Fetal Attachment and Depression: Measurement Matters

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Full Text: Headnote ABSTRACT: The purpose of this study was to examine the relationship between Fetal Attachment (FA) and depression. Condon and Corkindale (1997) have found a relationship between the quality of FA and depression, in women, using the Antenatal Attachment Inventory (AAI; Condon, 1993) to measure FA and four different instruments to measure depression. Previous studies have failed to find a consistent relationship between FA and depression when employing the Fetal Attachment Scale (FAS; Cranley, 1981) to measure FA. In a critical review of the FA research, Muller (1992) proposed that inconsistencies were possibly artifacts of the FAS. This study is both a replication and an elaboration of Condon and Corkindale's study. Several modifications were made to the procedures employed by Condon. This study used both the FAS and the AAI to measure FA, to illuminate whether they would perform equally in explicating the relationship between FA and depression. In addition, the Center for Epidemiologic Studies in Depression Scale (CES-D; Rodloff, 1977) was used to measure depression to determine if Condon and Corkindale's results would be upheld with a fifth measure of depression. Other modifications included: testing males to determine any sex differences and comparing persons with and without a history of major depression. There were 68 expecting adults in the study (35 females and 33 male partners). Results from this study, demonstrated that it does matter how FA is measured. As expected, the FAS did not correlate with the CES-D and, as Condon and Corkindale found, the AAI-Quality subscale did. For women, there was a significant inverse relationship between FA-Quality and depression ($r = -.62$, $p < .01$) and there was no association between FA-Intensity (i.e., the amount of time women spent engaging in FA behavior) and depression. Further analysis of the relationship between FA and depression was obtained by investigating results from the AAI data. Sex differences were detected; there were no significant associations between FA-Quality and depression for males. It was expected and confirmed that parents with a history of depression report greater depressive symptoms than parents without a history of major depression. Further exploration of the types of symptoms reported by individuals, with a history of major depression, revealed that women reported more somatic symptoms than men, but not more non-somatic symptoms. However, women, with a history of depression, reported more non-somatic symptoms of depression than women, without a history of major depression. Possible mechanisms that could account for the link between FA and depression are considered and the clinical importance of early detection and treatment of depression during pregnancy are discussed. Headnote KEY WORDS: fetal attachment, pregnancy, depression, measurement, sex differences, risk factors. INTRODUCTION Developing an attachment for one's unborn child is considered an important milestone in the developmental trajectory of adults and families during the transition to parenthood. Fetal attachment (FA) characteristics (i.e., level, quality, and intensity) denote the historical beginnings of the social-emotional environment into which the parent-child attachment relationship will begin to take root and develop after birth. Research has demonstrated that fetal attachment is associated with a variety of parenting factors including, positive health behaviors during pregnancy (Lindgren, 2001), sensitive parenting behavior after birth (Bloom, 1995), and parenting role competence (Grace, 1989). The parent's representation of the child after birth may be influenced by the quality and level of fetal attachment that develops during pregnancy. Research has illuminated a range of individual differences in the timing, quality, and intensity of fetal attachment. For example, parents awaiting results regarding potential chromosomal damage to the fetus seem to postpone developing fetal attachment until after medical results are provided and then attachment increases (Caccia, Johnson, Robinson, &Barna, 1991; Rothman, 1993). The relationship between depression and fetal

