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Maternal-fetal attachment and its correlates in a sample of Italian women: a study using the Prenatal Attachment Inventory

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Background: Maternal–fetal attachment (MFA) is considered to be related to the quality of subsequent maternal care of the infant and maternal health behaviour during pregnancy. **Objective:** The aims of the present study were to investigate the internal structure of a questionnaire used for assessing MFA, the Prenatal Attachment Inventory (PAI), and to address the role of gestational age, couple adjustment and depressive symptomatology on MFA, on a sample of women from suburban areas. **Method:** A cross-sectional study using self-report questionnaires was conducted to address these two aims on 130 women attending prenatal care services. **Results:** A five-factor solution emerged for the PAI questionnaire. MFA levels were comparable to those found in previous studies using PAI, whereas depressive symptoms were higher than those reported in previous studies with normative pregnant women. Couple adjustment and gestational age significantly increased MFA. Among the MFA dimensions, *Affect* and *Interaction* were mainly affected by gestational age; *Maternal–fetal differentiation* was associated with gestational age and couple adjustment. Depressive symptoms were associated with an increase in *Fantasy* and *Sensitivity* factor scores. **Conclusion:** Prenatal attachment increased as gestational age advanced and as mothers perceived greater levels of couple adjustment, which promoted MFA strength, positive affect and MFA interaction and differentiation. The internal structure of PAI and its association with specific correlates are discussed.

Keywords: maternal–fetal attachment; Prenatal Attachment Inventory; depressive symptoms; couple adjustment; gestational age

Introduction

The bond between a mother and her child starts well before birth. In contrast to the more widely described postnatal attachment (Bowlby, 1988), attachment before birth is not a bidirectional or interactional process, but rather consists of cognitive and emotional responses of only the mother toward the fetus (Redshaw & Martin, 2013). Different definitions are available for conceptualising pregnant women's mental representations. Over the past 50 years maternal–fetal attachment (MFA) has received significant attention from clinicians and researchers. The study of MFA has traditionally presented researchers with two challenges, discussed below: (1) detecting its predictors; (2) what this construct involves and the tools that can be used in its assessment.

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MFA was initially defined as 'the extent to which women engage in behaviours that represent an affiliation and interaction with their unborn child' (Cranley, 1981, p. 282), or 'as the personal, unique relationship that develops between a mother and her fetus' (Müller, 1990, p. 11). MFA has been shown to influence the quality of subsequent parent–child interaction and parents' adjustment – for example maternal health behaviour during pregnancy (Goecke et al., 2012; Lindgren, 2001) – and thus it may be useful to identify which specific variables promote MFA. In this context, a recent meta-analysis surveyed three categories of variables (Yarcheski, Mahon, Yarcheski, Hanks, & Cannella, 2009): (1) demographic, (2) gestational and (3) theoretical. The first, namely demographic variables, such as maternal age, socioeconomic status and education, showed only a small effect on MFA. The second, gestational age, emerged as the best predictor of MFA. Finally, among theoretical factors, primarily two variables – social support, both of family members and romantic partner, and depression – have been studied, with results unanimously supporting the influence of the former (Cannella, 2005; Condon & Corkindale, 1997; Kitzinger, 2012) and showing controversial findings for the influence of the latter (Honjo et al., 2003; Seimyr, Sjögren, Welles-Nyström, & Nissen, 2009).

A second issue, related to the results reported above, concerns what is implied in the MFA construct and the procedures used for its assessment. In order to fulfil the task of measuring MFA and to better understand the differences between pregnant women, specialised instruments highlighting specific facets have been developed (Walsh, 2010; Yarchesky et al., 2009). However, as van der Bergh and Simons emphasised in their recent review on MFA questionnaires (2009), the validity and reliability of MFA questionnaires have been neglected somewhat. Specifically, it is the paucity of data about the internal structure and consistency of items and scales in instruments assessing MFA that has been commented on (Redshaw & Martin, 2013; van der Bergh & Simons, 2009).

Among the questionnaires used to assess MFA, the Prenatal Attachment Inventory (PAI) is one of the most widely used; its factorial structure has been investigated in different cultures (Bielawska-Batorowicz & Siddiqui, 2008; Della Vedova, Dabrassi, & Imbasciati, 2008) with contradictory results. Specifically, there is no agreement about the internal structure of the questionnaire, with different studies reporting a one-dimensional (Gau & Lee, 2003; Muller, 1993) or a five-dimensional structure (Della Vedova et al., 2008; Siddiqui, Hagglof, & Eisemann, 1999), indicating the need for further research in different kinds of populations (van der Bergh & Simons, 2009).

