

## Conceptualizing Prenatal Attachment: Toward a Multidimensional View

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**Abstract:** None available.

**Full Text:** Headnote ABSTRACT: In the present paper, several theoretical issues are outlined as important to the understanding of the process of defining prenatal attachment. Each of the issues is related to the available research literature. In the current article, it is emphasized that to understand prenatal attachment, a dynamic, multidimensional approach should be used. Additionally, this paper points to the implications for future research and clinical intervention programs. KEY WORDS: prenatal attachment, pregnancy, maternal-fetal attachment, cognitive and emotional factors during pregnancy. INTRODUCTION From the 1970s, researchers have been suggesting that pregnancy is a time when the parents are developing their first attachments to their children (Leifer, 1977, 1980; Lumley, 1980, 1982; Rubin, 1975, 1984). Cranley, in 1981, added to the literature by developing a more objective measure to quantify the concept of prenatal attachment. Since then, there has been considerable research and discussion about the definition of the term, its measurement, the variables that correlate with prenatal attachment and the behaviors that correlate postnatally with prenatal measurements. In addition, there have been several review articles of the expanding body of literature on prenatal attachment (e.g., Beck, 1999; Laxton-Kane & Slade, 2002; Muller, 1992; Salisbury, Law, LaGasse & Lester, 2003; and Shieh, Kravitz and Wang, 2001). The aim of the present paper is to identify and examine some of the issues that remain under discussion with regard to defining the term, prenatal attachment.

**Defining Prenatal Attachment** An early definition of maternal-fetal attachment placed emphasis on maternal behavior during pregnancy, for example, Cranley, in 1981, defined maternal-fetal attachment as "the extent to which women engage in behaviors that represent an affiliation and interaction with their unborn child" (p 282). Based on that conceptualization of the concept, she developed the Maternal Fetal Attachment Scale. As Muller, 1989, pointed out the inclusion of the term "behavior" suggested an action in response to stimulation, which, Muller stated was too restrictive and did not consider thoughts or fantasy. For purposes of her research, Muller defined fetal attachment as "the unique relationship that develops between a mother and her unborn fetus. These feelings are not dependent on the feelings the woman has about herself as a pregnant person or her perception of herself as a mother" (p 11). She developed the Prenatal Attachment Inventory with 27 questions intended to measure fetal attachment that was independent of the mother's attitudes toward pregnancy and the maternal role (Muller, 1989). More recently, Condon and Corkindale (1997) suggested that prenatal attachment referred to "the emotional tie or bond which normally develops between the pregnant parent and her unborn child" (p 359). Condon, in 1993, developed the Antenatal Attachment Inventory. From a summary of their research, and the general research literature on prenatal attachment, Doan and Zimmerman (in press) proposed the following working definition: "Prenatal attachment is an abstract concept, representing the affiliative relationship between a parent and fetus, which is potentially present before pregnancy, is related to cognitive and emotional abilities to conceptualize another human being, and develops within an ecological system." In sum, what all the definitions share is an emphasis on the importance of the developing relationship (i.e., attachment) between a fetus and his/her parent-to-be. Some of the definitions focus more on the emotional components associated with prenatal attachment. Other definitions stress the behaviors that express that relationship. The Doan and Zimmerman definition orients attention to a number of other implications, some of which are: \* pregnancy is not just a significant stage in and of itself, but that, also, it should be conceptualized as part of a developmental sequence that starts before pregnancy; \* as part of a developmental sequence, some of the attitudes and skills in pregnancy have their precursors in the skills, abilities and experiences prior to pregnancy and have