attachment still needs to be established. Previous studies have reported mixed results; some studies have found a relationship between fetal attachment and depression and others have not (Cranley, 1981; Lindgren, 2001; Mercer, Ferketich, May DeJoseph, &Sollid, 1988; and Muller, 1992). Muller (1992) suggests that inconsistent results are artifacts of the instrument used to measure the construct (i.e., Cranley's Fetal Attachment Scale). Condon (1993) developed a new scale to measure fetal attachment, the Antenatal Attachment Inventory (AAI; Condon, 1993). A preliminary study using the AAI has begun to resolve some of the ambiguities regarding the relationship between depression and fetal attachment. As logically expected, Condon and Corkindale (1997) found a consistent inverse relationship between depression and FA-Quality regardless of how depression was measured (i.e., using four different instruments to measure depression). The more depressed a person was the lower the quality of fetal attachment. Fetal Attachment has been defined and measured in several ways (Cranley, 1981; Condon, 1993; Liefer, 1977; and Muller, 1993). There are also differences in the way Cranley and Condon define fetal attachment. Cranley (1981) defined the concept in general terms, as the growing affection that develops in the adult for their unborn child. Condon (1993) has attempted to refine the definition of fetal attachment so that it aligns more closely and specifically with Bowlby's original definition of "attachment." Condon's focus was on the complementary caregiver behaviors necessary to elicit and sustain the child's attachment behaviors. These complementary caregiver behaviors were developed into a hierarchical model of fetal attachment comprised of five dispositions in the parent: (1) the disposition to know the fetus/child, (2) the disposition to be with and interact with the fetus/child, (3) the disposition to avoid separation or loss, (4) the disposition to protect the fetus/child, and (5) the disposition to gratify the needs of the fetus/child. The AAI is a self-report measure of the quality, intensity and frequency of a parent's thoughts, behaviors, and feelings about the unborn child with regard to these five dispositions. Using the AAI, Condon and Corkindale (1997) have established a strong link between fetal attachment and depression. There are a variety of ways to define depression and a number of subtypes. The definition adopted for the purpose of this study was provided by Beck (1967) who described the disorder as a "depressive syndrome" which included symptoms of four types: (1) affective feelings of sadness and lack of enjoyment; (2) cognitive beliefs of helplessness and hopelessness; (3) somatic disturbances of appetite and sleep; and (4) behavioral manifestations of decreased activity and interest. For the purpose of the empirical analysis in this paper, the disorder was treated as a unitary dependent variable, although some exploratory analysis considered whether there were differences between somatic and nonsomatic symptoms reported. Depressions specific to pregnancy have not been defined. Postpartum depression is defined in the DSM-IV as a depressive episode with its onset in the first 4 weeks following delivery. Depression during pregnancy has not been defined as a sub-type and is not mentioned in the DSM-IV; however, it has been found to begin as early as 28 weeks of pregnancy (Davidson, Parker, &Robinson, 2002). Epidemiological studies have estimated that major depression is the leading cause of disability among women in the world today (Murray &Lopez, 1996). North American studies have estimated that during the childbearing years prevalence rates for women are between 8 and 12% (O'Hara, Neunaber, &Zekoski, 1984). McElhatton, Gabris, &Elefant (1996) estimate that 10% of all pregnant women meet psychiatric criteria for major or minor depression at some point during pregnancy. Depression during pregnancy is a significant predictor for postpartum depression (r = .45) (Beck, 2001) as are other factors including: self esteem, childcare stress, prenatal anxiety, life stress, social support, marital discord, depression history, infant temperament, maternity blues, marital status, socio-economic status, and unplanned/unwanted pregnancy (Beck, 1996, 2001; O'Hara &Swain, 1996). A variety of these factors also predict depression during pregnancy with significant risk present if there is a history of mood disorders (anxiety, major and minor depression) and other psychiatric disorders. Adults who have a history of major or minor depression before the transition to parenthood seem to be at greater risk of experiencing depression during pregnancy and during the postpartum period. Studies have consistently found lower prevalence rates for men with female:male (F:M) ratios reported to be around 2:1 (for a review see Nolen-Hoeksema, 1987). Depression during pregnancy and the postpartum

