

The Family Alliance Assessment Scales: Steps Toward Validity and Reliability of an Observational Assessment Tool for Early Family Interactions

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Abstract We present the first steps in the validation of an observational tool for father-mother-infant interactions: the FAAS (Family Alliance Assessment Scales). Family-level variables are acknowledged as unique contributors to the understanding of the socio-affective development of the child, yet producing reliable assessments of family-level interactions poses a methodological challenge. There is, therefore, a clear need for a validated and clinically relevant tool. This validation study has been carried out on three samples: one non-referred sample, of families taking part in a study on the transition to parenthood (normative sample; $n = 30$), one referred for medically assisted procreation (infertility sample; $n = 30$) and one referred for a psychiatric condition in one parent (clinical sample; $n = 15$). Results show that the FAAS scales have (1) good inter-rater reliability and (2) good validity, as assessed through known-group validity by comparing the three samples and through concurrent validity by checking family interactions against parents' self-reported marital satisfaction.

Keywords Family interactions · Infancy · Assessment · Observation · Validity

Introduction

Family is a primary socialization agent for children. Empirical and clinical evidence has shown that interactions within the family are predictive of several outcomes in children. Healthy development is most likely to occur in the context of high levels of warmth and acceptance and consistent behavioral control in parent-child interactions; conversely, conflictual or disorganized interactive practices in the family, with predominantly negative affect and harsh and distant parenting, are predictive of maladaptive or even psychopathological socio-emotional development (Cummings et al. 2000; Fauber and Long 1991; McHale 2007). Family-level assessment is thus essential to a comprehensive evaluation of the child's social context. Several procedures and instruments have been designed to this end, but these are intended mainly for families with school-aged children (or older), as they rely to a large extent on analysis of verbal exchanges (see Sperry 2004). An instrument designed specifically for infancy has been noticeably lacking. The aim of this paper, therefore, is to present an observational instrument to assess mother-father-infant interactions, along with the first stages of its reliability and validity study.

Historically, observational studies on infant-adults interactions have focused first on the link between the mother-infant relationship and infant social development and mental health, with an effort to objectivize the maternal interactive behaviors predictive of infant maladjustment. Mutuality in gaze orientation (or aversion), contingency in emotional facial expressions and body orientations, and fine-tuning of the intensity of stimulations are behaviors considered to be illustrative of psychological constructs like maternal sensitivity or intuitive parenting, whose systematic disturbance has been shown to be

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detrimental to the infant's development (Ainsworth et al. 1978; Sameroff and Emde 1989; Stern 1977; Tronick et al. 1979). A first shift toward a whole-family approach came about in the seventies, when researchers and clinicians began to study the father-infant relationship and its impact on infant development.

The first developmental studies (Lamb 1996, for a review) have shown that infants have significant interactions with their fathers right from the beginning. In addition, fathers put a different emphasis than mothers in the interaction; they are more oriented toward motor stimulations, while mothers are more prone to stimulating their infant vocally; moreover, fathers tend to bring about unexpectedness or originality when playing games (e.g., by using an object in an unconventional way; Labrell 1996). This led to the hypothesis that infants achieve different kinds of emotional learning with each parent, under the influence of these different types of stimulation. Moreover, the first studies including the father have shown that even when the interaction is primarily dyadic (like the mother feeding the baby, for example), the presence of the other parent (in this case the father) has an impact on the behaviors of each member of the dyad and on the quality of the emotional exchanges; this influence suggests a triadic or family effect (Clarke-Stewart 1978; Yogman 1981).

Finally, studies of parental psychopathology (Connell and Goodman 2002, for a meta-analysis) have been done to assess and compare the respective weight of each parent's behavior on the child's possible developmental troubles. Studies show that the mother-child interaction has a more significant impact, but the type of predicted child outcome is different according to which parent is mentally ill: psychopathology in fathers is linked to externalized symptoms in children (e.g. conduct disorders), while psychopathology in mothers is linked with internalized symptoms (e.g. anxiety; Cowan et al. 1996).

The next step toward a family approach has been to take into account the relationship between the parents and its influence on the child. Studies have shown that unresolved marital conflict is linked with several adverse child outcomes (Davies et al. 2002; Erel and Burman 1995; Katz and Gottman 1991). The harmful effect on the child occurs whether because both parents' relationships with the child are disrupted—the so-called “spillover” effect, where parenting behaviors become irritable and distant—or because the child is directly affected by witnessing hostile and competitive exchanges between the parents. McHale (1995) has shown the detrimental effect during infancy of coparental conflicts, that is, when each parent undermines, or at least does not support, the other's parenting decisions and actions. Coparental conflicts at 12 months are thus predictive of adaptive outcomes at 5 years, over and above the individual parenting relationship (McHale and

Rasmussen 1998). Moreover, the co-parenting measures are linked to parents' behavior in family context but not in dyadic parent-infant interaction: that is, each parent may behave in a sensitive way when alone with his or her infant, but their parenting behaviors become distant and cold when interacting in triad. McHale's data supply empirical confirmation of the clinical description offered by structural family therapy pioneers, in particular of the triangulation process described by Minuchin in which the child is “used” by the parents as a go-between or as a scapegoat to divert their conflict (Minuchin et al. 1978).

Oddly enough, the contribution of the child (especially of the youngest ones) is rarely taken into account in family researches; coparental and marital measures are often used as a proxy for family measurement. Our own data, which include observations of parental as well as infant interactive behaviors, have shown that mother-father-infant interactions during infancy are predictive of emotional and cognitive outcomes in the child (Favez et al. 2006a), especially theory-of-mind development assessed at age 5 (Frascarolo et al. 2008). Now, studies have shown how an infant's temperament and behavior can also exert an impact on its caregivers (Crouter and Booth 2003; Lewis and Rosenblum 1974), an impact which is more and more strategic and goal-oriented as the child grows (Cole 2003). Moreover, the infant is able to distribute its attention between its two parents as early as 3 or 4 months old, showing an early aptitude to manage a multi-person context (Fivaz-Depeursinge et al. 2005; McHale et al. 2008).