The present study

Considering the role of MFA in subsequent adjustment to parenthood and the debate on the reliability and assessment of this construct and its predictors, the present study aimed at investigating, on a sample of women from an Italian suburban area considered at risk for socioeconomic status and low availability of social services:

(1) the internal structure of the PAI;
(2) the role of specific variables, i.e. gestational age, depression, and couple adjustment between partners on maternal fetal attachment at PAI considering both PAI summary and factor scores.

Method

Sampling and procedure

The initial sample consisted of consecutive admissions of women entering prenatal services in four hospitals from suburban areas located in Central Italy. The Ethical Committees of all prenatal services gave approval for the study. The research staff approached 176 pregnant women in hospital waiting rooms. Of these, 142 agreed to participate (response rate: 81%) by signing the informed consent and completed the questionnaires, finally resulting in a sample of 130 participants meeting the inclusion and exclusion criteria listed below.

Inclusion criteria: (1) the presence of a stable couple relationship for at least 24 months; (2) fluency in speaking and reading Italian; (3) age range 18–45.

Exclusion criteria: (1) a current at-risk pregnancy; (2) previous abortion experiences.

Participants' characteristics

The age range was 19–45 (mean = 33.88 years; SD = 5.65 years); gestational age ranged from 9 to 41 weeks (mean = 27.08, SD = 9.11); 59% were married (n = 77) and all were involved in a stable couple relationship (range: 24–264 months, mean = 63.24 months, SD = 53.52 months). Eighty-one women (62.31%) were primiparous. Educational level was as follows: 3% (n = 4) had an elementary school degree, 18% (n = 23) had a middle school degree, 59% (77) had a high school degree and 20% (26) had a university degree. Concerning women's employment, 38% (n = 49) were unemployed. All women had undergone at least one ultrasound scan during pregnancy (ranging from 1 to 3 according to gestational age).

Measures

Maternal–fetal attachment

The PAI (Muller, 1993), a 21-item self-report questionnaire based on a 4-point Likert scale (ranging from 1 to 4) in the Italian back-translated version by Della Vedova and colleagues (2008) was used to assess MFS. A total summary score (ranging from 21 to 84) is obtained by summing the 21 items, with higher scores indicating a greater strength of MFA. Subsequent studies have identified a multidimensional structure comprising 5 factors (i.e. *Fantasy*, *Interaction*, *Affection*, *Maternal–fetus differentiation*, *Maternal sensitivity to the fetus*) with some items loading on different factors depending on the nature and context of the studies (Bielawska-Batorowicz & Siddiqui, 2008; Della Vedova et al., 2008).

Depression symptomatology

The Centre for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977), a 20-item self-report questionnaire based on a 4-point Likert scale (ranging from 0 to 3) was used to assess depressive symptoms. A total score (0–60) is obtained by summing the 20 items. Specifically, it measures the symptoms defined by the American Psychiatric Association's Diagnostic and Statistical

Manual (DSM-IV) (APA, 2000), as related to a major depressive episode, and is considered a useful tool to assess depressive symptoms in pregnant women (Marcus, Flynn, Blow, & Barry, 2003). Participants scoring 16–22 are considered at risk for depressive symptoms of clinical relevance; those scoring 23 or more are considered at risk for a major depressive disorder (Marcus et al., 2003; Radloff, 1977).

Couple adjustment

The Dyadic Adjustment Scale (DAS; Gentili, Contreras, Cassaniti, & D'Arista, 2002; Spanier, 1976), a 32-item self-report questionnaire with different response scales (Likert scales range varying from 0–1, 0–5 to 0–6) was used to assess the quality of perceived couple adjustment. A total score is given by summing all items (0–151).

Analytic plan

First, descriptive statistics were reported and compared with data in the literature. Then, given that there is still no agreement about the internal structure of the PAI, a Principal Component Analysis with Varimax rotation was used to identify the MFA dimensions of the PAI in our sample. Finally the relationship between the pregnancy-related variable (i.e. gestational age) and theoretically related variables (i.e. couple adjustment and depressive symptomatology) to the PAI summary score and factors were investigated using a regression model. No multi-collinearity problems were detected during the analyses.

