

# Prenatal parental representations: Influences on perceived romantic couple adjustment and infant's temperament during pregnancy and after the infant's birth

Laura Vismara  | Loredana Lucarelli  | Cristina Sechi 

Department of Pedagogy, Psychology,  
Philosophy, Faculty of Human Studies,  
University of Cagliari, Italy

## Correspondence

Laura Vismara, Department of Pedagogy,  
Psychology, Philosophy, University of  
Cagliari, Via Is Mirrionis 1, 09123 Cagliari  
Italy.

Email: vismara@unica.it

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## Abstract

**Objective:** The present work aimed to evaluate the differences between fathers' and mothers' prenatal parental representations, the differences between pre- and postnatal perceptions of couple adjustment, and whether the quality of prenatal parental representations is associated with the perception of couple adjustment and with the perception of infant temperament at 3 months.

**Background:** Within a multifactorial, transactional model, several studies indicated that prenatal parental representations are relevant to the quality of infant–parent relationship and the child's development.

**Method:** Couples experiencing their first pregnancy ( $n = 40$ ) (mothers:  $M_{age} = 33.7$  years,  $SD = 5.1$  years; fathers: ( $M_{age} = 37.4$  years,  $SD = 5.6$  years) responded to the Parental Representations Interview During Pregnancy and the Dyadic Adjustment Scale during the seventh month of pregnancy. When couples' infant was 3 months of age, the parents completed the Infant Behavior Questionnaire-R to assess infant temperament.

**Results:** Analyses revealed that mothers and fathers who had an unbalanced and unintegrated parental representation perceived their couple adjustment as less cohesive, and this was related to a more negative perception of the child's temperament.

**Conclusions:** Prenatal parental representations were found to be a significant variable in terms of their influence on the quality of pre- and postnatal parents' romantic couple adjustment and on the infant's temperament.

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**Implications:** It is important to include both mothers and fathers to further our understanding of parental influence on a child's development and to enhance the efficacy of preventive programs since pregnancy.

**KEYWORDS**

infant temperament, perinatal, postnatal romantic couple adjustment, prenatal parental representations, prenatal romantic couple adjustment

The study of the children's development and wellness may be conceptualized as the ongoing transactions between the child and their environment (Sameroff & Fiese, 2000), following an epigenetic path. Therefore, it is essential to acknowledge and analyze the interplay among the variables and processes that co-contribute to the child's outcome. Within such framework, it is important to examine in depth the role of prenatal parental representations on parenting and the child's development (Ammaniti et al., 2013; Barlow, 2018; Tambelli et al., 2020), a core element of the assessment of infants and their parents (Vreeswijk et al., 2012).

However, little attention has been paid to the differences between mothers' and fathers' prenatal parental representations. Moreover, the association between prenatal parental representations and the postnatal perception of both couple adjustment and child's temperament, which are critical co-determinants of development, is under-investigated. Hence, these dimensions are addressed in the current work.

## MATERNAL AND PATERNAL REPRESENTATIONS

Several studies with mothers have shown that the quality of early maternal parenting behavior is affected by her mental representations of herself as a parent and of her child (Barlow, 2018; Dayton et al., 2010; Rosenblum et al., 2009), which may influence the quality of the child's development (Benoit et al., 1997; Tambelli et al., 2020). Indeed, balanced and coherent representations of themselves as a parent, of the child, and of the relationship with the baby are associated with good mother–infant interactions characterized by high parental sensitivity and warmth, in contrast to low intrusiveness, negativity, and hostility (Vismara et al., 2021). It also has been found that the maternal internal subjective experiences of thoughts, perceptions, and emotions about and expectations of their infants and of their relationship with them are already present during pregnancy (Ammaniti et al., 2013; Vreeswijk et al., 2012).

There are some studies of mothers in relation to prenatal representation; however, research with fathers' mental representations of their infant and of themselves as a parent is scarce (Vreeswijk et al., 2014), even though it is acknowledged that fathers develop an emotional bond with their child beginning in pregnancy (Palkovitz, 2019; Psychogiou et al., 2018). Hence, it is plausible to suppose that paternal representations effect fathers' behaviors and perceptions similarly to mothers. Indeed, Hall et al. (2014) demonstrated that fathers who display balanced representations were associated with higher levels of sensitivity and lower levels of withdrawal and intrusiveness. Moreover, infants of fathers with balanced representations showed more sociability toward the father and higher levels of sustained attention during interaction.

## ROMANTIC COUPLE ADJUSTMENT

The transition to parenthood is a significant stage in the development of marriages and families (Cowan & Cowan, 2003). Indeed, the birth of a child may yield to transient changes in the quality of the couple relationship, according to their flexibility in adjusting to this new experience

(Alves et al., 2019; Belsky et al., 1991). It has been found that marital satisfaction tends to weaken after the birth of a baby (Gagné et al., 2021; Schulz et al., 2006), even among parents who are satisfied as a couple and choose themselves to become parents (Lawrence et al., 2008).

In general, it seems that fathers' parenting is more impacted by the quality of couple relationship than mothers (Mangialavori et al., 2021; Palkovitz, 2019; Stroud et al., 2011). In fact, fathers who report lower marital adjustment have lower levels of caregiving and play and are less sensitive toward their infant compared with fathers with higher marital adjustment (Belsky et al., 1991; Luz et al., 2017). It has also been found that the quality of the marital relationship influences both parenting behaviors and infants' emotional and behavioral regulation capacity (Gao et al., 2019; Knopp et al., 2017; Porter et al., 2003). However, we are aware of no study that has documented potential associations between the perception of couple adjustment and prenatal parental representations.