All of these results speak to the relevance of family assessment as an essential resource for information on the socio-emotional context of the infant's development. The main hypothesis in family assessment is that interactive processes exist that may be functional or dysfunctional for the family members' development (Cierpka 2005). Dysfunctional interactive processes may occur for several reasons: families under stress (for economic reasons, or when facing a chronic somatic illness; Duncan and Brooks-Gunn 1997; Hurtig 1994; Patterson and Garwick 1994) may show disturbances in the interactional processes that will have a negative impact on development, such as harsh parenting. Furthermore, relational conflicts will express themselves in the interaction with specific patterns of mutual behaviors, as described for example in the couple “conflict discussion task” (Weiss et al. 1973): when asked to discuss an unresolved issue, distressed couples tend to produce stereotyped sequences of interactions marked with negative affects (Gottman 1998). Finally, psychopathology in one member of the family may be correlated with severe disruption in interactions that will have an impact on the mental health of the other members of the family; one of the most studied examples is the impact of maternal

depression on parenting behaviors (Goodman and Gotlib 2002; Hudson and Rapee 2005).

What should be considered here is that interactional processes will be disrupted to a certain degree by adverse conditions, whether environmental, individual or relational. The aim of family assessment is thus to evaluate to what extent these disruptions are severe enough to provoke or exacerbate troubles in family members, and especially in the child, either by their recurrence or their pervasiveness.

Assessment of relationships can be achieved through various methods: self-reported questionnaires, interviews, testing and observation. Several instruments are designed to assess the family by means of self-report questionnaires or standardized interviews for parents. These include the Self-Report Family Inventory (Beavers and Hampson 1990), the Adult Attachment Interview (for its use as a family measure, see Cowan et al. 1996), the Family Adaptability & Cohesion Evaluation Scales IV (FACES; Olson 1986), the Family Assessment Device (FAD; Miller et al. 2000), and the Global Assessment of Relational Functioning, which is used along with the DSM IV (GARF; Yingling et al. 1998). Family measures may then be computed by aggregating the individual data obtained from both parents. A few research procedures were created to get child-based data, such as by showing them a filmed conflict between two “parents” and then asking the child how she would feel and react in such a situation (Davies et al. 2002: the Security in the Interparental Subsystem Scale). These procedures allow assessments of individual representations of the family and are suitable when the child is old enough to be able to answer the interviewer or the questionnaires.

Testing procedures may be the least developed of all methods in the field of family assessment. Several of them have an experiential-psychodynamic background; one such example is a quasi-projective test based on the use of symbolic figures to represent boundaries and cohesion in the family (FAST; Family System Test; Gehring and Wyler 1986); however, this procedure relies on individual performances as well, and the test is not designed for a quantitative or psychometric evaluation. It seems to be more suited to function as a basis for discussion in a therapeutic session than for an assessment per se.

Several arguments have led to the view of observational assessment as a complement to self-reported measures or even as a privileged means of getting unique data on family functioning: first, many of the behaviors are performed unconsciously, and even if they are conscious, social desirability may well prevent the family members from reporting them if they are not socially “correct” (Hartmann and Wood 1992; Weiss and Heyman 2004). Secondly, it may be argued that an accumulation of individual measures is not equivalent to a whole family measure, as the family

has “emergent properties” that cannot be captured by individual measurement (McHale et al. 2000). Finally, the exclusive use of self-reported measures raises the “glop problem” (Gottman 1998) when comparing the results to different questionnaires; that is, the same variance might be captured by different instruments, so that any correlation between them will result from a lack of independence in the measures rather than from any real association between two constructs (e.g. depressed spouses might rate their marital relationship as distressed because they are depressed, and not because the relationship is unsatisfactory per se).

Several observational tools for family measurement have been designed; some focus on specific subsystems (e.g. couples’ interactions, see Kerig and Baucom 2004; or co-parenting interactions, see the Mealtime Interaction Coding System, Dickstein et al. 1994; or the Co-parenting and Family Rating System, McHale et al. 2001), but only a very few center on “holistic” family interactions—i.e., including the child, especially the youngest ones. Indeed, validated observation instruments like the “Clinical Rating Scale for the Circumplex model of marital and family systems” (to assess dimensions of the Circumplex model; Olson and Killorin 1983), the “Clinical Rating Scale” derived from the McMaster model of family functioning (Miller et al. 2000), the Beavers “Interactional Competence Scale and Interactional Style Scale” (Beavers and Hampson 1990), or the “Global Assessment of Relational Functioning Scale” (GARF; Yingling et al. 1998), are not specifically designed for families with infants and toddlers. They allow observation of the two parents’ communicative and affective behaviors, directed either to one another or to the infant, but the infant’s own behaviors are not part of the assessment (indeed, as stated above, the measures are largely language-based and therefore cannot include the preverbal child). Finally, most of these coding systems are not designed for moment-to-moment observation of interactive behaviors (to the exception of McHale’s CFRS), but rely more on molar units derived from clinical constructs.

There is thus currently a need for a standardized evaluation tool that takes into account the whole family, including the infant, and which must therefore be based on non-verbal coordination cues. To guide the evaluation, we have conceived a model of family interactions in terms of “family alliance” to assess the degree of family engagement and coordination in any joint activities. This model includes interactions with an infant; it is derived from research traditions inspired by the symbolic interactionism approach (Blumer 1969) and by the so-called ecosystemic model (Keeney 1979), which put nonverbal communication and contextual information at the core of human interactions. According to these models and the studies

derived from them, space and time are the two main contextual characteristics of interaction.