period may have deleterious consequences for the fetus (Allister, Lester, Carr, &Liu, 2001), for the parent's health and development (O'Hara, Zekoski, Philipps, &Wright, 1990; Whiffen &Gotlib, 1989), for the child's developmental trajectory, and for interactions in the parent-child dyad after birth (Tronick &Field, 1986; Field, Diego, Dieter, Hernadez-Rief, Schanberg, Kuhn, Yando &Bendell, 2001). Allister, Lester, Carr, and Liu (2001) found that maternal depression affects fetal heart rate response to vibroacoustic stimulation (VAS). Fetuses of depressed mothers were slower to react to the VAS and slower to return to baseline than fetuses of non-depressed mothers. Also, depression during pregnancy is associated with poorer maternal health behaviors (Lindgren, 2000), increases in smoking, drug use, and alcohol consumption (Goldenberg, 1991) and lack of prenatal care (Miller, 1992). Pregnancy and delivery produce dramatic changes in estrogen and progesterone levels a well as significant suppression along the hypothalamic-pituitary-adrenal axis, possibly increasing vulnerability to depression (Steiner, 2003). Studies have found pregnancy and postpartum depression to be associated with negative outcomes for infant development in the domains of infant emotional (Cohn, Campbell, Matias &Hopkins, 1990; Field et al. 2001), cognitive (Whiffen &Gotlib, 1989), and social functioning (Cohn &Tronick, 1993). Emotional disturbances in three-month-old infants of depressed mothers have been described as having more "flat" affects (Cohn et al, 1990; Field, et al., 2001; Tronick &Field, 1986) and behavioral disturbances still evident even after the mother's symptoms went into remission (Cox, Puckering, Pound, &Mills, 1987). Depression effects maternal sensitivity and responsiveness, and compromises the mother's and the dyad's capacity to co-regulate (Cohn &Tronick, 1989; Tronick &Field, 1986; Weinberg &Tronick, 1994). Two patterns of interactions between depressed mothers and their infants have been observed: (1) intrusive mothers with withdrawn infants and (2) withdrawn mothers with protesting infants (Cohn, Matias, Tronick, Connell, &Lyons-Ruth, 1986; Field, 1986; Tronick &Field, 1986; Tronick &Weinberg, 1997). In the first pattern, depressed mothers were found to become overly intrusive, seemed angrier, and handled their infants roughly and their infants were more withdrawn and looked away more frequently in response to invasive behaviors. In the second pattern, depressed mothers who were observed to be more withdrawn, have flat affect, and were more disengaged from their infants had infants who were more likely to protest than infants of nondepressed mothers. If depression negatively effects the development of fetal attachment, then some of these dyadic consequences described above may be mediated through the effect of depression lowering fetal attachment. For example, parents who are depressed may have a lower level of fetal attachment (i.e., disposition to protect the fetus) and fail to quit smoking or continue to consume increasing amounts of alcohol placing the infant at risk for negative developmental outcomes. Parents with higher fetal attachment may be more prone to quit smoking to protect the fetus. Therefore, as a first step, it is important to determine and describe the effects of depression on fetal attachment. Given the ambiguities in the research on the relationship between depression and fetal attachment, when measured by the FAS, it was unclear whether there would be a significant correlation found between the FAS and depression. However, it was expected, as found by Condon and Corkindale (1997), that there would be a significant inverse relationship between depression and FA-Quality, but no relationship between depression and FA-Intensity. Further, it was expected that adults, with a history of major depression, would report higher levels of depressive symptoms than parents without a history. Also, it was hypothesized that parents with a history of depression would report lower levels of FA than individuals with no history of depression. METHOD Participants Participants were recruited through canvassing at a maternity clothing store located in a large shopping mall. A total of 57 couples expecting a child requested and received a questionnaire package. Ten couples decided not to participate and returned their package and, one couple lost their fetus, and three couples gave birth before they were able to complete the questionnaires. Of the remaining 72 subjects that completed all the measures, 1 female and 3 males (one couple and 2 male partners) were not included in the analyses because they provided information that indicated they were experiencing severe psychological distress. This left a total of 68 subjects (n = 35 females, n = 33 male partners). Twenty-four of the households were expecting a first child and 10 were expecting a second or third child. For the women 46% of

