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Prenatal attachment, distress symptoms and psychosocial variables in a sample of Italian first-time parents

Anna M. Della Vedova¹, Carlo Cristini¹ & Fabiola Bizzi²

Abstract

Background. The term prenatal attachment refers to the bonding that parents develop towards the unborn baby. It is considered a precursor of the care-giving system and there is evidence that it could affect the parent-child relationship. Literature provides the knowledge of predictors of poor maternal prenatal attachment. However, paternal prenatal attachment is rarely studied and few studies have investigated prenatal attachment in couples. *Aim:* The study aims at evaluating the relationship between prenatal attachment, distress symptoms and selected psychosocial variables in couples in the third trimester of pregnancy. *Methods:* First-time parents attending public antenatal

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¹ Department of Clinical and Experimental Sciences, Università degli Studi di Brescia.

² Department of Educational Science, Università degli Studi di Genova.

Corresponding author: Anna M. Della Vedova, Department of Clinical and Experimental Sciences, Università degli Studi di Brescia, Viale Europa, 11, 25123, Brescia, Italy. Phone: +39 30 3717276; Fax: +39 30 3717423; E-mail: anna.dellavedova@unibs.it.

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clinics were recruited into the study. A set of questionnaires investigated: sociodemographic, psychosocial and pregnancy related variables, depression and anxiety symptoms, distress and prenatal attachment. Results: Multiple linear regression showed that the woman's worries about pregnancy, her perceived social support, age and disappointment with the child's gender were independent predictors of maternal prenatal attachment. The degree of involvement toward the fetus by the father, his perception of the partner's attitude towards him during pregnancy and the impact of distress were independent predictors of paternal prenatal attachment. The results indicate several areas amenable to intervention by healthcare professionals to support couples in the transition of parenthood.

Keywords: Prenatal attachment; Parents; Pregnancy; Anxiety; Depression; Stress; Antenatal.

1. Introduction

Becoming a parent is a complex psychological transition aimed at defining parental identity and building a bond with the unborn child. As literature from the psychoanalytical domain initially has shown (Deutsch, 1945; Winnicott, 1958; Bibring, 1959) psychological processes of parenthood start in pregnancy (and even before) and encompasses adjustment at many different levels for both parents. Among the tasks of parenthood, the importance of building a bond with the unborn baby has been highlighted by many authors (Raphael-Leff, 1980; Soulè, 1982; Stern, 1995) describing the features of the parental emotional investment towards the unborn child. In the 1980s the 'prenatal attachment' construct was created to systematically investigate the nature of the emotional bond that develops in the parental mind during pregnancy (Cranley, 1981; Condon, 1985, 1993; Müller, 1993). The interest in the construct of prenatal attachment comes from the hypothesis that prenatal bonding influences the quality of the postnatal parent-child relationship, shaping the care-giving system, thereby affecting the child's development. The uniqueness of prenatal attachment is its unidirectionality, as it develops in the minds of expectant parents. Therefore, it differs from Bowlby's construct of attachment (1969) – regarding the fundamental importance of the attachment relationship developed by the baby towards parents – and refers to what Bowlby (1969) described as the complementary parental side of attachment, which he defined the “caregiving system”. Overall, the current conceptualization of prenatal attachment provides an integrated view of behavioral, affective and cognitive components (for review see: Doan & Zimmerman, 2003; Brandon, Pitts, Denton, Stringer, & Evans, 2009). Two authors have been initially interested in the prenatal attachment in both parents: Cranley (1981), who created a 24-item questionnaire to assess maternal prenatal attachment and adapted it to assess prenatal attachment in fathers (Weaver & Cranley, 1983); and Condon, who developed two different questionnaires starting from the idea that maternal and paternal attachment, though having a common basis, have some aspects that differentiate them (Condon, 1985, 1993).

Condon (1985), in a preliminary study on 54 first-time expectant parents found that thoughts and feelings about the fetus were similar between parents while the behavioral expression of the antenatal attachment was attenuated in men. Through interviews with expectant couples, he proposed a definition of the prenatal attachment construct based on adult attachment

theory (Bretherton, 1985; Bowlby, 1988) and created two specific questionnaires (Condon, 1993), the Maternal Antenatal Attachment Scale (MAAS) and the Paternal Antenatal Attachment Scale (PAAS) respectively assessing the maternal and paternal prenatal attachment. Since then on, maternal bonding towards the unborn baby has been widely studied (for review see: Laxton-Kane & Slade, 2002; Cannella, 2005; Della Vedova, 2005; Alhusen, 2008; Van den Bergh & Simons, 2009; Yarcheski, Mahon, Yarcheski, Hanks, & Cannella, 2009), while there have been less attempts to study the paternal side of prenatal attachment (Condon, 1993; Habib & Lancaster, 2010; Condon, Corkindale, Boyce & Gamble, 2013; Vreeswijk, Maas, Rijk, & van Bakel, 2014; Della Vedova & Burro, 2017), and only a few studies have investigated the maternal and paternal prenatal attachment in couples (Condon, 1985; Righetti, Dell'Avanzo, Grigio, & Nicolini, 2005; Ustunsoz, Guvenc, Akyuz, & Oflaz, 2010; Maas, Vreeswijk, de Cock, Rijk, & van Bakel, 2012; Camarneiro & de Miranda Justo, 2017).

As prenatal attachment has been considered a precursor of the caregiving system, many studies have investigated the potential influence of prenatal bonding on the quality of the postnatal parent-child relationship (Cataudella, Lampis, Busonera, Marino, & Zavattini, 2016). Prospective studies found that higher maternal prenatal attachment enhanced the quality of postnatal mother-baby interaction (Siddiqui & Hägglöf, 2000) and that mothers reporting higher prenatal attachment were more sensitive in caregiving and free play with their infants (Maas, de Cock, Vreeswijk, Vingerhoets, & van Bakel, 2016). Maternal prenatal attachment was found to be a predictor of postnatal parenting stress (Mazzeschi, Pazzagli, Radi, Raspa, & Buratta, 2015) and correlated with infant temperament at three months of age (Della Vedova, 2014). In a study of first-time fathers (Condon, Corkindale, Boyce, & Gamble, 2013) paternal antenatal attachment score was a strong predictor of the father's attachment to the six and 12-month-old infant. A cohort longitudinal study, investigating the continuity of parental bonding from pregnancy to toddlerhood (de Cock, Henrichs, Vreeswijk, Maas, Rijk, & van Bakel, 2016), found a moderate stability of bonding in both mothers and fathers and the presence of parental difficulties in parents with low bonding patterns. Thus, the emotional tie starting in the parent's mind during the prenatal period seems to be an important precursor of the postnatal bond, therefore influencing the wellbeing of the baby. For this reason, the research has focused on factors that may favor or disadvantage the formation of the prenatal attachment.

Data from literature provide the knowledge of predictors of poor prenatal attachment in mothers. In a meta-analytic study (Yarcheski *et al.*, 2009) the strongest predictors of maternal prenatal attachment having large effect sizes were gestational age and prenatal testing; social support had a moderate size effect, while anxiety, self-esteem, depression, planned pregnancy, age, parity, ethnicity, marital status, income, and education had low effect sizes. Predictors of paternal attachment are far less known, with studies reporting associations with father's age, parity, progress of pregnancy (Habib & Lancaster, 2010; van Bakel, Maas, Vreeswijk, & Vingerhoets, 2013) and depression symptoms (Vreeswijk *et al.*, 2014). In a study on paternal identity formation, prenatal attachment was higher in fathers strongly involved towards their unborn baby and describing themselves as a 'caregiver' (Habib & Lancaster, 2010).

