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Abstract

In this study, we explored the predictive role of family interactions and family representations in mothers and fathers during pregnancy for postnatal mother-father-infant interactions during the first 2 years after birth. Families ($N = 42$) were seen at the 5th month of pregnancy and at 3 and 18 months after birth. During pregnancy, parents were asked to play with their baby at the first meeting by using a doll in accordance with the procedure of the prenatal Lausanne Trilogue Play (LTP). Family representations were assessed by administering the Family System Test. Marital satisfaction and the history of the couple were assessed through self-reported questionnaires. At 3 and 18 months, family interactions were assessed in the postnatal LTP. Infant temperament was assessed through parent reports. Results show that (a) prenatal interactions and child temperament are the most important predictors of family interactions and (b) paternal representations are predictive of family interactions at 3 months. These results show that observational assessment of "nascent" family interactions is possible during pregnancy, which would allow early screening of family maladjustment. The findings also highlight the necessity of taking into account paternal representations as a significant variable in the development of family interactions.

Key words: prenatal representations and interactions, postnatal interactions, family

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The first relationships are of primary importance for the social and cognitive development of the child. Research and clinical practice have long underscored the negative influence of relationship disturbances in the mother-child dyad and the father-child dyad on this development (Rosenblum, Dayton, & Muzik, 2009; Sameroff & Emde, 1989). Because most children are born in multiple-adult families (usually mother-father, or mother-grandmother families), the focus of research has widened to "family-level variables," which refer to relational processes involving at least three people (such as the mother-father-infant triad) that have a meaningful influence on the development of the child.

Family Processes and Child Development

Clinicians and researchers have highlighted, among those family-level processes during infancy shown to be related to child development, the crucial role of the coparental alliance, which refers to the support both parents bring to each other in their relationship with the child (Abidin & Brunner, 1995; McHale, 1995). Warmth and cooperation in the coparental relationship during the first 2 years of the child's life are predictive of good emotion regulation skills and social adjustment in children during the preschool years, whereas conflict, negative reciprocity, and disengagement of one parent are predictive of externalizing and internalizing symptoms (McHale & Rasmussen, 1998). Moreover, the influence of the coparental relationship is specific and accounts for a significant part of the variance of the development of the child, over and above other known variables of influence such as dyadic parent-child relationships or the temperament of the child (Davies et al., 2002; McHale, 2007; McHale, Kuersten Hogan, & Rao, 2004). In the tradition of family therapy, two main dimensions of family functioning have been shown to influence the well-being of family members: cohesion, that is, the aptitude of being related to one another without being "too

close" or "too far," and flexibility or hierarchy, that is, the aptitude of the family to reorganize itself following internal or external demands, which implies being organized according to a hierarchy but not being overly strict or rigid (Minuchin, 1974; Olson & Gorall, 2003). Thus, in early childhood, a coalition between one parent and the child, whereby the cohesion of the family is impeded because one parent is systematically excluded from the interactions and the hierarchy is undermined because the child is entrapped in a conflict between adults, has been shown to be predictive of depressive symptoms in children at school age (Jacobvitz, Hazen, Curran, & Hitchens, 2004).

In our own work, we have conceptualized family interactions as a "family alliance," operationally defined as the family's ability to coordinate to successfully fulfill a task in everyday activity, for example, playing together or having a meal. Interactive coordination in the family depends on four functions: (a) participation of all family members, (b) organization in role distribution, (c) focalization on a common focus of interaction, and (d) affect sharing and empathy (Favez, Frascarolo, Keren, & Fivaz-Depeursinge, 2009; Fivaz-Depeursinge & Corboz-Warnery, 1999; Frascarolo, Favez, Carneiro, & Fivaz-Depeursinge, 2004). Our studies have shown that family alliance is predictive of child outcomes at 18 months and 5 years of age, in particular regarding the development of children's theory of mind and understanding of inner states (Favez, Frascarolo, Carneiro, et al., 2006; Favez, Frascarolo, & Fivaz-Depeursinge, 2006; Favez et al., in press; Favez, Lopes, & Frascarolo, 2011).

Longitudinal studies have thus repeatedly shown the impact of early family interactions on child development. The interest of researchers and clinicians has now turned to the search for predictors of these interactions before the birth of the baby. Two major gains can be expected of such a shift. First, with respect to prevention, it is indeed important to be able to intervene in relational difficulties between parents before they crystallize after the baby is born and then spread to mother- and father-infant relationships in accordance with the

"spillover" effect: In couples in conflict, parenting tends to become irascible and insensitive (Fainsilber Katz & Gottman, 1996). Second, prenatal research would also help to disentangle parental dynamics from the child's actual characteristics; after birth, it is difficult to sort out the respective contributions of each family member to overall interactive functioning (Kuersten Hogan, 2011). Although traditionally the parental contribution has been emphasized, the important influence of the child on family dynamics is increasingly acknowledged (Crouter & Booth, 2003); studies taking the child's temperament into account have, for example, shown that the parents of a "difficult" child (i.e., quickly aroused and slow to regulate) may be very responsive during the first months, but in the end, their unsuccessful efforts to calm the child may lead them to show a colder and more distant style of parenting (Crockenberg & Leerkes, 2003; Heinicke & Lampl, 1988; McHale, Kazali, et al., 2004; Schoppe-Sullivan, Mangelsdorf, Brown, & Szewczyk Sokolowski, 2007; van den Boom, 1994).