The spatial characteristics are, on the one hand, interpersonal: the interaction partners define a transactional space by their body position, at a distance that allows verbal or emotional exchanges; the “F-formation” designates the optimal interaction space, where each interaction partner has equal and direct access to the space established by the group of partners as a whole (Kendon 1977). The spatial characteristics are also intrapersonal: interaction is a total phenomenon that engages participants’ entire body, and each segment of the body can be used to transmit and accompany a message. Schefflen (1964), in his classic studies on psychotherapy, distinguished three levels: point (for instance, head movements to mark changes from one sentence to another), position (for example, the orientation of the torso, to mark a change of subject, or the end of a speaking turn), and finally, presentation (for example, marking the end of an engagement by physically leaving the interaction space or by orienting the body so the person excludes himself from the interaction). Communication is clearer when the segments are congruent among themselves (face, torso and hips all facing the other to signal engagement, for instance), while the incongruence between different levels of communication introduces ambiguity to the interaction (Spiegel and Machotka 1974). If all the partners have congruent body segments in and of themselves and among one another, it is possible to achieve a co-attentionality that allows focus on a common “theme” (Schefflen 1973).

The temporal characteristics refer to the dynamic of the interaction, that is, the sequence of behaviors and the synchrony of interactive signals (Argyle 1972). A fundamental aspect is the management of interactive mistakes (miscoordinations), which are inevitable (for instance, one partner seeks the other’s gaze just as the other turns her head because she’s heard a noise). A successful interaction implies the ability to fix such mistakes (seeking the partner’s attention anew when she becomes available again); a failure to fix an error results in an interruption of the interaction (Tronick and Cohn 1989).

An additional characteristic specific to adult-child interactions must be considered: the interaction is hierarchical. That is, the parents provide the child with a framework by being more stable across time (see, for instance, the “framing” described by Fogel 1977, which shows that the mother looks at the child more steadily than the child looks at her) and by supplying stimulation of appropriate intensity (Anders 1989). In return, the child “informs” the parents of his state, which allows them to adjust the setting (increase or decrease the stimulation, for example); these reciprocal influences guarantee the mutual adjustment of systems of different hierarchical levels (Cronen et al. 1982).

The family alliance model takes its inspiration from this work and aims to be applicable to the specific case of triadic father-mother-child interactions. Similarly to what we have discussed above, this model has two foundations: its structural and its dynamic characteristics (see Fig. 1). The structural foundation refers to interactional patterns that fulfill four functions necessary to establishing a successful interaction. First, the partners show their mutual availability and readiness to interact through their body position and orientation, mainly at the hips (the “participation” function). Then each partner maintains his or her role in the interaction (the “organization” function); for example, when one parent is interacting with the baby, the other one should not interfere and divert the attention of the baby; the orientation and position of the torso are particularly important markers of the organization. Thirdly, when participation and organization are provided, the partners may then have a common focus of exchange, marked by the orientation of their gazes and the sharing of a common subject of discussion (“focalization”). Finally, they can share positive emotions, mainly through facial expressions, and show one another emotional interest (“affect sharing”). These functions are hierarchically interlinked, similarly as in the model proposed by Schefflen (1964); we therefore posit that the fulfillment of each one of these functions is necessary for the accomplishment of the next one.

The other foundation of alliance is its dynamic or temporal aspect: each interaction has fluctuations, pauses in activities, changes in the topic of the exchange, all of

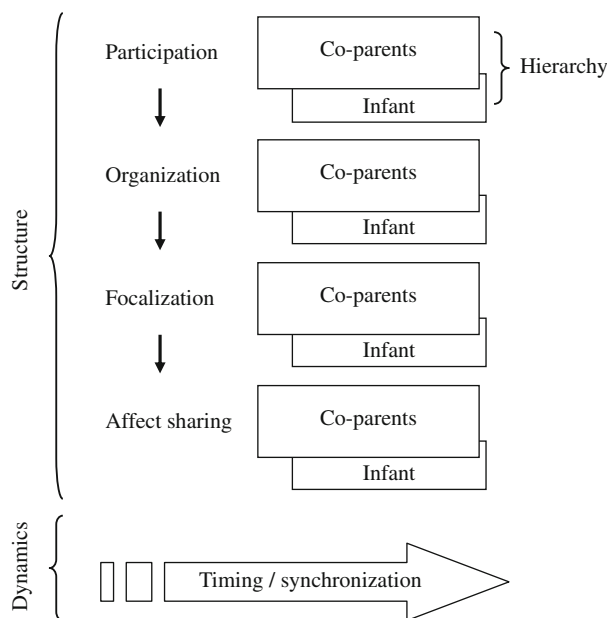


Fig. 1 The family alliance model

which necessitate transitions and adjustment. Miscoordinations or “interactive mistakes” are unavoidable in the flow of regular interactions: for example, one partner may smile at another just at the moment when the latter is marking a pause by gazing away. The alliance is thus also defined by the ability to reorganize the interaction after a pause or variation in the theme of the exchange, or to repair a miscoordination without interrupting the ongoing exchange (Fivaz-Depeursinge 1991; Fivaz-Depeursinge and Corboz-Warnery 1999; Frascarolo et al. 2004; Stern 1977).

We present the Family Alliance Assessment Scales (FAAS) and the study leading to the first steps of its validation. Families were assessed while interacting in a standardized observation situation, the Lausanne Trilogue Play (LTP). A normative population is compared to families in which parents have been through a stressful major life event (a medically assisted procreation procedure, MAP), and to families referred for psychiatric illness in the postpartum period. Our hypothesis is that the FAAS scales will show distinctions that make it possible to discriminate among these populations.

Method

Population

This study involved three samples. All families gave their written consent. The study received consent from the ethical committee of the Faculty of Medicine of the University of Lausanne (Switzerland). All families were Caucasian European.

S1: “Normative” Sample (N = 30)

This sample was constituted of volunteer couples and their firstborn child, with socioeconomic status from middle-class to upper-middle class (Hollingshead two-factor index); these families participated in our longitudinal study from pregnancy to age 5 of the firstborn (subsides FNRS 32-52508.97). Mothers’ mean age was 31.2 years (SD = 2.3), and fathers’ was 32.6 years (SD = 3.5) at the birth of their child. 15 infants were girls, and 15 were boys. For this FAAS study, we used Time 3 of the longitudinal project, i.e., when infants were 9 months old (mean age 38.5 weeks, SD = 2.5 weeks; range 36 to 46 weeks).