## INFANT TEMPERAMENT

Undeniably, it seems that the parent–infant relationship influences the development of the child's temperament (Samdan et al., 2020). Indeed, although temperament is defined as a neurobiological, constitutional element that differs among individuals in terms of reactivity and self-regulation (Rothbart, 1986), it may also be shaped by environmental experiences (Montirosso et al., 2011). To our knowledge, no data are available on parental representations and their infant's temperament; however, some studies have linked maternal attachment representations with infant temperament. Attachment representations have been found to be related to the quality of parental representations (Tambelli et al., 2020). The first representations are derived from narratives about the individual's past experiences with their caregivers; the latter are narratives about the ongoing construction of the representation of themselves as caregivers in the relationship with their own child. In light of the influence of past attachment experiences on current relationships (Bowlby, 1988), an association between the two may be assumed. In this perspective, parental insecure attachment style was associated with perceptions of the infant's temperament as more fearful, angry, distressed to limitations, and negatively reactive (IQ et al., 2020; Feldman et al., 2011; Pesonen et al., 2004). Conversely, security of attachment is correlated with the perception of an easier and less irritable infant, and it predicts their better regulation (Feldman et al., 2011). More recently, Guyon-Harris et al. (2021) showed that disrupted maternal prenatal representations were highly associated with lower toddler social–emotional functioning at 24 months of the child.

## AIMS

Building on the preceding illustrated theoretical assumptions and research and considering the lack of data on the relation between maternal and paternal prenatal representations and their child's temperament, the goals of the present study were as follows:

H1: to evaluate differences between fathers' and mothers' prenatal mental representations of themselves as a parent and of their unborn infant (Time 1) and the differences between fathers' and mothers' perception of couple adjustment in the prenatal and postnatal period (Time 1 and Time 2);

H2: to evaluate, separately for mothers and fathers, the developmental change in the perception of couple adjustment (from pregnancy, Time 1, to 3 months postpartum, Time 2) and if the perception of couple adjustment is different with respect to prenatal parental representations;

H3: to evaluate, separately for mothers and fathers, whether the perception of infant temperament at 3 months (Time 2) is different with respect to prenatal parental representations.

## METHODS

### Recruitment and participants

All mothers and fathers included in this study were contacted when they were in the 24th to 26th week of pregnancy during the attendance of a *prenatal* childbirth preparation course in a public, university hospital in Sardinia, Italy. Participation was voluntary, and expectant couples had to meet the following inclusion criteria: (a) experiencing a first pregnancy, (b) being in a couple relationship, (c) experiencing spontaneous pregnancy, (d) having had no gestational pathology, and (e) being at least 18 years of age. Parents were excluded if they (a) had experienced complications during pregnancy, (b) were receiving treatment for depression or any other mental health problem, or (c) were currently receiving psychological help or counseling.

Couples received information and consent forms detailing the research, and they had the opportunity to address any concern with a member of the research team before signing the consent. Eligibility was based on both mothers' and fathers' responses in relation to the inclusion and exclusion criteria. Seventy percent of the eligible contacted parents (46 couples) agreed to participate in the study. Of the 92 participants (46 couples) who had initially entered the study, 13% (6 couples) dropped out at Time 2. Those couples who dropped out of the study and couples completing the study did not differ in any baseline sociodemographic or outcome measures.

The final sample consisted of 80 Caucasian parents (40 couples) and their healthy babies (60% boys, 40% girls). The mothers' age ranged from 21 to 45 years ( $M_{age} = 33.7$  years,  $SD = 5.1$  years). The fathers' age ranged from 24 to 49 years ( $M_{age} = 37.4$  years,  $SD = 5.6$  years). All parents were White and middle class, as assessed by level of education and job status according to ISTAT classification (Istituto Nazionale di Statistica, 2013). Of the parents, 90% were married ( $n = 36$  couples), and 10% (4 couples) were cohabiting; 97% of the fathers and 79% of the mothers were employed.

With respect to parental educational level, 5% of the mothers and 15% of the fathers had an elementary school degree (at least 5 years within the *education* system), 47.5% of the mothers and 45% of the fathers had an upper secondary school degree (at least 12–13 years within the *education* system), 37.5% of the mothers and 35% of the fathers had a undergraduate degree (at least 17 years within the *education* system), and 10% of the mothers and 10% of the fathers had a postgraduate degree (PhD; at least 20 years within the *education* system). Parents who participated in the present study did not receive any economic compensation.

### Measures

The Interviews of Maternal and Paternal Mental Representations during Pregnancy—Revised (IRMAG-R and IRPAG-R, respectively; Ammaniti et al., 2013) explore maternal and paternal mental representations, before the child's birth, by investigating the parent's description of their unborn infant, themselves as parents, and the development of their relationship.

Specifically, the following domains are investigated: woman's/man's and the couple's desire for a baby; emotional reactions of the woman/man, of the couple, and of the other family members to pregnancy; emotions and changes in the woman's/man's life, in the life of the couple, and in relation to the families of origin during pregnancy; perceptions, positive and negative emotions, maternal and paternal fantasies, the internal child's psychological space; future expectations and possible life modifications; and personal history perspective.