Prenatal Representations as Predictors of Postnatal Interactions

Predictors of postnatal family interactions might be considered at the level of parental representations, that is, parental views, emotions, and internal world regarding family relations (Mayseless, 2006a). Parents, like any individuals, are guided within relationships by cognitive templates of the self, of others, and of self in relation to others that help them to understand the social world, to organize their behavior, and to anticipate and figure out what this relational world will be in the future. Several concepts, such as Bowlby's (1969) "internal working model" and Stern's (1994) "schemas-of-being-with" have been proposed to depict these representations. During pregnancy, parental representations have been studied in two complementary domains: first, the model each parent has of the couple relationship and second, the model each parent (but with a special emphasis on mothers) has of the baby-to-come and of the parental role.

Representations of the couple relationship have indeed been shown to be significant predictors of family functioning. On the one hand, one of the most consistently identified factors of influence on postnatal family adjustment is marital satisfaction, that is, the way each parent assesses the quality of the couple relationship according to the representation he or she has of it. Marital dissatisfaction has been reported to have a negative impact on the coparental relationship and hence on the development of the child (Belsky & Kelly, 1994; Cowan & Cowan, 1992; Davies et al., 2002; Lewis, 1989; McHale, 1995; Shapiro, Gottman, & Carrère, 2000). On the other hand, parents' expectations about coparental cooperation are linked with actual coparental interactions once the baby is born: A pessimistic view during pregnancy of the coparental relationship to come, or incongruence between expectations and actual interactions, are both factors of postnatal maladjustment in the family (Delmore-Ko, Pancer, Hunsberger, & Pratt, 2000; McHale & Rotman, 2007; van Egeren, 2003; von Klitzing, Simoni, & Bürgin, 1999). Of particular interest is a difference according to parents' gender: Prenatal negative representations of the family-to-come in fathers (anticipating competition or non-supporting interactions, for example) have a straightforward link with maladjusted triadic mother-father-infant interactions, while in mothers the link between prenatal pessimistic representations and postnatal interactions is moderated by the perception that the mother has of the temperament of the child (McHale, Kazali, et al., 2004).

However, the most investigated domain prenatally is that of representations of the baby-to-come and of the parental role, especially in mothers (see Mayseless, 2006b, for a review). Several studies have shown that these representations are linked to maternal postnatal behaviors and representations and thus related to early developmental issues in children; for example, warmth, richness, and variety in the representations of the baby are related to postbirth maternal sensitivity and security of attachment in children (Benoit, Parker, & Zeanah, 1997; Stern, 1991; Zeanah et al., 1993; Zeanah, Keener, Stewart, & Anders, 1985;

Zeanah, Zeanah, & Stewart, 1990). Moreover, the aptitude of the mother in differentiating herself from her own mother during pregnancy is related to her aptitude to differentiate herself from her baby after birth and to consider the baby as an "autonomous individual" (i.e., with own desire and personality; Ammaniti, 1991; Ilicali & Fisek, 2004). Even if maternal representations evolve and change once the baby is born (Stern, 1989) in accordance with environmental variables such as the relationship with the partner (Theran, Levendosky, Bogat, & Huth-Bocks, 2005) or with the temperament of the child (Huth-Bocks, Theran, Levendosky, & Bogat, 2011; Porter & Hsu, 2003), the prenatal representations still explain a significant part of postnatal representations and mother-infant interactions; for example, a comparison between mothers who have to face partner violence and mothers in a control group shows that in both cases, the behavior of the mother with the infant (assessed in terms of warmth, hostility, or control) is predicted by the working model that the mother has of the baby during pregnancy more than by the relationship with the partner (Dayton, Levendosky, Davidson, & Bogat, 2010).

Prenatal Interactions as Predictors of Postnatal Interactions

Predictors of postnatal family interactions might also be considered at the level of parents' interactions, although prenatal parental interactions have been far less studied than representations. The few studies done by observational assessment have shown that marital interactions during pregnancy are linked to marital and coparental postnatal interactions: Negativity and conflict in prebirth interactions are, for example, predictive of poorer adaptation and interactions between the spouses after birth (Heinicke & Guthrie, 1996; Lewis, 1989). In our own studies, coparental interactions assessed in a specific baby-oriented task—the prenatal Lausanne Trilogue Play (LTP) procedure (Corboz-Warnery & Fivaz-Depeursinge, 2001; Fivaz-Depeursinge, Frascarolo-Moutinot, & Corboz-Warnery, 2010) in which parents are asked to interact with a pretend-to-be baby (represented by a doll)—have

also proven to be predictive of postnatal mother-father-infant interactions; we have referred to these prenatal interactions as a "nascent" family alliance. This result has been found in normative samples in Switzerland and in the United States (e.g., Carneiro, Corboz-Warnery, & Fivaz-Depeursinge, 2006; Favez, Frascarolo, & Fivaz-Depeursinge, 2006; Schoppe-Sullivan, Kamp Dush, & Bower, 2011), as well as in a sample of parents who became pregnant through in vitro fertilization (Cairo et al., 2012).

Aim and Hypotheses

Building on the literature reviewed on the role of prenatal representations and interactions, we hypothesize both specific family-level representations and family interactions during pregnancy to be significant factors of influence on postnatal interactions, along with other well-known factors of influence such as marital satisfaction, long designated the main "template" for family relationships, and child temperament, a moderating factor in the transition to parenthood. With this aim, we focus on the one hand on representations of family relationships in terms of cohesion and flexibility/hierarchy, according to the classic model in family therapy (Minuchin, 1974; Olson & Gorall, 2003), and on the other hand on interactions according to the family alliance model (Fivaz-Depeursinge & Corboz-Warnery, 1999).