S2: “Infertility” Sample (N = 30)

This sample comprised families who conceived their first child through medically assisted procreation (MAP) after having received an infertility diagnosis. Mothers’ mean age

was 32 years (SD = 2.9), and fathers’ was 34 years (SD = 4.5). Socioeconomic status of the families ranged from middle-class to upper-middle class (Hollingshead two-factor index). 16 infants were girls, 14 were boys. The firstborn infants were 9 months old (mean age 37.5 weeks, SD = 2, range 35 to 44 weeks).

S3: “Clinical” Sample (N = 15)

This sample was constituted of families referred for postpartum psychopathology in mothers, with socioeconomic status ranging from lower-middle class to upper-middle class (Hollingshead two-factor index). Mothers’ mean age was 26.6 years (SD = 2.8), and fathers’ was 29.2 years (SD = 3.4). For 87% of the sample, the children were the firstborn. The mean age was 10 months old, with a broad range (from 4 weeks to 107 weeks). Eight infants were girls, seven were boys.

Procedure

Families were received at our laboratory at the Center for Family Studies in Lausanne. Family interactions were video-recorded during the Lausanne Trilogue Play (LTP), a semi-standardized observation situation (Corboz-Warnery et al. 1993).

Observational Situation: The Lausanne Trilogue Play (LTP)

The Lausanne Trilogue Play (LTP) is a play situation involving the father, mother and baby together. The parents sit in front and on each side of the child, who sits in a chair specially designed to be adapted to the child’s size and weight and to be oriented toward each parent or between them. The parents’ and the child’s body positions thus form a triangle. The technical equipment includes two cameras: one records the parents, and the other the baby. The following instructions are given: “We’ll ask you to play together as a family in four separate parts. In the first part, one of you plays with the child, and the other one is simply present. In the second part, you reverse the roles. In the third part, the three of you will all play together. In the last part you will talk a while together; it will be the child’s turn to be simply present.” Whoever begins the game is decided by the research team in order to counterbalance a possible order effect. The play is thus structured in four parts, related to the four possible relational configurations in a triad: (1) 2 + 1, one parent is active with the child, (2) 2 + 1, the other parent is active, (3) 3, all play together, (4) 2 + 1, both parents together while the child is in the third party position. Mean duration of the LTP in this study was 10 min, 30 s (SD = 2’39).

Ecological validity of the situation has been assessed through parent-reported questionnaires about the representativeness of the situation. Each parent completed a questionnaire with 19 five-point Likert scales (from 1, “not at all”, to 3 for “somewhat identical” and 5 “completely identical”), with each scale addressing a question about the extent to which the behaviors of the family members resembled their everyday behaviors (e.g., “Did your infant behave as usual?”). Mean scores are 3.7 (SD = 0.5), indicating that, on average, families considered their behaviors to be quite close to their everyday behaviors (scores of mothers and fathers were aggregated, as they are correlated; Rossé and Maeder 2008).

Coding Strategy

All of the videos were coded by one coder. In order to test inter-rater reliability, two additional coders each coded half of the videos (videos were randomly attributed to one or to the other coder) so that all the videos were double-coded. All the coders were blind to the families’ status.

The Family Alliance Assessment Scales

Item Selection and the First Version of the Instrument: Content Validity

A first version of the instrument was elaborated by collecting items relevant to the family alliance model. For this, we used several sources: the literature on family interactions, the existing coding systems (mentioned above), and discussion with family experts (family therapists and researchers). This first version had 66 scales. The scales were chosen to be precise enough to allow coding on an observational basis, but also broad enough to allow a subsequent adaptation of the coding criteria to children in several age ranges. Each scale allows an assessment of the interaction according to an ordinal scoring system in three points: “appropriate” (2 points), “moderate” (1 point) and “inappropriate” (0 points). A preliminary coding was done using 20 situations from a pilot sample. Some scales were then removed for the following reasons: lowering internal consistency (item-total correlation), redundancy, and low inter-rater reliability.

The Second Version of the Instrument: Description of the Scales

Fifteen scales remained for the final version, for a total score ranging from 0 to 30. All details of the categories and dimensions, as well as the coding criteria, are described in the coding manual, not published (Lavanchy Scaiola et al.

2008). Criteria are adapted according to the age of the child; we will present here the criteria for a 9-month-old infant, since the quantitative results presented were assessed on families with babies of that age.

Eleven scales were designed to operationalize the four functions and the dynamic aspects of our model. Four more scales were added concerning specific aspects of subsystems of the family: the coparental unit (McHale 2007) and the contribution of the infant (Lewis and Rosenblum 1974). Specific behavioral coding criteria are derived from the ethological tradition of observation, with a focus on non-verbal cues (Hinde and Stevenson-Hinde 1988; Kendon 1982; Schefflen 1972).

For each scale, a brief explanation of the criteria for the appropriate and inappropriate range is given (see Table 1 for a summary). The complete description of these criteria and those for the moderate range are available in the coding manual.

The scales are as follows (the theoretical concept of the family alliance model to which each scale is attached appears in parentheses):

1. Postures and gazes (participation function): this scale derives from the basic level of interactions described by Argyle (1972) and Schefflen (1964). The ensemble of “readiness to interact” signals converge to indicate engagement in the interaction.

Appropriate range: the gazes and body attitudes presented by the family throughout the game create an optimal context to facilitate emotional exchanges and sharing of affects. Each partner’s body is engaged in the interaction area; that is, each is oriented toward one of the other partners. For the parents, torso and hips are mainly oriented toward the infant. For the infant, the torso is oriented toward one of the parent or between them. The partners make eye contact.

Inappropriate range: the partners’ gazes and body orientation do not create an optimal context for the interaction. Signs of disengagement, of unavailability to interact, are displayed repeatedly. Body signals show marked disengagement through turning the body away and/or a prolonged indifferent or neutral attitude. This behavior is observed in one or more of the partners. As for eye contact, one or more of the partners averts their gaze numerous times.