The potential influence of anxiety, depression and distress symptoms on prenatal attachment has been considered in several studies. It is well recognized that the psychological complexity of the transition to parenthood can expose both parents to a greater risk of experiencing distress or developing symptoms of anxiety and depression (Epifanio, Genna, De Luca, Roccella, & La Grutta, 2015; Della Vedova & Matthey, 2016; Prino, Rollè, Sechi, Patteri, Ambrosoli, Caldarera *et al.*, 2016; Vismara, Rollè, Agostini, Sechi, Fenaroli, Molgora *et al.*, 2016; Molgora, Fenaroli, Malgaroli, & Saita, 2017; Rollè, Prino, Sechi, Vismara, Neri, Polizzi *et al.*, 2017). Literature has extensively shown that parenting is affected by parental psychological difficulties (Stein, Pearson, Goodman, Rapa, Rahman, McCallum *et al.*, 2014) and there is some evidence that maternal prenatal attachment can also be affected by anxiety, depression or distress (Yarcheski *et al.*, 2009; Hopkins, Miller, Butler, Gibson, Hedrick, & Boyle, 2018) although some studies have failed to find this association (Honjo, Arai, Kaneko, Ujiie, Murase, Sechiyama *et al.*, 2003; Haedt & Keel, 2007) and little is known about the effects on paternal prenatal attachment (Vreeswijk *et al.*, 2014). Social support is also consistently found to be related to prenatal attachment in mothers (Yarcheski *et al.*, 2009; Hopkins *et al.*, 2018), much less is known about its role in paternal prenatal attachment.

As pregnancy provides an opportunity for enhancing prenatal attachment in expectant couples, a greater knowledge of the factors that influence the parental bonding with the unborn baby can be useful to identify parents who could benefit from a supportive intervention.

2. Objectives and hypotheses

The aim of this study was to investigate prenatal attachment in couples of first-time parents and to evaluate its relation with distress symptoms and selected psychosocial, sociodemographic and pregnancy related variables in order to highlight areas amenable to intervention by healthcare professionals to support couples in the complexity of the transition of parenthood. A further aim was to compare prenatal attachment in mothers and fathers through the comparison between MAAS and PAAS scores.

The study hypotheses were:

- RQ 1. Symptoms of stress, anxiety and depression predict low prenatal attachment;
- RQ 2. Maternal and paternal selected psychosocial and parenthood related variables are associated to prenatal attachment;
- RQ 3. The MAAS and PAAS scores correlates and the maternal scores are greater than the paternal ones.

3. Method

3.1. Participants

Inclusion criteria: ≥ 18 yrs, third trimester of pregnancy, singleton pregnancy; first child. 103 (75.8%) of the 136 eligible couples accepted. The questionnaires of 93 couples (90%) were correctly completed and constitute the study sample.

3.2. Measures

- *Background and Risk questionnaire.* The background questionnaire asked about sociodemographic and pregnancy related information, including anamnestic and psychosocial risk factors for poor prenatal attachment. Stressful events in the previous year (economic problems, illness of a loved one, separation, conflicts with the partner) were asked about through dichotomous questions. Further dichotomous questions investigated the parents' emotions towards pregnancy and parenthood ('happy', 'sad', 'worried', 'anxious', 'fearful') and their reaction when they knew the child's sex (disappointed: 'yes', 'no', 'a little'). Men were also asked about their emotional involvement towards the unborn child and the pregnancy, while women were asked

to what extent they perceived their partner involved. The perceived social support was assessed, distinguishing the global support from that coming from the partner. All these areas have been investigated using a four point Likert-scale item ranging from 1 (low) to 4 (high). Both partners were asked about their perception of the partner's attitude (towards them) since pregnancy started (response options: 'better', 'worse', 'unchanged' or 'something better and something worse'). All these questions have been appropriately dichotomized to allow analysis.

- *Maternal Antenatal Attachment Scale and Paternal Antenatal Attachment Scale* (MAAS, PAAS; Condon, 1993). These are two questionnaires for the evaluation of prenatal attachment. The maternal scale (MAAS) is made up of 19 statements and the paternal scale (PAAS) of 16 statements assessing parental feelings towards their unborn child in the last two weeks on a Likert scale from 1 to 5 points. Higher scores indicate higher levels of bonding. The items are not exactly the same in the maternal and paternal scale, because Condon's framework of prenatal attachment considers some different aspects between maternal and paternal attachment: 14 items are common, 2 are specific to fathers (item 8. Clear/vague ideas of baby's names; item 10. Frequent/infrequent thoughts of future child) and 5 are specific to mothers (item 7. Fetus dependent for well-being; item 8. Frequent/infrequent talking to fetus; item 10. Clear/vague mental picture of fetus; item 12. Absence/presence of desire to hurt or punish fetus; item 14. Frequent/infrequent concern regarding mother's diet). The Italian validation studies of MAAS (Busonera, Cataudella, Lampis, Tomasi, & Zavattini, 2016) and PAAS (Della Vedova & Burro, 2017) show good psychometric characteristics. The PAAS and the MAAS in English-speaking parents (Condon, 1993) are each comprised of two subscales: *quality of attachment* and *time spent in attachment mode*; The Italian validation study of the PAAS (Della Vedova & Burro, 2017), however, found that the items loaded differently, giving two different factors. Given this lack of consistency, just the total scores of the PAAS and MAAS have therefore been used in the analyses.
- *Edinburgh Postnatal Depression Scale* (EPDS; Cox, Holden, & Sagovsky, 1987). This is a 10-item self-report questionnaire designed to screen for possible depression. Each item is scored from 0-3, assessing the woman's mood over the past 7 days. Higher scores

reflect poorer mood. Two studies have validated it postnatally in Italian women (Benvenuti, Ferrara, Niccolai, Valoriani, & Cox, 1999; Carpiniello, Pariante, Serri, Costa, & Carta, 1997) and one in Italian fathers (Loscalzo, Giannini, Contena, Gori, & Benvenuti, 2016). As there has not yet been an Italian validation study during pregnancy, the score ≥ 10 has been used to determine screen positive status for possible depression. Some studies have found that items 3, 4 and 5 of EPDS load on an anxiety subscale with the optimal cut-off score as being 6 or more (EPDS-3A: Matthey, 2008). Therefore, this score is used to determine screen positive status for possible anxiety in this study.

- *Matthey Generic Mood Question* (MGMQ; Matthey, Valenti, Souter, & Ross-Hamid, 2013). The MGMQ consists of three questions concerning how the person has been feeling over the past two weeks: MGMQ-1 (Distress Question): *'Have you felt very stressed, anxious, or unhappy, or found it difficult to cope, for some of the time?'* (response options: 'Yes', 'Possibly', 'No'); MGMQ-2 (Bother Impact question): If 'Yes' or 'Possibly' (to the Distress question), *'How bothered have you been by these feelings?'* (response options: 'Not at all'; 'A little bit'; 'Moderately'; 'A lot'); MGMQ-3 (Reason for distress question): If the Impact Question was endorsed, *'What do you think has made you feel this way?'*. The measure has been translated into Italian (Matthey & Della Vedova, 2018) showing good receiver operating characteristics with the EPDS screen positive threshold. The MGMQ was chosen in view of its ability to assess the impact and the reason for any maternal or paternal distress. Any positive endorsement to MGMQ-1 (i.e. 'Yes' or 'Possibly') and MQMQ-2 (i.e. 'A little bit' 'Moderately'; 'A lot') was classified as screen positive for the presence of distress.

3.3. Procedure

The study was explained to the mothers and fathers attending public health clinics and hospitals for parents and babies in a medium size city in northern Italy between June 2014 and February 2016. The study was offered on the day when the fathers were present at the childbirth classes or in the waiting room before the midwives' visits. When the partner was not present, the woman was given an informative letter to take to her partner along with the questionnaires.

