
**THE AGES & STAGES QUESTIONNAIRE:
SOCIAL-EMOTIONAL: A VALIDATION STUDY OF A
MOTHER-REPORT QUESTIONNAIRE ON A CLINICAL
MOTHER-INFANT SAMPLE**

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ABSTRACT: Mother-report questionnaires of infant socioemotional functioning are increasingly used to screen for clinical referral to infant mental health services. The validity of the Ages & Stages Questionnaire: Social Emotional (ASQ:SE; J. Squires, D. Bricker, K. Heo, & E. Twombly, 2002) was investigated in a sample of help-seeking mothers with young infants. It was compared with independent observer-rated dyadic interactions, and the quality of dyadic relationships was rated by expert clinicians. The ASQ:SE ratings also were compared with questionnaires on maternal psychological stress and distress. The ASQ:SE did not correlate significantly with either external ratings of dyadic interaction or clinically assessed relationship qualities, though the latter two were strongly associated with each other. In contrast, ASQ:SE scores were associated with questionnaires relating to maternal psychological distress. This was especially true for mothers classified as depressed. Furthermore, reports on the ASQ:SE were strongly predicted by maternal stress. The study points to some problems with the concurrent validity of the ASQ:SE in clinical samples. It also demonstrates a close link between mothers' psychological distress and their ratings of infant social and emotional functioning. Further research should investigate the extent to which the ASQ:SE specifically measures infant functioning or maternal distress, and how it functions in clinical versus nonclinical samples.

RESUMEN: Los cuestionarios en que las madres reportan el funcionamiento socio-emocional del infante se están usando más para determinar la necesidad de referir a los servicios de salud mental infantil.

We thank Professors Peter Fonagy and Rolf Sandell for their many invaluable suggestions, and the research group at the Institute of Perinatal Health at the Karolinska Institute for a valuable discussion. We also thank the EAS raters, Iraj Danai and Malin Kan, and the interreliability rater on the PIR-GAS, Anna Skagerberg. The article was made possible by generous grants from the Ax:son Johnson, Engkvist, Groschinsky, Jerring, Kempe-Carlgren, the Mayflower Charity Foundation, Solstickan, and Wennborg Foundations, The Big Lottery Fund, and the Research Advisory Board of the International Psychoanalytical Association.

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INFANT MENTAL HEALTH JOURNAL, Vol. 31(4), 412–431 (2010)

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Published online in Wiley InterScience (www.interscience.wiley.com).

DOI: 10.1002/imhj.20263

Se investigó la validez del Cuestionario de Edades y Niveles: Socio-emocional (ASQ:SE) en un grupo muestra de madres con infantes pequeños las cuales buscaban ayuda. Al grupo se le comparó con las interacciones de las díadas evaluadas por un observador independiente, y con la calidad de las relaciones de las díadas evaluadas por clínicos expertos. Los puntajes del ASQ:SE también fueron comparados con cuestionarios sobre el estrés y la ansiedad maternas psicológicas. Resultados: el ASQ:SE no se correlacionó significativamente ni con los puntajes externos de la interacción de la díada ni con las cualidades de la relación evaluadas clínicamente, aunque ambas fueron asociadas fuertemente una con la otra. En contraste, los puntajes de ASQ:SE fueron asociados con cuestionarios que se referían a la ansiedad mental psicológica maternal. Esto resultó verdadero sobretudo en los casos de madres clasificadas como depresivas. Es más, el estrés maternal predijo fuertemente los reportes sobre el ASQ:SE. Este estudio apunta hacia ciertos problemas con la validez concurrente del ASQ:SE en muestras clínicas. El mismo demuestra una conexión cercana entre la ansiedad mental psicológica maternal y los puntajes que las madres les dan al funcionamiento social y emocional del infante. La investigación futura debe enfocarse en hasta qué punto el ASQ:SE mide específicamente el funcionamiento del infante o la ansiedad mental de la madre, y cómo el mismo funciona en muestras clínicas versus aquellas que no lo son.

RÉSUMÉ: Les questionnaires “rapport de la mère” de fonctionnement social et émotionnel du nourrisson sont de plus en plus utilisés pour tester les enfants afin de les envoyer consulter en services de santé mentale du nourrisson. La validité du questionnaire “âge et étapes: social et émotionnel” (en anglais *Ages and Stages Questionnaire: Social et Emotionnel*, abrégé ASQ:SE en anglais) a été examinée chez un échantillon de mères de jeunes bébés cherchant de l’aide. Elle a été comparée à des interactions dyadiques évaluées par un observateur indépendant, la qualité des relations dyadiques étant évaluée par des cliniciens experts. Les évaluations ASQ:SE ont aussi été comparées aux questionnaires sur la détresse et le stress psychologique maternel. Résultats: Le questionnaire ASQ:SE n’a pas été fortement mis en corrélation avec soit les évaluations externes d’interaction dyadique soit les qualités de la relation évaluées cliniquement, bien que ces deux dernières aient été fortement liées les unes aux autres. Par contre, les scores ASQ:SE étaient liés aux questionnaires qui portaient sur la détresse psychologique maternelle. Ceci s’est surtout avéré vrai pour les mères classifiées comme déprimées. De plus, les rapports sur le ASQ:SE étaient fortement prédits par le stress maternel. Cette étude met en lumière certains problèmes avec la validité simultanée du questionnaire ASQ:SE dans les échantillons cliniques. Elle démontre aussi un lien étroit entre la détresse psychologique des mères et leurs évaluations du fonctionnement social et émotionnel du nourrisson. Des recherches plus approfondies devraient porter sur la mesure dans laquelle le questionnaire ASQ:SE mesure spécifiquement le fonctionnement du nourrisson ou la détresse maternelle, et comment il fonctionne dans des échantillons cliniques par rapport à non-cliniques.