2. Inclusion of the partners (participation function): this scale refers to the F-formation described by Kendon (1977), which marks the reciprocal interpersonal engagement among the group as a whole.

Appropriate: All partners present are included in the play and take each other into account. Everyone

Table 1 The FAAS scales—Brief summary

Theoretical concepts	Scales	Brief description of appropriate criteria
Participation	Postures and gazes	The non-verbal cues of the families indicate readiness and willingness to interact with one another
	Inclusion of partners	Each and all partners in the interaction are included; no one is excluded or excludes him/herself from the interaction
Organization	Role implication	Each partner sticks to his or her role during the play
	Structure	The game follows the expected interactive structure; all the tasks requested by the instructions are implemented
Focalization	Co-construction	Turn-taking is respected, and each can participate without being interrupted; the topic of the game is shared by all participants
Affect sharing	Parental scaffolding	Stimulation is adapted to the child's age and state, in the proximal zone of development
	Family warmth	Affects are mainly positive during the interaction, the atmosphere is warm and supportive
	Validation	Partners react implicitly to the emotional state of each other by adjusting to it; if the child expressing negative affects, the parents help him or her to regulate
	Authenticity	Affects are congruent with the situation and the behaviors displayed by the partners; they are not forced or exaggerated
Timing/ synchronization	Interactive mistakes during activities	There are few communication mistakes (misunderstanding, miscoordinations), and when they occur, they are repaired quickly
	Interactive mistakes during transitions	When a change in activities occur, the interaction is reorganized in a smooth manner, with quick and resolved negotiations
Co-parenting	Support	Both parents cooperate and support each other, at either an instrumental or an emotional level
	Conflicts	No conflict is expressed between the parents, either at a direct, verbal level, or indirectly by one parent's interfering in the activities of the other
Infant	Involvement	The child is involved in the play activities, using its sensory, motor and cognitive skills
	Self-regulation	The child shows good self-regulation abilities, calming down quickly when tense or frustrated, and maintaining an adequate level of arousal

actively participates in the play (regardless of the role defined by the instructions, for example as third party parent or as active parent in the LTP) and is integrated in the interaction. Everyone's initiatives are taken into account.

Inappropriate: exclusive behaviors by one or more partners are recurrent. The partners are not in contact with the others on several occasions, causing a break in the interactive ties. A feeling of exclusion pervades the play-session and seems characteristic of their patterns of interaction.

3. Implication of each partner in his role (organization function): this scale derives from the second physical level described by Scheflen (1964), the position by which individuals modulate their involvement without breaking out of the interaction.

Appropriate: the family members fulfill the roles set out by the instructions; when they are supposed to be active, they engage in the interaction. Conversely, they can take the position of observer when so requested; they do not interfere in the other parent's activities when the instructions require that they be "just present". The infant displays behaviors (relative to his

developmental age) that mark his particular involvement with the active partner(s) throughout the game.

Inappropriate: one of the parents regularly carries out his role inadequately, and this upsets the organization and development of the play: high frequencies of interferences appear and are repeated at several moments.

4. Respect for the task's structure and timeframe (organization function): interaction timing and pace are two fundamental aspects described by Argyle (1972); activities must be organized within the given time period.

Appropriate: the family follows the instructions provided at the beginning regarding the task's structure. All four parts are carried out and remain distinct. The duration of each part of the play is long enough for a joint activity to be set up, while at the same time being adjusted to the infant's state and not compromising the development of the rest of the play session.

Inappropriate: the structure of the task is unclear. In the LTP, different parts of the play get confused. The duration of play of two or more parts is not suitable;

either it is too short, which does not allow the development of a joint activity; or it is too long, which compromises the proper unfolding of the task, the observation of the instructions and the adjustment to the infant's state.

5. Co-construction (focalization function): inter-attentionality is the characteristic that makes the F-formation functional; that is, the fact of sharing a common object of attention through the orientation of the gaze or a common subject of discussion (Kendon 1977).

Appropriate: the parents co-construct the joint activity, for example by taking turns to talk, or to keep the game or discussion going creatively. From time to time, the partners may show a lack of synchrony, but this does not prevent the development of a joint activity. Furthermore, when a parent is supposed to be in the "just present" position, he keeps his interest focused on the activity shared by the two others.

Inappropriate: Very few activities are shared by multiple participants or, when they are, they mobilize only sub-groups, that is, the dyads. Most of the time, when an activity is put forth, either it is carried out individually, or it ends quickly without the other members of the family being able to take part in it. When a parent is supposed to be in the "just present" position, he seems uninterested in the activity shared by the others, for instance looking away.

6. Parental scaffolding (focalization function): to ensure the focalization function, the parents, who are hierarchically above the child, must supervise the child and provide appropriate stimulation to keep him or her engaged (Croonen et al. 1982).

Appropriate: stimulations are adapted to the infant's age and state. The parents bring enough elements to keep the infant interested in the activity and propose a variety of stimulations. The behaviors follow one another at a rhythm of play that is respectful of the infant's capacities (giving him time to respond during an exchange that is adapted to his age).

Inappropriate: over-stimulation and/or under-stimulation are characteristic of the exchanges between the partners. The parents have difficulty adapting to the infant's state, and consequently, the infant interrupts the game and disengages from the interaction.

7. Family warmth (affect sharing function): this scale concerns one of the emotional characteristics most favorable to interaction (Truax et al. 1966) and associated with optimal child development (McHale and Rasmussen 1998).

Appropriate: Warmth is characteristic of the family's affective atmosphere. Positive affects (mutual smiles, laughing, affectionate gestures) are shared by all partners, and an empathetic attitude is shown toward negative affects; the main cue here is the circularity and the circulation of emotion among family members.

Inappropriate: the family presents a tense, negative overall family atmosphere with possible criticisms and comments between the different partners. One can sense the presence of a conflict, even if it is not expressed (it is rare to witness an open conflict between the parents in an LTP situation). This conflict influences all of the affective climate and interactions presented by the family. There is a lack of circularity, which is to say that affects are not shared by the whole family, or are shared only by dyads.