3.4. Statistical analysis

Descriptive statistics were calculated for quantitative and qualitative variables, the Cronbach's α coefficient was used to evaluate the internal consistency of the questionnaires. Before carrying out the analyzes the normality of the distribution was ascertained using skewness, kurtosis and visual inspection (Kim, 2013). Student's *t*-tests was used to evaluate the MAAS and the PAAS scores with regards to selected variables covering sociodemographic, pregnancy and psychosocial risk factors for poor prenatal attachment. The presence of distress was evaluated using the EPDS and MGMQ responses. To perform the analysis the EPDS total scores were dichotomized as follows: absence of depressive symptoms (EPDS score: 9 or less); absence of anxiety symptoms (EPDS-3A score: 5 or less). The MGMQ answers were dichotomized as follows: presence of stress or other psychological disturbance ('yes' or 'possibly' endorsed on the MGMQ-1; disturbing impact of distress ('a little', 'moderately, or 'very' endorsed on the MGMQ-2). Pearson's correlation was calculated to evaluate the associations between the MAAS, PAAS, EPDS, EPDS-3A scores. Alpha was set at .01 due to the number of tests being conducted within the analysis (liberal Bonferroni correction). Two multiple linear hierarchical regressions were conducted with the variables that were statistically significant in the bivariate analysis ($p < .01$), and controlling for sociodemographic and psychosocial variables, to obtain those that were independently associated respectively with the MAAS score and the PAAS score. To check for multicollinearity, the correlations among independent variables were inspected. Goodness of fit was assessed by means of the R squared.

A further analysis was carry out to compare the MAAS and the PAAS scores between each other. Due to differences in the number of items, the MAAS and PAAS scores were transformed. The transformation was performed standardizing the obtained scores on the corresponding range. In particular, the difference between the score (measured MAAS or PAAS) and the minimum allowable value (19 for MAAS and 16 for PAAS) was divided by the difference between the maximum allowable value (95 for MAAS and 80 for PAAS). A paired T test was used to compare the transformed scores, the delta between maternal and paternal scores were also calculated to allow a graphical comparison. The analysis was performed using SPSS-23.

4. Results

4.1. Participants

Sociodemographic and pregnancy related variables of pregnant women are reported in Table 1. The sample was composed of couples with medium to high education level, mostly employed with a stable work and a low risk pregnancy. All were in a stable relationship, 19.4% had unexpected pregnancy but they said that anyway it was welcomed. All women were attending childbirth classes.

Table 1 - Characteristics of the sample (N =186)

<i>Sociodemographic variables</i>	<i>Mothers N = 93</i>	<i>Fathers N = 93</i>
	<i>M (SD), Median, Range</i>	<i>M (SD), Median, Range</i>
Age	32.13 (4.607), 32, 21-44	36.16 (5.343), 36, 23-52
Gestational week	33.81 (3.063), 34, 27-39	34.01(2.943), 35, 27-39
	<i>Frequencies (%)</i>	<i>Frequencies (%)</i>
<i>Place of birth</i>		
Italy	85 (91.4%)	84 (90.3%)
<i>Education</i>		
Middle school	4 (4.3%)	13 (14.0%)
Professional school	5 (5.4%)	13 (14.0%)
High school	34 (36.6%)	40 (43.0%)
University	50 (53.8%)	27 (29.0%)
<i>Occupation</i>		
Stable employment	74 (79.6%)	88 (94.6%)
Clerical work	42 (45.2%)	30 (32.3%)
Freelance professional	7 (7.5%)	11 (11.8%)
Workman	4 (4.3%)	28 (30.1%)
Artisan	3 (3.2%)	6 (6.5%)
Teacher	6 (6.5%)	-
Others	26 (28.1%)	16 (17.3%)
Unemployment	5 (5.4%)	2 (2.2%)
<i>Marital status</i>		
Married	60 (64.5%)	60 (64.5%)
<i>Pregnancy characteristics</i>		
Spontaneous pregnancy	89 (95.7%)	89 (95.7%)
Pregnancy at risk	9 (9.7%)	9 (9.7%)
Previous abortions	17 (18.3%)	17 (18.3%)
Unexpected pregnancy	18 (19.4%)	18 (19.4%)

4.2. Characteristics of prenatal attachment, mood and anxiety scores in mothers and fathers.

The descriptive statistics of PAAS, MAAS, EPDS and EPDS-3A in mothers and fathers are shown in Table 2. PAAS mean score was comparable to that of the Italian validation study, while the MAAS mean was slightly higher; their internal consistence was adequate. Eight women (8.6%) scored 10 or more on the EPDS, 8 women (8.6%) scored 6 or more at the EPDS-3A. Anxiety and depression symptoms were comorbid in 5 women (5.6%). No men scored above the EPDS or EPDS-3A cut-off. Regarding the MGMQ, maternal and paternal answers were as follows: 18 (19.4%) men, and 31 (33.3%) women, endorsed 'yes' or 'possibly' on MGMQ-1 (Distress question), indicating the presence of stress or other psychological disturbance, 14 (15%) men and 28 (30.1%) women endorsed 'a little', 'moderately', or 'a lot' on the MGMQ-2 ('Bother Impact question'), indicating significant impact of stress or other psychological disturbance. To be noted that sources of distress were different between women and men. Women attributed their stress to factors relating to pregnancy, delivery, preparation for the childbirth or becoming a mother; men gave reasons almost totally tied to work problems and job uncertainty. The correlation between MAAS and PAAS scores was not statistically significant, not even MAAS and PAAS correlated with EPDS or EPDS-3A.

Table 2 - Descriptive statistics of EPDS, MAAS, PAAS

	<i>M (SD)</i>	<i>Range</i>	<i>Cronbach's alpha</i>
<i>Mothers N = 93</i>			
MAAS	80.84 (5.12)	68-89	.663
EPDS	4.28 (3.28)	0-13	.743
EPDS-3A	2.67 (1.96)	0-7	.639
<i>Fathers N = 93</i>			
PAAS	64.29 (6.07)	46-78	.767
EPDS	2.38 (2.34)	0-9	.635
EPDS-3A	1.33 (1.49)	0-5	.548

4.3. Analysis of the association between prenatal attachment and sociodemographic, pregnancy related and psychosocial variables in mothers.

Table 3 reports the statistically significant associations between prenatal attachment and selected maternal sociodemographic, pregnancy related and

psychosocial variables. Maternal prenatal attachment was significantly associated with maternal age, with women who were 30 years or older having lower prenatal attachment than women less than 30 years old ($p < .001$). Women who were disappointed with their child's gender (answering 'yes' or 'a little' disappointed) had lower prenatal attachment ($p < .001$). In addition, from the list of adjectives describing how the woman emotionally felt about pregnancy and becoming a mother, those 'worried' had lower attachment scores ($p < .0001$). Women who reported less social support (answering 'moderately/enough supported' vs 'a lot supported') also had a lower prenatal attachment ($p < .001$). The support from the partner was not significantly associated with maternal prenatal attachment – mean (*SD*) of the MAAS scores were: 79.58 (4.05) for women who felt 'a lot supported', 79.47 (5.85) for women 'moderately supported' and 81.50 (5.01) for women 'enough supported' – nobody felt low supported from the partner or in general.

Table 3 - *Analysis of association between prenatal attachment (MAAS) and selected sociodemographic, pregnancy related and psychosocial mothers' variables*

Mother's variables		N 93	MAAS		I.C. 95%		p *
			M	SD	lower	higher	
Age	< 30	32	83.22	3.883	1.530	5.727	< .001
	≥ 30	61	79.59	5.267			
Disappointment with the child's gender	Absent	82	81.49	4.862	-8.911	-2.464	< .001
	Present	10	75.80	4.686			
Worries related to pregnancy and motherhood	Absent	77	81.68	4.919	2.244	7.482	< .0001
	Present	16	76.81	4.135			
Social support	High	48	82.46	4.491	1.345	5.350	< .001
	Moderate, low	45	79.11	5.223			
Illness of a loved one	Absent	80	81.26	4.916	.420	6.022	.047
	Present	13	78.23	5.747			
Personal and/or family history of psychological disease	Absent	68	81.47	4.790	.110	4.690	.049
	Present	25	79.12	5.667			

* Student *t*-test

Among the stressful events experienced by the woman in the last year, one item, that of 'illness of a loved one' was significantly associated with lower prenatal attachment ($p = .047$). Women who reported personal and/or family history of psychological disease also had a lower prenatal attachment

($p = .049$). Women with depressive or anxious symptoms did not show a lower prenatal attachment when compared with women without such symptoms, when mood was assessed with either the EPDS or MGMQ. No pregnancy related variables (such as previous abortion, pregnancy at risk, unexpected pregnancy) were associated to maternal prenatal attachment.