Transcripts may be classified into either *integrated/balanced representations* or *unbalanced representations*. Integrated/balanced women or men provide a coherent narration of their experience, conveying affective involvement in the unfolding relationship with their child, whose individuality is acknowledged; they also express flexibility and show openness to doubts. Unbalanced

representations encompass two subtypes: restricted/disengaged and nonintegrated/ambivalent representations. Restricted/disengaged interviews are characterized by emotional flatness, poor fantasies, and generalizations. Nonintegrated/ambivalent parents offer an inconsistent picture of their experience with contradictory feelings toward their unborn child and their parental role. Descriptions may be emotionally charged, yet the narration is not well organized.

Two independent, trained coders scored all the interview transcripts. The interrater reliability, estimated with the use of intraclass correlation coefficients for both IRMAG-R and IRPAG-R scales ranged from .87 ( $p < .001$ ) to .94 ( $p < .001$ ), with a mean reliability of .89. The percentage of joint coding with respect to the main category was 92%, Cohen's  $k = .81$ ,  $p < .001$ .

The Dyadic Adjustment Scale (DAS; Gentili et al., 2002; Spanier, 1979) is a 32-item self-report instrument for evaluating couple adjustment. The total score is a combined score of the four subscale scores: dyadic satisfaction (i.e., the degree to which the couple is satisfied with their relationship), affectional expression (i.e., the degree to which respondent agrees with partner regarding emotional and sexual affection.), dyadic cohesion (i.e., the degree of closeness and shared activities experienced by the couple), and dyadic consensus (i.e., the degree to which the couple agrees on matters of importance to the relationship). The DAS comprises varying response scales, including ordinal, Likert, and dichotomous scales (e.g., from *always agree* to *always disagree*, from *all the time* to *never*, from *every day* to *never*, *yes* or *no*).

The scores for subscales are obtained by summing the items that make up each subscale. The DAS Total Score is obtained by summing all the subscale scores. The resultant score ranges from 0 to 151, with higher scores indicating a more positive dyadic adjustment and a lower level of distress (Spanier et al., 1976). Various authors have distinguished couples' relationships as distressed or nondistressed based on cutoff values ranging from 92 to 107 on the total DAS score; the value of 100 was used as the cutoff in the present study (Graham et al., 2006). In the current study, the internal consistency coefficient for the mothers was  $\alpha = .87$  and  $\alpha = .85$  at Time 1 and Time 2, respectively; for the fathers, it was  $\alpha = .86$  and  $\alpha = .84$  at Time 1 and Time 2, respectively.

The Infant Behavior Questionnaire (IBQ-R; Gartstein & Rothbart, 2003; Montirosso et al., 2011) is a 191-item parent-report measure of temperament designed for use with infants between 3 and 12 months. It assesses 14 subscales: Activity Level, Distress to Limitation, Fear, Duration of Orienting, Smiling and Laughter, High Intensity Pleasure, Low Intensity Pleasure, Soothability, Falling Reactivity/Rate of Recovery from Distress, Cuddliness, Perceptual Sensitivity, Sadness, Approach, and Vocal Reactivity. Parents were invited to rate how often their babies engaged in the different behaviors described in each item during the past week, from 1 (*never*) to 7 (*always*).

Three factor scale scores were computed (Putnam et al., 2001): Positive Affectivity/Surgency (PAS; approach, vocal reactivity, high intensity pleasure, smiling and laughter, activity level, and perceptual sensitivity), Negative Affectivity (NA; sadness, distress to limitation, fear, and low-falling reactivity), and Regulatory Capacity/Orienting (RCO; low intensity pleasure, cuddliness, duration of orienting, and soothability). The reliability estimates of PAS, NA, and RCO were .71, .70, and .72 for the mothers, .70, .70, and .71 for the fathers.

## Procedure

The study protocol was examined and approved by the hospital and university ethics committees. All parents signed their informed consent. The data were collected in two sessions (Time 1 and Time 2) at the university's laboratory. Specifically, between the 24th and 26th week of pregnancy (Time 1), mothers and fathers were interviewed individually by means of the

IRMAG-R or IRPAG-R. The approximately 1-hour-long IRMAG-R/IRPAG-R was audio-recorded and conducted by clinical interviewers with a specific training in the aforementioned interviews. At the end of the interviews, the mothers and fathers were again asked to fill out the paper-and-pencil DAS, and completed the paper-and-pencil IBQ-R.

## Data analysis

The analyses were completed with the SPSS package (version 21 for Windows). Descriptive statistics were computed on the measured psychological variables, reporting *frequencies*, percentages, mean values, and standard deviation. No missing data were found.

To evaluate the differences between mothers' and fathers' mental representations in the prenatal period, we used a McNemar's exact test. To evaluate the differences between mothers and fathers in dyadic adjustment in the prenatal and postnatal period, we used a paired sample *t*-test.

For the purpose of the present study, in consideration of the low number of both *restricted/disengaged* and *nonintegrated/ambivalent* representations, the two subtypes were collapsed in the global category: *unbalanced mental representations group*, and analyses were carried out on the *balanced mental representations group* (integrated/balanced) and *unbalanced mental representations group* dichotomy (Theran et al., 2005).

To explore the prenatal parental representation differences and the developmental change in perception of couple adjustment, we conducted separate one-way repeated-measures analyses of variance (ANOVAs) for each DAS subscale and total scores. Time (Time 1: pregnancy or Time 2: 3 months postpartum) was the within-subject factor, and prenatal parental representations were the between-subject factor.