implications for behaviors and attitudes after birth; \* one of the cognitive skills that may affect the level of attachment relates to the ability to formulate an abstraction, e.g., in the form of an internal mental representation or fantasy, the ability for which is present prior to becoming pregnant; \* emotional factors are important potential determinants of prenatal attachment \* prenatal attachment involves an interaction between cognitive, emotional and situational (ecological) factors; \* intervention programs should address all the components associated to the formation of attachment and may be effective not only during the time of pregnancy (e.g., Carson & Virden, (1984); Carter-Jessop, 1981; Davis & Akridge, 1987; Gaffney, 1988) but prior to pregnancy. While a more extensive body of research would aid in the elaboration of these complex issues, what follows is some of the evidence that supports these points. Pregnancy As Part of a Developmental Sequence Rooted in the speculations by theorists, such as Pines (1972), is a suggestion that there is a continuity in some characteristics that affect the woman's functioning prior to, during, and after birth. Conceptualizing pregnancy as part of a woman's developmental sequence has many implications. For example, this conceptualization implies that some of the characteristics and attitudes, of a woman prior to pregnancy, are stable throughout pregnancy and after birth. Some characteristics prior to pregnancy, however, influence pregnancy and, at the same time, may be changed by it, indicating that some characteristics thought to be stable traits may be much more malleable or fluid. This developmental approach also suggests that factors and characteristics, that are present prior to the pregnancy, influence the experience of the relationship of the mother and fetus. Further, the experience during pregnancy potentially affects, at least, the early mother-infant relationship. With regard to prenatal attachment, there have been five main sources of evidence to support the 'developmental nature' of the concept. There has been research to investigate: 1) the ability of never-pregnant women to imagine being attached to a developing fetus; 2) the variability of attachment scores to the fetus and imagined fetus; 3) the relationship between attachment and attachment behaviors at different stages of interaction between the mother and child; 4) the change in scores of prenatal attachment during the pregnancy and 5) the relationship between characteristics occurring within one stage of development and their effect on another stage, e.g., the effect of the mother's own parenting history on her prenatal attachment. Never-Pregnant Women's Prenatal Attachment to An Imagined Fetus. From case studies (Doan & Zimmerman, in press) and research (Doan, Zimmerman & Howell, 1997, 1998; Guger & Doan, 1995), it was demonstrated that never-pregnant women were able to conceptualize pregnancy and being attached to an imagined fetus. Guger and Doan, 1995, compared prenatal attachment in pregnant women (in the first four months of gestation) with a group of never-pregnant women. The groups were matched for age, education, marital status and income. The never-pregnant married women all stated a wish to be pregnant at some point in the future. The findings indicated high levels of prenatal attachment for both groups. The mean scores for the two groups were 91.83 and 85.95, with the never-pregnant group having the higher mean score. The possible range of scores was 24 to 120. The scores were both consistent with the norms for the Maternal Fetal Attachment Scale summarized by Cox, 2002. Doan, Zimmerman and Howell (1997, 1998) found that a sample of unmarried college students also were able to conceptualize being pregnant and attached to the imagined fetus. The researchers reported individual differences in the scores and the extent to which this conceptualization was positive, i.e., from low to high levels of attachment. That adolescents are also able to conceptualize pregnancy was demonstrated in a study by Condon, Donovan and Corkindale (2001). Condon et al used a questionnaire survey of Australian adolescents' attitudes and beliefs about pregnancy and parenthood and found that, in the 15-18 year old group, not only were attitudes and beliefs present, but there was considerable idealization of the transition to parenthood. The results of the Condon, Donovan and Corkindale study further supported the findings, of Doan, Zimmerman and Howell and Guger and Doan, that never-pregnant women have higher levels of imagined prenatal attachment than their pregnant counterpart, which implies possible idealization of pregnancy. Variability of Prenatal Attachment to the Fetus and Imagined Fetus. A consistent finding in the prenatal attachment literature has been the wide range of variability in the scores on prenatal attachment measures, regardless of the measure used. The variability in scores suggests that some