Results

Descriptive statistics

The mean PAI summary score was 58.66 (SD = 11.53; primiparous vs. multiparous $t(128) = .476$, $p = .635$) and mean score per item was 2.85 (SD = .49, range: 1.62–3.86). Results were comparable to those found by Della Vedova and colleagues (2008) in a previous Italian psychometric study with low-risk women (mean = 2.90, $t(129) = -1.08$, ns). Correlation between maternal age and PAI summary score was not statistically significant ($r = -.08$, ns); correlation between gestational age and PAI was moderate ($r = .33$, $p \leq .001$). Cronbach's alpha for the PAI was .89.

The mean CES-D summary score was 13.85 (SD = 8.66), higher than that found in previous studies (Giardinelli et al., 2012) on low-risk Italian pregnant women (mean = 10.03, $t(129) = 4.91$, $p \leq .001$). Specifically, 36% ($n = 47$) of the participants were above the clinical cut-off score (i.e. 16) found in depression-screening studies during pregnancy (Della Vedova, Ducceschi, Cesana & Imbasciati, 2011; Marcus et al., 2003). Among those above the 16 cut-off score, 25% ($n = 12$) scored above 23, denoting the risk for a Major Depressive Disorder. Correlations between CES-D and maternal age and between CES-D and gestational age were both trivial and nonsignificant (respectively, $r = .02$, ns; $r = -.05$; ns). Cronbach's alpha for the CES-D was .81.

The mean DAS summary score was 113.26 (SD = 14.59, range = 63.28–146.59) and the mean per item was 3.94 (SD = 0.48), figures comparable to those found in the Italian DAS validation study (Gentili et al., 2002; mean summary score 114.98 $t(129) = -1.31$, ns). The DAS showed a moderate negative correlation with maternal age ($r = .25$, $p = .01$), whereas no significant correlation was found with gestational age ($r = .06$, ns). Cronbach's alpha was .82.

Maternal–fetal attachment dimensions of PAI

A Principal Component Analysis with Varimax rotation was conducted to explore the PAI's internal structure. As reported in Table 1, five factors with eigenvalues greater than one emerged, explain 59.44% of the total variance on the PAI scales. When item loading was .30 or above on more than one factor, the item was considered as a part of the factor with the highest loading. Results showed that a total of 6 items loaded on the first factor (Factor 1, *Affect*, alpha = .78) accounting for 15.58% of the variance in the rotated solution. Five items loaded positively on the second factor (Factor 2, *Interaction*, alpha = .81) accounting for 14.65% of the total variance. Four items loaded positively on the third factor (Factor 3, *Maternal–fetus differentiations*, alpha = .63) accounting for 11.08% of the variance. Finally, 3 items loaded positively on Factor 4 (*Fantasy*, alpha = .59) accounting for 10.65% of the variance, and 3 items on Factor 5 (*Sensitivity*, alpha = .47) accounting for the remaining 7.90% of the total variance. Item loadings and factors are reported in Table 1 and item labels are reported in Table 2.

Table 1. Prenatal Attachment Inventory factorial structure.

PAI items	Factor 1 Affect	Factor 2 Interaction	Factor 3 Differentiation	Factor 4 Fantasy	Factor 5 Sensitivity
Item 1	.310	–.121	**.526**	.097	.310
Item 2	.417	.112	**.583**	–.015	.097
Item 3	**.506**	.233	.354	–.056	.200
Item 4	.085	.184	.200	.374	**.507**
Item 5	.155	**.699**	.151	.017	.092
Item 6	–.056	.127	.206	–.143	**.734**
Item 7	.047	.202	**.731**	.284	.078
Item 8	.197	**.659**	.423	.121	.089
Item 9	.341	**.611**	.355	.032	.125
Item 10	.023	**.717**	–.026	–.008	.104
Item 11	.042	**.619**	.014	.285	.249
Item 12	.022	.478	**.589**	.170	–.132
Item 13	**.776**	–.011	.131	.013	–.111
Item 14	**.620**	.191	.035	.428	.359
Item 15	**.544**	.197	.025	.452	.236
Item 16	.234	.016	.109	**.730**	–.039
Item 17	.224	.503	–.056	**.557**	.011
Item 18	**.749**	.290	.051	.183	.102
Item 19	.019	.048	.406	**.660**	.123
Item 20	.334	.248	–.170	.225	**.605**
Item 21	**.635**	.075	.251	.327	.012

Note: Numbers in bold are for underlining items loading on that specific factor.

Table 2. Prenatal Attachment Inventory factorial structure and items.