the sample, were under 30 years of age, and 51% were between the ages of 30 to 39 and one woman was 40 years old. Thirty percent of the men were under 30 years of age, 60% were between the ages of 30 and 39, and 9% were 40 years or older. Sixty-one percent of the families had a combined income of over $70,000 a year and 6% of the families had an income of under $40,000 a year. Most of the couples were more than 13 weeks pregnant (i.e., 3 couples were 13 weeks or less, 14 were 14 to 26 weeks pregnant, and 18 were 27 to 29 weeks pregnant). Instruments The AAI. The Antenatal Attachment Inventory (AAI: Condon, 1993) includes both a maternal (MAAI) and a paternal (PAAI) version. The MAAI is a 19-item scale and the PAAI is a 16-item scale. Each scale provides a AAI-Quality and a FA-Intensity score as well as a global score. AAI-Quality and AAI-Intensity have been found to be orthogonal (Condon, 1993). The differentiation between both the MAAI and the PAAI and the subscales of AAI-Quality and AAI-Intensity for each version were determined empirically through factor analysis. The scales(s) were designed to measure the quality and intensity of five dispositions in the parent: (1) the disposition to know the fetus/child, (2) the disposition to be with and interact with the fetus/child, (3) the disposition to avoid separation or loss, (4) the disposition to protect the fetus/child, and (5) the disposition to gratify the needs of the fetus/child. Reliability coefficients in excess of r = .8 have been reported for both the male and female versions (Condon, 1993). For women scores can range from 19 to 95 on the global scale, from 10 to 50 on the FA-Quality scale, and from 8 to 40 on the FA-Intensity scale. For men scores can range from 16 to 80 on the Global scale, 8 to 40 on the FA-Quality scale, and from 6 to 30 on the FA-Intensity scale. The FAS. The Fetal Attachment Scale (FAS, Cranley; 1981; Weaver &Cranley, 1983) is a 24-item scale (i.e., one version for females and the other for males). For the paternal version, items from the maternal version, simply were rewritten to be from the father-to-be's perspective. For example, "I stroke my tummy to quiet the baby when there is too much kicking" was written to be "I stroke my partner's tummy to quiet the baby when there is too much kicking." The scale was designed to measure five dimensions of behaviors, thoughts, and feelings believed to represent attachment to the unborn child. The five dimensions of fetal attachment included: (1) Role taking, (2) Differentiation of self from fetus, (3) Giving of self, (4) Attributing characteristics to the fetus, and (5) Interaction with the fetus. Internal consistency has been reported at r=.85 (Cranley, 1981) and others have reported a convergent validity correlation of r = .72 (Muller, 1993). Scores on the FAS can range from 22 to 110 for males or females. The CES-D. The Center for Epidemiologic Studies in Depression Scale (CES-D; Radloff, 1977) is a 20-item self-report depression scale. The scale was developed to identify depression in the general public. Many of the items were from a number of other depression scales including the Beck Depression Inventory (BDI), Zung's Self Reporting Depression Inventory (SDS), Raskin's Depression Scale, and the Minnesota Multiphasic Personality Inventory. Items are ranked on a Likert-type scale with response choices ranging from 0 (rarely or none of the time-less than 1 day) to 3 (most or all of the time (5-7 days). The CES-D was reported to have adequate internal consistency (i.e., alpha = .85). On the CES-D scores can range from 0 to 60. A cut-off score of 16 on the CES-D is suggested to indicate probable clinical depression (Radloff, 1977). In addition, a score was calculated to represent depressive symptoms, which excluded somatic symptoms by taking the total CES-D score and subtracting the score on the Somatic subscale. Classification of Risk Status. Participants were asked to report if they had any history of major depression which required medical intervention. Those individuals who reported previous depression were classified as "high risk" for depression during pregnancy and those individuals who did not report previous depression were classified as "low risk." Procedure Participants were recruited through advertising at a maternity clothing store by informing them of a study on the transition to parenthood. All potential participants were offered a chance to win a draw for a $100 gift certificate at the maternity clothing store. All pregnant women interested in participating in the study were given a brochure about the study. A total of 57 couples expecting a child requested and received a questionnaire package. Each package contained a consent letter, information about the study, and a number of questionnaires (only the instruments used in this study have been described here). There were two versions for males and two versions for females. In version 1 the FAS scale

was presented first followed by the CES-D and then the AAI later in the package, and in Version 2 the AAI scale was presented first followed by the CES-D and then the FAS. Packages were mailed out to ensure counterbalancing of the two package versions. RESULTS Means, standard deviations, actual range of scores, and potential range of scores for fetal attachment and depression are presented in Table 1. Note that the potential range of scores is similar for males and females for most variables except in the case of AAI scores. Different types and numbers of items are used on the AAI to measure quality-, intensity-, and global fetal attachment for males and females. Females scored significantly higher than males on all measures of FA including the FAS (t = 1.89, p <.05), the AAI-Quality (t = 2.46, p <.05), the AAI-Intensity (t = 2.36, p <.05), and the AAI-Global (t = 2.76, p <.05) subscales. Females scored significantly higher than males on the CES-D (t = 3.29, p <.01). Further testing revealed that females scored significantly higher on the CES-D somatic items (t = 4.45), p <.001) but not on non-somatic items (t = -2.25, p >.05). As expected, in this sample 37% (n = 13) of pregnant women scored 16 or greater on the CESD which is greater than the levels of depression found in the general population (18% to 23%). Only 6% (n = 4) of men in this sample scored 16 or greater on the CESD. T-tests of differences in mean depression scores for pregnant women and their partners are presented in Table 2. Scores are reported for males and females for the full sample, for participants who did not report a history of depression and for those who did report a history of major depression. Women had higher levels of depression than men (t = -3.29, p <.002). Pregnant women scored significantly higher than men on somatic-depression items (t = -4.45, p <.001). There were no significant differences between men and women on non-somatic-depression scores (t = -2.25, p >.05).

