completed.

Presence of Depressive Symptoms. The mothers in the present sample reported very few depressive symptoms. Depression scores on the BDI ranged from 0 to 18 with a mean depression score of 6.42, which is considered to be below the level of mild depression (Beck et al., 1979). Six mothers met the criteria for mild depression and 2
mothers met the criteria for mild to moderate depression. Six mothers in the sample did not complete the BDI and were therefore not included in the following analyses.

Two independent measures of depression, depression status (depressed, non-depressed) and total depression score (continuous measure), were derived from mothers’ scores on the BDI. One-way ANOVAs were completed in order to determine if vocal communication of emotion differed according to depression status. Neither mean difference between ratings of emotional involvement in infant-present and infant-absent conditions or mean ratings of emotional involvement for the infant-present condition were found to be significant. A regression was also completed using total score on the BDI as a continuous measure to determine if a linear relationship existed between emotional involvement and the presence of depressive symptoms. Significant relationships were not indicated for the presence of depressive symptoms and mean difference between ratings of emotional involvement in infant-present and infant-absent conditions or mean ratings of emotional involvement for the infant-present condition. These results suggest that overall ratings of emotional involvement did not significantly differ according to maternal depression status or the presence of depressive symptoms.

Analyses looking at the interaction between song type (play song, lullaby) and depression status (depressed, not depressed) were not possible due to the small numbers of mothers classified as depressed and lullabies sung. Only 6 mothers sang lullabies which included songs from only a single depressed mother.
**Maternal Attachment Representation and Presence of Depressive Symptoms.** An ANOVA was conducted in order to determine the combined effect of maternal attachment representation (Autonomous, Dismissing, Preoccupied) and depression (depressed, non-depressed) on emotional communication. Mean difference between ratings of emotional involvement in infant-present and infant-absent conditions did not significantly differ by attachment classification, depression status, or the interaction of attachment classification and depression status. Analyses of co-variance (ANCOVA) looking at attachment representation and mean difference of emotional involvement between infant-present and infant-absent conditions and infant-present ratings of emotional involvement with total depression score serving as a co-variate were also found to be non-significant.

**Perception of Emotion**

**Total Sample Findings.** Perception of emotion differed between female and male raters. One-way ANOVAs revealed a significant relationship between gender and ratings of emotional involvement in the infant-present condition ($F(1,49) = 6.040$, $p<.02$) and a non-significant relationship between gender and the difference between ratings of emotional involvement in infant-present and infant-absent conditions. These results suggest that female raters perceived higher levels of emotional involvement than male raters, as shown in Table 2, but that perceived differences in emotional involvement did not significantly differ based on the gender of the rater. Perception was not found to differ by rater age or years of musical training.
Table 2

Mean Ratings of Emotional Involvement in the Infant-Present Condition for Female and Male Raters

<table>
<thead>
<tr>
<th>Gender</th>
<th>Mean Rating of Emotional Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>6.35</td>
</tr>
<tr>
<td>SD</td>
<td>0.73</td>
</tr>
<tr>
<td>Male</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>5.76</td>
</tr>
<tr>
<td>SD</td>
<td>0.61</td>
</tr>
</tbody>
</table>

*Note.* The higher the score, the greater the emotional involvement in the infant-present condition.

**Rater Attachment Representations.** Thirty-eight raters were classified as Secure and 12 raters were classified as Avoidant. Since no raters were classified as having Resistant attachments, only 2 levels (Secure, Avoidant) were used in the following analyses. Attachment classification did not significantly differ based on age or gender.

One-way ANOVAs were completed in order to determine if perception of vocal emotion differed according to attachment representation. The relationship between attachment representation and mean difference between ratings of emotional involvement in infant-present and infant-absent conditions was found to be non-significant. Since significant gender differences were found for the level of emotional involvement in the infant-present condition, an ANOVA was completed to look at the interaction between gender (female, male) and attachment representation (Secure, Avoidant). A significant
main effect was found for gender ($F(1,49) = 7.134, p < .01$) indicating that female raters perceived higher levels of emotional involvement than male raters. As indicated by the means shown in Table 3, the main effect of attachment representation approached significance ($F(1,49) = 3.279, p = .077$) suggesting that securely attached raters perceived higher levels of emotional involvement than raters with Avoidant attachments. A significant interaction between gender and attachment representation was not found.