Factor	Items
I. Affect	(3) I enjoy feeling the baby move
	(13) I feel love for the baby
	(14) I try to imagine what the baby is doing in there
	(15) I like to sit with my arms around my tummy
	(18) I stroke the baby through my tummy
	(21) I get very excited when I think about the baby
II. Interaction	(5) I let other people put their hands on my tummy to feel the baby move
	(8) I tell others what the baby does inside me
	(9) I imagine what part of the baby I'm touching
	(10) I know when the baby is asleep
	(11) I can make my baby move
III. Differentiation from fetus	(1) I wonder what the baby looks like now
	(2) I imagine calling the baby by name
	(7) I plan the things I will do with my baby
	(12) I buy/make things for the baby
IV. Fantasy	(16) I dream about the baby
	(17) I know why the baby is moving
	(19) I share secrets with the baby
V. Sensitivity to the fetus	(4) I think that my baby already has a personality
	(6) I know things I do make a difference to the baby
	(20) I know the baby hears me

Gestational age, couple adjustment and depressive symptoms on maternal–fetal attachment

Consecutive regression analyses were conducted to test the role of depressive symptomatology and the quality of perceived couple adjustment on PAI summary score and the factors identified in the PCA analysis, controlling for maternal age and educational level. The results, displayed in Table 3, showed that the total PAI score was mainly affected by increase in gestational age ($\beta = .37$, $p = .001$) and couple adjustment ($\beta = .24$, $p = .01$). Concerning PAI dimensions, gestational age marginally increased the *Affect* factor ($\beta = .18$; $p = .06$) and significantly increased the *Interaction* factor ($\beta = .55$; $p = .001$). Together with the quality of couple adjustment it significantly increased *Maternal–fetal differentiation* (respectively, $\beta = .25$ and $= .27$, $p = .01$). Additionally, the quality of couple adjustment was found to increase the *Fantasy* factor as well ($\beta = .30$, $p = .01$). Finally, higher values of depressive symptoms were related to higher scores in the *Fantasy* and *Sensitivity* factors (respectively, $\beta = .24$, $p = .02$; $\beta = .26$, $p = .01$).

No effect of sociodemographic variables was found.

Discussion and conclusion

The present study aimed at investigating the role of gestational age, couple adjustment and depressive symptoms on prenatal maternal attachment towards the fetus considering both MFA summary score and dimensions emerging from the PAI on a sample of women from suburban areas in the Centre of Italy, enrolled using a consecutive admission criteria.

Table 3. Regression analysis: demographic variables, gestational age, depressive symptoms (CES-D) and dyadic adjustment (DAS) on maternal–fetus attachment (PAI).

Dep. variable	Predictor	B	[5–95%]	β	*p*	R^2
PAI – Affect	*Block 1*					.01
	Age	–.01	–.11–.10	–.01	.96	
	Educational level*	–.42	–1.27–.43	–.09	.33	
	Block 2					.06
	Gestational age	.06	–.01–.12	.18	.06	
	CES-D	.31	–.49–1.05	.08	.45	
	DAS	.90	–.32–2.13	.14	.15	
PAI – Interaction	*Block 1*					.04
	Age	.02	–.15–.18	.02	.85	
	Educational level	.36	–.95–1.67	.05	.59	
	Block 2					.33
	Gestational age	.28	.201–.358	.55	.001	
	CES-D	.48	–.55–1.51	.08	.36	
	DAS	1.49	–.10–3.07	.15	.07	
PAI – differentiation	*Block 1*					.01
	Age	–.05	–.15–.04	–.11	.28	
	Educational level	–.03	–.81–.75	–.01	.94	
	Block 2					.16
	Gestational age	.08	.03–.13	.25	.01	
	CES-D	–.19	–.89–.51	–.05	.59	
	DAS	1.54	.46–2.61	.27	.01	
PAI – Fantasy	*Block 1*					.01
	Age	.01	–.07–.09	.03	.78	
	Educational level	–.22	–.87–.43	–.06	.50	
	Block 2					.11
	Gestational age	–.03	–.07–.02	–.11	.25	
	CES-D	.75	.15–1.35	.24	.02	
	DAS	1.44	.51–2.36	.30	.01	
PAI – Sensitivity	*Block 1*					.02
	Age	–.01	–.08–.06	–.04	.70	
	Educational level	.45	–.11–1.01	.15	.15	
	Block 2					.09
	Gestational age	.02	–.02–.06	.08	.38	
	CES-D	.71	.192–1.23	.26	.01	
	DAS	.61	–.19–1.41	.15	.13	
PAI – Total score	*Block 1*					.01
	Age	–.14	–.55–.27	–.06	.50	
	Educational level	.50		.03	.76	
	Block 2					.19
	Gestational age	.46	.25–.68	.37	.001	
	CES-D	1.80	–1.04–4.64	.11	.21	
	DAS	5.70	1.32–10.06	.24	.01	