ZUSAMMENFASSUNG: Fragebögen der sozial-emotionalen Funktionsweisen, die auf Elternurteilen beruhen, werden zunehmend zur Klärung der Frage eingesetzt, ob eine ärztliche Überweisung im Rahmen von psychischer Gesundheit im Kleinkindalter induziert ist. Die Gültigkeit des Fragebogens zum Alter und zu den Entwicklungsstufen “Sozial Emotional” (ASQ: SE) wurde von einer Gruppe Hilfe-suchender Mütter mit Kleinkindern entwickelt. Die Fragebögen wurden von unabhängigen Beobachter innerhalb dyadischer Interaktionen validiert. Zusätzlich überprüften erfahrene Kliniker die Qualität der dyadischen Beziehungen. Die Bewertungen mittels ASQ: SE wurden darüber hinaus mit Fragebogen zu mütterlichen psychologischen Stress und Ängste verglichen. Ergebnisse: Die ASQ: SE zeigte keine signifikant Korrelation mit den externen Ergebnissen der dyadischen Interaktion oder den klinisch beurteilten Beziehungsqualitäten, obwohl die beiden letzteren trotzdem in Zusammenhang standen. Im Gegensatz dazu zeigten die Ergebnisse

des ASQ: SE einen Zusammenhang mit den Fragebögen zur mütterlichen psychischen Belastung. Dies galt vor allem für Mütter die als depressiv eingestuft wurden. Außerdem machten die Ergebnisse des ASQ: SE eindeutige Vorhersagen was den mütterlicher Stress anbelangt. Die Studie weist auf einige Probleme der übereinstimmenden Gültigkeit des ASQ: SE in klinischen Stichproben hin. Es zeigt aber auch eine enge Verbindung zwischen mütterlicher psychischer Belastung und ihren Bewertungen der sozialen und emotionalen Funktionsfähigkeit ihrer Säuglinge hin. Weitere Forschung sollte untersuchen, inwieweit der ASQ: SE gezielt Maßnahmen zur Steigerung der Funktionalität von Säuglingen oder mütterliche Not misst und in wie weit der Fragebogen im klinischen bzw. nicht-klinischen Setting Gültigkeit behält.

抄録：乳幼児の社会－感情的機能について母親が報告する質問紙は、乳幼児精神保健サービスに臨床的に紹介するかスクリーニングするために、ますます使われるようになっていく。年齢と段階の質問紙：社会感情的 the Ages and Stages Questionnaire: Social Emotional (ASQ:SE)の妥当性が、若い乳児を持ち援助を求めている母親のサンプルで、調査された。それは、独立した観察者が評価した二者間の相互交流、および熟練した臨床家によって評価された二者間の関係性の質と、比較された。ASQ:SEの評価は、母親の心理的なストレスと苦痛についての質問紙とも比較された。結果：ASQ:SEは二者間の相互交流の外的な評価および臨床的に評価された関係性の質のどちらとも有意に相関してはいなかったが、後の二つはお互いに強く関連していた。それに対し、ASQ:SEは母親の心理的な苦痛に関する質問紙と関連していた。これは特に抑うつと分類される母親に、当てはまった。さらに ASQ:SE の報告は母親のストレスによって強く予測された。この研究は臨床サンプルにおける ASQ:SE の同時妥当性に、いくつかの問題を指摘する。これはまた、母親の心理的な苦痛と、乳児の社会的および感情的機能についての母親の評価との間に、密接な関連があることを示している。ASQ:SE が特異的に乳児の機能を測定している、あるいは母親の苦痛を測定している程度について、そしてそれが臨床ではないサンプルに対して、臨床サンプルではどのように機能しているのかについて、さらに研究調査するべきである。

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The nature of early social and emotional development in infancy is widely recognized as crucial for the individual's future development (Sroufe, 1995). This insight has highlighted the need for methods of detecting disruptions in infant social and emotional functioning. Our study aims to contribute to an understanding of the utility of mother-report questionnaires in clinical samples. More specifically, the study investigates the validity of one such recent questionnaire, the Ages & Stages Questionnaire: Social-Emotional (ASQ:SE; Squires, Bricker, Heo, & Twombly, 2002). The ASQ:SE is a brief parent-report questionnaire designed to identify young children and infants in need of further evaluation for social and emotional problems. Our study examines its validity in a clinical sample by comparing it to self-report questionnaires on maternal psychological distress, observer-rated qualities of mother-infant interaction, and interviewer-rated qualities of the mother-infant relationship. This study has two aims:

- to investigate the concurrent validity of mothers' reports of infant social and emotional functioning on the ASQ:SE with clinical assessments of dyadic relationships and independent ratings of the interactions, and
- to investigate the associations between ASQ:SE scores and maternal psychological distress, as measured on self-report questionnaires.