women have high levels of prenatal attachment, while others have low scores. For example, Doan and Green (2001), using Muller's 1993 Maternal Prenatal Attachment Inventory, found that the scores of pregnant women ranged from 30 to 96, when the possible score was 27 to 108. Cranley (1981) also noted the variability of scores on her Maternal Fetal Attachment Scale. She reported that by the third trimester 78 percent of the women in her study engaged in attachment related behaviors. Condon (1985) reported that approximately 10-15 percent of women develop only a minimal attachment prenatally. Guger and Doan (1995) and Doan, Zimmerman & Howell (1997, 1998) also found a wide range of variability in the scores on never-pregnant women. Guger and Doan reported that, using Cranley's Maternal Fetal Attachment Scale, the range of scores for never-pregnant women was from 51 to 101, which represented a very similar range to the pregnant women (range 51-104). What this data demonstrated was that both never-pregnant and pregnant women vary in their ability to conceptualize being positively attached to a developing fetus. The question of how attitudes prior to pregnancy influence later attachment remains a topic for longitudinal research. A particularly interesting question for further research is whether women who have a low level of imagined prenatal attachment prior to becoming pregnant, also have a low level of prenatal attachment during pregnancy and further, what factors may influence the level of attachment and the consistency of scores. The relationship of attachment and attachment behaviors at different stages. Research, to examine the relationship between levels of attachment at different stages of interaction of a mother and her child, has measured the relationship between prenatal attachment to postnatal attachment and postnatal behaviors. Muller (1996) found a significant correlation between prenatal and postnatal attachment. She felt that, even though the correlation was significant, due to the small size of the correlation, other factors also influenced the postnatal scores. With regard to the relationship between prenatal attachment and attachment-related behaviors, prenatal attachment has been related to parental behavior both before and after birth (Condon & Corkindale, 1997; Pollock & Percy, 1999); maternal feelings to the infant after delivery (Leifer, 1977); to the intention of mothers to breast feed (Foster, Slade & Wilson, 1996); to the intended or expected length of breastfeeding (Zimmerman & Doan, 1995); to later feeding behavior (Fuller, 1990); to maternal sensitivity to the cues of her infant (Fuller, 1990), and to postnatal maternal involvement with their infant (Siddiqui & Hagglof, 2000). The possibility that prenatal, and early postnatal, attachment and subsequent attachment behaviors can be modified is evident in the following case study: Doan and Zimmerman (in press) reported a case study, of a 26 year old white, middle-class woman, who despite having positive pre-pregnancy attitudes to being pregnant and being able to imagine herself as pregnant, when pregnant, engaged in attributing negative intentions to her fetus (e.g., "she is hurting me on purpose", "she is kicking my bladder and will damage it," etc.). Her prenatal attachment to her fetus was weak. Significantly, her early relationship with her infant was consistent with the lack of prenatal emotional attachment. For example, she actively avoided caring for the baby for the first month, leaving the care to a "nanny", while she continued many of her prebirth social activities without the child. There came a time when this woman could no longer afford child care and, in effect, was forced to care for the infant herself, she developed a closer emotional relationship with her daughter, and started to report a greater level of bonding. Four years later, during her second, and planned, pregnancy, in a follow-up case study of the same woman, it was found that she had a close and sensitive attachment to her fetus. When this fetus was kicking, she described the experience in this way: "the baby is uncomfortable, he needs to move". Her own physical discomfort was framed as well worth the result of nurturing and enhancing the development of the fetus. She had a high level of prenatal attachment to this second child. What is clear from this case study is that there can be characteristics, related to prenatal attachment, which can change, and are changed by, a pregnancy and postnatal interactions with a child. Changes in attachment throughout pregnancy. One of the few consistent findings in studies that have examined the relationship of variables to prenatal attachment has been the high correlation between gestational age and the level of prenatal attachment. This finding has been replicated using both Cranley's (1981) Maternal Fetal Attachment Scale (e.g., Bloom, 1995; Grace, 1989; Heidrich & Cranley, 1989; LoBiondo-Wood, 1985; Mikulincer & Florian, 1999;