To assess the prenatal parental representation differences in relation to the perception of infant temperament, we conducted multivariate ANOVA (MANOVAs), separately for mothers and fathers, with parental prenatal representations as independent variables and the IBQ-R factor and subscale scores as the dependent variables. Effect sizes were estimated using *Cohen's d* for paired *t*-test and partial eta squared ( $\eta_p^2$ ) for ANOVA and MANOVA (Gravetter & Wallnau, 2006).

## RESULTS

### H1: Comparisons between mothers and fathers

Frequency, mean values, and standard deviation were calculated for each considered variable at Time 1 (Table 1). McNemar's exact test for prenatal mental representations, which analyzed data regarding balanced and unbalanced parents, did not reveal statistically significant differences between the mothers and fathers of each couple.

DAS differences between mothers and fathers within each couple were found with respect to the dyadic satisfaction subscale in both Time 1,  $t = -3.69(39)$ ,  $p = .001$ , and Time 2,  $t = -2.83(39)$ ,  $p = .007$ , showing that mothers during pregnancy and at 3 months postpartum had less dyadic satisfaction than partners. The mean score for both mothers and fathers was under the cutoff point for risk of distress (scores below 100; Table 1).

### H2: Prenatal parental representation differences and developmental changes in the perception of couple adjustment from pregnancy to 3 months

A 2 (Group: balanced vs. unbalanced)  $\times$  2 (Time: Time 1 and Time 2) repeated-measures ANOVAs, separately for mothers and fathers, were performed for each DAS subscale and total



**TABLE 1** Descriptive statistics and parent’s comparisons of the IRMAG-R, IRPAG-R, and DAS

	Mothers	Fathers	<i>p</i>	Cohen’s <i>d</i>
Parental mental representations at T1, <i>n</i> (%)				
Balanced	30 (75%)	28 (70%)	0.77 <sup>a</sup>	
Unbalanced	10 (25%)	12 (30%)		
Dyadic adjustment at T1, <i>M</i> ( <i>SD</i> )				
DAS-DCS	54.42 (5.11)	52.71 (6.32)	0.11 <sup>b</sup>	0.31
DAS-AE	9.01 (1.12)	8.91 (1.22)	0.68 <sup>b</sup>	0.12
DAS-DS	35.01 (2.92)	37.71 (3.01)	0.00 <sup>b</sup>	0.81
DAS-DC	18.11 (3.22)	19.12 (3.62)	0.10 <sup>b</sup>	0.20
TOT- DAS	116.42 (9.53)	118.23 (9.71)	0.28 <sup>b</sup>	0.21
Dyadic adjustment at T2, <i>M</i> ( <i>SD</i> )				
DAS-DCS	53.71 (5.41)	53.32 (7.53)	0.77 <sup>b</sup>	0.10
DAS-AE	9.62 (1.91)	9.81 (2.11)	0.47 <sup>b</sup>	0.12
DAS-DS	34.22 (3.01)	36.12 (1.81)	0.01 <sup>b</sup>	0.80
DAS-DC	17.41 (3.62)	17.62 (3.43)	0.76 <sup>b</sup>	0.10
TOT-DAS	114.71 (10.71)	116.82 (12.12)	0.33 <sup>b</sup>	0.21

*Note:* Balanced = integrated/balanced mental representations; DAS = Dyadic Adjustment Scale; DAS-AE = affectional expression; DAS-DC = dyadic cohesion; DAS-DCS = dyadic consensus; DAS-DS = dyadic satisfaction; IRMAG-R = Interview of Maternal Mental Representations during Pregnancy—Revised; IRPAG-R = Interview of Paternal Mental Representations during Pregnancy—Revised; T1 = Time 1; T2 = Time 2; TOT-DAS = total score of the DAS scale; unbalanced = restricted/disengaged + nonintegrated/ambivalent mental representations.

<sup>a</sup>McNemar’s exact test. <sup>b</sup>Paired *t*-test.

score. Follow-up analyses were performed where appropriate. Means and standard deviations for all subscales and total scores of DAS at Time 1 and Time 2 are shown in Table 2.

## Mothers

Analysis of the dyadic consensus subscale of DAS showed a no significant main effect for group,  $F(1, 38) = 0.58, p = .45, \eta^2 = .02$ . Thus, there was no overall difference in the scores of the balanced group ( $M = 54.4$ ) compared with the unbalanced group ( $M = 53.1$ ). No significant main effect of time was obtained,  $F(1, 38) = 2.09, p = .16, \eta^2 = .01$ . Dyadic consensus scores did *not change significantly* from Time 1 to Time 2 (Table 1). No significant Time  $\times$  Group was obtained,  $F(1, 38) = 1.81, p = .19, \eta^2 = .01$ .

Analyses of the affectional expression subscale of DAS showed a no significant main effect for group,  $F(1, 38) = 4.1, p = .51, \eta^2 = .01$ . Thus, there was no overall difference in the scores of the balanced group ( $M = 9.5$ ) compared with the unbalanced group ( $M = 8.6$ ). No significant main effect of time was obtained,  $F(1, 38) = .85, p = .36, \eta^2 = .02$ . Affectional expression scores did *not change significantly* from Time 1 to Time 2 (Table 1). However, a significant Time  $\times$  Group interaction was obtained,  $F(1, 38) = 4.96, p = .32, \eta^2 = .01$ . This was interpreted using a follow-up test (2  $\times$  2 ANOVA) that examined the effect separately at Time 1 and Time 2. Results showed that the unbalanced mothers showed significantly lower affectional expression scores than balanced mothers only at Time 2,  $F(1, 39) = 5.96, p = .019, \eta^2 = .01$  (Table 2).