Socioemotional development evolves within the infant's primary relationships. These relations affect the developing child's ability to regulate behavior (Sorce, Emde, Campos, & Klinnert, 1985) and affective states (Gergely & Watson, 1996). However, several factors can deleteriously affect early infant socioemotional development. One risk factor is parental mental illness (e.g., Field, 2002; Grace & Sansom, 2003; Martins & Gaffan, 2000; Murray & Cooper, 1997; Teti, Gelfand, Messinger, & Isabella, 1995). Field et al. (1988) found that infants of depressed mothers, as compared to infants of nondepressed mothers, showed less positive interactive behavior. This was true not only when interacting with their mothers but also with strangers. The adverse effects of maternal postnatal depression on the child's later cognitive functioning have been well documented (e.g., Murray & Cooper, 2003). Taken together, these studies have highlighted the importance of very early experiences as well as the need to detect risk and intervene early (Fonagy, 1998; Glascoe, 2005; Squires, Bricker, Heo, & Twombly, 2001).

Many authors have recommended parent-report questionnaires for screening and assessing infant social and emotional functioning (e.g., Bricker, 2004; Briggs-Gowan, Carter, Irwin, Wachtel, & Cicchetti, 2004; Glascoe, 2005; Glascoe & Macias, 2003); however, until recently, there have been few brief and user-friendly questionnaires. One of the first, the Infant-Toddler Social Emotional Assessment (ITSEA; Carter & Briggs-Gowan, 2000), is a comprehensive, 169-item adult-report questionnaire with acceptable internal consistency, test-retest reliability, and concurrent validity with other parent-report checklists (Briggs-Gowan & Carter, 1998; Carter, Briggs-Gowan, Jones, & Little, 2003; Carter, Garrity-Rokous, Chazan-Cohen, Little, & Briggs-Gowan, 2001). A study comparing ITSEA scores with laboratory observations of 12-month-old infants' behavior (Carter, Little, Briggs-Gowan, & Kogan, 1999) has revealed moderate correlations between some problem and competence subscales on the ITSEA and infant behavior and with attachment classifications. The same correspondence was not found for the dysregulation subscales of the ITSEA, relating to eating and sleeping. This study was carried out with a low-risk, nonclinical sample and does not inform us about the utility of parent reports in high-risk samples in which infant social and emotional difficulties are likely to be more prevalent.

A shorter version of the ITSEA, the Brief Infant-Toddler Social and Emotional Assessment (BITSEA; Briggs-Gowan et al., 2004), is used to screen for socioemotional/behavioral problems and delays in 12- to 36-month-olds. It has been shown to have acceptable psychometric properties (Briggs-Gowan et al., 2004). The validation criteria included independent observer ratings of the child's behavior at home. In this normative sample, there were significant correlations between BITSEA scores and observer ratings.

The ASQ:SE (Squires et al., 2002), the instrument investigated here, was developed for children aged 3 months to 5 years. It is currently recommended and used as a screening instrument for social and emotional difficulties (e.g., Gilkerson & Kopel, 2005; Lyman, Njoroge, & Willis, 2007) and for evaluating outcome in early intervention initiatives in the United States (Perry, 2005; Richardson & Graf, 2006). The ASQ:SE has been validated in clinical and nonclinical populations, but criterion measures were based on parents' reports of child functioning and not on

observer-rated behavior. It is very important that the validity of such an instrument be established in relation to observed behavior as well as other parent-report instruments.

FACTORS IN THE MOTHER INFLUENCING HER REPORTS OF CHILD FUNCTIONING

The demonstrated associations between mother-report questionnaires and external ratings of behavioral interaction have not precluded considerable criticism of the validity of parent-report measures (Bates, 1980; Bates & Bayles, 1984; Sameroff, Seifer, & Elias, 1982; Seifer, Sameroff, Barrett, & Krafchuk, 1994; Vaughn, Taraldson, Cuchton, & Egeland, 1981). Sameroff et al. (1982) demonstrated that mothers' reports of infant temperament related to maternal social status, level of anxiety, and mental health status. They concluded that individual differences in the mother, rather than in the infant, may contribute to ratings of infant temperament. Similarly Vaughn et al. (1981), in their study using the Carey Infant Temperament Questionnaire, found that mothers' psychological factors influenced their perceptions of infant temperament and their own behavior with the baby. In contrast, these maternal factors were minimally related to observer ratings of infant behavior, and infant behavior was unrelated to maternal reports of infant temperament.