4.4. Regression analysis (MAAS)

A multiple linear hierarchical regression analysis was carried out with the maternal prenatal attachment measure (MAAS) as the dependent variable. Selected maternal variables, statistically significantly associated at the bivariate analysis ($p < .01$), were entered as independent variables. There was no evidence of multicollinearity. The independent variables were entered in the model as follows: in the first step sociodemographic variables (age of the woman, $\geq 30 / < 30$), in the second step psychosocial factors related to the mother (being disappointed with their child's gender yes/no; feeling worried about becoming a mother yes/no) and in the third step social support (low/moderate vs high). This model (Tab. 4) yielded four significant predictors of poor prenatal attachment: the older age ($p = .031$), being disappointed with child's gender ($p = .041$), feeling worried about pregnancy and motherhood ($p = .008$) and lower social support ($p = .018$). The model explained 27% of variance in the measure of maternal prenatal attachment (MAAS) (adjusted $R^2 = .272$; Tab. 5). The fit of the model was supported by the improvement of the adjusted R squared in the final model (from .103 to .272) as shown in Table 5.

Table 4 - Linear hierarchical regression (dependent variable MAAS score)

	B	Beta	Sig.	t	95% C.I. for B	
					Lower bound	Upper bound
Maternal age	2.210	.206	.031	2.198	.211	4.208
Disappointment with the child's gender	3.240	.197	.041	2.071	.131	6.350
Worries related to pregnancy and motherhood	3.449	.256	.008	2.713	.922	5.975
Social support	2.296	.225	.018	2.418	.409	4.183
Constant	73.166		.000	47.357	70.095	76.237

Adjusted $R^2 = .272$; $p < .0001$

Table 5 - *Change of the R Squared in the model*

Model	<i>R</i>	<i>R Squared</i>	<i>Adjusted R Squared</i>	<i>R Squared Change</i>	<i>Sig. F Change</i>
Step 1	.336 ^a	.113	.103	.113	.001
Step 2	.507 ^b	.257	.232	.144	.000
Step 3	.551 ^c	.304	.272	.047	.018

^a Predictors: maternal age

^b Predictors: maternal age, disappointment with the child's gender, worries related to pregnancy and motherhood

^c Predictors: maternal age, disappointment with the child's gender, worries related to pregnancy and motherhood, social support

4.5. Analysis of the association between prenatal attachment and sociodemographic, pregnancy related and psychosocial variables in fathers

Table 6 reports the statistically significant associations between prenatal attachment and selected paternal sociodemographic, pregnancy related and psychosocial variables.

Table 6 - *Analysis of association between prenatal attachment (PAAS) and selected sociodemographic, pregnancy related and psychosocial fathers' variables*

<i>Father's variables</i>		<i>N</i>	<i>PAAS</i>		<i>I.C. 95%</i>		<i>p</i> *
			<i>M</i>	<i>SD</i>	<i>lower</i>	<i>higher</i>	
Age	< 33	23	66.87	5.496	.600	6.253	.018
	≥ 33	70	63.44	6.050			
Disappointment with the child's gender	Absent	76	65.26	5.372	1.462	7.865	.005
	Present	15	60.60	7.219			
Better attitude perceived from the partner	Present	31	66.29	3.909	.406	5.594	.008
	Absent	62	63.29	6.713			
Involvement towards the fetus	High	70	66.17	4.194	4.311	10.902	< .0001
	Moderate, low	23	58.57	7.316			
Personal and/or family history of psychological disease	Absent	76	64.93	5.797	.352	6.693	.030
	Present	17	61.41	6.615			

* Student *t*-test

Men who were disappointed with their child's gender (answering 'yes' or 'a little' disappointed) had lower prenatal attachment ($p = .005$). Men who said they felt 'enough' or 'a little' involved with the unborn baby had a

lower prenatal attachment compared to those who affirmed to feel ‘very’ involved ($p < .0001$). Men who responded ‘something better something worse’, ‘unchanged’ or ‘worse’ to the question about how they perceived their partner attitude towards them had a lower prenatal attachment than those responding ‘better’ ($p = .008$). Similarly to maternal attachment but to a lesser extent, paternal attachment to the fetus was associated with age with men who were 33 years or older having lower prenatal attachment than men less than 33 years old ($p = .018$). Similarly, men who reported personal and/or family history of psychological disease had a lower prenatal attachment ($p = .030$).

4.6. Regression analysis (PAAS)

A further multiple linear hierarchical regression analysis was carried out with the paternal prenatal attachment measure (PAAS) as the dependent variable. The paternal variables, statistically significantly associated at the bivariate analysis ($p < .01$), were entered as independent variables as follows: in the first step psychosocial factors related to the father (being disappointed with their child's gender no/yes; being involved with the unborn baby highly/moderately; better attitude perceived from the partner since pregnancy present/absent); in the second step the endorsement of MGMQ-2 ‘Bother Impact question’ (‘not bothered by distress’ vs ‘bothered by distress’).

Table 7 - Linear hierarchical regression (dependent variable PAAS score)

	<i>B</i>	<i>Beta</i>	<i>Sig.</i>	<i>t</i>	95% C.I. for <i>B</i>	
					<i>Lower bound</i>	<i>Upper bound</i>
Disappointment with the child's gender	2.644	.166	.061	1.898	-.125	5.412
Involvement towards the fetus	6.049	.439	.000	4.958	3.623	8.474
Attitude perceived from the partner	2.325	.187	.032	2.181	.206	4.444
Endorsement of MGMQ-2 ‘Bother Impact question’	3.106	.190	.037	2.117	.189	6.024
Constant	54.280		.000	32.616	50.972	57.588

Adjusted $R^2 = .356$; $p < .0001$

There was no evidence of multicollinearity. This model yielded three significant predictors of poor prenatal attachment: lower involvement of the father with the unborn baby ($p < .0001$), worse attitude perceived from the

partner since pregnancy ($p = .032$) and endorsement of MGMQ-2 ‘Bother Impact question’, meaning a disturbing impact of distress perceived by the father ($p = .037$). The variable ‘being disappointed with child’s gender’ was no longer statistically significant ($p = .061$). The model explained 36% of variance in the measure of paternal prenatal attachment (PAAS) (adjusted $R^2 = .356$; Tab. 7). The fit of the model was supported by the improvement of the adjusted R squared in the final model (from .330 to .356) as shown in Table 8.