Zachariah, 1994) and Muller's (1993) Prenatal Attachment Inventory (Damato, 2000; and Muller, 1993). In order to explain the general trend in prenatal attachment, which seems to be an increasing level of attachment throughout the pregnancy, some researchers have suggested that one of the factors that affects prenatal attachment is fetal movement (e.g., Heidrich & Cranley, 1989; Lerum and LoBiondo-Wood, 1991). However, what complicates the interpretation of this trend is the finding that some women are very attached to their fetuses from early on in the pregnancy (e.g., Mikulincer and Florian, 1999). The question remains of what differentiates the women who are attached early in pregnancy from those who report higher levels of attachment later in the pregnancy. The Effect of Characteristics and Experiences Prior to Becoming Pregnant on Prenatal Attachment. Another way in which the research has suggested a developmental sequence in prenatal attachment is through the identification of characteristics and experience from pre-pregnancy that correlate with prenatal attachment. With regard to the experiences prior to becoming pregnant, two of the topics investigated relate to the relationship between a woman's perception of her attachment to her parents and her memories of how she was parented to her level of prenatal attachment. To examine the effect of one pregnancy on prenatal attachment in a later pregnancy, studies have been done to compare first pregnancies with subsequent pregnancies and have also investigated the effect of perinatal loss on a subsequent pregnancy. Siddiqui, Hagglof and Eisemann (2000) examined the relationship between expectant mothers' memories of their childhood experiences with their parents and their own prenatal attachment to their unborn child. "Women who experienced more emotional warmth from their mothers and rejection from their father were better in establishing an affectionate relationship with their unborn baby" (p 70). In contrast, Zachariah (1994) did not find a significant correlation between maternal-fetal and mother-daughter attachment. Mikulincer and Florian (1999) examined the relationship between pregnant women's attachment style, their maternal-fetal attachment, level of mental health, and ways of coping with pregnancy-related problems during the three trimesters of their pregnancy. They found that securely attached women were strongly attached to their fetus from early in the pregnancy, reported a coping strategy that involved seeking support, and expressed positive mental health during the entire pregnancy. Women, with an avoidant attachment style, showed weak attachment to the fetus and negative mental health in the first and last trimester of pregnancy and stronger maternal-fetal attachment and better mental health in the second trimester. They used distancing coping throughout the pregnancy. On the other hand, the women, who had an anxious-ambivalent style, showed a gradual increase of maternal-fetal attachment throughout the pregnancy but used an emotion-focused coping style and reported negative mental health through the entire pregnancy. Comparisons of first pregnancies with subsequent pregnancies have also yielded inconsistent results. For example, some studies have shown a negative correlation between prenatal attachment and parity, i.e., higher levels of prenatal attachment with first pregnancies (e.g., Mercer & Ferketich, 1994; Mercer, Ferketich, May, DeJoseph & Sollid, 1988). Other studies have not found a significant correlation between prenatal attachment and parity (e.g., Berryman & Windridge, 1993; Cranley, 1981; Muller, 1993). The focal point of many studies of perinatal loss (e.g., Armstrong & Hutti, 1998, Armstrong, 2002) has been a concern with identifying whether a subsequent pregnancy following a perinatal loss would result in pregnancy-related anxiety, depression, and lower prenatal attachment. Comparisons were made between a pregnancy following a loss, a pregnancy following an earlier pregnancy with no loss, and a first pregnancy. Armstrong and Hutti (1998) found the "loss group" had greater anxiety and lower prenatal attachment than a first pregnancy. In a study in 2002, Armstrong found higher depressive symptoms in the prior "loss group" than the first pregnancy group and higher pregnancy specific anxiety with the "loss group" relative to the "no loss groups", but, there was no difference in prenatal attachment among any of the three groups. While there are inconsistencies in the findings, it is clear, that, for some pregnant women experiences prior to their pregnancy, either with their own parents or experiences of loss with a child, affect their level of prenatal attachment. What remains a topic for future research is: What factors may help to explain why prenatal attachment of some women is more strongly affected by their earlier experiences? The Developmental Sequence of Attitudes, Personality Characteristics