In clinical populations, maternal depression and anxiety may potentially bias parents' reports of child behavior and functioning (e.g., Breslau, Davis, & Prabucki, 1988; Briggs-Gowan, Carter, & Schwab-Stone, 1996; Estroff et al., 1984). For example, Field, Morrow, and Adelstein (1993) compared parent and observer ratings of the same videotaped mother–infant interaction. Mothers classified as “depressed” on the Beck Depression Inventory (BDI; Beck, Ward, Mendelsohn, Mock, & Erbaugh, 1961) rated their infants' behaviors more negatively than did independent observers. Depressed mothers' ratings of infant behavior also were addressed by Lee, Hans, and Thullen (2006). They compared young, prenatally depressed mothers' sensitive responsiveness to their newborn infants, as rated by trained observers, with scores on infants' disruptive behavior on the BITSEA at 12 months. Depressed mothers were rated as being less sensitive in interactions. In addition, their levels of sensitive responsiveness were related to their BITSEA scores at 12 months. In contrast, these associations were not found for mothers with low levels of depression. The authors concluded that depressed women with insensitive responsiveness to their infants' cues also may perceive their infants' behavior as problematic.

In the current climate, which advocates early screening methods for young babies, we need to clarify the constructs that screening questionnaires measure, especially in high-risk populations. Our study investigates the validity of the ASQ:SE in such a sample. This is important for a number of reasons. First, the ASQ:SE is relatively new and is the first easily administered screening instrument for social and emotional problems in infants under 1 year of age. Second, few studies have compared such screening instruments with observer-rated interactions, especially concerning very young infants. Third, few studies have been devoted to clinical samples. Finally, reported biases in mothers' perceptions of infant behavior and temperament might impact negatively on later infant development.

Rothbart and Hwang (2002) argued that recent studies have shown some convergence between parent-reported and observed measures of infant temperament, particularly as methods of assessment have improved. These authors also noted that the brief observations by independent raters are not necessarily a good standard for validating parents' reports based on a different context. In consideration of this critique, our study compares the ASQ:SE not only with

external assessments of brief interactions but also with clinical assessments of mother–infant relationships, and with three other questionnaires tapping maternal psychological distress.

THE ASQ:SE

The ASQ:SE (Squires et al., 2002) is a further development of the ASQ (Bricker & Squires, 1999). It is a parent-report questionnaire in which the mother assesses her child's social and emotional functioning. She is asked questions such as "Does your baby smile at you and other family members?" "Does your baby cry for long periods of time?" "Does your baby have trouble sucking from a bottle or breast?" Most items are rated on a 4-point scale (0, 5, 10, or 15 points: "most of the time," "sometimes," "rarely or never," and "check if this is a concern"), but four items are rated on a 2-point scale (0 or 5 points, whether any problem is indicated or not). For babies 3 to 8 months of age, there are 22 items. For babies 9 to 14 months, there are 25 items, and for babies 15 to 20 months, there are 29 items. To facilitate comparisons between babies of different ages, we have used the mean score across all rated items (total score/number of items).

The ASQ:SE has been standardized on 3,014 children aged 6 to 60 months and their families (Squires et al., 2001). The sample was drawn from both community and clinical sources. Internal consistency ranged from a Cronbach's α coefficient of .67 to .91, with an overall α of .82. Questionnaires for the youngest age intervals (3–14 months) had moderately low internal consistencies of .69 and .67, respectively. Test-retest reliability between 1- to 3-week intervals was reported as 94%.

The concurrent validity of the ASQ:SE was assessed by comparing classifications of risk based on empirically derived cutoff scores with classifications on selected criterion measures. For infants aged 24 months and older, the Child Behavior Checklist (Achenbach, 1991, 1992a) was used whereas the Vineland Social–Emotional Early Childhood Scale (Sparrow, Balla, & Cicchetti, 1998) was used for infants 24 months and under. Squires et al. (2002) found that the sensitivity to correctly identify children with socioemotional delays ranged from .75 to .89, with an overall sensitivity of .82. Specificity ranged from .82 to .96, with an overall specificity of .92.

The authors of the ASQ:SE provided recommended cutoff scores. We adjusted them according to the number of questions in each age group, which yielded the following cutoff scores: 2.05 for the youngest age group, 1.92 for children 9 through 14 months, and 1.72 for children aged 15 through 20 months.

METHODS

Sample

The sample was recruited from the Mother–Infant Psychoanalysis Project in Stockholm (MIPPS), in which mother–infant dyads were randomized to mother–infant psychoanalytic treatment (Norman, 2001) or to treatment as usual at child health centers. Inclusion criteria were (a) the mother had expressed a need for psychological help with her infant or for herself in her role as a mother, (b) the family was living in the Stockholm area, (c) the mother had sufficient mastery of Swedish to take part in psychotherapeutic treatment, and (d) the infant was younger than 18 months of age. Dyads were excluded if the mother had a current psychosis or an alcohol or drug dependence to an extent precluding cooperation.

Dyads were recruited from advertisements on parenting Web sites on the Internet (64%), from child health centers collaborating with the MIPPS (24%), and from an information sheet

at the delivery ward of the Karolinska University Hospital (12%). The mothers were invited to take part in the project if they were experiencing difficulties with their babies or with themselves as mothers to an infant. Interviews took place between October 2005 and January 2008.