Table 3

**Mean Ratings of Emotional Involvement in the Infant-Present Condition for Raters with Secure and Insecure Attachments**

<table>
<thead>
<tr>
<th>Attachment</th>
<th>Mean Rating of Emotional Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secure</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>6.31</td>
</tr>
<tr>
<td>SD</td>
<td>0.70</td>
</tr>
<tr>
<td>Insecure</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>5.95</td>
</tr>
<tr>
<td>SD</td>
<td>0.83</td>
</tr>
</tbody>
</table>

*Note.* The higher the score, the greater the emotional involvement in the infant-present condition.

Since significant differences were found between difference scores of emotional involvement ratings in infant-present and infant-absent conditions for play songs and lullabies, a second set of ANOVAs using emotional involvement ratings for play songs and lullabies was completed to look at the interaction between song type (play song,
lullaby) and attachment classification (Secure, Avoidant). No significant main effects or interactions were found for differences of ratings of emotional involvement in infant-present and infant-absent conditions for play songs or for lullabies.

**Presence of Depressive Symptoms.** Depression scores ranged from 1 to 26 and the mean depression score on the BDI was 9.02, which is considered to be just below the cut-off point of mild depression (Beck et al., 1979). Seventeen raters scored within the range of mild depression, 1 scored within the range of mild to moderate depression, and 2 scored within the range of moderate depression.

One-way ANOVAs were completed in order to determine if perception of emotion differed according to depression status (depressed/non-depressed). Neither mean difference between ratings of emotional involvement in infant-present and infant-absent conditions or mean ratings of emotional involvement for the infant-present condition were found to be significant. A regression was also completed in order to determine the nature of the relationship between ratings of emotional involvement and the presence of depressive symptoms (total score on the BDI). A non-significant relationship was found for both presence of depressive symptoms and mean difference between ratings of emotional involvement in infant-present and infant-absent conditions and presence of depressive symptoms and mean ratings of emotional involvement for the infant-present condition. These results suggest that overall ratings of emotional involvement did not significantly differ according to rater depression status or the presence of depressive symptoms.
Since significant gender differences were found for the perceived level of emotional involvement in the infant-present condition, an ANOVA was completed to look at the interaction between gender (female, male) and depression status (depressed, non-depressed). The analysis revealed a significant main effect for gender ($F(1,49) = 5.208, p<.05$) indicating that female raters perceived higher levels of emotional involvement than male raters. The main effect for depression status and the interaction between gender and depression status was non-significant.

Since significant differences were found between the difference in ratings of emotional involvement in infant-present and infant-absent conditions and song type, a second set of ANOVAs using the ratings of emotional involvement for play songs and for lullabies was completed in order to determine if song type (play song, lullaby) influenced the relationship between and depression status and ratings of emotional involvement. No significant main effects or interactions were found.

**Rater Attachment Representation and Presence of Depressive Symptoms.** An ANOVA was conducted in order to determine the combined effect of attachment classification and depression status on the perception of emotion. Neither mean difference scores between ratings of emotional involvement in infant-present and infant-absent conditions or mean ratings of emotional involvement in the infant-present condition differed significantly by attachment classification, depression status, or the interaction of attachment classification and depression status.
Chapter 4

Discussion

The ability to communicate and accurately perceive emotion is one keystone of sensitive parenting that appears to be pivotal to the formation of a secure attachment between mother and infant (Ainsworth et al., 1978; Belsky, Rovine, & Taylor, 1984; Egeland & Farber, 1984). Infants depend on their mothers to be able to accurately perceive, accept, and share in a full range of emotional experiences (Stern, 1985) that will ultimately assist in the regulation of their emotional state (Cassidy, 1994). One important means by which mothers communicate emotion is through the prosody of their voice. Mothers tend to naturally alter the characteristics of their voice when speaking to their infants (Cooper, 1993; Fernald, 1991, 1992). This is also true of mothers sung performances to infants (Trainor et al., 1997). The present study found that mothers tended to alter their performances of songs based on whether or not their infant was present and more specifically, tended to perform songs in the infant’s presence that were rated as exhibiting more emotional involvement than the same songs sung without an infant audience. This finding is consistent with past research that has demonstrated that listeners rate mothers’ performances of songs for infants as being sung with a more “loving tone of voice” (Trainor, 1996), and as being more emotionally engaging (Trehub, Unyk, et al., 1997) and more expressive in either a more soothing or playful manner (Trehub, Hill, et al., 1997) in comparison to the same songs sung without an infant present.
Not all mothers, however, respond to or communicate emotion in the same manner. Within the present study a great degree of individual variation was indicated in the degree of emotional involvement communicated in mothers’ songs and the raters’ perception of emotion in these songs. According to Stern (1985), decreased emotional availability may arise when mothers overemphasize or dampen emotion due to their own needs and perceptual biases. It has further been suggested that a mother’s ability to be attuned to her infant’s affective state is likely related to her own attachment representation (Cowan, 1996) and emotional state (Field, 1992; Zahn-Waxler & Wagner, 1993). The present study therefore investigated the relationship between adult attachment representation and depression and the communication and perception of emotional cues.