and Skills Prior to Being Pregnant, During Pregnancy, and Postbirth Many studies have focused on understanding the factors, during pregnancy, that correlate with prenatal attachment. The variables examined have included personality characteristics, e.g., empathy, trait anxiety, depression (Chazolte, Freda, Elovitz & Youchah, 1995; Condon & Corkindale, 1997; Kunkel, 2002; Lindgren, 2001), attitudes, e.g., attitudes to pregnancy (Doan & Green, 2001), and situational factors, e.g., (marital status (Muller, 1996), social support (Siddiqui, Hagglof & Eiseman, 2000); marital relationship (Cranley, 1981) with prenatal attachment. In some of the literature, there is an examination of the relationship between prenatal attachment and characteristics related to the pregnancy (e.g., stage of pregnancy (LoBiondo-Wood, 1985; Zachariah, 1994), physical symptoms of the pregnant woman (Foster, Slade & Wilson, 1996; Lo Biondo-Wood, 1985; Muller, 1993; Siddiqui, Hagglof & Eisemann, 1999). Others have been interested in the demographics of the mother, e.g., maternal age (Damato, 2000; Lindgren, 2001; Muller, 1993; Siddiqui, Haglof & Eisemann, 1999). The associated findings with many of these variables suggest an inconsistent relationship with prenatal attachment. For example, with regard to the relationship between prenatal attachment and maternal age, some of the studies stated that age had a significant negative effect on maternal fetal attachment (Lindgren, 2001; Muller, 1993; Siddiqui, Hagglof & Eisemann, 1999). Other studies found no relationship between age and attachment (Damato, 2000). Still others suggested an interaction between age and some other variable, e.g., Berryman & Windridge (1996) indicated age was associated with lower maternal fetal attachment at mid pregnancy but not by late pregnancy. Much of the discussed research has been conducted during pregnancy or immediately after. The timing of the data collection, however, presumes that these variables have preexisted in the same form as at the time of pregnancy. However, at the time of pregnancy some of the factors indicated above may have changed. The gap in the literature points to a need for more longitudinal studies to ascertain relationships between characteristics, situational factors and attachment, prior to pregnancy, during pregnancy and postnatally. What we would like to hypothesize is: There is a developmental sequence of skills that may be relevant to prenatal and postnatal attachment and their development and interaction should be studied from prior to pregnancy, to during pregnancy, to after the birth of the child. Some of the proposed skills are as follows: Prior to Pregnancy: \* the ability to communicate a global representation (whether favorable or unfavorable) of what the expectant mother's relationship was with each parent (Fonagy, Steele, & Steele, 1991) \* secure attachment to her parents (Mikulincer & Florian, 1999) \* cognitive capacities to fantasize about a pregnancy, and to have abstract thinking skills to develop an internal representation of a fetus \* emotional skills that promote ways of coping During Pregnancy: \* appropriate life style changes to promote the growth of the fetus and minimize abuse or neglect (Pollock & Percy, 1999) \* the development of realistic fantasies about the child (Condon, 1985) \* the development of the beginnings of reciprocity and sensitivity in the relationship with the fetus (Doan, 2001) \* the development of attachment behaviors, e.g., touching, talking to the fetus, gathering information \* the development of prenatal attachment \* the ability to separate self from the fetus and to develop an internal representation of the fetus After Birth: \* the development of attachment promoting behaviors, e.g., holding (Bryan, 2000) \* the development of postnatal attachment (Benoit & Parker, 1994; Benoit, Parker & Zeanah, 1997) \* the ability to develop congruence between the fantasy and the reality baby (Condon & Dunn, 1988) \* maternal sensitivity to the infant's cues (Ainsworth, Bell & Stayton, 1974; Bradley, Whiteside-Mansell, Brisby & Caldwell, 1997) \* interactional synchrony with the infant, i.e., the caregiver reacts to the "infant signals in a well-timed, appropriate fashion" (Berk, 2002, p 275) \* maternal attunement to infant's affect regulation (Feldman & Greenbaum, 1997; Stern, 1985). Cognitive Skills to Formulate Abstractions The relationship between cognitive skills and prenatal attachment has been demonstrated in terms of internal working models, the ability to fantasize, and maternal representations of the fetus. Internal working models are the mother's mental representations of the infant and her relationship with that infant (Bowlby, 1980). He also suggested that the internal working models guide the behaviors involved in caregiving relationships. Parental representations of the fetus have been examined with a measure of the working model of the child, measures of temperament and