Analyses of dyadic satisfaction subscale of DAS showed a significant main effect for Group,  $F(1, 38) = 28.17, p = .000, \eta^2 = .4$ . Mothers with balanced prenatal mental representations were more likely to *report higher* dyadic satisfaction’ scores than mothers with unbalanced prenatal mental representations. A significant main effect of Time was obtained,  $F(1, 38) = 9.04, p = .01, \eta^2 = .02$ . Dyadic satisfaction scores decreased significantly from Time 1 to Time 2. Finally, a

**TABLE 2** Means and standard deviations of the DAS dimensions scores at each of the two assessments by the balanced/unbalanced groups of mothers and fathers

	Time 1		Time 2	
	Balanced	Unbalanced	Balanced	Unbalanced
	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )
<b>Mothers</b>				
DAS-DCS	54.42 (5.51)	54.51 (4.02)	54.32 (5.61)	51.72 (4.54)
DAS-AE	9.01 (1.12)	8.81 (0.91)	10.01 (1.92)	8.42 (1.34)
DAS-DS	35.63 (2.53)	33.22 (3.42)	35.32 (2.21)	30.62 (2.11)
DAS-DC	18.72 (3.44)	16.32 (2.13)	18.23 (3.14)	14.84 (3.92)
TOT- DAS	117.64 (9.92)	112.81 (7.42)	117.81 (10.01)	105.51 (6.75)
<b>Fathers</b>				
DAS-DCS	55.33 (4.31)	46.63 (6.31)	54.52 (7.11)	50.52 (7.82)
DAS-AE	9.02 (1.32)	8.62 (0.82)	10.22 (2.14)	9.03 (1.92)
DAS-DS	37.42 (2.62)	38.42 (3.84)	36.31 (1.92)	35.82 (1.74)
DAS-DC	19.11 (2.91)	18.91 (5.22)	18.12 (2.84)	16.33 (4.43)
TOT- DAS	120.92 (6.92)	112.52 (12.64)	119.01 (11.34)	111.62 (12.61)

*Note:* Balanced = integrated/balanced mental representations; DAS = Dyadic Adjustment Scale; DAS-AE = affectional expression; DAS-DC = dyadic cohesion; DAS-DCS = dyadic consensus; DAS-DS = dyadic satisfaction; TOT-DAS = total score of the DAS scale; unbalanced = restricted/disengaged + nonintegrated/ambivalent mental representations.

significant Time  $\times$  Group was obtained,  $F(1, 38) = 6.81, p = .013, \eta^2 = .02$ . This significant interaction was interpreted using a follow-up test ( $2 \times 2$  ANOVA) that examined the effect separately at Time 1 and Time 2. Results showed that at both Times, the unbalanced group showed significant lower dyadic satisfaction' scores than the balanced group:  $F(1, 39) = 5.76, p = .02, \eta^2 = .01$  and  $F(1, 39) = 36.97, p = .000, \eta^2 = .05$  at Time 1 and at Time 2, respectively.

Analyses of the dyadic cohesion subscale of the DAS showed a significant main effect for Group,  $F(1, 38) = 7.96, p = .008, \eta^2 = .02$ . Thus, mothers with balanced prenatal mental representations were more likely to report higher dyadic cohesion scores than mothers with unbalanced prenatal mental representations. No significant main effect of Time was obtained,  $F(1, 38) = 3.06, p = .09, \eta^2 = .01$ , and no significant Time  $\times$  Group was obtained,  $F(1, 38) = .85, p = .36, \eta^2 = .02$ .

Analyses of total score of the DAS scale showed a significant main effect for Group,  $F(1, 38) = 7.97, p = .008, \eta^2 = .02$ . Thus, mothers with balanced prenatal mental representations were more likely to report higher dyadic adjustment scores than mothers with unbalanced prenatal mental representations. A significant main effect of time was obtained,  $F(1, 38) = 5.18, p = .03, \eta^2 = .01$ . Dyadic adjustment scores decreased significantly from Time 1 to Time 2 (Table 1). Finally, a significant Time  $\times$  Group was obtained,  $F(1, 38) = 5.67, p = .022, \eta^2 = .01$ . This significant interaction was interpreted using a follow-up test ( $2 \times 2$  ANOVA) that examined the effect separately at Time 1 and Time 2. Results showed that at 3 months postpartum, the unbalanced group showed significant lower dyadic adjustment scores than the balanced group,  $F(1, 39) = 13.03, p = .001, \eta^2 = .03$ .

## Fathers

Analyses of the dyadic consensus subscale of the DAS showed a significant main effect for Group,  $F(1, 38) = 12.15, p = .001, \eta^2 = .02$ . Thus, fathers with balanced prenatal mental



representations were more likely to *report higher* dyadic consensus scores than fathers with unbalanced prenatal mental representations. No significant main effect of time was obtained,  $F(1, 38) = 1.71, p = .20, \eta^2 = .04$ . Dyadic consensus scores did *not change significantly* from Time 1 to Time 2 (Table 1). No significant Time  $\times$  Group was obtained,  $F(1, 38) = 4.05, p = .05, \eta^2 = .01$ .