Table 8 - Change of the R Squared in the model

Model	R	R Squared	Adjusted R Squared	R Squared Change	Sig. F Change
Step 1	.593 ^a	.352	.330	.352	.000
Step 2	.620 ^b	.384	.356	.032	.037

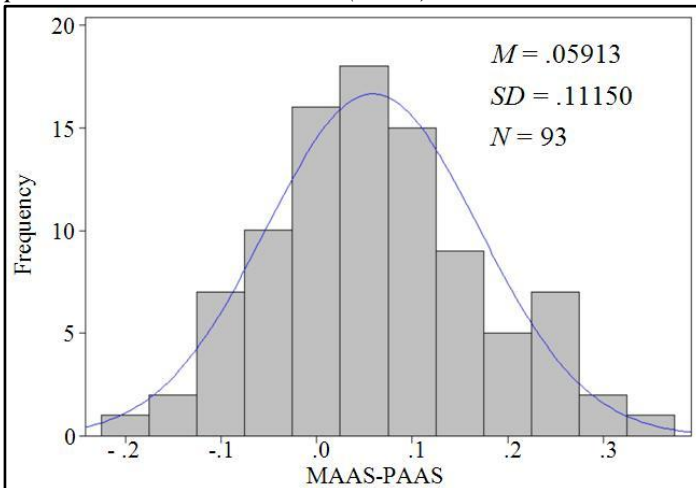
^a Predictors: disappointment with the child’s gender, involvement towards the fetus, better attitude perceived from the partner

^b Predictors: disappointment with the child’s gender, involvement towards the fetus, better attitude perceived from the partner, endorsement of MGMQ-2 “Bother Impact question”

4.7. Comparison between MAAS and PAAS

The paired t -test analysis showed that difference between the transformed maternal and paternal prenatal attachment scores was statistically significant, with women scoring higher than men ($p < .0001$, respectively: mean .81 and standard deviation .07, mean .75 and standard deviation .09).

Figure 1 - Histogram of the differences between maternal and paternal prenatal attachment scores (delta)



The histogram of Figure 1 reports the distribution of the differences (delta) between maternal and paternal prenatal attachment scores. The mean of the delta distribution was positive (.06), confirming that the mother attachment was higher than the father attachment.

5. Discussion

The purpose of the study was to investigate prenatal attachment in couples of first-time parents and to evaluate its relation with distress symptoms also considering selected psychosocial, sociodemographic and pregnancy related variables. The study sample was composed of first-time parents in a stable relationship, with a medium-high educational level, mostly employed, attending childbirth classes (women) and with low-risk pregnancy. These characteristics describe a low-risk sample, which proved to be true also in the way the questionnaires were completed. The PAAS scores were similar to that of the Italian validation study, made on first-time fathers (Della Vedova & Burro, 2017), while the MAAS' scores were slightly higher compared to those of the Italian validation study (Busonera *et al.*, 2016). This result was expected as first-time parents usually show greater prenatal attachment compared with parents with increased parity (Condon & Esuvaranathan, 1990; Camarneiro & de Miranda Justo, 2017).

At the EPDS men did not show scores compatible with the clinical threshold of depression or anxiety, while 9% of women – a lower percentage compared to the Italian prevalence in pregnancy (Della Vedova, Ducceschi, Cesana, & Imbasciati, 2011; Agostini, Neri, Salvatori, Dellabartola, Bozicevic, & Monti, 2015) – showed depression or anxiety symptoms. However, no statistically significant association was found between the maternal prenatal attachment and depression or anxiety symptoms measured by means of EPDS and EPDS-3A. Not even the correlation analysis showed associations between MAAS or PAAS and EPDS or EPDS-3A. This result was unexpected, even though a similar result has been found in a previous study in Italy (Della Vedova *et al.*, 2011) and in other studies carried out with mothers at low psychosocial risk (Honjo *et al.*, 2003; Haedt & Keel, 2007).

The MGMQ was more sensitive to the presence of distress in both mothers and fathers, showing a percentage of people endorsing the MGMQ-1 'Distress question' and the MGMQ-2 'Bother Impact question' similar to that of the Italian sample (Matthey & Della Vedova, 2018; Matthey & Della Vedova, 2019). Surprisingly, at the bivariate analysis, no association was

found between the maternal prenatal attachment and the perception of distress as measured by the MGMQ, while in men the association between paternal attachment and perceived distress at the MGMQ was statistically significant. In particular, the endorsement of the MGMQ-2 'Bother Impact question' remained in the last model of the multiple linear regression as an independent predictor of paternal prenatal attachment.

It is interesting to note that distress sources seem to be different in women and men. Women reported reasons mostly related to pregnancy, delivery and preparations for the arrival of the child, while men gave almost all reasons related to work problems or job uncertainty. This result seems to highlight how men can be sensitive to external sources of distress, such as work or economic problems, as if these disturbed their ability to involve themselves in the process of becoming a father, in particular the attachment to their incoming child. The fact that, in this sample, maternal attachment does not appear to be influenced either by depressive symptoms or by the perception of distress, as measured by the MGMQ, was unexpected. However, it can be partly explained by the normal intensification of the anxieties and concerns typical of pregnancy and the transition to motherhood (Winnicott, 1958; Bibring, 1959). If one looks in particular at the nature of the reasons for the distress provided by women at the MGMQ-3 question (Reason for distress question), they reveal a focus on pregnancy, preparations for child arrival and delivery. Most of those variables are part of the construct of maternal prenatal attachment, and are at the core of the "primary maternal preoccupation" (Winnicott, 1958), a concept that describes the normal adjustment to maternity. So it may not be too surprising that in this sample maternal attachment to the fetus was not particularly disturbed by maternal anxieties, except in a subgroup in which they were particularly intense (women who answered the list of adjectives about pregnancy and motherhood claiming to be 'worried').

With regard to the other variables possibly influencing maternal and paternal prenatal attachment, no pregnancy related variables (e.g. unexpected pregnancy, previous abortion, preterm risk, gestation week) or demographic variables (e.g. education level, stable work, nationality, marital status), except age, were associated with prenatal attachment. This result was found in a previous Italian study (Della Vedova, Dabrassi, & Imbasciati, 2008) and is often noticed in literature (Alhusen, 2008).

The bivariate analysis showed three variables significantly associated with low prenatal attachment in both mothers and fathers: the older age, the feeling of disappointment with the child's gender and a personal or family

history of psychological disease. Among those factors, age is a recognized factor influencing prenatal attachment (Yarcheski *et al.*, 2009). This is possibly due to the increased risks related to a pregnancy in older age that makes parents more cautious in establishing a link with their fetus. However, it remained significant in the regression model only for women. The association between prenatal attachment and parent's personal or family psychological difficulties is a quite new result and, although slightly statistically significant, it aligns with the intergenerational nature of the attachment relationship theory, which has been otherwise investigated in studies on parental attachment (Belsky, Steinberg, & Draper, 1991; Fonagy, Steele, & Steele, 1991; Pace, Cavanna, Guiducci, & Bizzi, 2015). The role of a feeling of disappointment that parents may experience when they learn the sex of the child is far less investigated. The difficulties that a parent can encounter in dealing with the characteristics of the 'real child' (the child's gender for instance) recall the complexity that makes it possible to move from the representation of the imagined child to the real child (Cramer & Palacio-Espasa, 1993). Parents may achieve that by re-elaborating their ideal expectations linked to unmet needs, conflicts or traumas of their childhood history. This process is very complex and could greatly benefit from a sensitive counseling if these aspects are taken into account and listened to by health care professional.

Further variables associated to lower prenatal attachment in mothers were the presence of 'worries related to pregnancy and motherhood' and, to a lesser extent, the 'illness of a loved one'. Both these variables refer to specific sources of distress that may interfere with the maternal involvement towards the fetus.

So, it is interesting to note that maternal prenatal attachment, although not significantly associated with MGMQ and EPDS, was actually influenced by specific stressful aspects. In particular 'worries related to pregnancy and motherhood' remained as the strongest predictor of poor prenatal attachment in the regression model. In addition, prenatal attachment was associated to low perceived 'social support', a factor that is consistently found as a predictor of maternal prenatal attachment in literature (Yarcheski *et al.*, 2009; Hopkins *et al.*, 2018). In the present study, the low perceived 'social support', remained in the last model of the regression analysis as a significant predictor of low maternal prenatal attachment. In particular, it was the general support coming from all the family and from close people that made the difference, not the support coming from the male partner (which anyway was very high in this sample).