semi-structured interviews. The findings of all of these studies suggest that many parents have a mental representation of their fetus that includes a personality. For example, Zeanah, Zeanah and Stewart (1990) reported that only 8% of the mothers and 14% of the fathers in their sample did not know what their fetus's personality was or did not believe that the fetus had a personality. In addition, studies have demonstrated a stability in the parent's presentation of the child's temperament from pregnancy to infancy (e.g., Zeanah, Keener, Stewart & Anders, 1985). Zeanah et al (1985) postulated that when there was a change in the parent's perception of temperament, from pregnancy to infancy, that it was related to labor, which was perceived as different than anticipated. Also, mental representations during the later part of pregnancy, as measured by the Working Model of the Child Interview, were predictive of infants' attachment classification (e.g., Zeanah, Benoit, Hirshberg, Barton & Regan, 1994). In fact, Benoit, Parker and Zeanah's (1997) research indicated that maternal representations of their fetuses predicted infant attachment classifications in 74% of the cases. Benoit, Parker and Zeanah (1997) compared mother's representations of their fetuses (as measured by the Working Model of the Child's Interview-WMCI, by Zeanah, Benoit, Hirshberg, Barton & Regan, 1984) with their representations of the same infants at 12 months of age. They found that 80% of their representations were matched for the prenatal and postnatal WMCI scores. As well, they found a high concordance rate between the 12 month WMCI and the Strange Situation Classifications (SS: Ainsworth, Blehar, Waters & Wall, 1978), which is a widely used measure of the attachment of the infant to the mother. Mebert (1989) measured the working model concept by measuring perceptions of infant temperament during pregnancy and up to 13.5 months of the infant's age. She found that on this measure of ICQ (Infant's Characteristics Questionnaire) that over five different times, the scores were generally stable. Therefore, their internal working model of the fetus' temperament was very similar to their perception of the infant's temperament. The finding that mothers have a mental representation of their fetus has been related, by many researchers, as an indication of mothers beginning, during pregnancy, to conceptualize their infants as a person. The question remains: What does it mean when the parent's ability to form a mental representation of their fetus is limited or absent? Also, of interest, would be comprehensive examinations of mental representations as they relate to different cultures, social classes, health status of the infant pre- and post-natally. The ability of the pregnant mother to fantasize about her unborn child is a cognitive skill that has been examined by several investigators. Brazelton and Cramer (1990) stated that fantasies, about the developing fetus, are expressed by most pregnant women. It has been hypothesized, that the lack of antenatal fantasies indicate a dysfunctional adaptation to the pregnancy that may for some lead to potential problems in the mother-child relationships (Cohen (1979), Lederman (1990) and Rubin (1984). Themes of fantasies can vary from positive to negative ((??)Sorensen & Schuelke, 1999) or more fantasy- or reality-based (Condon & Dunn, 1988). Some researchers have argued that negative fantasies allow a pregnant woman to cope with her prenatal anxiety (e.g., Brazelton, 1973). Others (e.g., Sherwen, 1981) proposed that too many negative fantasies may be indicative of a poor adaptation to pregnancy and may lead to poor maternal-child attachment. On the other hand, Cranley (1981) indicated that giving the fetus physical and emotional characteristics was correlated positively with maternal-fetal attachment. That fantasies of the child may change during pregnancy was suggested by Rubin (1972, 1984) and Leifer (1977). Rubin and Leifer both found a difference in the number and type of fantasies, as well as the clarity of the fantasy, mothers have of their fetuses over the gestational period. Their findings suggested that over time the number of expressed fantasies increased; the fantasies became clearer, more specific and detailed, and there were differences in the actual conceptualization (e.g., the age of the fantasized child changed over the trimesters). Sorensen and Schuelke (1999) outlined the major themes that emerged from analyzing 184 pregnant women's fantasies (by asking women to write a few sentences about what they expect their baby to be like). The results were analyzed in terms of major themes, i.e., appearance, psychological traits, gender, behavior, normalization, deification, role relations, impact on parents, spiritual and ambiguity. They also found the themes differed across trimesters and for first pregnancy and later pregnancy mothers. The overlap, among the concepts of an internal working

model, mental representation and fantasies of the fetus, is clear. Levine, Tuber, Slade and Ward (1991) examined the relationship between two of the constructs of mental representation, i.e., the one proposed by attachment theory of internal working models and the other stemming from object relations theory of object representations. They found that in a sample of 42 adolescent mothers attachment and object relations were highly related. While these categories all overlap, each suggests that cognitive skills are involved in the prenatal and pre-pregnancy conceptualization of the fetus and infant and the relationship between the infant and parent. The findings indicate that the experience of pregnancy is different for different parents and that the differences in parenting style during pregnancy should be considered as relevant for teaching parents about pregnancy, identifying high risk parents and developing clinical techniques to work with parents during pregnancy. One can hypothesize that without the ability to conceptualize the abstract experience of pregnancy in terms of the fetus as a separate person and the role definition of the woman as a mother, prenatal attachment would be very low and likely to result in a problematic mother-infant relationship. We are suggesting that this cognitive ability to conceptualize is a prerequisite for prenatal attachment. In other words, we see it as a necessary, although not sufficient determinant of prenatal attachment and the relationship the woman has with her fetus.