Table 1
Means and Standard Deviations of FAS, AAI, and CES-D Scores by Sex

	Male (n = 33)				*Female (n = 35)*			
	M	*SD*	*Actual Range*	*Potential Range*	*M*	*SD*	*Actual Range*	*Potential Range*
FAS	77.88	9.40	60–95	22–110	82.17	9.27	58–103	22–110
AAI								
Quality	34.30	2.57	30–39	8–40	44.94	3.68	37–50	10–50
Intensity	18.54	3.70	10–26	6–30	27.28	4.01	20–36	8–40
Global	60.79	5.89	48–72	16–80	76.77	6.29	65–91	19–95
CES-D								
Somatic	3.12	2.30		0–12	6.66	4.06		0–12
Non-Somatic	4.21	4.14		0–48	7.17	6.50		0–48
Global	7.33	5.93	0–26	0–60	13.83	9.97	1–34	0–60

FAS – Fetal Attachment Scale; AAI – Antenatal Attachment Inventory; CESD – Centre for Epidemiologic Studies in Depression Scale.

Table 2
Sex Differences in Depression

Group	*Male*	*Female*	*t*	*p*
Full Sample	(n = 33)	(n = 35)		
CESD	7.33 (5.95)	13.83 (9.97)	−3.29	.002
Somatic	3.12 (2.30)	6.66 (4.06)	−4.45	.000
Non-Somatic	4.21 (4.14)	7.17 (6.49)	−2.25	n/s
No Previous Depression	(n = 27)	(n = 28)		
CESD	6.96 (6.25)	12.53 (9.52)	−2.56	.013
Somatic	2.85 (2.36)	6.39 (6.77)	−4.15	.000
Non-Somatic	4.11 (4.31)	6.14 (6.14)	−1.42	n/s
Previous Depression	(n = 6)	(n = 7)		
CESD	9.00 (4.29)	19.00 (10.78)	−2.12	n/s
Somatic	4.30 (1.63)	7.71 (5.28)	−1.61	n/s
Non-Somatic	4.67 (3.56)	11.28 (6.70)	−2.16	n/s

CESD – Centre for Epidemiologic Studies in Depression Scale.