In fathers, further variables associated to prenatal attachment were the ‘paternal involvement towards the fetus’ and a ‘better attitude perceived by him from the partner’ since pregnancy started. The father’s involvement is a recognized aspect of fatherhood and its role is supported by several studies (Habib & Lancaster, 2010; Jackson, Newsome, & Beaver, 2016). In particular, in a prospective study on first-time fathers, the paternal involvement in their unborn child and their partner’s pregnancy was found to be a key point in transition to fatherhood (Habib, 2012). Indeed, the ‘paternal involvement towards the fetus’ remained in the last model of the regression analysis as the strongest predictor of paternal prenatal attachment. This result extends previous data, showing how important it is to foster the emotional and practical involvement of fathers in the care of their children.

The lower prenatal attachment found in fathers who didn’t perceive a better attitude toward them from the partner is interesting and is linked to findings of previous studies where the couple harmony was associated with a greater prenatal attachment (Condon *et al.*, 2013). This seems to highlight how much important it is for future fathers to feel taken into account and supported by the partner in the process of becoming a parent, a result that also emerged in studies on perinatal paternal psychological well-being (Massoudi, Wickberg, & Hwang, 2011; Baldoni, 2016).

In summary, the multiple regression analysis confirmed the role of specific predictors of low parental prenatal attachment: in fathers, the importance of their involvement towards their children, their sensitivity to the quality of the relationship with the partner and their susceptibility to the impact of the distress, in particular that linked to external and intrusive sources such as work problems; in mothers, the older age, the impact of worries related to pregnancy and motherhood, the feeling of disappointment with the child’s gender and the significant role of social support. All those predictors relate to psychological and psychosocial aspects of transition to parenthood, highlighting how complex it is to become a parent for both partners. The results also highlight some areas amenable to intervention by healthcare professionals to promote prenatal attachment.

In line with previous studies done with couples, maternal prenatal attachment scores were significantly higher than the paternal ones (Condon, 1985; Ustunsoz *et al.*, 2010; Camarneiro & de Miranda Justo, 2017). This result may highlight a difference between men’s and women’s way of bonding with their unborn child. In this regard, there are different hypotheses. Some authors proposed that during pregnancy fathers are somewhat more involved in the idea of the future baby while mothers are

more involved in the fetus (Condon *et al.*, 2013). A study on paternal representation of the fetus found more disengaged representations of the fetus in men compared to women, which suggests an emotional distance in men (Vreeswijk *et al.*, 2014). This has a reasonable explanation on the fact that the woman carries the child and feels the child's presence throughout the day. Thus, involving the father and make him feel the physical presence of the child could favor his attachment in earlier stages. This turned out to be true in an Italian study (Della Vedova & Burro, 2017) where fathers interacting with the fetus (stroking belly, talking to the belly) had higher prenatal attachment.

Unexpectedly, in this sample the MAAS and PAAS scores did not correlate with each other, a result that contrasts with the finding of another study that used a different tool (that is the Cranley's questionnaire) to assess maternal and paternal attachment in the Turkish population (Ustunsoz *et al.*, 2010). However, as far as our knowledge is concerned, in Italy there are no other studies comparing the PAAS and the MAAS, therefore the present result could be due to cultural aspects that must be considered in subsequent studies.

6. Conclusion

Overall, the results converge in delineating recognized and new factors that may affect the process of bonding with the unborn baby. According to the study hypothesis, the presence of different sources of distress predicted a lower prenatal attachment in both mothers and fathers. Furthermore, in this low risk sample, several variables related to the psychological aspects of transition of parenthood proved to be influential on prenatal attachment. Finally, maternal prenatal attachment was higher than the paternal one, suggesting a possible intervention area.

The knowledge of factors that foster prenatal attachment in mothers and fathers have a great utility on the clinical level, because it provides information on future family relationships (Bizzi, Shmueli-Goetz, Castellano, & Cavanna, 2018). Considering the relevance of developing a prenatal bonding, the study highlights areas amenable to intervention by healthcare professionals to promote prenatal attachment in parents who access perinatal care services.

6.1. Implication for clinical practice

The study results show that, although in a different way, mothers and fathers develop an attachment to their child during pregnancy and that this bond is sensitive to many different variables which concern the individual, the couple and the context. The most influent predictors - the 'degree of involvement with the unborn baby', the 'attitude perceived from the partner' in men; the 'worries related to pregnancy and motherhood', the 'disappointment with child's gender' in women - are related to the psychological adjustments that are necessary to create an adequate bond with the child. In addition, the influence of distress was significantly associated with poor prenatal attachment in fathers while the presence of worries related to motherhood and the social support were particularly relevant for mothers. All those predictors relate to psychological and psychosocial aspects that could be potentially addressed by health care professional in the scheduled visits of pregnancy. Indeed pregnancy offers a unique opportunity to meet parents regularly and listen to their psychological needs. Pregnancy, therefore, offers the possibility of planning interventions through which parents can be supported in the complexity of the transition to parenthood.

6.2. Study limitations and future directions

Limitations of the study relate to the small sample size, the characteristic of the sample (low risk, all the women attended to childbirth classes) and the use of self-report instrument to assess depression and anxiety instead of clinical interview. Therefore, the results must be considered with caution; next studies will address those limitations in larger sample.

References

Agostini, F., Neri, E., Salvatori, P., Dellabartola, S., Bozicevic, L., & Monti, F. (2015). Antenatal depressive symptoms associated with specific life events and sources of social support among Italian women. *Maternal and Child Health Journal*, 19 (5), 1131-1141. <https://doi.org/10.1007/s10995-014-1613-x>.

Alhusen, J. L. (2008). A literature update on maternal-fetal attachment. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 37 (3), 315-328. <https://doi.org/10.1111/j.1552-6909.2008.00241.x>.

Baldoni, F. (2016). I disturbi affettivi perinatali nei padri. In P. Grossu & A. Bramante (Eds.), *Manuale di Psicologia Perinatale* (pp. 443-485). Milano: Erickson.

Belsky, J., Steinberg, L., & Draper, P. (1991). Childhood experience, interpersonal development, and reproductive strategy: An evolutionary theory of socialization. *Child development*, 62 (4), 647-670. <https://doi.org/10.1111/j.1467-8624.1991.tb01558.x>.

Benvenuti, P., Ferrara, M., Niccolai, C., Valoriani, V., & Cox, J.L. (1999). The Edinburgh postnatal depression scale: validation for an Italian sample. *Journal of Affective Disorders*, 53 (2), 137-141. [https://doi.org/10.1016/S0165-0327\(98\)00102-5](https://doi.org/10.1016/S0165-0327(98)00102-5).

Bibring, G. L. (1959). Some considerations of the psychological processes in pregnancy. *The Psychoanalytic Study of the Child*, 16, 113-121. <https://doi.org/10.1080/00797308.1959.11822824>.

Bizzi, F., Shmueli-Goetz, Y. Castellano, R. & Cavanna, D. (2018). A multi assessment approach for the attachment in middle childhood and early adolescence in two clinical groups. *Testing, Psychometrics, Methodology in Applied Psychology*, 25 (3), 409-427. <https://doi.org/10.4473/TPM25.3.6>.

Bowlby, J. (1969). *Attachment and Loss: Vol. 1. Attachment*. London: The Hogarth Press and the Institute of Psycho-Analysis.

Bowlby, J. (1988). *A Secure base*. London: Routledge.

Brandon, A. R., Pitts, S., Denton, W. H., Stringer, C. A., & Evans, H. M. (2009). A history of the theory of prenatal attachment. *Journal of prenatal & perinatal psychology & health: APPPAH*, 23 (4), 201-222.

Bretherton, I. (1985). Attachment theory: Retrospect and prospect. *Monographs of the Society for Research in Child Development*, 50, 3-35.