8. Validation of the infant's emotional experience (affect sharing function): the second emotional characteristic, this scale concerns empathic emotional reactions (Truax et al. 1966), or *sensitivity*, which is an essential component of the child's affective development (Braun-gart-Rieker et al. 2001).

Appropriate: parents are sensitive to the infant's signals; they are empathic, regulate and validate his affects. They react verbally or non-verbally to the signals they perceive from the infant.

Inappropriate: both parents repeatedly do not respond to the infant's emotional signals. The parents show inadequacy in some of their affective responses, which are repeated all along the play session. This inadequacy can take the form of a distortion of the infant's emotional expression by a wrong interpretation and affective response (e.g., laughs while the child is crying).

9. Authenticity of the expressed affects (affect sharing function): the third and final characteristic, this scale concerns the authenticity of emotional expression, that is, to what extent the affects, whether positive or negative, are genuine and not forced (Biringen 2000; Truax et al. 1966).

Appropriate: the expressed affects are congruent with the situation and coherent with the behaviors and affects expressed by the other partners.

Inappropriate: the coder has a feeling of dissociation, of a marked incoherence between the expressed affects and the observed situation. He perceives a disconnect between the parents' and the infant's emotional state. For example: the parent makes the infant "smile" by touching the corner of its lips to

raise the corners of its mouth, but does not try to make the infant reach the emotional state of pleasure that would then provoke smiling. Thus the affects are inauthentic or pseudo (affect simulation).

10. Interactive mistakes and their resolution during activities (dynamic of the interaction): one of the fundamental aspects of the flow of the interaction is the ability to fix and readjust the inevitable interactional “mistakes”; these repairs are necessary for the interaction to be able to continue (Tronick and Cohn 1989).

Appropriate: the partners carry out effective resolutions to the possible interactive mistakes (e.g., false starts in the play), and these unfold in a fluid, quick and smooth manner. The partners carry out mostly well-flowing repairs, with few communication mistake resolutions that are costly in time and energy.

Inappropriate: communication mistakes follow one another without really finding a resolution and repair, thus an interactive mistake loop is carried out and the interaction slowly deteriorates. This interaction sequence can be accompanied by neutrality, simulation of positivity, or aggressiveness and hostility. The attempts to rectify the mistakes tend to accentuate their effect rather than correct them, and this results in major interruptions of the interactive sequences.

11. Interactional mistakes and their resolutions during transitions (dynamic of the interaction): transitions from one configuration to another require negotiations—the change of speakers, for instance. This scale evaluates the ability to fix interactive errors during changeovers (Feldman 2003).

Appropriate: the sequence of interactions presented by the family gives an impression of fluidity (even if slight maladjustments create a halting interaction at times). The transitions from one part of the game to the other are carried out smoothly and creatively, with an announcement of this change, an explicit or implicit (without consultation) negotiation of this transition, and mutual ratifications.

Inappropriate: the session is halting, with an abrupt intervention on the part of one or the other partner and no mutual ratification. The parents do not consult each other to determine the transitions, and when the latter takes place, it causes a break of contact between the participants already engaged in the previous interaction. An announcement of context change is made (either by the active parent, or by the observing third party parent), and the other participants do not

ratify the announcement. A few moments of confusion between the different contexts follow (that of the previous context, that of the following context, and the transition between the two).

12. Support and cooperation between parents (co-parenting): family unity depends principally on coparental unity; one of the dimensions for evaluating coparental cohesion is the support parents give one another (McHale 2007).

Appropriate: The parents work together and cooperate throughout the task. They show mutual support both verbally and non-verbally. Any interruptions are aimed at supporting the spouse in the accomplishment of his role as a parent.

Inappropriate: the parents show neither support nor cooperation. Different actions are carried out in turn, without negotiations. Each parent follows his or her own course of action, and does not comply with the other parent’s requests. Different activities follow one another without continuity.

13. Conflicts and disruptive interferences in coparental coordination (co-parenting): another dimension for evaluating coparental cohesion is conflict between the parents, which is independent of support (McHale 2007).

Appropriate: no disruptive interference emerges between the parents, or at most only infrequent, minor interferences. The latter are accepted and integrated by the partners. Parents do not show any competitive behaviors during the playtime.

Inappropriate: several major disruptive interferences are observed during the situation. The second parent may perceive these interferences as disruptive, and may openly express criticism or resentment of the first parent’s behavior. Parents may show competitive behaviors to get the child’s attention.

14. Infant’s involvement (infant): in accordance with the model supplied by Cronen et al. (1982), the hierarchically lower system “informs” the higher system of its state. This scale evaluates the extent to which the child’s signals are clear and interpretable by the parent.

Appropriate: overall, the infant is engaged in the interaction with his parents. He uses his visual, motor and vocal competences during the interaction with his parents, according to his age.

Inappropriate: the infant cuts himself off repeatedly and for relatively long periods of time (longer than the regular pauses during cycling, for example) before reengaging in the interaction. Although he

presents moments of interaction with his parents, these are short and regularly interrupted. Thus, during the main part of the play, the infant cuts himself off from the interaction (turns his gaze or his torso away from the area of interaction; leans forward; focuses on an object outside of the interaction).

15. Infant's self-regulation (infant): another dimension for evaluating the infant's ability to engage is the extent to which he is able to regulate his emotions (Crockenberg and Leerkes 2003).

Appropriate: the infant demonstrates good self-regulation skills throughout the playtime. Despite an occasionally agitated internal state, he is able to stabilize his state and remain available for the interaction.

Inappropriate: the infant struggles to regulate himself. He cries with his eyes closed, without responding to his parents' attempts to comfort him. During the play, he regularly manifests behaviors showing tension, protest and finally distress. The infant is unable to benefit from the help offered by his parents. In other cases, the baby interacts with parents who are over-stimulating him, and he continues to look at them in a sustained manner. He adopts an expressionless or sometimes tense expression, but no affect is expressed. He does not show them his discomfort. The infant shows himself to be over-adapted.