Ninety mother–infant dyads met the inclusion criteria and chose to take part. After the interviews, four dyads dropped out of the study without completing the questionnaires, and in 16 cases, the interaction videos were unfeasible because the child was asleep or because of technical problems with the recording. This study reports results for the remaining 68 mothers and infants. The mothers' mean age was 33.0 years ($SD = 4.0$), and the fathers' mean age was 34.4 years ($SD = 5.3$). In 78% of the dyads, the target infant was the first-born child. Infants were 1 to 16 months of age ($M = 5.6$ months, $SD = 3.3$). Mean birth weight of the infants was 3,500 g ($SD = 550$), and delivery had taken place, on average, in Pregnancy Week 39.8 ($SD = 1.6$). Fifty-five percent of the infants in the sample were female.

All except 4 mothers lived with the child's father. Sixty-seven percent of the mothers had an educational qualification above A-level (i.e., >13 years of school education). Twenty-four percent had an A-level qualification while 9% had a lower educational level or were still studying. The educational level of the sample is somewhat higher than average for Stockholm mothers of the same age (53, 35, and 12%, respectively (figures for 2005 from the Stockholm City Web site, <http://www.stockholm.se>). This difference probably reflects the design, which captured the attention of distressed mothers with an interest in mother–infant relations.

Ethical Approval

The MIPPS project was approved May 23, 2005, by the Swedish Central Ethical Vetting Board (Centrala etikprövningsnämnden).

Data collection. Following referral, the first author met with the mothers and babies and gained informed consent for their participation. In-depth assessments of 90 min took place with the mothers and babies. A semistructured interview was adapted to the themes brought up by the mother. It consistently covered 20 specified items on how she experienced pregnancy, delivery, nursing, family relations, and her own psychological state as well as her baby's symptoms and their emotional contact (see the Appendix for more details on the interview format, which is currently the subject of a validation study). The interviewer also closely observed and recorded the baby's behavior and contact with the mother. Mothers and infants were video recorded while interacting together for 10 min, in the interviewer's absence. Mothers were instructed to be together with their child as they normally would. Finally, mothers were asked to complete four self-report questionnaires at home.

Instruments

Observer-based assessments of parent–infant interaction. The Emotional Availability Scales, third edition (EAS; Biringen, Robinson, & Emde, 1998) was used to assess mother–baby interactions on a videotaped sequence. It is comprised of four maternal subscales: Sensitivity, Structuring, Nonintrusiveness, and Nonhostility, and two infant subscales: Responsiveness and Involvement. Sensitivity refers to how the mother reads and responds to the infant's signals, including her "affect, awareness of timing, variety and creativity in play, and flexibility in negotiating conflict situation" (Biringen, Robinson, & Emde, 2000, p. 257). Structuring refers to how

she “structures the child’s play by taking care to follow the child’s lead, and sets limits for appropriate child behavior and/or misbehavior” (p. 260). Nonintrusiveness refers to an absence of overdirectiveness, overstimulation, interference toward the child, with the mother thus respecting the child’s autonomy. Nonhostility refers to the absence of overt and covert hostile behavior and attitudes toward the child. A child’s responsiveness is reflected in his or her “eagerness or willingness to engage with the parent following a suggestion or bid for exchange and . . . in displaying clear signs of pleasure in interaction” (p. 266). Finally, child involvement “assesses the degree to which the child attends to and engages the parent in play” (p. 268).

Interrater reliability for the EAS is reported to be high after training, with correlations around .80 (Biringen et al., 2000; Wiefel, 2005). The subscales’ ranges differ between 1 to 5 and 1 to 9. We adjusted scores to these different ranges and then calculated the means of the four maternal subscales and the two infant subscales, respectively. We named them “EAS Mother mean” and “EAS Infant mean.” Their possible range was thus 0 to 1. In our sample, the average EAS Mother mean was .76 (.11), and the average EAS Infant mean was .63 ($SD = .19$), implying a 76 and 63% level, respectively, of optimal maternal and infant interactive contributions. These assessments were based on interactions with free play or situations in which the mother thought the child’s behavior indicated hunger and fed him or her. Behavioral as well as emotional qualities were rated and subsumed under each EAS subscale.

Two independent and blind raters carried out the coding of the interactions on the EAS; one a psychologist and one a child psychiatrist, both with substantial clinical experience with infants. They were trained by the first author and certified by the author of the instrument. Regular seminars were held to keep rating quality at a high level and to minimize rater drift.

In the EAS literature, different methods of assessing interrater reliability have been used. While Little and Carter (2005) used interclass correlation coefficients, Kogan and Carter (1996) used intraclass (ICC) reliability coefficients. We regard the EAS scores as quantitative data and followed the standard practice of calculating interrater reliability for quantitative variables (i.e., by calculating ICC correlations). This was done on each subscale for 31 dyads assessed by both raters. For the maternal subscales Sensitivity, Structuring, Nonintrusiveness, and Nonhostility, the ICC was .74, .71, .84, and .67, respectively. For the infant subscales Responsiveness and Involvement, the ICC was .78 and .77, respectively. We used the rater means on each subscale for calculations.