- Busonera, A., Cataudella, S., Lampis, J., Tommasi, M., & Zavattini, G. C. (2016). Investigating validity and reliability evidence for the maternal antenatal attachment scale in a sample of Italian women. *Archives of Women's Mental Health, 19* (2), 329-336. <https://doi.org/10.1007/s00737-015-0559-3>.
- Camarneiro, A. P. F., & de Miranda Justo, J. M. R. (2017). Prenatal attachment and sociodemographic and clinical factors in Portuguese couples. *Journal of Reproductive and Infant Psychology, 35* (3), 212-222. <https://doi.org/10.1080/02646838.2017.1297889>.
- Cannella, B. L. (2005). Maternal-fetal attachment: an integrative review. *Journal of Advanced Nursing, 50* (1), 60-68. <https://doi.org/10.1111/j.1365-2648.2004.03349.x>.
- Carpiniello, B., Pariante, C. M., Serri, F., Costa, G., & Carta, M. G. (1997). Validation of the Edinburgh postnatal depression scale in Italy. *Journal of Psychosomatic Obstetrics & Gynecology, 18* (4), 280-285. <https://doi.org/10.3109/01674829709080700>.
- Cataudella, S., Lampis, J., Busonera, A., Marino, L., & Zavattini, G. C. (2016). From parental-fetal attachment to a parent-infant relationship: A systematic review about prenatal protective and risk factors. *Life Span and Disability, XIX* (2), 185-219.
- Condon, J. T. (1985). The parental-foetal relationship-a comparison of male and female expectant parents. *Journal of Psychosomatic Obstetrics & Gynecology, 4*, 271-284. <https://doi.org/10.3109/01674828509016729>.
- Condon, J. T., & Esuvaranathan, V. (1990). The influence of parity on the experience of pregnancy: A comparison of first-and second-time expectant couples. *British Journal of Medical Psychology, 63* (4), 369-377. <https://doi.org/10.1111/j.2044-8341.1990.tb01632.x>.
- Condon, J. T. (1993). The assessment of antenatal emotional attachment: development of a questionnaire instrument. *Psychology and Psychotherapy: Theory, Research and Practice, 66* (2), 167-183. <https://doi.org/10.1111/j.2044-8341.1993.tb01739.x>.

Condon, J., Corkindale, C., Boyce, P., & Gamble, E. (2013). A longitudinal study of father-to-infant attachment: antecedents and correlates. *Journal of Reproductive and Infant Psychology*, *31* (1), 15-30. <https://doi.org/10.1080/02646838.2012.757694>.

Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression: development of the 10-item Edimburg Postnatal Depression Scale. *The British Journal of Psychiatry*, *150* (6), 782-786. <https://doi.org/10.1192/bjp.150.6.782>.

Cramer, B., & Palacio-Espasa, F. (1993). *La pratique des psychothérapies mères-bébés : Études cliniques et techniques* [The practice of mother-baby psychotherapies: Clinical and technical studies]. Paris: Presses Universitaires de France.

Cranley, M. (1981). Development of a tool for the measurement of maternal attachment during pregnancy. *Nursing Research*, *30* (5), 281-284. <http://dx.doi.org/10.1097/00006199-198109000-00008>.

de Cock, E. S., Henrichs, J., Vreeswijk, C. M., Maas, A. J., Rijk, C. H., & van Bakel, H. J. (2016). Continuous feelings of love? The parental bond from pregnancy to toddlerhood. *Journal of Family Psychology*, *30* (1): 125. <http://dx.doi.org/10.1037/fam0000138>.

Della Vedova, A. (2005). The construct of 'parental-fetal attachment': A review on the current knowledge. *Imago*, *4*, 341-359.

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* (2), 86-98. <https://doi.org/10.1080/02646830701805349>.

Della Vedova, A. M., 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* (3), 208-222. <https://doi.org/10.1080/02646838.2011.592973>.

Della Vedova, A. M. (2014). Maternal psychological state and infant's temperament at three months. *Journal of Reproductive and Infant Psychology*, 32 (5), 520-534. <https://doi.org/10.1080/02646838.2014.947472>.

Della Vedova, A. M., & Matthey, S. (2016). The relative risks, and the likelihoods, of becoming postnatally distressed in the presence of common psychosocial risks: a study with Italian-speaking mothers. *International Journal of Mental Health Promotion*, 18 (5), 276-290. <https://doi.org/10.1080/14623730.2016.1251953>.

Della Vedova, A. M., & Burro, R. (2017). Surveying prenatal attachment in fathers: the Italian adaptation of the Paternal Antenatal Attachment Scale (PAAS-IT). *Journal of Reproductive and Infant Psychology*, 35 (5), 1-16. <https://doi.org/10.1080/02646838.2017.1371284>

Deutsch, H. (1945). *The psychology of women* (Vol. 2). New York: Grune & Stratton.

Doan, H. M., & Zimmerman, A. M. (2003). Conceptualizing Prenatal Attachment: Toward a Multidimensional View. *Journal of Prenatal & Perinatal Psychology & Health*, 18 (2), 109-129.

Epifanio, M. S., Genna, V., De Luca, C., Roccella, M., & La Grutta, S. (2015). Paternal and maternal transition to parenthood: the risk of postpartum depression and parenting stress. *Pediatric reports*, 7 (2), 5872. <https://doi.org/10.4081/pr.2015.5872>.

Fonagy, P., Steele, H., & Steele, M. (1991). Maternal representations of attachment during pregnancy predict the organization of infant-mother attachment at one year of age. *Child development*, 62 (5), 891-905. <https://doi.org/10.1111/j.1467-8624.1991.tb01578.x>.

Habib, C., & Lancaster, S. (2010). Changes in identity and paternal-foetal attachment across a first pregnancy. *Journal of Reproductive and Infant Psychology*, 28, 128-142. <https://doi.org/10.1080/02646830903298723>.

Habib, C. (2012). The transition to fatherhood: A literature review exploring paternal involvement with identity theory. *Journal of Family Studies*, 18 (2-3), 103-120. <http://dx.doi.org/10.5172/jfs.2012.18.2-3.103>.

Haedt, A., & Keel, P. (2007). Maternal attachment, depression, and body dissatisfaction in pregnant women. *Journal of Reproductive and Infant Psychology*, 25, 285-295. <https://doi.org/10.1080/02646830701691327>.

Honjo, S., Arai, S., Kaneko, H., Ujiie, T., Murase, S., Sechiyama, H., Sasaki, Y., Hatagaki, C., Inagaki, E., Usui, M., Miwa, K., Ishihara, M., Hashimoto, O., Nomura, K., Itakura, A., & Inoko, K. (2003). Antenatal Depression and Maternal-Fetal Attachment. *Psychopathology*, 36 (6), 304-311. <https://doi.org/10.1159/000075189>.

Hopkins, J., Miller, J. L., Butler, K., Gibson, L., Hedrick, L., & Boyle, D. A. (2018). The relation between social support, anxiety and distress symptoms and maternal fetal attachment. *Journal of reproductive and infant psychology*, 36 (4), 381-392. <https://doi.org/10.1080/02646838.2018.1466385>.

Jackson, D. B., Newsome, J., & Beaver, K. M. (2016). Does early paternal involvement predict offspring developmental diagnoses?. *Early Human Development*, 103, 9-16. <https://doi.org/10.1016/j.earlhumdev.2016.07.001>.

Kim, H. Y. (2013). Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis. *Restorative Dentistry & Endodontics*, 38 (1), 52-54. <https://doi.org/10.5395/rde.2013.38.1.52>.

Laxton-Kane, M., & Slade, P. (2002). The role of maternal prenatal attachment in a woman's experience of pregnancy and implications for the process of care. *Journal of Reproductive and Infant Psychology*, 20 (4), 253-266. <https://doi.org/10.1080/0264683021000033174>.

Loscalzo, Y., Giannini, M., Contena, B., Gori, A., & Benvenuti, P. (2016). The Edinburgh Postnatal Depression Scale for Fathers: A contribution to the validation for an Italian sample. *General Hospital Psychiatry*, 37 (3), 251-256. <https://doi.org/10.1016/j.genhosppsych.2015.02.002>.