**Attachment and the Communication and Perception of Emotion**

Despite research emphasizing an important link between attachment representation and emotional availability in mother-infant interactions (Cassidy, 1994; Haft & Slade 1989), Autonomous mothers were not found to communicate significantly more emotional cues than either Dismissing or Preoccupied mothers in the context of song. Neither the difference in ratings of emotional involvement between songs sung in the infant’s presence and absence or ratings of the overall level of emotional involvement when singing to an infant differed depending on the mother’s attachment representation. Similarly, securely attached raters did not appear to perceive greater differences between infant-present and infant-absent conditions in comparison to insecurely attached raters. It is interesting to note however, that the relation between the rater’s attachment representation and ratings of overall level of emotional involvement approached significance suggesting that raters who were securely attached perceived higher levels of
emotional involvement than raters who were insecurely attached. This trend is consistent with qualitative research findings which suggest that securely attached mothers are better able to respond to a broader range of affect, be it negative or positive, whereas mothers who are insecurely attached tend to selectively misattune based on their own needs or state of mind with regard to attachment (Haft & Slade, 1989).

Given that research has suggested that a mother’s cognitive representation of attachment affects both the manner in which she interacts with her infant and the quality of those interactions (van IJzendoorn, 1995), findings suggesting that the communication and perception of emotion in the context of song are not significantly related to attachment representation are unexpected. Although song is a salient and natural means of emotional interaction between a mother and her infant, there are a number of reasons why a mother’s sung performance may not provide an optimal situation for observing attachment-based differences.

Similar to past studies that have indicated that mothers in North America tend to predominantly sing play songs to their infants (Trehub, Unyk et al., 1993), mothers in the present study chose to sing play songs more often than lullabies to their infants. Furthermore, mothers who sang play songs communicated greater differences in emotional involvement between infant-present and infant-absent conditions than mothers who sang lullabies. The communication of different levels of positive emotion and different emotional messages (i.e., playful/soothing) with play songs and lullabies is consistent with the perceived function of these songs and the musical constraints inherent to each song form. Play song performances tend to be more brilliant, clipped, and rhythmic and tend to be associated with a more “smiling” tone of voice, whereas lullabies
tend to be more airy, smooth, and soothing (Rock et al., 1999). These differences are not surprising given the perceived functions of these songs. Play songs typically fulfill a playful or attentional function and therefore tend to emphasize positive emotion whereas lullabies are often used to soothe and quiet an infant. Trehub and Trainor (1998) have also suggested that play songs tend to draw on primary emotions, such as joy/happiness, whereas lullabies tend to draw on secondary emotions, such as affection and tenderness.

Given that play songs tend to allow more opportunities for emotional expression and lullaby performances are more constrained in terms of providing vehicles for vocal emotional expression (Trehub & Trainor, 1998), it is not surprising in the present study that play songs received higher ratings of emotional involvement between infant-present and infant-absent conditions than lullabies.

Given the large proportion of play songs sung and the emphasis on positive emotion, it is possible that significant attachment representation based differences in communication and perception of emotion through song were not found because the adult attachment system was not adequately activated by the communication or perception of positive and playful emotion. Goldberg, Grusec, & Jenkins (1999b) have suggested that the emotion “happiness” is not sufficient to activate the infant attachment system because it is not associated with a sense of threat. Bowlby’s (1969/1982) original construct of attachment emphasized the mother’s protective role. The attachment system was thought to be activated in the presence of illness, injury, and emotional upset. Through interactions with the mother during these times, it was thought that the infant developed a sense of his/her mother as a protector and buffer. Investigating maternal behaviours which are associated with the mother-infant attachment relationship (e.g., communication
and perception of emotion) outside of situations that involve actual or anticipated fear and sadness therefore may potentially result in the measurement of non-attachment related behaviour. Goldberg, Grusec, & Jenkins, (1999a) have recently argued that research paradigms in the field of attachment have become rather diffuse focusing more broadly on general responsivity and good parenting rather than on interactions having to do specifically with protection and the attachment relationship. Although it is probable that the degree of responsiveness that a mother exhibits in non-stressful interactions with her infant contribute to a sense of felt security in the mother as a protector and secure base, it may also be logical to expect that situations that involve threat, danger, illness, or distress may be more salient to the attachment relationship (Goldberg et al., 1999a, 1999b) and may more intensely activate the attachment system resulting in a better measure of emotional availability.