In this study, we postulated three hypotheses: (a) Regarding family interactions, we postulated that interactive dimensions present during pregnancy would be predictive of dimensions of postnatal mother-father-infant triadic interactions; (b) we expected the quality of the prenatal representations of the family in parents to be linked to interactions before and after birth; and (c) we expected prenatal family-level variables to explain a specific part of postnatal family interactions, over and above marital satisfaction or child temperament.

Method

Sample

The sample consisted of 50 families expecting their first child (27 boys, 23 girls), recruited through press announcements and in a maternity ward during pregnancy. Families were Swiss, French-speaking, clinically nonreferred, and middle to upper-middle class (Hollingshead Index of Social Position). A subset of 42 families completed the protocol from pregnancy to 18 months. The mean age of the mothers was 30 years (*SD* = 3.2) and that of the fathers was 32 years (*SD* = 5.4).

Procedure

Families were seen before birth (at the fifth month of pregnancy, after the routine morphological ultrasound done at the University Hospital), and then when the child was 3 months old and 18 months old. Each assessment involved two visits: the first visit for family interactions and the second for completion of questionnaires, test administration, and video feedback—a procedure during which the films made during the first visit are discussed with the parents (see Rusconi Serpa, Sancho Rossignol, & McDonough, 2009). Family interactions were video recorded in the LTP, a semistandardized observation situation. This situation has received good criterion-related validity by comparisons of referred and nonreferred families (Fivaz-Depeursinge & Corboz-Warnery, 1999). In the present study, we used the prenatal and the postnatal version of the LTP situation. Self-report questionnaires were also completed by the parents in the laboratory following the observation situations.

The prenatal Lausanne Trilogue Play. In this situation, parents played out an encounter with their child (Corboz-Warnery & Fivaz-Depeursinge, 2001; Fivaz-Depeursinge et al., 2010), simulated by a doll (with a baby's body but an undefined face). The experimenter asked the parents to imagine and play the first episode in which the three of them are together

after birth. The instructions were as follows: "It's the first time you are together and I'm asking you to play this fabulous moment for us. We ask you to play according to the following four parts. First, one of you plays with the baby, then, the other, then both of you play with the baby together, and finally, you let the baby sleep and chat together about what you have just been experiencing. You can take the baby in your arms. The play usually lasts 4 or 5 minutes and you signal me when you are finished." The entire play was recorded by three cameras (one for the situation in its entirety, and one for each parent's face). The mean duration of the prenatal LTP was 5.10 min (*SD* = 1.46 min; range 2.15-9.25 min).

The postnatal Lausanne Trilogue Play. This play situation involving the father, mother, and baby together followed the same four-part scenario as the prenatal LTP (Fivaz-Depeursinge & Corboz-Warnery, 1999). When the infant was 3 months old, the parents sat on chairs and the child in a baby chair, which could be oriented in three positions: toward one parent, toward the other, and between the two of them. When the child was 18 months old, the parents and child sat around a small round table. Various toys were at hand (wooden blocks, animals, a dinner set, a small hairbrush, a car). The entire play was recorded by two cameras (one for the baby/child and the other taping the parents). The instructions were as follows: "We ask you to play together as a family according to the following scenario in four parts. In the first part, one of you plays with the child, the other one being simply present. In the second part, roles are reversed. In the third part, you both play with the child together. In the last part you will talk a while together; it will be the child's turn to be simply present or playing on her own." In 50% of cases, we asked the mothers to be the first to play, and in the other 50%, we asked the fathers. On the other hand, we let the parents decide the duration of the play. Mean duration was 11.10 min at 3 months (*SD* = 2.58; range 4.57-17.58) and 13.48 min at 18 months (*SD* = 2.45; range 6.43-19.50). There was no significant difference in the duration of the play between the two times.

Coding strategy

The coding was done by three pairs of independent coders, one pair for all LTPs before birth, another for all LTPs at 3 months, and the third for all LTPs at 18 months. At each of these times, one of the coders coded all of the LTPs and the other double coded 30% of the LTPs. Coders at a given time were blind to the coding of the other times. For the prenatal LTPs, coders were trained and coding was supervised by the fourth author of this paper (ACW), who created the coding system; for the postnatal LTPs, coders were trained and coding was supervised by the third author (CLS), who is a senior coder in our team and also participated in the development of the coding system.

Instruments

Prenatal alliance was assessed by using five Likert scales with scores ranging from 0 (*inappropriate*) to 1 (*partially appropriate*) to 2 (*appropriate*; Corboz-Warnery & Fivaz-Depeursinge, 2001): (a) coparental playfulness toward the task (the couple's capacity to create a playful space and to co-construct the game; interrater reliability; Cohen's kappa = .83); (b) structure of the play (the couple's capacity to structure the play in four parts according to the instructions; kappa = .78); (c) intuitive parenting behaviors (use of intuitive parenting behaviors such as baby talk; kappa=.63); (d) couple's cooperation (degree of active cooperation reached by the couple during the play; kappa = .64); and (e) family warmth (positive bond and mood between parents during play, including the infant and not at her expense; kappa = .64). The scores of the five scales (α = .79) were summed to obtain a global score of between 0 and 10. The higher the score, the more functional the prenatal alliance is.

Postnatal family alliance was assessed with the GETCEF scale (Fivaz-Depeursinge, Cornut-Zimmer, Borcard-Sacco, & Corboz-Warnery, 1997), which operationally evaluates the interaction across six dimensions representing the interactive functions described earlier.