Results

The coding takes into account the entire LTP. A preliminary check showed that the infant's gender has no link with the study's variables.

Inter-rater Reliability

Inter-rater reliability (intra-class coefficient ICC) ranges from .61 and .90, for an average of .80, all correlations being significant to at least $P < .05$ (see Table 2). "Inclusion of partners" and "Authenticity of affects" are the two scales with the lowest reliability (.62 each). "Family warmth" is the scale with the highest reliability (.90). Despite these variations, the overall inter-rater reliability of the scales has been judged as acceptable. Coders were used as independent variables in order to test systematic differences in the level of coding between two coders; paired comparisons (*t*-test) show no significant difference.

Table 2 Intra-class coefficients for the FAAS scales

Scales	ICC
1. Postures and gazes	.74***
2. Inclusion of partners	.62*
3. Role implication	.76***
4. Structure	.68***
5. Co-construction	.80***
6. Parental scaffolding	.84***
7. Family warmth	.90***
8. Validation	.73**
9. Authenticity	.62*
10. Interactive mistakes during activities	.81***
11. Interactive mistakes during transitions	.84***
12. Support	.73***
13. Conflicts	.83***
14. Involvement	.88***
15. Self-regulation	.79***

Structure of the Scales

Unidimensionality of the construct is confirmed by a high internal consistency (Cronbach $\alpha = .92$). The consistency is confirmed by the positive correlations between the scales of the FAAS: all correlations are significant at least at $P < .05$. A principal component analysis (PCA) with extraction eigenvalues >1 yields to a solution with one main factor explaining 48% of the variance (eigenvalue = 7.3) and one secondary factor explaining 10% of supplementary variance (eigenvalue = 1.5). Examination of the scree plot shows a significant decrease of the explained variance between the first and the second factor.

Validity of the Scales

We have tested the scales' validity through two types of criterion-validity: known-group validity and concurrent validity (Spector 1989). Based on previous studies showing that clinical groups tend to be less efficient when assessed in standardized interactive situations (see for example Ryan et al. 2005), we expected normative families to have higher scores on the FAAS scales than the two other groups of families. To test this hypothesis, we have used one-way ANOVAs to compare the results to the scales for the three samples: the 30 families from the normative sample, the 30 families from the infertility sample and the 15 families from the clinical sample. Results (see Table 3) show that for 12 scales out of 15 the results are significantly different. Bonferroni's post hoc tests show that the significance is due to the normative sample, which gets a better score than the clinical sample for 10 scales (postures and gaze, inclusion of partners, co-construction, family warmth,

Table 3 Oneway ANOVA's between the longitudinal sample (Lausanne), the infertility sample and the clinical sample ($N = 75$)

FAAS scales	a. Normative ($n = 30$)		b. Infertility ($n = 30$)		c. Clinical ($n = 15$)		<i>F</i> test (2, 72)	Post-hoc Bonferroni
	Mean	SD	Mean	SD	Mean	SD		
1. Postures and gazes	1.3	0.9	1.5	0.8	0.7	0.7	5.05**	a > c, b > c
2. Inclusion of partners	1.1	0.8	1.0	0.6	0.6	0.6	3.12*	a > c
3. Role implication	1.0	0.8	0.9	0.8	0.6	0.6	2.29	–
4. Structure	1.5	0.8	0.8	0.8	0.9	0.9	4.81**	a > b
5. Co-construction	1.1	0.8	1.0	0.7	0.4	0.5	5.12**	a > c, b > c
6. Parental scaffolding	1.0	0.7	1.1	0.7	0.5	0.7	3.89*	b > c
7. Family warmth	1.3	0.8	1.4	0.6	0.7	0.6	5.03**	a > c, b > c
8. Validation	1.5	0.7	1.3	0.7	0.5	0.7	8.93***	a > c, b > c
9. Authenticity	1.6	0.6	1.4	0.6	0.9	0.9	4.84**	a > c
10. Interactive mistakes during activities	1.0	0.9	0.9	0.7	0.4	0.5	3.13*	a > c
11. Interactive mistakes during transitions	1.3	0.8	0.9	0.9	0.9	0.9	1.27	–
12. Support	1.2	0.9	1.2	0.7	0.5	0.6	4.62*	a > c, b > c
13. Conflicts	1.3	0.6	1.3	0.8	0.7	0.7	3.97*	a > c, b > c
14. Involvement	1.3	0.8	1.2	0.7	1.1	0.8	0.33	–
15. Self-regulation	1.5	0.7	1.1	0.8	0.9	0.8	3.38*	a > c

*** $P < .001$, ** $P > .01$, * $P < .05$

validation of affects, authenticity, interactional mistakes during activities, support and conflict in co-parenting, infant's self-regulation), and a better score than the infertility sample for 1 scale (structure of the game). Finally, for 7 scales (postures and gaze, co-construction, parental scaffolding, family warmth, validation of affects, support and conflict in co-parenting), the score of the infertility sample is also significantly higher than that of the clinical sample.

In order to test concurrent validity, the most obvious construct that comes to mind is marital satisfaction, as the links between the quality of the marital relationship and the coparental and family relationships have been demonstrated repeatedly. For instance, when couples are distressed, not only are their own interactions marked with anger and negative feelings, but the interactions in the entire family are lacking in warmth and acceptance (Gottman 1998; McHale et al. 2004; Pape Cowan and Cowan 1992). Moreover, longitudinal studies have shown that outcomes in children are predicted by both marital distress and family functioning, which demonstrates the complex interplay among these variables (see for example Cummings et al. 2000). The marital relationship has been considered as a template for the family relationship (Lewis 1989), and negative emotions in marital interactions have been shown to spill over into other interactions in the family (mother-child, father-child and mother-father-child) (Erel and Burman 1995; Katz and Gottman 1996). As a result, researchers can consider a good marital relationship a prerequisite for family interactions (Fearnley Shapiro et al. 2000).