**The Role of Emotional Factors During Pregnancy** It is clear that for some women emotional factors are related to prenatal attachment. However, no one factor seems to be consistently correlated. Studies that have focused on the relationship of emotional functioning and prenatal attachment have examined the effects of pregnancy-specific anxiety, depression and empathy. The relationship of pregnancy-specific anxiety and prenatal attachment has been examined using different scales (e.g., Cranley's and Condon's scales) and different populations (e.g., 'typical' pregnancy or pregnancy subsequent to a prenatal loss). Gaffney (1988) studied the relationship between maternal-fetal attachment (as measured by the Maternal Fetal Attachment Scale of Cranley, 1981) and self concept and trait and state anxiety during pregnancy. She reported no significant relationship between self concept and maternal-fetal attachment, however there was an inverse correlation between anxiety state and maternal-fetal attachment. Cox (2002) noted that there have also been several other studies, using Cranley's scale for prenatal attachment, that did not find a significant correlation between anxiety and attachment during pregnancy. Additional evidence, that anxiety related to prenatal attachment, was found in a study by Condon and Corkindale (1997). Using the Maternal Antenatal Attachment Scale, they found that the level of anxiety during pregnancy was negatively correlated with the quality dimension of the test and the global score of attachment. There was not a significant correlation between anxiety and the intensity of the attachment. As explained in Condon and Corkindale's article, in Condon's measure of prenatal attachment, the quality dimension defines attachment in terms of the maternal experiences of closeness, tenderness, pleasure in interaction, distress at fantasized loss and the conceptualization of the fetus as a little person. The intensity dimension refers to the amount of time spent thinking about, talking to, dreaming about or palpating the fetus. Anxiety in pregnancy related to previous perinatal loss was examined by Armstrong and Hutti (1998). They compared anxiety levels and prenatal attachment in a group of expectant mothers during a pregnancy subsequent to experiencing a late pregnancy miscarriage, stillbirth or neonatal death with a group of first time pregnant women. They found that the subsequent group had both higher levels of anxiety and lower levels of prenatal attachment. Armstrong (2002) examined prenatal attachment in couples, during the second trimester of pregnancy, who had either experienced perinatal loss in a previous pregnancy, had prior successful pregnancies or were pregnant for the first time. The group, who had a previous loss, had higher levels of both pregnancy-specific anxiety and depressive symptoms. None of the groups differed in their level of prenatal attachment. Several investigators have also examined the relationship between depression and maternal-fetal attachment. Condon and Corkindale (1997), for example, indicated a significant negative correlation between depression during pregnancy and the quality of the attachment and the global attachment score. Lindgren's (2001) study indicated that "depression was a significant predictor of maternal-fetal attachment, accounting for 3% of the variance in maternal-fetal attachment. Women who had lower depression scores had higher levels of