Clinical assessments of the mother–baby relationship. The Parent–Infant Global Assessment Scale (PIR-GAS; ZERO-TO-THREE, 2005) was used to assess the parent–infant relationship. The PIR-GAS is an instrument that “measures overall relationship functioning, without regard to whether relationship impairments arise from the infant, the caregiver, or the unique fit between the two” (Boris, Zeanah, Larrieu, Scheeringa, & Heller, p. 296). On the basis of three components (behavioral interactive quality, affective tone, and psychological involvement), a global judgment is made on a scale of 0 (*documented maltreatment*) to 99 (*well-adapted*).

After a lengthy interview, PIR-GAS ratings were made by the first author, who is an experienced child and infant psychoanalyst and psychiatrist. Interrater reliability assessments were carried out by an independent psychologist, who has no allegiance to mother–infant psychoanalytic treatment and who has extensive experience in infant clinical work and PIR-GAS ratings. She and the first author met for regular seminars to view and discuss video recordings of the entire interviews and the free-play dyadic interactions to keep rating quality at a high level and to minimize rater drift. Interrater reliability was computed for 20 interviews,

and the ICC correlations coefficient was .90. In the statistical analyses, we used the means of the two ratings for those dyads assessed by two raters. In our sample, the mean of the PIR-GAS ratings was 69 ($SD = 12$), implying relationship ratings of “significantly perturbed,” reflecting the clinical nature of the sample.

Instrument assessing maternal depression. The Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987; Cox, Chapman, Murray, & Jones, 1996) was used to rate maternal depression. This questionnaire is widely used internationally, including at Swedish child health centers. It has been validated in Swedish samples (Edhborg, Lundh, Seimyr, & Widstrom, 2003; Rubertsson, Waldenstrom, Wickberg, Radestad, & Hildingsson, 2005; Wickberg & Hwang, 1996, 1997) as well as samples from many other countries (Adouard, Glangeaud-Freudenthal, & Golse, 2005; Areias, Kumar, Barros, & Figueiredo, 1996; Carpiniello, Pariante, Serri, Costa, & Carta, 1997; Garcia-Esteve, Ascaso, Ojuel, & Navarro, 2003; Guedeney & Fermanian, 1998; Murray & Carothers, 1990). The EPDS consists of 10 items with 3-point scales (“Yes, all the time.” “Yes, most of the time.” “No, not very often.” “No, not at all.”), the total score ranging from 0 to 30. As Eberhard-Gran, Eskild, Tambs, Opjordsmoen, and Ove Samuelsen (2001) established, cutoff scores for nondepressed versus depressed women have varied in different studies from 8/9, respectively, to 12/13, respectively. Some Swedish studies have used 12/13, respectively (Edhborg, Seimyr, Lundh, & Widstrom, 2000), while others have used 11/12, respectively (Rubertsson et al., 2005). A Swedish validation study (Wickberg et al., 1996) recommended 11/12, which was the one used in the study.

The EPDS has been shown to have good sensitivity (.86–.96) and specificity (.78–.81) in detecting major depression compared to diagnoses through standardized psychiatric interviews (Cox et al., 1996; Murray & Carothers, 1990). Internal consistency also has been shown to be satisfactory, with $\alpha = .87$ (Cox et al., 1996).

Seimyr, Edhborg, Lundh, and Sjogren (2004) administered the EPDS to a normative sample of mothers in Stockholm ($N = 326$), 2 months after childbirth; they reported mean scores of 5.65 ($SD = 4.13$). Wickberg and Hwang (1997) found corresponding scores in a sample of 1,874 Gothenburg mothers to be 6.9 ($SD = 4.1$). In our sample, the mean EPDS score was 11.7 ($SD = 4.7$), and the median value was 12. Half of the mothers were thus at or above the cutoff score, at which point one should “confirm whether or not clinical depression is present” (Cox et al., 1987, p. 785). Again, this testifies to the clinical nature of our sample.

Instrument assessing symptoms of maternal psychological distress. The Symptom Check List-90 (SCL-90; Derogatis, Lipman, & Covi, 1973) was used for assessing maternal psychiatric and somatic distress. As a more recent version, the SCL-90 R, (Derogatis, 1994) has not been translated into Swedish, the Swedish translation of the SCL-90 (Fridell, Cesarec, Johansson, & Malling Thorsen, 2002) was used. This widely used instrument taps the individual’s present psychological complaints rather than any specific psychiatric disorder (Fridell et al., 2002). The SCL-90 has been used for evaluating the effects of group therapy for postpartum depression (Hofecker-Fallahpour et al., 2003) and the validity of the EPDS (Brouwers, van Baar, & Pop, 2001).

Fridell et al. (2002) argued that the homogeneity of all SCL-90 items is high, which has led them to focus on one comprehensive scale of all items. Similarly, intercorrelations between the nine subscales originally devised by Derogatis (1994) also are high. Consequently, our analyses focus on the General Severity Index (GSI) rather than on individual subscales. The mean GSI of

our sample was .93 ($SD = .59$), which is twice as high as that reported for a normative Swedish sample of women in the same age range (Fridell et al., 2002).