Each dimension is attributed a score of 0 (*inappropriate*), 1 (*partially appropriate*), or 2 (*appropriate*): (1) participation: (a) contextual (correct positioning of the child and timing of the play to have the child always included); (b) corporal (parents' pelvises and torsos oriented toward the child, showing that they are physically engaged in the interaction); and (c) visual (each partner can see the other in his or her peripheral vision, showing that they are visually involved in the interaction; kappa = .92 at 3 months and .76 at 18 months); (2) organization: (a) corporal (distance between partners is appropriate for dialogue; the child is oriented toward the parent with whom he is playing, allowing for a better coordination of roles); and (b) visual (the three partners' faces are oriented toward each other; kappa = .64 at 3 months and .89 at 18 months); and (3) focalization: the three partners co-construct a common play, or, in two-together play situations, the third partner monitors the other two partners' play (kappa = .64 at 3 months and .66 at 18 months).[1] Each part of the LTP is coded separately. Scores are added to obtain an alliance score of between 0 and 12 for each part of the play; adding the scores of the four parts results in a global score totaling a possible maximum of 48 points. The higher the score, the more functional the alliance is. The coding system is adjusted to each age to take into account the increasing contribution of the child to the interaction (at 3 months, α = .78; at 18 months, α = .86).

Family representations during pregnancy were assessed with the Family System Test (FAST; Gehring, 1998). This procedure is considered to be similar to the sculpture techniques in family therapy, in which physical space is used to represent or symbolize relationships (Bischof & Helmeke, 2005). The FAST constitutes a 9 × 9 square board. A set of wooden figures that represents family members is given to the parents with the instruction to place the figures on the board, each on a separate square. Parents are asked to represent the “cohesion” of the family by depicting the proximity between family members according to their position

[1]The fourth dimension of the model, affect sharing, has not been taken into account in this study, as it can be coded starting at 18 months and not at 3 months.

on the board (the more squares between the figures, the greater the psychological distance is between the family members) and to represent the "hierarchy" in the family by depicting the power of each member by using cylindrical blocks to elevate figures according to their respective power in the family. A score for family cohesion is obtained according to the distance between all the figures on the board: Cohesion is "high" when all figures are adjoining and inside a 3 × 3 square on the board, "average" when they are not all adjoining but inside the 3 × 3 square, and "low" when one or more figures are outside the 3 × 3 square. A score for hierarchy is obtained by considering the height differences in the number of blocks between the less "powerful" parent (the one who was the least elevated) and the child: Hierarchy is "high" when the difference is three blocks or more, "average" when the difference is one or two blocks, and "low" when there is no difference. The combination of the scores of cohesion and hierarchy allow classification of parental representations according to three mutually exclusive categories of representation (Gehring, 1998): (a) labile-balanced (either cohesion or hierarchy high or low); (b) unbalanced (both cohesion and hierarchy either high or low); or (c) balanced (average hierarchy and cohesion). For this study, the instruction was to depict the perception of the family-to-be with the baby[2]; we asked first the mother alone, and then the father alone, and finally the couple to complete the task. Thus, we had three categories for each family: one for the mother, one for the father, and one that was co-constructed by the couple.

Marital satisfaction was assessed during pregnancy by using the Dyadic Adjustment Scale (DAS; Spanier, 1976; French version by Vandeleur, Fenton, Ferrero, & Preisig, 2003). This scale totals 32 items that assess various aspects of the couple's life, for example, the frequency and intensity of disagreements. The addition of answers produces a score of

[2] This is an adaptation that we have made for the specific situation of pregnancy. In the standard procedure, the parents are asked to repeat the operation three times to represent their (a) actual family, (b) ideal family, and (c) family in conflict.

between 0 and 160 (at under 107, a couple is judged to be "distressed"); the higher the score, the higher the marital satisfaction is. The parents-to-be filled in the questionnaire separately in the laboratory (α = .81 for mothers and α = .67 for fathers).

An ad hoc questionnaire was used to collect data about the couple's history: the number of years since (a) their establishment as a couple, (b) the marriage (100% of the couples were married), and (c) the decision (if any) to have a child.

Temperament of the infant at 3 months was assessed by the mothers. They completed the French version of Rothbart's (1981) Infant Behavior Questionnaire (IBQ; Dieckman, Forcada, Jaunin, & Pierrehumbert, 1996). This questionnaire assesses six temperament dimensions derived from 90 items assessed on Likert scales from 1 (*never*) to 5 (*always*): activity level, distress about limitations, fear, duration of orienting, smiling/laughter, soothability (α between .71 and .86, except the duration of orienting dimension, with α = .35; this latter dimension was not used for subsequent analyses). Fathers and mothers assessed temperament when the child was 18 months old (α between .70 and .84). Separately, they completed the Emotionality-Activity-Sociability Survey (EAS; Buss & Plomin, 1984; French version Stern & Favez, 1996). This questionnaire assesses four temperament dimensions on a scale from 1 (*not characteristic*) to 5 (*very characteristic*): shyness, emotionality, activity, and sociability. As scoring between parents was highly positively correlated (all correlations: $p < .01$), we aggregated their scores by computing the means for each dimension (α between .76 and .91). Because concerns about the internal consistency of the translated versions of the EAS have been consistently reported in the literature, especially regarding the sociability dimension (e.g., Spinath & Angleitner, 1998, for the German version; Boer & Westenberg, 1994, for the Dutch version), we performed item-total correlations analyses for each dimension of the instrument. Results showed that for the dimension of sociability, one item

caused the internal consistency to drop: “When the child is alone, she/he feels isolated.” This item was removed from the total for this dimension in subsequent analyses.