maternal-fetal attachment." (p 211). Pelton, (1994) also investigated the effect of depression on maternal fetal attachment. She reported that, in her sample, depressed women who had the most difficulty adjusting to their pregnancy, had higher scores on the measure of prenatal attachment (i.e., Maternal Fetal Attachment Scale, Cranley, 1981). On the other hand, Armstrong (2002) did not find a significant relationship between depression and prenatal attachment. There has also been some research that examined personality factors such as empathy. Doan, Zimmerman and Howell (1997, 1998) examined the relationship between fetal attachment (measured by the Maternal Fetal Attachment Scale, Cranley, 1981) and empathy (measured by the Interpersonal Reactivity Index, Davis, 1983a, 1983b) in a group of never-pregnant male and female university students. Empathy was positively correlated with fetal attachment in the first study, and for males in the second study. Doan and Howell (1998) examined fetal attachment and empathy in a group of pregnant women and their partners. The results demonstrated that empathy perspective taking subscale was one of the variables that significantly predicted the level of fetal attachment. Not only has empathy been shown to be related to fetal attachment, when the measure of attachment was Cranley's scale. Zimmerman (in press) also demonstrated a relationship between empathy and fetal attachment for a group of women expecting their first child, a group who were pregnant following the birth of a "typical" child and a group who were pregnant following the birth of a child with Down's syndrome. In the Zimmerman study, Condon's (1993) measure of attachment was used, i.e., the Maternal Antenatal Attachment Scale. For mothers expecting their first child, the scores for quality and strength of attachment were correlated with empathic concern, an emotional subscale of the Davis Interpersonal Reactivity Index. The strength of attachment was correlated also with another subscale of the empathy instrument, i.e., fantasy. For pregnant women who were already mothers of typically developing children, the frequency subscale of attachment was correlated with the fantasy subscale of empathy and, in addition, to perspective taking (the cognitive subscale of empathy) and personal distress (an emotional subscale of empathy). With a group of pregnant mothers of a child with Down's syndrome, frequency was highly correlated with the perspective taking subscale of the empathy measure. Further support, that emotional factors may be correlated with fetal attachment, was apparent in two studies that examined the relationship between fetal attachment and women's ratings of their emotional reaction to the news that they were pregnant, i.e., from extremely happy to extremely upset (Doan & Green, 2001; Zimmerman, in press). Both studies found that women's level of prenatal attachment was positively correlated with a positive emotional reaction to the pregnancy. The Development of Prenatal Attachment in an Ecological System That fetal attachment develops within an ecological system is apparent in the many studies of the relationship of fetal attachment and social support within the marital or other family relationship(s). Social support has been examined in terms of total functional support or total size of the social network (e.g., Koniak-Griffin, 1988), as family dynamics (Wilson et al, 2000), husband and wife relationships (e.g., Condon, 1985; Cranley, 1984; Muller, 1993) or mother and daughter relationships (e.g., Zachariah, 1994). Some studies showed a positive correlation between measures of social support and fetal attachment (Wilson et al, 2000) and others did not find this relationship (Zachariah, 1994). It would appear that for some mothers-to-be, the level of social support (Condon & Corkindale, 1997), the amount of emotional warmth from the mothers (Siddiqui, Haggloff and Eiseman (2000), the perceived close relationship to the father (Bloom, 1998), the mutuality in the family (Wilson et al, 2000) significantly affect the level of the mother's prenatal attachment. These studies support the contention that environmental factors can affect the maternal-fetal interaction and point to the interdependent and complex qualities of maternal-fetal interactions. Not only may factors in the ecological system affect the level of prenatal attachment, but Lindgren (2001), in an examination of maternal-fetal attachment and health practices, reported that inner-city women with lower levels of attachment prenatally had poorer health practices (e.g., obtaining prenatal care, eating nutritious food, not smoking, etc.) than inner-city women with higher levels of attachment. Such studies suggest that prenatal attachment is both developed in and supported by environmental factors

SUMMARY This present paper has been a discussion of some of the theoretical and research issues related to the defining of "prenatal



attachment". What has been suggested is that there is evidence that there is a continuity in some characteristics, that affect a woman's interaction with her developing child, that are present prior to being pregnant, that affect and are affected by the pregnancy and are a determinant of the maternal-child interaction after birth. It is also clear that there are individual differences in women's prenatal attachment, postnatal attachment and never-pregnant women's imagined attachment to a fetus. While there is some evidence that women's prenatal attachment is correlated with their postnatal attachment, there are many factors that can influence this developmental sequence. Two factors were discussed as potentially influencing the level of attachment at all levels, i.e., cognitive skills related to an ability to think abstractly and to conceptualize the internal representation of the fetus/child or a 'realistic' fantasy of the fetus/child and emotional skills that allow for the separation of the self from the fetus/child that enables the woman to be sensitive and responsive to needs of the fetus/ child. In addition, it was emphasized that the relationship between a mother-to-be and fetus develops within an ecological system. In spite of the potential complexity of the multidimensionality of the construct of prenatal attachment, longitudinal studies may help us to start to clarify some of the key issues. A developmental approach to prenatal attachment also has implications for clinical work. It would suggest that intervention programmes should start with couples prior to becoming pregnant, e.g., courses in high schools. Another possible implication is that a developmental approach defines a possible framework for identifying women who are potentially high risk for having lower attachment scores. While in this article we have discussed the role of the mother, there is an equally important literature that suggests that many similar factors affect mothers-to-be and fathers-to-be prenatal attachment. Our decision to discuss only the information about mothers was simply related to the limitations of space. In addition, other important factors, such as the influence of cultural backgrounds, need to be investigated. Further, we appreciate that the term "affiliative relationship" in our working definition needs to be operationalized. The thoughts, feelings and behaviors, that are a part of the affiliative relationship, will need to be elaborated in future research.

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