Instrument assessing maternal stress. Since parental stress is known to influence child development (Essex et al., 2006; Faught, Bierl, Barton, & Kemp, 2007; Mäntymaa, Puura, Luoma, Salmelin, & Tamminen, 2006; Pelchat, Bisson, Bois, & Saucier, 2003), the Swedish Parental Stress Questionnaire (SPSQ; Östberg, Hagekull, & Wettergren, 1997) was used to assess levels of maternal stress. The SPSQ is a Swedish version of the Parenting Stress Index (Abidin, 1990). Östberg et al. (1997) reported good internal consistency (.87–.90) and test-retest reliability ($r = .89$).

The SPSQ consists of 35 items on 5-point scales (“strongly agree,” “moderately agree,” “neither agree nor disagree/unsure,” “moderately disagree,” “strongly disagree”), and our analyses focus on the total mean scores. For our sample, the mean value was 2.92 ($SD = 0.56$). The total mean score reported by Östberg (1998) for a sample of mothers seeking help at a specialist child health center was 2.79 ($SD = 0.59$), confirming the high rates of psychopathology in our sample.

Statistics

For the statistical analyses, we used SPSS Version 15.0. Only one case had incomplete values because the mother did not return the EPDS. We imputed her missing values by substituting means. Statistical methods included correlation analysis, multiple regression, and factor analysis.

RESULTS

Descriptive Statistics for the ASQ:SE

Sixty-eight ASQ:SE questionnaires were completed. Of these, 52, 15, and 1 applied to children aged 3 to 8 months, 9 to 14 months, and 15 to 20 months, respectively. Mean scores for each child ranged from 0.00 to 5.23. The mean value was 1.94 ($SD = 1.2$), and the median was 1.82. Kurtosis and skewness of the distribution were within the acceptable range; their ratios with corresponding standard errors being less than 2. There were no outliers.

Comparing the ASQ:SE With Other Instruments

An initial analysis revealed significant correlations between observer-rated mother–infant interaction and interviewer-rated relationship quality (i.e., the EAS and the PIR-GAS). The ASQ:SE, however, did not correlate significantly with these instruments, only with the other questionnaires (see Table 1).

The ASQ:SE was developed for children from age 3 months and older, and 16 of 68 babies in our sample were younger; however, the mean ASQ:SE scores were the same for infants older and younger than 3 months of age. We also tested the effects of child age on the correlation matrix. The correlations remained essentially the same when we partialled out the effects of child age, whether measured as number of months or when dichotomized into infants older and younger than 3 months of age.

To further our understanding of the variables predicting ASQ:SE scores, we carried out a multiple regression analysis. The ASQ:SE total score was the dependent variable, and all

TABLE 1. Correlations of Questionnaire Mean Scores, Clinical Ratings of Dyadic Relationship, and Observer Ratings of Interaction

	EAS Mother	EAS Infant	PIR-GAS	EPDS	SCL-90 GSI	SPSQ
ASQ:SE	-.061	-0.91	-.225	.286 ^a	.366 ^b	.502 ^b
EAS Mother		.645 ^b	.400 ^b	.134	.060	.145
EAS Infant			.257 ^a	-.228	-.163	.249 ^a
PIR-GAS				.316 ^b	-.184	.285 ^a
EPDS					.716 ^b	.632 ^b
SCL-90 GSI						.617 ^b

ASQ:SE = Ages & Stages Questionnaire: Social-Emotional; EAS = Emotional Availability Scales; PIR-GAS = Parent-Infant Global Assessment Scale; EPDS = Edinburgh Postnatal Depression Scale; SCL-90 GSI = Symptom Check List-90, General Severity Index.

^aSignificant at the .05 level (two-tailed).

^bSignificant at the .01 level (two-tailed).

other instrument scores and child age were entered as independent variables. With a backwards stepwise procedure, all variables except SPSQ were excluded, $F = 22.237$, $p = .000$, $\beta = .502$. This model accounted for 24% of the variance in ASQ:SE scores.

To further investigate inter-instrument correlations, a principal components analysis with oblique rotation on all instrument scores was carried out. A two-component solution with eigenvalues above 1 accounted for 65% of the total variance. The first component loaded strongly on the questionnaire scores, and the second component loaded strongly on interaction ratings (see Table 2).

To investigate the effects of maternal depression on the factor structure, the sample was divided into mothers scoring above or below the cutoff score of 11/12 on the EPDS. Thirty-six mothers were classified as depressed, and 32 as nondepressed. A principal components analysis with oblique rotation on the depressed subsample resulted in a two-factor solution explaining 62% of the total variance. The pattern was almost identical to that for the total sample (i.e., one factor loading on questionnaire scores and the other on external ratings of

TABLE 2. Factor Loadings Following Principal Components Analysis, with Oblique Rotation, of Questionnaire Scores, Clinical Ratings of Dyadic Relationship, and External Ratings of Interaction (Whole Sample)

	Component 1	Component 2
ASQ:SE	.640	
EPDS	.823	
SCL:90 GSI	.872	
SPSQ	.842	
EAS Mother		.935
EAS Infant		.845
PIR-GAS		.549

ASQ:SE = Ages & Stages Questionnaire: Social-Emotional; EPDS = Edinburgh Postnatal Depression Scale; SCL-90 GIS = Symptom Check List-90, General Severity Index; SPSQ = Swedish Parental Stress Questionnaire; EAS = Emotional Availability Scales; PIR-GAS = Parent-Infant Global Assessment Scale.