Analyses of affectional expression subscale of the DAS showed a no significant main effect for Group,  $F(1, 38) = 2.86, p = .10, \eta^2 = .07$ . Thus, there was no overall difference in the scores of the balanced group compared with the unbalanced group. A significant main effect of Time was obtained,  $F(1, 38) = 6.46, p = .02, \eta^2 = 0.1$ . Affectional expression scores increased *significantly* from Time 1 ( $M = 8.8$ ) to Time 2 ( $M = 9.6$ ). No significant Time  $\times$  Group interaction was obtained,  $F(1, 38) = 1.43, p = .24, \eta^2 = .04$ .

Analyses of dyadic satisfaction subscale of DAS showed no significant main effect for Group,  $F(1, 38) = .12, p = .74, \eta^2 = .003$ . Thus, there was no overall difference in the dyadic satisfaction scores of the balanced group compared to the unbalanced group. A significant main effect of Time was obtained,  $F(1, 38) = 11.21, p = .002, \eta^2 = .02$ . Dyadic satisfaction scores decreased significantly from Time 1 to Time 2. Finally, no significant Time  $\times$  Group was obtained,  $F(1, 38) = 1.61, p = .21, \eta^2 = .04$ .

Analyses of dyadic cohesion subscale of DAS showed no significant main effect for Group,  $F(1, 38) = .95, p = .34, \eta^2 = .02$ . Thus, there was no overall difference in the dyadic cohesion scores of the balanced group ( $M = 18.6$ ) compared with the unbalanced group ( $M = 17.6$ ). A significant main effect of Time was obtained,  $F(1, 38) = 9.14, p = .004, \eta^2 = .02$ . Dyadic cohesion scores decreased significantly from Time 1 to Time 2 (Table 1). Finally, no significant Time  $\times$  Group was obtained,  $F(1, 38) = 1.90, p = .18, \eta^2 = .05$ .

Lastly, analyses of total score of the DAS scale showed a significant main effect for Group,  $F(1, 38) = 7.19, p = .011, \eta^2 = .02$ . Thus, fathers with balanced prenatal mental representations were more likely to *report higher* dyadic *adjustment* scores than fathers with unbalanced prenatal mental representations. No significant main effect of time was obtained,  $F(1, 38) = .39, p = .54, \eta^2 = .01$ , nor was there a significant Time  $\times$  Group effect,  $F(1, 38) = .12, p = .72, \eta^2 = .003$ .

### **H3: Differences in the perception of infant temperament with respect to parental prenatal representation**

A MANOVA, separately for mothers and fathers, was carried out on the IBQR scores, with the prenatal mental representations group as the independent factor for exploring the perception of infant's temperament in the balanced/unbalanced groups. Means, standard deviations, and statistical results for all IBQR- R factor and subscales scores are shown in Table 3.

#### **Mothers**

Regarding the mothers, a significant multivariate effect of group was obtained,  $F(14,25) = 8.62; p = .000, \text{Wilks's } \lambda = .17, \text{partial } \eta^2 = .83$ . Given the significance of the overall test, the univariate main effects were examined. Univariate tests showed significant differences between balanced and unbalanced mothers with respect to all three factor scales (PAS, NA, and RCO) as well as with respect to specific subscales. In particular, mothers with unbalanced mental representations perceived their infant as more negatively responsive in terms of their levels of cuddliness, high intensity pleasure and smile or laughter compared with the mothers with balanced mental representations. Also, the mothers with unbalanced mental representations perceived their infant as more fearful and sadder compared with the mothers with balanced mental representations (Table 3).

**TABLE 3** Descriptive statistics (mean and standard deviations) and group comparison (balanced vs. unbalanced) of the IBQ-R dimensions scores at Time 2 for mothers and fathers

IBQ-R subscales and factor scales	Mothers				Fathers			
	Balanced		Unbalanced		Balanced		Unbalanced	
	mean score (SD)	mean score (SD)	<i>F</i>	$\eta^2$	mean score (SD)	mean score (SD)	<i>F</i>	$\eta^2$
Activity Level	3.61 (1.31)	3.72 (0.90)	0.03	0.00	3.32 (0.71)	3.22 (1.02)	0.10	0.00
Distress to Limitations	2.82 (1.00)	3.31 (0.80)	2.54	0.10	3.51 (0.62)	4.11 (0.50)	9.19**	0.20
Fear	2.00 (0.51)	1.53 (0.41)	7.45*	0.21	2.21 (0.72)	3.02 (0.90)	9.41**	0.20
Duration of Orienting	4.41 (1.40)	3.92 (0.71)	1.24	0.00	3.71 (1.32)	4.03 (1.21)	0.38	0.01
Smile and Laughter	4.32 (0.60)	3.6 (0.3)	11.87**	0.20	4.32 (0.81)	3.52 (0.70)	9.11**	0.21
High Pleasure	5.31 (1.00)	4.12 (1.93)	6.21*	0.10	5.11 (1.10)	4.82 (1.10)	0.36	0.02
Low Pleasure	5.41 (1.01)	5.42 (1.23)	0.01	0.00	4.82(1.11)	4.61 (1.00)	0.36	0.01
Soothability	5.03 (0.82)	4.41 (1.10)	3.28	0.11	4.80 (0.50)	4.62 (1.00)	1.03	0.00
Falling reactivity	4.61 (0.82)	5.01 (0.82)	2.34	0.11	4.30 (1.52)	4.91 (0.83)	1.95	0.00
Cuddliness	5.81 (1.02)	4.61 (1.03)	10.65**	0.21	5.50 (0.90)	5.40 (1.10)	0.33	0.00
Perceptual Sensitivity	4.00 (1.51)	3.21 (1.32)	1.70	0.00	3.72 (1.42)	3.31 (1.02)	1.16	0.00
Sadness	2.40(0.7)	3.21(0.60)	10.82**	0.22	3.01 (0.71)	3.62 (0.70)	8.32**	0.21
Approach	4.80 (1.22)	4.32 (1.40)	1.20	0.00	4.41 (1.22)	3.91 (1.20)	1.25	0.01
Vocal Reactivity	4.53 (1.01)	4.73 (1.02)	0.39	0.00	4.30 (1.12)	4.20 (0.81)	0.10	0.00
PAS	4.42 (0.72)	4.21 (0.63)	4.21*	0.10	4.21 (0.60)	3.82 (0.60)	2.71	0.11
NA	2.91 (0.42)	3.32 (0.33)	4.82*	0.11	3.22 (0.53)	3.90 (0.42)	19.20***	0.30
RCO	5.11 (0.62)	4.64 (0.52)	6.48*	0.12	4.72 (0.61)	4.61 (0.52)	0.27	0.01