The focus of the present study on play songs that emphasize the communication and perception of positive emotion may fail to create a situation in which negative emotion (i.e, distress, illness, or danger) is experienced and therefore may fail to adequately activate the adult attachment system. Furthermore, it is possible that positive interactions are not sufficient to differentiate attachment groups. This has been evidenced by Haft and Slade (1989) who found that dismissing mothers tended to misperceive affect, particularly if it was negative, and tended to be rejecting of their infants’ bids for comforting and reassurance. Since one important function of a lullaby is to soothe a distressed infant, a state typically associated with negative emotion, it is possible that the performance of a lullaby in the context of infant distress may provide a more effective
and accurate means of capturing attachment-related differences in maternal emotional communication and perception.

**Depression and the Communication and Perception of Emotion**

The presence of depression is also thought to be associated with decreased emotional availability. Although research has indicated that mothers experiencing depression during the postpartum period tend to display lower levels of affective expression and are less responsive to their infants' cues (Beck, 1995; Cohn et al., 1990; Downey & Coyne, 1990), findings of the present study did not suggest a link between the communication or perception of emotional cues and the presence of depression.

Although inconsistent with past research findings, the findings of the present study are not surprising when the characteristics of the present sample are taken into consideration. The average depression score for both the mothers and the raters in the present study was below the level of mild depression. Furthermore, those individuals scoring within the depressed range tended to be suffering from mild to moderate levels of depressive symptoms and were not classifiable as clinically depressed. Although, a number of studies have shown a relation between maternal depression and emotional availability in mother-infant interactions, "depression" has tended to be broadly defined to include both mothers who have been diagnosed with clinical depression and those who have reported high levels of depressive symptoms on self-report questionnaires. Coyne (1994) has suggested that high levels of depressive symptoms may be indicative of "distress" which may not be equivalent to a clinical level of depression. Given the relatively low levels of depressive symptoms that were experienced by both mothers and
raters within the present sample, it is possible that the present study is not representative of a true "depressed" or even "distressed" sample.

Differences in depression classification have the potential to result in inconsistent results that are difficult to interpret. For example, failure to differentiate between "distressed" community samples and different forms of clinical depression has lead to inconsistent findings in the area of infant attachment. A recent meta-analysis completed by Atkinson, Paglia, Coolbear, Niccols, and Bruger (in press) found a relation between depression and attachment security (effect size of $r = .18$), with a weak association in community/self-report samples and a moderately strong association in clinical samples. Results suggested that not only were infants of mothers who were clinically depressed more likely to have insecure attachments (D'Angelo, 1986; Murray, 1992), but that the attachments tended to be more maladaptive (Atkinson et al., 1998). Radke-Yarrow, McCann et al. (1995), however, found that only mothers with Bipolar depression were more likely to have children with disorganized attachments and that there was not a significant association between maternal clinical depression in general and infant attachment security. These results have been replicated in a number of recent studies suggesting that extreme mood fluctuation and affective unresponsiveness, which are characteristic of Bipolar depression, may in part explain why these infants are unable to develop a coherent attachment strategy. It is possible therefore that in samples of more severely depressed individuals greater differences in emotional communication and perception may exist.
Chronicity of depressive symptoms may also have an important impact on communication and perception of emotional cues. In a clinically depressed sample of postpartum depressed mothers, Campbell, Cohn, and Meyers (1995) found that depression in the postpartum period was highly transient. Results indicated that four months after the initial diagnosis, when the infant was 6 months old, only 30% of the depressed mothers continued to meet criteria for clinical depression, 40% evidenced low level symptoms thought not to interfere with mother-infant interaction, and 30% were relatively symptom-free. Furthermore, they found that a diagnosis of depression in the postpartum period was not necessarily associated with impaired mother-infant interactions. However when chronicity of depression was considered, differences in mother-infant interaction were apparent. Chronically depressed mothers tended to express lower levels of positive affect and were less emotionally engaged when compared to mothers whose depression was more transient. These results suggest that the communication and perception of emotion may become more impaired if high levels of depressive symptoms are experienced over an extended period of time.