Results

Preliminary Analyses

Descriptive data for the study variables are given in Table 1. The DAS is the only instrument for which there are norms and a cut-off score; our results show that, on average, marital satisfaction is high in our sample, and even the mean minus a standard deviation is still above the threshold of 107 for mothers, as well as for fathers. Only one couple has a satisfaction score below the cut-off score (due to both mother and father). The correlation between the scores of mothers and fathers is .59 ($p < .01$).

Regarding the FAST (see Table 2): 46% of the fathers ($n = 23$) and 36% of the mothers ($n = 18$) have a “balanced” representation of their family-to-be, 42% of fathers ($n = 21$) and 38% of mothers ($n = 19$) have a “labile-balanced” representation, and finally 12% of fathers ($n = 6$) and 26% ($n = 13$) of mothers have an “unbalanced” representation. The difference between mothers and fathers is not significant (chi square). Interestingly, the proportion of balanced representations (54%, $n = 27$) is higher for the couples than it is for each parent separately, which seems to mean that when they co-construct the representation of their future family, parents are less prone to indicate extreme cohesion of hierarchy.

Neither marital satisfaction nor the historical data of the couples were linked with the other study variables, except for one tendency: The couples with the longest relationship were those who tended to have an unbalanced couple representation of the family.

Links Between Prenatal and Postnatal Interactions

Three prenatal dimensions in the LTP are significantly correlated to postnatal dimensions (see Table 3). Specifically, couple cooperation during pregnancy is positively

linked to all interactive dimensions at 3 months after the birth, and to organization and focalization at 18 months. Warmth is positively linked with organization and focalization at 3 months and with organization at 18 months. Intuitive parenting is positively linked with participation and focalization at 3 months and with participation and organization at 18 months (all correlations significant at $p < .05$). The structure of the game is the only prenatal dimension not linked with postnatal dimensions. All in all, these results show that prenatal interactions are strongly positively linked to postnatal interactions.

Links Between Prenatal Representations and Pre- and Postnatal Interactions

To assess the influence of prenatal representations, we performed one-way analyses of variance with the type of representation as the between-subjects factor for mothers, fathers, and couples, and the dimensions of interactions in the prenatal and in the postnatal LTP as dependent variables.

The results show that prenatal representations of mothers and couples are not linked to interactions in the LTP, either prenatally or postnatally. On the other hand, representations of fathers are linked to three prenatal variables: coparental playfulness, $F(2, 46) = 3.9$, $p = .02$, intuitive parenting, $F(2, 46) = 3.4$, $p = .04$, and warmth, $F(2, 46) = 3.6$, $p = .03$, and to the total score of the LTP, $F(2,46) = 3.7$, $p = .03$. Bonferroni post hoc comparisons show that this effect is due to the difference between the balanced and unbalanced groups, the former having higher scores than the latter (all comparisons $p < .05$). Representations of fathers are also linked to participation at 3 months, $F(2,46) = 5.1$, $p = .01$, this effect being due to fathers in the balanced group being in families with a higher participation in the LTP compared with the families of fathers in the unbalanced group ($p = .01$). In other words, only paternal representations are linked to interactions, fathers with “balanced” representations co-constructing a better alliance in the interaction during pregnancy and at 3 months than fathers with “unbalanced” representations.

Links Between Child Temperament and Postnatal Interactions

Two dimensions of temperament are significantly correlated with LTP interactions: At 3 months, the higher the infants are rated on the fear dimension, the higher the participation in the LTP is (r = .31, p = .04). At 18 months, the dimension of sociability is negatively correlated with the dimensions of participation (r = −.34, p = .02) and organization (r = −.33, p = .03) and marginally correlated with the dimension of focalization (r = -.28, p = .06) in the LTP. In both cases, the less optimal the temperament (high on the fear dimension, low on the sociability dimension), the better the alliance is.

Predictors of Postnatal Family Interactions

We also tested the relative contribution of the prenatal variables as predictors of postnatal interactions with stepwise regressions. We first computed a total score for the prenatal LTP (α = .73) to gain statistical power by reducing the number of predictors. We then created two dummy variables for father prenatal representations: one for the labile-balanced group and one for the unbalanced group. A preliminary check (t test) showed that the unbalanced group is the only one to have a link with the postnatal variables; thus, it was kept as the only representational variable for the analyses. IBQ fear at 3 months and EAS sociability at 18 months were the two temperamental variables entered in the regressions. Finally, in order to test possible interactions between prenatal variables and the temperament of the child, we created four variables with interactions terms: The prenatal LTP total score and the unbalanced variables were each crossed with IBQ fear and EAS sociability.

The results of the analyses (Table 4) show that all models are significant, with an explained variance ranging from 13 to 42% at 3 months and from 7 to 16% at 18 months.

Participation at 3 months is positively predicted by the interactions in the prenatal LTP and negatively predicted by the paternal unbalanced representations. The temperament of the

infant does not predict family interactions, except for families in which the father has unbalanced representations, as assessed by the interaction effect between these two variables; in this case, the more the child is assessed high on the fear dimension, the better the participation is. Organization is positively predicted by the prenatal LTP and by the interaction between paternal representation and the temperamental dimension of fear. Focalization is positively predicted by the prenatal LTP.

At 18 months, the most robust predictor is the temperament dimension of sociability, which is significantly negatively associated with the dimensions of participation and focalization. The only other significant predictor is the prenatal LTP, which is positively associated with organization.