Note: IBQ = Infant Behavior Questionnaire; PAS = Positive Affectivity/Surgency factor scale; NA = Negative Affectivity factor scale; RCO = Regulatory Capacity/Orienting factor scale.

\*\*\* $p < .001$ . \*\* $p < .01$ . \* $p < .05$ .

## Fathers

As concerns the fathers, a significant multivariate effect of group was obtained,  $F(14,25) = 3.23$ ;  $p = .005$ , Wilks'  $\lambda = .36$ , partial  $\eta^2 = .64$ . Given the significance of the overall test, the univariate main effects were examined. Univariate tests showed significant differences between balanced and unbalanced fathers with respect to the NA factor scale as well as with respect to the specific subscales.

In particular, fathers with unbalanced mental representations perceived their infant as more negatively responsive in terms of their levels of smile or laughter compared to the fathers with balanced mental representations. Also, the fathers with unbalanced mental representations perceived their infant as more fussed and distressed to limitations, fearful and sadder compared to the fathers with balanced mental representations (Table 3).

## DISCUSSION

The purpose of the present study was to examine the differences between fathers' and mothers' prenatal parental mental representations, the differences between pre- and postnatal fathers' and mothers' perception of couple adjustment, and the association of the quality of prenatal parental representations with both the perception of couple adjustment and the perception of

infant temperament at 3 months. The relations among all these dimensions, albeit concurrent to the complexity of child development, have, to our knowledge, rarely been analyzed in the existing literature.

The attention on parental representations during pregnancy is linked to the possibility of revealing vulnerabilities that may put the caregiving system at risk (Barlow, 2018; Rollé et al., 2020)—and consequently, the child's emotional and physiological regulation as well. Indeed, fathers and mothers' early representations, as well as marital adjustment, are related to the quality of the parent–infant relationships, thus favoring the child's emotional and affective regulatory skills (Dayton et al., 2010; Porter et al., 2003; Tambelli et al., 2020).

## **Differences between mothers and fathers**

When comparing mothers and fathers, no statistically significant difference emerged with respect to the type of representations—balanced versus unbalanced. In both mothers and fathers, the prevailing representations were balanced. Indeed, balanced representations are most common among nonclinical samples, as it is ours (Ammaniti et al., 2013; Vreeswijk et al., 2012). However, differences arose in relation to couple adjustment. Specifically, mothers showed less dyadic satisfaction than their partners. This result seems counter to previous studies, according to which fathers are the influenced more by the quality of their relationship with their partners (Stroud et al., 2011). However, it is important to point out that in our sample, the mean score for both mothers and fathers was under the cutoff point for risk of distress; therefore, the higher reported dissatisfaction among mothers may be interpreted as a higher ability on behalf of these women to acknowledge their current difficulties in balancing their maternal and marital roles, rather than a problematic relationship with their partner per se.

## **Maternal representation and romantic dyadic adjustment**

With respect to maternal representations, several differences emerged comparing mothers with balanced versus unbalanced representations. The unbalanced mothers showed lower dyadic cohesion, lower affectional expression, and lower dyadic satisfaction scores compared with the balanced group. Indeed, Bowlby (1988) conceptualized mental representations as working models of the self and the other. Not surprisingly, a woman who presents frequent contradictions and lapses in organization and clarity, who is overinvolved and ambivalent or emotionally detached and inhibited toward her child and her parental role, may in parallel view her relationship with her partner as not satisfactory, in that it is not fulfilling her own expectations. Poor agreement on matters important to the relationship may now involve caregiving practices and beliefs; in addition, less time for the couple for itself may increase the tension in the romantic relationship (Cohen et al., 2019; Young et al., 2017).

## **Paternal representation and romantic dyadic adjustment**

Results concerning fathers are similar to mothers with respect to the relation between mental representations and couple adjustment. In fact, the unbalanced group showed significant lower dyadic consensus and dyadic adjustment scores than the balanced group. In line with the literature, a significant reduction over time in the level of dyadic satisfaction was shown (Schulz et al., 2006); however, it is important to underline that, in our study, this is true only among fathers with an unbalanced representation.

Conversely, a significant increase over time in the level of affectional expression emerged only within the balanced group. These findings seem to confirm that a good marital relationship is supported by a flexible, affectionally involved, emotionally attuned representation of the self and of the other. Whereas representations dominated by inconsistencies, focus on negative emotions or idealization and abstractness may interfere with the father's capacity to develop an adequate relationship with their infant and to acknowledge their emotional needs (Gallegos et al., 2019).