Men and women, who reported that they had experienced depression in the past, did not score significantly different on average depression score (t = -2.12, p >.05), somatic scores (t=-1.61, p >.05), or non-somatic symptoms (t =-2.16, p >.05). The inter-correlations among the FAS and AAI subscales were examined. It was expected that there would be a significant positive association between different measures of FA. Results for females and the males are presented separately. For females (i.e., using the maternal version of the AAI) the correlation between the AAI-Quality and AAI-Intensity subscales was not significant (r = .27, p >.05), suggesting these dimensions are orthogonal. The correlation between the FAS scale and the AAI-Quality subscale was not significant (r = .04, p >.05), however the FAS scale was moderately correlated to the AAI-Intensity subscale (r = .44, p <.01) and the AAI-Global scale. For males (i.e., using the paternal version of the AAI) the correlation between AAI-Quality and AAI-Intensity subscales was moderate (r = .46, p <.01) suggesting these dimensions overlap. The FAS scale was moderately correlated to the AAI-Quality subscale (r = .55, p <.01), the AAI-Intensity subscale (r = .47, p <.01), and the AAI-Global scale (r = .61, p <.01). For females, the correlation between FA and depression was significant and negative when examining FA using the AAI-Quality (r = -.62,p <.01)andtheAAI-Global(r = -.38, p <.05) subscales. The correlation between FA and depression was not significant when considering scores from the AAI-Intensity subscale (r = -.07, p >.05) or the FAS scale (r = .11, p >.05). For males the correlation between FA and depression did not reach significance regardless of which instrument was used to measure FA correlations ranged from -.12 to -.26. CONCLUSIONS AND IMPLICATIONS Understanding the effects of depression on fetal attachment is important to the health and well being of parents, families, and children. Depression is a major health issue during pregnancy and postpartum. In particular, depression during pregnancy poses a unique risk because of complications regarding pharmacological treatments (i.e., selective sertonin reuptake inhibitors (SSRIs) and feared effects on the early development of fetus. This study found that FA quality is significantly inversely related to depression; the more depressed parents were the lower the quality of FA. In addition, Condon and Corkindale (1997) found that for women the relationship between depression and FA was specific to the quality of FA but not the intensity, and this study provides support for the robustness of this finding. In this study, for women, AAI-Quality and AAI-Intensity were orthogonal and so was the relationship to depression; AAI-Quality was inversely related to depression, whereas there was no relationship between AAI-Intensity and depression. This study has begun to untangle some of the measurement concerns that have contributed to the ambiguities regarding the relationship between fetal attachment and depression, and yet further study is needed. Results from this study confirm that it matters how fetal attachment is defined and measured, and what aspect of the construct is considered. This

study used two instruments (i.e., the FAS and the AAI) to measure fetal attachment in an attempt to untangle some of the ambiguities regarding the relationship between fetal attachment and depression. Past research has primarily used the FAS to measure fetal attachment. Across these studies mixed results have been reported; some studies found an association between fetal attachment and depression and other studies did not. Recent research, using the AAI, has demonstrated a robust relationship between AAI-Quality and depression for women (Condon &Corkindale, 1997) when using four different instruments to measure depression. Muller (1993) has suggested that measurement problems may be at the root of the problem and that inconsistent results were possibly artifacts of the FAS. This study supports Muller's proposal. The FAS was not related to depression, however, AAI-Quality was. A large-scale study to examine and compare the psychometric properties of the FAS and the AAI and to examine the convergent and discriminate validity of these and other instruments that claim to measure fetal attachment would advance our understanding of measurement differences. In addition, although self-report instruments are economical there is still a need to develop multiple methods (i.e., observational coding schemes, interview protocols) for assessing fetal attachment. Qualitative research examining differences in fetal attachment for males and females and persons from different cultural backgrounds is unavailable. Qualitative approaches would increase our understanding and confirm or disconfirm the assumptions and theoretical components currently used to define fetal attachment and help to explicate whether current definitions need to be further refined or expanded. Further, qualitative measures, such as brief interview protocols, could be useful to clinicians trying to detect and differentiate women at risk for lags in their development of fetal attachment. It is unclear whether the relationship between FA-Quality and depression is a result of a third variable. For example, fetal attachment and depression may be related to fluctuating levels of estrogen and other sex steroids during pregnancy and postpartum (Steiner, Nunn, &Born, 2003). The direction of causality is also unclear. Does depression lead to lower fetal attachment or does lower fetal attachment lead to more depression? The developmental trajectories of women who are depressed during pregnancy need to be studied longitudinally to explore the moderating and mediating effects of other stress or adjustment variables. For example, Pelton (1995) found that depressed women, who had the most difficulty adjusting to their pregnancy, surprisingly reported the most attachment to their fetuses. Also, changes in the course of the depression (i.e., women who were depressed during their pregnancy but had a lifting of the depression after birth) led to different outcomes. Women who experienced remission during pregnancy viewed their neonates as the least difficult. However, women who suffered from postpartum depression viewed their neonates as the most difficult. Women who were never depressed fell between these two groups of women. The multiple pathways through which depression effects fetal attachment and attachment after birth seems to be complex. Therefore, it is important to study women's lives and these variables longitudinally and qualitatively across the transition to parenthood to gain a better understanding of the risks and the resiliencies that may manifest. In this study, pregnant women experienced higher levels of depression than did their male partners. Further exploration revealed that women reported significantly higher levels of somatic symptoms than men but not higher non-somatic complaints. In part, these sex differences may be explained by an apparent greater susceptibility to depression (Radloff &Rae, 1981) by women. Both the men and the women in this study are going through the transition stressors of pregnancy, however women are experiencing more physiological changes suggesting that the sex differences may be explained by women's increased risk to precipitating factors. However, Kelly, Russo, and Katon (2001) found that compared to women without depression or anxiety disorders, women with depression or anxiety disorders reported significantly more somatic symptoms. In this study, women in general reported more somatic symptoms of depression than did men. Surprisingly, women with a history of depression reported significantly more non-somatic items on the CES-D than women without a history of depression. Due to the multiple physiological changes related to pregnancy there may be a general tendency for both groups (i.e., women with a history of major depression and women without) to report somatic complaints, however the non-somatic symptoms of depression seem to be amplified for women with a history of