Discussion

In this article, we presented research that aimed to identify family-level prenatal precursors of postnatal family interactions. Two kinds of predictors were investigated: mothers' and fathers' representations of their family with the baby, and family interactions through coparental coordination in a pretend play with a doll representing the baby–what we have referred to as the "nascent family alliance."

According to our first hypothesis, our results have shown that there are several links between prenatal mother-father interactions and postnatal mother-father-child interactions: Specifically, couple cooperation in the prenatal play is correlated with almost all dimensions of postnatal play at 3 and 18 months, and warmth and intuitive parenting are also correlated with several postnatal dimensions. These links tend to show that the interactive qualities necessary to mother-father-infant coordination can be detected in parents' "pretend-to-be" family interactions during pregnancy. On the other hand, none of the prenatal dimensions showed up as most significant: It is the overall interactive coordination that is meaningful

rather than any specific aspect of the interaction. The vignette below illustrates a family with an optimal alliance during pregnancy and at 3 months (parentheses: examples of dimensions of the coding systems to which the described behaviors correspond):

During the prenatal play, as the doll was lying in the basket, parents shared mutual looks and laughed warmly. Father told mother: “It’s hard.” Mother said: “Yes, but look at your daughter, she is so beautiful.” Father looked at the doll, took it in his arms, explored its body, and said: “This is your hand, your leg, you have everything in order”; then he gave the doll to mother. Mother smiled at the doll, caressed its cheek for a moment, then turned to father and smiled (high intuitive parenting and warmth). She oriented the doll toward father and said: “Look, this is your daddy.” Father smiled to mother, took the hand of the doll, and said: “We are so happy and lucky now you are here. We were looking forward to seeing you.” Mother smiled and moved, looking at father (high warmth). At 3 months, in the LTP standard, father began to play with Nina while mother leaned back on her seat. Baby, whose seat was oriented in front of father, was grasping father’s finger while he was telling her: “Hi baby, how are you?” Father caressed baby’s belly. Mother looked at father and Nina, smiling. Then father caressed Nina’s hand and cheeks, commenting about how she might feel. After two and a half minutes, he turned to mother saying: “Is it up to you?” Mother smiled and leaned forward while father oriented baby’s seat toward mother. Then father leaned back on his seat (high organization). Mother said “Hello” to Nina and decided to sing a nursery rhyme. After a few minutes, mother invited father to join them, reorienting Nina between both of them. While father was leaning forward, mother said: “Oh Nina, you’re lucky, you have mommy and daddy just for you.” They both looked at baby smiling, while Nina grasped each partner’s finger (high participation).

By contrast, the vignette below illustrates a family with a non-optimal alliance.

During the prenatal play, mother looked at the doll in the basket and laughed very loudly. Father looked at it, with a little smile. Mother went on laughing, taking the doll in her arms. She said: “Oh, daddy is grouchy.” Father looked at her and the doll, with a neutral face. Mother explored the body of the doll saying: “You are beautiful little baby.” Then, abruptly, she looked at father and said: “We have to let her sleep, that’s it?” and father answered: “I think so” (average intuitive parenting). Mother

put the doll in the basket, saying while laughing: “I hope she won’t have your nose” (low warmth). At 3 months, in the LTP standard, father decided to play with John, whose seat was oriented between both parents. Father and mother leaned forward, with mother a little bit more distant than father from the child. Father was tickling his baby, who was smiling. Mother laughed loudly and was doing a lot of expressive faces, attracting sometimes John’s attention (low organization). After a moment, John became fussy and father said: “Oh no, don’t cry… okay, it’s up to mommy.” Mother began to do some gymnastics, waving John’s arms and legs. Father leaned back on his seat and adopted an inexpressive face. After a few minutes, mother began a nursery rhyme. She gave a glance to father who was looking around and exploring the room (low participation).

The links between prenatal and postnatal interactions found in this study are consistent with our previous results, which have shown that in 80% of families, there is continuity in the quality of interactions from pregnancy to 18 months after birth (Favez, Frascarolo, Carneiro, et al., 2006; Favez, Frascarolo, & Fivaz-Depeursinge, 2006).

In order to test our second hypothesis, we considered prenatal representations of the family according to the FAST test, which allows the respondent to depict the family in terms of cohesion (the affective proximity between family members) and hierarchy or flexibility (the balance of power between family members). Our results show that for mothers, fathers, and couples (mothers and fathers taking the test together), representations of the family-to-be are mainly balanced (i.e., the two dimensions of cohesion and hierarchy are average) or labile-balanced (one dimension being average, the other low or high), the latter referring to instability that is rather common in a life cycle transition (see Olson & Gorall, 2003). For some parents, representations are unbalanced (both cohesion and hierarchy at the extremes, high or low).

However, representations in fathers are the only representational variable linked to postnatal family interactions. As the influence of maternal representations on early