## Maternal representations and infant's temperament

In terms of maternal representations and their child's temperament, mothers with unbalanced mental representations perceive their infant as more negatively responsive in terms of their levels of cuddliness, high intensity pleasure and smile or laughter compared to the mothers with balanced mental representations. Also, the mothers with unbalanced mental representations perceive their infant as more fearful and sadder compared with the mothers with balanced mental representations. Mothers' representations of the self, of others, and of the relation between the self and the other certainly influence the way in which they interpret their relational world, creating expectations on how their infant may be in the future (Benoit et al., 1997). Such representations are resulting from past affective relationships, that interact with current experiences, which contribute to the quality of the behavioral and emotional involvement of the mother with her child (Vreeswijk et al., 2012).

Many researchers have proved that the association between maternal representations and her interactions with their infants contribute to the child's regulatory capacity (Benoit et al., 1997; Davis et al., 2020; Foley & Hughes, 2018; Guyon-Harris et al., 2021; Tambelli et al., 2020; Trumello et al., 2018). Therefore, it may be assumed that mother's prenatal representations may impact her perception of her child's temperament and, consequently, her parenting behavior.

## Paternal representations and infant's temperament

Similarly, fathers with unbalanced mental representations perceive their infant as more negatively responsive in terms of their levels of smile or laughter compared with the fathers with balanced mental representations. Also, the fathers with unbalanced mental representations perceive their infant as more fussy and distressed to limitations, fearful, and sadder compared with the fathers with balanced mental representations. The fathers' differences with respect to mothers' reports of their infant's temperament may be attributed to the more complex and nuanced perception of mothers about their child. Indeed, fathers become involved later in the caregiving of their infant (Samdan et al., 2020). Nonetheless, it is plausible to think that balanced fathers, who, since pregnancy, are engaged in the relationship with their infant, are flexible and invest in their paternal role, are more inclined to have a more positive perception of their infants' temperament; thus, a more regulating infant–father relationship (Cohen et al., 2019; Psychogiou et al., 2018).

## Limitations

Some methodological issues must be considered in interpreting our results. First, our sample is nonrepresentative of the population because participants are limited to highly educated, heterosexual couples with no specific psychosocial risk. Therefore, our results should be replicated on diverse samples with respect to education and economic levels, as well as ethnicity and today's new family configurations. Further, their infants were all full term and healthy babies.

Second, child's temperament has been assessed by means of parental reports with no support of professional observation; therefore, findings on infant's characteristics should be interpreted with caution.

Also, the sample size of the study is limited, especially in relation to the distribution within the different types of mental representation. In particular, the unbalanced groups are relatively small ( $n = 10$  for the mothers and  $n = 12$  for the fathers). However, it should be observed that the distribution found in this research is in line with the distribution of not referred samples reported in other studies (Ammaniti et al., 2013; Vreeswijk et al., 2012). Future studies should differentiate between restricted/disengaged and nonintegrated/ambivalent representations. This specification would provide relevant information for targeted and effective early interventions. Indeed, previous studies showed that mothers with restricted/disengaged representations had poor affective involvement and lower communicative exchanges during the early feeding interactions with their infant compared with the nonintegrated/ambivalent women who displayed intrusiveness and higher interactional conflict in the same context (Tambelli et al., 2014).

Finally, it is important to consider that there is a bidirectional effect between parental and child's characteristics. Thus, even if it is the caregiver who primarily guides the relationship with the infant, the child's temperament may in turn contribute to shape that relationship (Davis et al., 2020; Wittig & Rodriguez, 2019). Future studies should investigate the reciprocal and combined interactions among the considered variables.

## Implications

The findings of the present study underscore the importance of prenatal parental representations on the perception of parents' romantic relationship and of their child's temperament.

Certainly, interviews are a time-consuming and expensive method; yet we think that the subjective narrations of parents about themselves as a parent and about their infant may provide information not otherwise detectable on their ongoing experience, thus enlightening preventive and treatment interventions. In the presence of prenatal, unbalanced, noncoherent representations of the child and of themselves as a parent, parents tend to attribute more negative regulatory skills to their child, jeopardizing the development of a sensitive and responsive parent–infant relationship. Therefore, it is important to include both mothers and fathers to further our understanding of parental influence on child's development and to enhance the efficacy of preventive programs since pregnancy.

Undoubtedly, our study evidenced that to understand the processes by which mothers' and fathers' parenting affect infant development, it is necessary to explore their mental representations and affective state during both the prenatal and the postnatal period. Research or interventions focused only on the postnatal psychological state of the parents may miss critical factors that contribute to the development of their offspring since pregnancy.

Finally, studies during perinatality may also be pivotal for family clinicians who work to enhance the parent–child relationship; surely it is important to target regulatory processes that are shaped by both temperamental predispositions (Gross & John, 2003) and family characteristics (Southam-Gerow & Kendall, 2002). Early support to the affective and communicative caregiving system may help parents enhance such abilities and find healthy ways of reducing ongoing emotional distress (Rosenblum et al., 2009; Sameroff & Fiese, 2000).

## ORCID

Laura Vismara  <https://orcid.org/0000-0002-7115-749X>

Loredana Lucarelli  <https://orcid.org/0000-0002-4714-4832>

Cristina Sechi  <https://orcid.org/0000-0002-2896-312X>

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