Since depressed mothers are not homogeneously withdrawn and disengaged (Field et al., 1990), the manner in which their depression is exhibited may also greatly influence communication and perception of emotion. In groups of women with self-reported postpartum depression, two forms of depression have been differentiated. Depressed mothers are typically unresponsive to their infants and display either undercontrolling and detached caregiving behaviours or over-involved and over-available caregiving behaviours (Biringen & Robinson, 1991). Cohn et al. (1986) found in a postpartum depressed sample that women typically manifested depression in either a disengaged or
intrusive style when interacting with their infants. Similarly, Rosenblum et al. (1997) differentiated between irritable/stressed and dull/slow depressed mothers and found that dull/slow depressed mothers tended to exhibit higher levels of emotional involvement during their interactions with their infants whereas irritable stressed depressed mothers and infants tend to be more synchronous. These results suggest that depending on the expression of depression some mothers may tend to be more intrusive in their interactions with their infants. Although these mothers may display increased levels of emotional involvement, they are typically misattuned to their infants’ affective state. Conversely, depressed mothers who are withdrawn tend to match their infants’ affective state with both mother and infant exhibiting decreased levels of affective involvement. Given the heterogeneity of postpartum depressed mothers, it appears to be essential that sample characteristics, such as severity, chronicity, and type of expression, be considered in future studies investigating communication and perception of emotional cues within mother-infant interaction.

**Future Directions: Measurement of Emotional Communication and Perception**

For a mother to be perceived as emotionally available to her infant, it is essential that she be able to perceive a full range of emotional cues accurately and respond in a prompt and emotionally responsive manner. Although it is necessary for the mother to be able to both communicate and perceive emotional cues, communication and perception of emotion are not independent processes. The inter-relationship between the communication and perception of emotion needs to be considered in the measurement of emotional availability within mother-infant interactions. Although the present study, investigated both the communication and perception of emotion by looking at mother and
rater characteristics, the investigation of emotional communication and perception was independent and involved disparate adult samples. The present study therefore could not assess how adult attachment representation and the presence of depressive symptoms impacts on the communication and perception of emotion within a single individual. Future studies looking at both communication and perception of emotion within the mother-infant dyad may be more effective in delineating the inter-relationships between attachment, depression, and emotional availability.

Just as communication and perception of emotion act in concert, a mother’s behaviours cannot be separated from those of her infant in mother-infant interactions. The mother is not doing all of the work in establishing and maintaining ongoing emotional communication and the communication of needs. It is therefore a mistake to view emotional availability as a solely maternal characteristic. The child’s social, emotional, and physical responsiveness to the mother as the mother initiates and provides scaffolding for interactions is a critical aspect of emotional communication for the mother-child dyad (Biringen & Robinson, 1991, p. 262).

Del Carmen, Pedersen, Huffman, and Bryan (1993) have further suggested that our lack of understanding of maternal influences on the mother-child attachment relationship is in part due to the fact that maternal characteristics are often confounded by infant characteristics.

Although arguments have been made in support of looking at mother and infant behaviour independently, Biringen and Robinson (1991) have suggested that there is merit in looking at mother and infant in combination and the degree of attunement between the dyad. As noted above, although both mothers with Dismissing attachment
representations and dull/slow depressed mothers appear to be emotionally expressive, the emotion being expressed tends to be in service of their own needs and is not concordant with their infants’ emotional state. This type of misattunement, that can only be identified by looking at the mother-infant dyad in combination, is what likely puts these infants at risk for insecure attachment and problems with emotion regulation. It is therefore necessary to look at both the mother’s and the infant’s affective behaviour in order to gain an accurate understanding of emotional availability within mother-infant interactions.

Researchers investigating mothers’ sung performances to infants are also becoming more keenly aware of the important influence that the infant’s behaviour may have on the interaction. For example in the present study, it is possible that the infant’s mood, activity level and responsiveness to mother’s emotional cues may have influenced the mother’s sung performance and communication of emotion. It is also probable that mothers communicated emotion to their infants non-verbally. For example, play songs may have included actions and exaggerated facial expressions, whereas lullabies may have included soothing and gentle stroking of the infant. Studies currently being completed in this area are utilizing videotaped interactions of mother and infant in order to better understand to the role of mother’s and infant’s verbal and non-verbal behaviours (S.E. Trehub, personal communication, May 17, 2000).

Although the present study did not establish any clear relationships between adult attachment representations or depression and the communication and perception of emotion, a number of important measurement considerations for future research in this area have been indicated. By taking into consideration the role of protection and stress in
activating the attachment system, the severity, chronicity, and expression of depression, and both the verbal and non-verbal communication and perception of positive and negative emotional cues within mother-infant interactions, our understanding of the relations between maternal attachment representations, the presence of depression, and emotional communication and perception may be furthered.
References