interactions has been extensively documented in the clinical and research literature, this may seem at first surprising. Several tentative hypotheses can explain this result. First, the representations that we assessed in this study specifically concern models of the "whole" family (mother-father-infant) and not only the baby-to-be or the mother in relation to the baby, as was the focus of other studies; thus, we may have addressed a type of relational model other than the one that is usually assessed. Second, there seems to be a "cultural" difference in the representational world of mothers and fathers during pregnancy. Indeed, as in most families in Western societies (Cowan & Cowan, 1992), most of the mothers in our sample planned to reduce their professional activities after their maternal leave so that their engagement could be (or should be) focused on the infant and the dyadic relationship with her. The McHale, Kazali, et al. (2004) study has, for example, shown that there is no direct link in mothers between their representations of the coparenting relationship and their behavior in triadic interactions; this link is indeed moderated by mothers' perception of the temperament of the child, which tends to show that they put priority on the infant. On the other hand, fathers are prepared, according to cultural expectations, to take care of the whole family, in this case, the triadic configuration mother-father-infant. Accordingly, they may be more likely to activate working models of family (or coparental) interactions during the immediate prepartum period and to behave in the interaction according to these models. As suggested by McHale, Kazali, et al. (2004), this direct link may also be explained by the fact that fathers are free to disengage themselves from the family if the child has a difficult temperament (while mothers have to stay "on board," as they are most often the main caretakers), so that the infant may have a less direct impact on fathers, who put priority on the coordination with the mothers, than on mothers. Third, the effective context of life for mothers differs from that of fathers once the baby is born: Mothers spend more time interacting with the baby in a dyadic configuration than they do in a triadic configuration,

whereas it is the reverse for fathers. The interactive experiences of fathers are thus in essence proportionally more triadic than is the case for mothers. Taken together, these reasons may explain why paternal representations are specifically linked to triadic interactions, whereas maternal representations might be more specifically linked to dyadic interactions with the baby.

It is also intriguing that the representations co-constructed by the couples are not linked to family interactions, because we expected that the result of an interactive procedure during pregnancy would be linked with interactions postnatally. This calls for further investigations into the processes involved in the joint representation by both parents in which not only the result of their co-construction is considered: for example, taking into account the actual negotiations implied in the co-construction and the repartition of power between the parents, and not only as it is depicted by the arrangement of the FAST figures on the board. Another procedure would also be warranted to validate the results of the FAST, for example, an interview with both parents about their representations of the family-to-come (see, for example, the Prenatal Coparenting Interview, McHale, Kazali, et al., 2004).

In order to test our third hypothesis, we first investigated two variables whose influence on family interactions has been widely demonstrated: marital satisfaction and child temperament. Regarding marital satisfaction, we did not find a link with either of the variables of the research, which is surprising because our previous results showed that couple satisfaction is linked to the evolution of family interactions through the first 2 years after birth (Favez, Frascarolo, & Fivaz-Depeursinge, 2006). Marital satisfaction seems thus not predictive of the quality of interactions at a given moment, but rather of changes in quality through time. However, these contradictory results may also be because almost all satisfaction scores in our sample are above the cut-off score (only one couple is in the distressed range) and the variance is small, so that different directions in the association with other variables

may be explained by a few outlying cases in the distribution of the scores. More data are needed for a better understanding of the link between marital satisfaction and family interactions; a sound research strategy would be to proceed to paired comparisons of couples from a distressed sample with couples from a sample in the normal range for marital satisfaction. We also have to mention a possible methodological issue: We have compared the results of a self-reported questionnaire with observed interactions; another strategy could be to assess the marital relationship through the observation of couple interaction, as a conflict discussion task (see, for example, Gottman, 1998), which may be more accurate for detecting marital-related processes that could be related to family interactions.

Regarding child temperament, we found, on the other hand, that the tendency of the baby to be fearful at 3 months is linked with better participation of the three family members in the interaction. This might be related to studies that have shown that parents of difficult babies are all the more sensitive and responsive during the first months to counterbalance the vulnerability of the child (Crockenberg & Leerkes, 2003; Heinicke & Lampl, 1988; McHale, Kazali, et al., 2004; Schoppe-Sullivan et al., 2007; van den Boom, 1994). Finally, sociability at 18 months is negatively linked to all dimensions in the interactions. This result in counterintuitive, as we had thought that sociability, as an index of social skills and motivation in children, would have been linked with more optimal family interactions. Sociability in children has indeed been described as related to parental engagement in the interaction and is thus regarded as a positive temperamental dimension (Calkins & Hill, 2007; Deater-Deckard et al., 2001). Two complementary interpretations can be made. First, taken on the side of high sociability related to low alliance, it might well be the specific consequence of a triadic process: If sociability is related to parental engagement, by the same token, sociability also stresses the coordination capacities of the coparental unit because both parents might be all the more motivated to interact with the child—at the risk of wanting do so simultaneously.

Competition might thus be likely to arise, especially because the child is “appealing.” Interestingly, this may mean that a construct shown to be a facilitator for regulating the interaction at a dyadic level might be a more demanding factor at a triadic level, as it requires negotiations and thus depends more on the quality of the relationship between the parents. This would be another argument for practitioners to take a family-level perspective as early as when working with infants. Second, taken on the side of low sociability related to high alliance, it might be understood, similar to the fear dimension, as the result of the increased engagement parents show during the first months when they have to face a more difficult baby that requires more team work between them (McHale, 2007).

When all the significant variables were tested simultaneously as predictors of postnatal interactions in regressions, we found that at 3 months, the prenatal interactions are a predictor of each postnatal dimension and that unbalanced representations are the most powerful predictor of low participation in the LTP. The temperament is not a significant predictor in itself, but an interaction effect appears between representation and temperament, which means that the positive effect of fear that we observed in participation is true only when fathers have an unbalanced representation of the family. In this case, the temperament of the child seems to act as a moderator of the paternal representations. At 18 months, prenatal interactions are a predictor only for the organization in the LTP, whereas sociability is the main significant predictor for participation and focalization. No interaction effect was observed. That seems to mean that the older the child gets, the more important her own contribution to family interactions becomes.

These results should be regarded with caution in consideration of several methodological limitations. The sample size is small and biased toward a middle- to upper-middle class socioeconomic group, as is unfortunately often the case in family research based on voluntary participation. Moreover, because the variables are interrelated, a larger sample

size would be necessary to perform more complex analyses (i.e., SEMPATH) that would allow testing of a multifactorial model.