Maas, A. J. B., Vreeswijk, C. M., de Cock, E. S., Rijk, C. H., & van Bakel, H. J. (2012). "Expectant Parents": Study protocol of a longitudinal study concerning prenatal (risk) factors and postnatal infant development, parenting, and parent-infant relationships. *BMC Pregnancy And Childbirth*, *12* (1): 46. doi:10.1186/1471-2393-12-46.

Maas, A. J. B., de Cock, E. S., Vreeswijk, C. M., Vingerhoets, A.J., & van Bakel, H.J. (2016). A longitudinal study on the maternal-fetal relationship and postnatal maternal sensitivity. *Journal of Reproductive and Infant Psychology*, *34* (2), 110-121. <https://doi.org/10.1080/02646838.2015.1112880>.

Massoudi, P., Wickberg, B., & Hwang, C. P. (2011). Fathers' involvement in Swedish child health care – the role of nurses' practices and attitudes. *Acta Paediatrica*, *100* (3), 396-401. <https://doi.org/10.1111/j.1651-2227.2010.02047.x>.

Matthey, S. (2008). Using the Edinburgh Postnatal Depression Scale to screen for anxiety disorders. *Depression and Anxiety*, *25*, 926-931. <https://doi.org/10.1002/da.20415>.

Matthey, S., Valenti, B., Souter, K., & Ross-Hamid, C. (2013). Comparison of four self-report measures and a generic mood question to screen for anxiety during pregnancy in English-speaking women. *Journal of Affective Disorders*, *148* (2-3), 347-351. <https://doi.org/10.1016/j.jad.2012.12.022>.

Matthey, S., & Della Vedova, A. M. (2018). A comparison of two measures to screen for emotional health difficulties during pregnancy. *Journal of reproductive and infant psychology*, *36* (5), 463-475. <https://doi.org/10.1080/02646838.2018.1490497>.

Matthey, S., & Della Vedova, A. M. (2019). Screening for mood difficulties in men in Italy and Australia using the Edinburgh Postnatal Depression Scale and the Matthey Generic Mood Questionnaire. *Psychology of Men & Masculinities*. Advance online publication. <http://dx.doi.org/10.1037/men0000227>.

Mazzeschi, C., Pazzagli, C., Radi, G., Raspa, V., & Buratta, L. (2015). Antecedents of maternal parenting stress: the role of attachment style, prenatal attachment, and dyadic adjustment in first-time mothers. *Frontiers in Psychology*, *6*, 1443. <https://doi.org/10.3389/fpsyg.2015.01443>.

Molgora, S., Fenaroli, V., Malgaroli, M., & Saita, E. (2017). Trajectories of Postpartum depression in Italian first-time fathers. *American Journal Of Men's Health*, *11* (4), 880-887. <https://doi.org/10.1177/1557988316677692>.

Muller, M. E. (1993). Development of the Prenatal Attachment Inventory. *Western Journal Of Nursing Research*, *15* (2), 199-211. <https://doi.org/10.1177/019394599301500205>.

Pace, C. S., Cavanna, D., Guiducci, V., & Bizzi, F. (2015). When parenting fails: alexithymia and attachment states of mind in mothers of female patients with eating disorders. *Frontiers in Psychology*, *6*: 1145. <https://doi.org/10.3389/fpsyg.2015.01145>.

Prino, L. E., Rollè, L., Sechi, C., Patteri, L., Ambrosoli, A., Caldarera, A. M., Gerino, E., & Brustia, P. (2016). Parental relationship with twins from pregnancy to 3 months: the relation among parenting stress, infant temperament, and well-being. *Frontiers in Psychology*, *7*: 1628. <https://doi.org/10.3389/fpsyg.2016.01628>.

Raphael-Leff, J. (1980) Psychotherapy with pregnant women. In B. L. Blum (Ed.), *Psychological Aspects of Pregnancy, Birthing and Bonding* (pp. 174-205). New York: Human Sciences Press.

Righetti, P. L., Dell'Avanzo, M., Grigio, M., & Nicolini, U. (2005). Maternal/paternal antenatal attachment and fourth-dimensional ultrasound technique: A preliminary report. *British Journal of Psychology*, *96* (1), 129-137. <https://doi.org/10.1348/000712604X15518>.

Rollè, L., Prino, L. E., Sechi, C., Vismara, L., Neri, E., Polizzi, C., Trovato, A., Volpi, B., Molgora, S., Fenaroli, V., Ierardi, E., Ferro, V., Lucarelli, L., Agostini, F., Tambelli, R., Saita, E., Riva Crugnola, C., & Brustia, P. (2017). Parenting Stress, Mental Health, Dyadic Adjustment: A Structural Equation Model. *Frontiers in Psychology*, *8*: 839. <https://doi.org/10.3389/fpsyg.2017.00839>.

Siddiqui, A., & Hägglöf, B. (2000). Does maternal prenatal attachment predict postnatal mother-infant interaction? *Early Human Development*, 59 (1), 13-25. [https://doi.org/10.1016/S0378-3782\(00\)00076-1](https://doi.org/10.1016/S0378-3782(00)00076-1).

Soule', M. (1982). L'enfant dans la tête, l'enfant imaginaire. In T.B. Brazelton (Ed.), *La dynamique du nourrisson* (pp. 135-175). Paris: ESF.

Stein, A., Pearson, R. M., Goodman, S. H., Rapa, E., Rahman, A., McCallum, M., Howard, L. M. & Pariante, C. M. (2014). Effects of perinatal mental disorders on the fetus and child. *The Lancet*, 384 (9956), 1800-1819. [https://doi.org/10.1016/S0140-6736\(14\)61277-0](https://doi.org/10.1016/S0140-6736(14)61277-0).

Stern, D. N. (1995). *La costellazione materna* [The motherhood constellation]. Torino: Bollati Boringhieri.

Ustunsoz, A., Guvenc, G., Akyuz, A., & Oflaz, F. (2010). Comparison of maternal- and paternal-fetal attachment in Turkish couples. *Midwifery*, 26 (2), 1-9. <https://doi.org/10.1016/j.midw.2009.12.006>.

van Bakel, H. J., Maas, A. J. B., Vreeswijk, C. M., & Vingerhoets, A. J. (2013). Pictorial representation of attachment: measuring the parent-fetus relationship in expectant mothers and fathers. *BMC Pregnancy and Childbirth*, 13 (1), 138. <https://doi.org/10.1186/1471-2393-13-138>.

Van den Bergh, B., & Simons, A. (2009). A review of scales to measure the mother-fetus relationship. *Journal of Reproductive and Infant Psychology*, 27 (2), 114-126. <https://doi.org/10.1080/02646830802007480>.

Vismara, L., Rollè, L., Agostini, F., Sechi, C., Fenaroli, V., Molgora, S., Neri, E., Prino, L. E., Odorisio, F., Trovato, A., Polizzi, C., Brustia, P., Lucarelli, L., Monti, F., Saita, E. & Tambelli, R. (2016). Perinatal parenting stress, anxiety, and depression outcomes in first-time mothers and fathers: A 3-to 6-months postpartum follow-up study. *Frontiers in Psychology*, 7: 938. doi: 10.3389/fpsyg.2016.00938.

Vreeswijk, C. M., Maas, A.J., Rijk, C.H., & van Bakel, H.J. (2014). Fathers' experiences during pregnancy: Paternal prenatal attachment and representations of the fetus. *Psychology of Men & Masculinity*, 15 (2): 129. <https://doi.org/10.1037/a0033070>.

Weaver, R. H., & Cranley, M. S. (1983). An exploration of paternal-fetal attachment behavior. *Nursing Research*, 32 (2), 68-72.

Winnicott, D.W. (1958). *Collected works: From paediatrics to psycho-analysis*. London: Tavistock.

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 (5), 708-715. <https://doi.org/10.1016/j.ijnurstu.2008.10.013>.