**Educational level*: 1, elementary school; 2, middle school; 3, high school; 4, university.

First, an unexpected but noteworthy result emerged from our study: a significant rate of depressive symptoms was detected, and it was higher than that found in previous studies with pregnant women (Della Vedova et al., 2011). These findings could be due to several factors, including that the current economic crisis is deeply affecting suburban areas with a scarcity of social facilities, but it needs to be taken into consideration in further studies for a better understanding. If it is true that pregnancy is a period potentially characterised by an increased psychological

vulnerability, as reported in previous studies from a low-risk population (Della Vedova et al., 2011), this finding calls for attention and further investigation in future independent studies.

Concerning MFA levels, these were comparable to those found in low-risk Italian populations.

Analysing MFA dimensions and item loadings yielded 5 factors as in the previous Italian and Swedish studies on the PAI questionnaire, suggesting that MFA can be considered as made up of multiple components (Bielawska-Batorowicz & Siddiqui, 2008; Della Vedova et al., 2008; Siddiqui et al., 1999). Further studies from different countries and based on larger samples are nevertheless needed to draw a more definitive conclusion about the debate on the multidimensional vs. one-dimensional solution (Gau & Lee, 2003).

With regard to the role of specific variables on the factors identified in the current multidimensional solution, results showed that gestational age was associated with positive affect towards the fetus, interaction and maternal planning and thinking about her involvement in the dyadic interaction (*Affect* and *Interaction* and *Maternal–fetus differentiation* factors). The quality of couple adjustment mainly increased MFA in the *Maternal–fetal differentiation* and *Fantasy* factors, suggesting that women who perceive their partner as more supportive seem to imagine and plan more future projects concerning their unborn child, even in our sample at risk for a high level of depressive symptoms.

Finally, we did not find any significant effect of depressive symptoms on MFA summary score; however, an apparently contradictory result emerged when MFA factors were taken into account: self-reported depressive symptoms in our sample were associated with an increase in the *Fantasy* and *Sensitivity* factor scores. We can better understand these data if we consider that items pertaining to the *Fantasy* and *Sensitivity* factors typically refer to internalising thoughts and feelings that do not necessarily relate to positive affect as in the case of the other items (e.g. 'I enjoy feeling the baby move', item 1, *Affect* factor). It may be of interest in this context to take into account the distinction proposed by Condon and Corkindale (1997) between MFA features related to the *quality* of bonding and those related to *strength* of bonding. While the former pertain to closeness and tenderness, the latter are conceptualised as a measure of thought directed toward the child, not necessarily of a positive quality. The same seems to be true for the item loadings on *Sensitivity* and *Fantasy* factor scores, which pertain to the intensity of thoughts and feelings about the fetus and are not necessarily about positive affect. An alternate explanation could be that women reporting more depressive symptoms might be more receptive and susceptible with respect both to their emotional status and to the perception of their fetus, resulting in higher scores on those items referring to the perception of the unborn child (e.g. 'I know why the baby is moving', item 17, *Fantasy* factor, 'I know my baby hears me', item 20, *Sensitivity* factor). Our results were comparable to that of Seimyr and colleagues (2009), with mothers with high rates of depressive symptoms showing more attention to fetal movements (see the *Sensitivity* factor from the PAI).

Taken together, these findings suggest that the analysis of MFA dimensions could be more informative than taking into account only the final score, further supporting the opportunity to consider MFA as a multidimensional construct composed by different components (Della Vedova et al., 2008; Siddiqui et al., 1999).

Before concluding, the limitations of the current study, that is the relative small sample size and the correlational nature of the data collection, should be taken into account in evaluating our results.

Notwithstanding these limitations, we believe that our study contributes to the literature on this topic by sustaining the 5-factor structure of PAI as a reliable procedure for analysing MFA in sample characterised by different socioeconomic status (Bielawska-Batorowicz & Siddiqui, 2008; Della Vedova et al., 2011); confirming, even with a sample at risk for a high depressive rate, the role of gestational age and the quality of couple adjustment during pregnancy, on maternal–fetal attachment.

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

Bielawska-Batorowicz, E., & Siddiqui, A. (2008). A study of prenatal attachment with Swedish and Polish expectant mothers. *Journal of Reproductive and Infant Psychology, 26*, 373–384.