Several clinical implications may follow from this research. The first is that coparenting and "family" dynamics can be assessed during pregnancy, at an interactive level as well as at a representational level. This shows the relevance of developing preventive interventions targeting family-level relations even before the baby is born to prevent the baby, once born, from becoming entrapped in possible relationship difficulties between the parents. The second clinical implication is the importance of taking into account several variables other than the mother-infant relationship; first, our results show that the infant brings its own contribution to family interactions, a variable that has long been neglected (Crouter & Booth, 2003). Second, the results show that the contribution of the father is critical, not only as a breadwinner or as a support to the mother, but also at a psychological and emotional level, as his internal life, assessed through representations of the family, is directly related to triadic interactions. Interestingly, although much attention has focused on paternal behavior and father-child interactions (see Lamb & Lewis, 2010, for a review), to date few researchers have studied the representations that fathers have of the family.

In conclusion, the results showing the influence of prenatal predictors substantiate the efforts made to prevent relationship disturbances even before the birth of the baby, confirming the necessity of taking a family perspective during pregnancy, as fathers, mothers, and children bring specific and significant contributions to family interactions.

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Table 1

Descriptive Data of Study Variables (Mean, Standard Deviation, Minimum, Maximum)

Variables	Mean	*SD*	Minimum	Maximum
Prenatal LTP				
Coparental playfulness	1.49	.54	0	2
Intuitive parenting	1.12	.66	0	2
Warmth	2.45	1.06	0	4
Couple cooperation	2.16	1.00	0	4
Structure of the game	1.18	.75	0	2
Postnatal LTP (3 months)				
Participation	18.32	5.34	0	24
Organization	9.48	3.94	1	16
Focalization	3.44	2.26	0	8
Postnatal LTP (18 months)				
Participation	16.47	5.66	0	24
Organization	7.62	4.24	0	16
Focalization	3.02	2.32	0	8
IBQ temperament (3 months)				
Activity level	2.32	0.57	1.35	3.83
Distress to limitations	2.32	0.62	1.00	4.13
Fear	1.73	0.54	0.02	3.00
Duration of orienting	2.78	0.60	1.89	4.60
Smiling/laughter	3.01	0.68	1.75	4.73
Soothability	3.28	0.59	2.00	4.75
EAS temperament (18 months)				
Shyness	2.26	0.69	1.30	4.50
Emotionality	2.42	0.55	1.50	4.20
Sociability (4 scales)	3.84	0.71	1.75	5.00
Activity	4.04	0.66	2.40	5.00
DAS marital satisfaction (prenatal)				
Mothers	118.96	12.72	81	141
Fathers	117.66	10.01	86	142

Note. DAS = Dyadic Adjustment Scale; EAS = Emotionality-Activity-Sociability Survey; IBQ = Infant Behavior Questionnaire; LTP = Lausanne Trilogue Play.

Table 2

Distribution of FAST categories for Fathers, Mothers, and Couples (Numbers and Percentages)

FAST	Fathers	Mothers	Couples
Balanced	23 (46%)	18 (36%)	27 (54%)
Labile-balanced	21 (42%)	19 (38%)	15 (30%)
Unbalanced	6 (12%)	13 (26%)	8 (16%)

Note. FAST = Family System Test.

Table 3

Significant Correlations Between Prenatal Predictors and Postnatal Interactions

	3 months (N = 46) α = .78			18 months (N = 42) α = .83		
Predictors	Participation	Organization	Focalization	Participation	Organization	Focalization
Intuitive parenting	.38**	-	.29*	.42**	.40**	-
Warmth	-	.36*	.30*	-	.42**	.28*
Couple cooperation	.51***	.40**	.41**	-	.41**	.31*
IBQ fear	.31*	-	-	-	-	-
EAS sociability	-	-	-	-.34*	-.33*	-.28°

Note. Correlations are Spearman's rho. EAS = Emotionality-Activity-Sociability Survey; IBQ = Infant Behavior Questionnaire.

*p < .05. **p < .01. ***p < .001. °p = .06.

Table 4
Predictors of Family Interactions: Prenatal Variables and Child Temperament

	3 months ($N = 46$)			18 months ($N = 42$)		
Predictors	Participation	Organization	Focalization	Participation	Organization	Focalization
Prenatal LTP total	.35**	.47**	.36*	Excl.	.43**	Excl.
FAST unbalanced	-1.01***	Excl.	Excl.	Excl.	Excl.	Excl.
IBQ fear	Excl.	Excl.	Excl.			
Total LTP × IBQ fear	Excl.	Excl.	Excl.			
FAST unbalanced × IBQ fear	.81**	.31*	Excl.			
EAS Sociability				-.36*	*ns*	-.30*
Total LTP × EAS sociability				Excl.	Excl.	Excl.
FAST unbalanced × EAS sociability				Excl.	Excl.	Excl.
R^2 (Adj. R^2)	.65 (.42)	.48 (.23)	.36 (.13)	.36 (.11)	.43 (.16)	.30 (.07)
F	(3, 42) 9.99***	(2, 43) 6.32**	(1, 44) 6.46*	(1, 42) 6.1*	(1, 42) 9.4**	(1, 42) 4.3*

Note. Excl. = variable excluded from the regression. EAS = Emotionality-Activity-Sociability Survey; FAST = Family System Test; IBQ = Infant Behavior Questionnaire; LTP = Lausanne Trilogue Play.

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