Marital distress has often been assessed through self-reports on marital satisfaction. We have thus used a widespread instrument, the Dyadic Adjustment Scale (DAS, Spanier 1976), to evaluate marital satisfaction in our sample, during pregnancy and 18 months after birth. This scale totals 32 items assessing various aspects of the couple's life, such as the frequency and intensity of disagreements. The sum of the answers produces a score between 0 and 151 (under 107, a couple is judged to be "distressed", see Vandeleur et al. 2003); the higher the score, the higher the marital satisfaction. Parents answered separately and an average was computed for each couple. Results were correlated with the FAAS dimensions; we expected that the higher the DAS scores, the higher the scores on the FAAS.

The results show first that most of the couples are not distressed, as only three of them have scores below the 107 threshold. Correlations with the FAAS scales yield somewhat surprising results: contrary to our expectations, most of the correlations are negative, which two of them being significant: authenticity of affects ($r = -.27$, $P < .05$) and infant's involvement ($r = -.26$, $P < .05$). This tends to mean that the more satisfied the couples are in their relationship, the less their family interactions are coordinated.

Discussion

Our aim was to design an observational tool to assess family interactions by taking into account all participants in

the interaction from a holistic perspective, while conveying enough clinical meaning to be directly useful to clinicians. Moreover, we have included a “forgotten guest” in most observational family assessment, which is the infant itself. Although the inclusion of the infant is widespread in the domain of dyadic mother-infant observational assessment (see Sameroff and Emde 1989; Stern 1977), it is rarely the case in family assessments, where either the aim is an assessment of families with older children, or an assessment of the inter-parental relationship as a representation of the functioning of the whole family.

The results of this validation study are promising. The main points can be summarized as follows:

The scales show good inter-rater reliability, although some of the scales could use improvement. “Inclusion of partners” and “authenticity of affects” are the two scales with the lowest reliability rating; the first one needs better specification of the behaviors to be taken into account to assess inclusion. The second one is a bit trickier; this scale was added at a late stage of the elaboration of the instrument, because we realized that sometimes emotional exchanges might look as though they were positive with mutual engagement (at the level of the behaviors, all partners may be smiling, for example), yet the coder gets the feeling that something is wrong (there is a forced tone to the affects, or the pace of the interaction is either too quick or too slow). In these situations non-verbal clues are ambiguous, and the assessment relies in part on a gestalt of behaviors and on the clinical feeling of the coder, which may explain why the reliability is lower. More work is needed here in order to specify the criteria to identify the authenticity of affects.

The internal consistency of the grid is high, suggesting that families tend to be coherent in their interactions and that all variables vary in the same direction. Family alliance seems thus to be a unidimensional construct; however, specification of different scales is still worthwhile, as this allows a detailed assessment of the various facets of the interaction, which might be useful from a clinical perspective. For example, we know from our experience with LTP assessment in clinical settings that failure to implement the participation function is indicative of the most severe disturbances in the family, while difficulty in affect sharing might indicate more moderate difficulties (Fivaz-Depeursinge et al. 2004).

The known-groups validity done by comparison of samples identified according to their clinical status show that the FAAS scales allow for discrimination between a normative sample and a sample of families seeking consultation for a stressful life event (the “infertility” sample) and a sample of families in psychotherapeutic treatment for post-partum disorders (the “clinical” sample). This is the most important result given the clinical purpose of this instrument, whose aim is specifically to add an interpersonal and family

assessment to individual diagnosis, for example in the case of a family with a psychiatrically ill parent. The instrument can help assess the degree to which family interactions are disrupted, creating an added risk for the ill person’s social and affective development and negative impact on family members.

Finally, the concurrent validity led to conclusive but surprising results, as the evidence from the correlations suggest a negative link rather than the theoretically expected positive link between marital satisfaction and family interactions. Although the positive link between marital satisfaction and family interactions is theoretically founded and has been empirically demonstrated by multiple studies, the results of our research constantly called this association into question. In a longitudinal study on a normative population, from which the normative sample presented in this article was pulled, we found using a variable-based approach that marital satisfaction was not connected with the family alliance and had no impact on the child’s development (Favez et al. 2006a). Using a person-based approach to regroup the families according to the development of the alliance from pregnancy to 2 years old, we found that the families whose interactions degraded over time were those in which marital satisfaction was highest (Favez et al. 2006b). Finally, the results reported in this article show that even when contrasting clinical and non-clinical groups, we get an inverse effect to the one theoretically predicted.

One explanation for this result might lie in the method we used to assess the marital relationship, that is self-reported questionnaires: parents with fewer difficulties might be better able to step back and evaluate their marital relationship than parents facing stressful events or illness, who could be more defensive and more prone to bias their answers according to social desirability, resulting in a more positive or optimistic view of their marital relationship. It might be more appropriate to compare family interactions with couple interactions observed in a standardized situation, such as the “conflict-discussion task”. Another explanation might lie in the theoretical link between couple relationship and family relationship; contrary to what has been believed, this link may be not linear, but curvilinear. Too much conjugal satisfaction may be detrimental to the establishment of triadic interactions; moderate and temporary marital dissatisfaction during the child’s infancy may be a necessary step to ensuring a successful transition from dyad to triad after the first baby’s birth, and parents who stay too couple-centered may actually have difficulty adapting to functioning with the baby. This non-linear association would explain the contradictory results among the different studies and within our own studies.

The main limitation of our results is the small N, as we lacked statistical power to study the structure of our scales

with in-depth analyses. We will now continue to use these FAAS scales in studies about family interactions, in order to refine the coding criteria and confirm the reliability and validity established in this study. The acknowledgement that the clinical status is linked to different scores on the various scales is a necessary but insufficient step in the use of this clinically-oriented instrument. The next stage will be to determine to what extent a low score in a given scale is specific to a certain type of disturbance; our clinical experiences and some case studies have shown, for example, that difficulties in the participation function (assessed by the postures and gaze and inclusion of partners scales) are associated with severe dysfunction, as evidenced in families where one parent (or both) suffers from psychosis (Favez and Fivaz-Depeursinge 2004). The ultimate aim of this instrument is to allow the clinician to calibrate interventions according to which interactive dimensions are impaired.

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