Bowlby, J. (1988). *A secure base: Parent–child attachment and healthy human development*. New York: Basic Bks.

Cannella, B. L. (2005). Maternal–fetal attachment: An integrative review. *Journal of Advanced Nursing, 50*, 60–68.

Condon, J. T., & Corkindale, C. (1997). The correlates of antenatal attachment in pregnant women. *British Journal of Medial Psychology, 70*, 359–372.

Cranley, M. S. (1981). Development of a tool for the measurement of maternal attachment during pregnancy. *Nursing Research, 30*, 281–284.

Della Vedova, A. M., Dabrassi, F., & Imbasciati, A. (2008). Assessing prenatal attachment in a sample of Italian women. *Journal of Reproductive and Infant Psychology, 26*, 86–98.

Della Vedova, A., Ducceschi, B., Cesana, B. M., & Imbasciati, A. (2011). Maternal bonding and risk of depression in late pregnancy: A survey of Italian nulliparous women. *Journal of Reproductive and Infant Psychology, 29*, 208–222.

Gau, M. L., & Lee, T. Y. (2003). Construct validity of the Prenatal Attachment Inventory: A confirmatory factor approach. *Journal of Nursing Research, 11*, 177–186.

Gentili, P. P., Contreras, L. L., Cassaniti, M. M., & D'Arista, F. F. (2002). La Dyadic Adjustment Scale: Una misura dell'adattamento di coppia. *Minerva Psichiatrica, 43*, 107–116.

Giardinelli, L., Innocenti, A., Benni, L., Stefanini, M. C., Lino, G., Lunardi, C., et al. (2012). Depression and anxiety in perinatal period: Prevalence and risk factors in an Italian sample. *Archives of Women's Mental Health, 15*, 21–30.

Goecke, T. W., Voigt, F., Faschingbauer, F., Spangler, G., Beckmann, M. W., & Beetz, A. (2012). The association of prenatal attachment and perinatal factors with pre- and postpartum depression in first-time mothers. *Archives of Gynecology and Obstetrics, 286*, 309–316.

Honjo, S., Arai, S., Kaneko, H., Ujiie, T., Murase, S., Sechiyama, H., et al. (2003). Antenatal depression and maternal–fetal attachment. *Psychopathology, 36*, 304–311.

Kitzinger, S. (2012). Rediscovering the social model of childbirth. *Birth – Issues in. Perinatal Care, 39*, 301–304.

Lindgren, K. (2001). Relationships among maternal–fetal attachment, prenatal depression, and health practices in pregnancy. *Research in Nursing & Health, 24*, 203–217.

Marcus, S. M., Flynn, H. A., Blow, F. C., & Barry, K. L. (2003). Depressive symptoms among pregnant women screened in obstetrics settings. *Journal of Women's Health & Gender-Based Medicine, 12*, 373–380.

Müller, M.E. (1990, February). The development and testing of the Müller Prenatal Attachment Inventory. *Dissertation Abstracts International*, 50.

Muller, M. E. (1993). Development of the Prenatal Attachment Inventory. *Western Journal of Nursing Research, 15*, 199–211.

Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*, 385–401.
Redshaw, M., & Martin, C. (2013). Babies, 'bonding' and ideas about parental 'attachment'. *Journal of Reproductive & Infant Psychology, 31*, 219–221.
Seimyr, L., Sjogren, B., Welles-Nystrom, B., & Nissen, E. (2009). Antenatal maternal depressive mood and parental–fetal attachment at the end of pregnancy. *Archives of Women's Mental Health, 12*, 269–279.
Siddiqui, A., Hagglof, B., & Eisemann, M. (1999). An exploration of prenatal attachment in Swedish expectant women. *Journal of Reproductive and Infant Psychology, 17*, 369–380.
Spanier, G. B. (1976). Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads. *Journal of Marriage & Family, 38*, 15–28.
van den Bergh, B., & Simons, A. (2009). A review of scales to measure the mother–foetus relationship. *Journal of Reproductive and Infant Psychology, 27*, 114–126.
Walsh, J. (2010). Definitions matter: If maternal–fetal relationships are not attachment, what are they? *Archives of Women's Mental Health, 13*, 449–451.
Yarcheski, A., Mahon, N. E., Yarcheski, T. J., Hanks, M. M., & Cannella, B. L. (2009). A meta-analytic study of predictors of maternal–fetal attachment. *International Journal of Nursing Studies, 46*, 708–715.