major depression. Previous research has found that women with a history of depression are more susceptible to depression during pregnancy. Results from this study suggest that, compared to men, women amplify somatic complaints of depression. However, when comparing women with a history of major depression, they seem to have more non-somatic symptoms of depression than women without a history of major depression do. Professionals trying to assess for depression during pregnancy may find it helpful to consider this relative increase in non-somatic symptoms among women with a history of major depression. There are a number of mechanisms that may account for a relationship between fetal attachment and depression including: transitional factors, higher vulnerability, compound risks, and personality differences. Pregnant persons may be more vulnerable to depression because of differences in the dosage of stress they may be exposed to during this life transition (i.e., greater economic demands, changes at work, home, and in the marital relationship). Some woman may be more reactive because of physiological changes (i.e. biochemical or hormonal changes). Other transitional and ecological factors may influence the development of fetal attachment directly or indirectly through increased depression including: how wanted the pregnancy is, age (e.g., pregnancy during adolescence or pregnancy after 40 years of age), marital status and the quality of the partner relationship, fertility issues, family-of-origin issues, career pressures, health risk/ status (e.g., disabilities, HIV, diabetes). Some of these ecological factors may account for increased susceptibility to depression and also have consequences for the development of fetal attachment. It may be that the relationship is direct or indirect. In addition, many of these factors may also be associated with increased anxiety, and the relationship between anxiety, depression, and fetal attachment deserves greater attention. The relationship between anxiety, depression, and fetal attachment seems to be complex. Woman with a past history or current tendency towards anxiety may experience compound difficulties adjusting to new responsibilities, biochemical changes (e.g., health-related/increased smoking), and social changes (changes in role definitions, relationships, that is, marital discord). Field et al. (2003) found that the combination of anxiety and depression could have negative consequences. Women with high anxiety had higher scores on depression and anger scales. Longitudinal follow-up revealed that fetuses of the high anxiety women were more active and experienced growth delays. The authors suggested that women with high anxiety would have higher prenatal norepinephrine and lower dopamine levels which, may have resulted in their neonates having low dopamine and serotonin levels. Newborns, of high-anxiety mothers, also had greater relative right frontal EEG activation and lower vagal tone and spent more time in deep sleep and less time in quiet and active alert states and showed more state changes and less optimal performance on the Brazelton Neonatal Behavior Assessment Scale (motor maturity, autonomie stability and withdrawal). This study punctuates the need to examine the effects of anxiety, and the combined effect of depression and anxiety on development during pregnancy. However, the complexity of the relationship between anxiety, depression, and fetal attachment needs further exploration and study. For example, the combined effects of depression and being anxious about being HFV-positive on fetal attachment need to be studied. Kwalombota (2002) compared pregnant women from Zambia who were either diagnosed with HIV during the course of their pregnancy, or who knew their HIV-positive status prior to becoming pregnant. This study found that the majority of women (85%) showed major depressive episodes and had significant suicidal thoughts. There was an amplification in somatic illness with about 60% of the women whose HIV was diagnosed during their pregnancy showed signs. Women who knew they had HIV before becoming pregnant had more anxiety about the HIV status of their babies (i.e., disposition to protect the fetus) but did not show severe depressive episodes. This study suggests that there may be a complex relationship between fetal attachment and depression in parents with HIV. The relationship between depression, anxiety, and fetal attachment in women with other health issues needs to be examined. Personality factors may make some women (and men) more prone to depression during pregnancy. In a prospective study (Priel &Besser, 1999) examined self-criticism and dependency personality styles as vulnerability factors to postpartum depressive symptoms in a nonclinical sample. Seventy-three pregnancies were assessed during the third trimester and 8

weeks postpartum. After controlling for depression during pregnancy, self-criticism predicted postpartum depression. However fetal attachment scores were found to moderate the effects of self-criticism; mothers with self-critical personalities who had high fetal attachment were less depressed than mothers who did not develop strong fetal attachment. This study did not find dependency to be associated with postpartum depressive symptoms. Some personality factors are more resistant to change during transitions, whereas others are more permeable. It may be that adults have an opportunity to become more flexible, develop greater empathy, and creativity through this life-course transition of pregnancy and through the achievement of developing an attachment to their fetus and subsequent child. In summary, the link between depression and fetal attachment is complex and needs to be untangled. Previous research has relied heavily on the FAS to measure fetal attachment. Mixed results have been reported regarding associations between fetal attachment and depression. In this study, fetal attachment was not related to depression when considering scores obtained from the FAS. However, as expected, for women, there was a robust relationship between FA Quality and depression when using the AAI to measure fetal attachment. As expected, there was no relationship between the intensity of FA and depression when using the AAI. Hence, this study supports Muller's (1992) proposal that some of the previous mixed results reported in the literature regarding the relationship between fetal attachment and depression may be artifacts of the FAS. This study punctuates the need to carefully consider how fetal attachment is being measured when explicating associations between the concept and depression. Further, given the current instruments available for measuring fetal attachment in men (i.e., the FAS and the AAI) the relationship between fetal attachment and depression is more significant for women than men. However, because of some of the measurement issues, the relationship between transitional factors, depression and fetal attachment, for men, deserves further study. Understanding the complex relationship between fetal attachment and depression is important for a variety of reasons. People who fail to develop an attachment for the fetus may find that they experience more depression during pregnancy and the postpartum period. Regardless of the causal chain, the link between lower fetal attachment and higher depression may have deleterious effects for adult adjustment, fetal development, and for adjustment in the parent-child relationship after birth. For example, adults who have difficulty developing an attachment for the fetus and are depressed have been found to have less motivation to practice appropriate healthcare behaviors (e.g., quitting smoking and drinking during pregnancy) and the subsequent consequences of these behaviors have long range effects on child and parent development. The relationship between depression, anxiety, and fetal attachment also deserves further study. The intensity of fetal attachment is not related to depression but may be related to anxiety. For example, parents who are depressed but also are anxious for the safety of the fetus (i.e., have a disposition to protect the fetus/child) may invest in more preventative health behaviors (i.e., find social support or seek therapy). This study contributes to an evolving understanding of the link between fetal attachment and depression but also punctuates the need to further explore the longitudinal effects of lower fetal attachment on postpartum depression and the combined effects of anxiety and depression on both the quality and intensity of fetal attachment. References REFERENCES Allister, L., Barry, L. M., Carr, S., &Liu, J. (2001). The effects of maternal depression on fetal heart rate response to vibroacoustic stimulation. Developmental Neuropsychology, 20(3), 639-651. Beck, A. T. (1967). Depression. New York: Harper &Row. Beck, C. T. (2001). Predictors of postpartum depression: An update. Nursing Research, 50, 275-285. Beck, C. T. (1996). A meta-analysis of predictors of postpartum depression. Nursing Research, 45, 297-303. Bloom, K. C. (1995). The development of attachment behaviors in pregnant adolescents. Nursing Research, 44(5), 284-289. Caccia, N., Johnson, J. M., Rominson, G. E., &Barna, T. (1991). Impact of prenatal testing on maternal-fetal bonding: Chorionic villus sampling versus amniocentesis. American Journal of Obstetrics and Gynecology, 165, 112-1125. Cohn, J. F., &Tronick, E. Z. (1983). Three month old infants' reaction to simulated maternal depression. Child Development, 54, 185-193. Cohn, J. F., &Tronick, E. Z. (1989). Specificity of infants' response to mothers' affective behavior. Journal of the American Academy of Child and Adolescent Psychiatry, 28, 242-248. Cohn, J. F., Campbell, S.

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