TABLE 3. Factor Loadings Following Principal Components Analysis, with Oblique Rotation, of Questionnaire Scores, Clinical Ratings of Dyadic Relationship, and External Ratings of Interaction (Nondepressed Mothers Only)

	Component 1	Component 2	Component 3
ASQ:SE		.827	
EPDS			-.630
SCL-90 GSI	.527		
SPSQ	-.907		
EAS Mother	-.849		
EAS Infant		.838	
PIR-GAS			.838

ASQ:SE = Ages & Stages Questionnaire: Social-Emotional; EPDS = Edinburgh Postnatal Depression Scale; SCL-90 GIS = Symptom Check List-90, General Severity Index; SPSQ = Swedish Parental Stress Questionnaire; EAS = Emotional Availability Scales; PIR-GAS = Parent-Infant Global Assessment Scale.

mother-infant interaction and relationship). On the other hand, the corresponding analysis of the nondepressed subsample revealed a different pattern. A three-factor solution explained 66% of the total variance. As seen in Table 3, the pattern matrix was more complex; the first factor loaded on the EAS and the GSI, the second factor on the SPSQ and ASQ:SE scores, and the third on the PIR-GAS ratings and EPDS scores.

In summary, parent reports on the ASQ:SE did not significantly correlate with external ratings of dyadic interactions and relationships. In addition, ASQ:SE ratings were predicted only by the mothers' concurrent reports of parenting stress, but not by any other measured variable. The ASQ:SE and the other questionnaires of maternal stress and psychological distress formed one principal component with high factor loadings. A second component was comprised of external ratings of dyadic interaction and relationship. After splitting the sample into depressed and nondepressed mothers, the two-component pattern remained for the depressed mothers while the pattern became less discernible for the nondepressed mothers.

DISCUSSION

The ASQ:SE mean scores reflected the clinical nature of the sample, as did the other instruments used. Compared with the constructor's recommended cutoff score of 2.05 for the youngest age group and 1.92 for the older ones, the mean score reported here of 1.94 lies close to the borderline, indicating children in need of help. As a comparison, Squires, Bricker, and Twombly (2004) reported mean scores of 1.35 and 1.62, respectively, for children of the same age groups who were categorized as having a "developmental disability" due to several risk factors being present.

Thus, for this sample, which on all measures revealed some level of risk, we aimed to investigate (a) mothers' reports of infant socioemotional functioning on the ASQ:SE in relation to external ratings of dyadic relationships (the PIR-GAS) and interactions (the EAS), and (b) mothers' reports of infant socioemotional functioning in relation to self-reported stress and psychological distress (the EPDS, the SCL-90, and the SPSQ).

We found that the ASQ:SE did not correlate significantly with the EAS or the PIR-GAS, though the latter two correlated significantly with each other. We also found that the ASQ:SE

scores were clearly associated with the other maternal questionnaires, especially with the SPSQ measuring maternal stress.

In terms of our first aim, we had expected significant correlations between ratings of interaction/relationship and mother reports on infant socioemotional functioning. One might argue that the ASQ:SE was not designed to measure the same constructs as the EAS or the PIR-GAS, and that these would not constitute appropriate validation criteria. However, the rationale for measuring infant socioemotional functioning is to capture infants potentially in need of clinical intervention. Since clinical need also is revealed by disturbances in dyadic interactions and relationships, especially when the infants are very young, we believe there should be substantial overlap between the three instruments. Disruptions in infant socioemotional functioning, such as problems with feeding, social relatedness, affect regulation, and so on, would be expected to impinge on the baby's responsiveness to the mother and involvement with her. In parallel, this would be expected to affect the quality of their clinically assessed relationship.

The association between the EAS and the PIR-GAS and clinical need in infancy has been supported by previous studies. Wiefel et al. (2005) found associations between the need for psychotherapeutic treatment based on clinical assessments and EAS scores assessed by independent raters. Similarly, Aoki, Zeanah, Heller, and Bakshi (2002) found that low PIR-GAS scores were related to clinical symptomatology in infancy, and that they predicted adverse mother–infant interaction and child internalizing symptomatology. In a clinical sample, Thomas and Guskin (2001) found the PIR-GAS to correlate with Axis I diagnoses on the DC 0–3 (ZERO-TO-THREE, 1994), and with externalizing and internalizing symptoms on the Child Behavior Check List/2–3 (Achenbach, 1992b).

Our findings are contrary to two other studies (Briggs-Gowan et al., 2004; Carter et al., 1999) that have found links between parent-reported infant socioemotional functioning on the ITSEA and the BITSEA and observed parent–infant interaction; however, these studies were carried out with low-risk, nonclinical populations. Lee et al. (2006) found that mothers who were depressed and insensitively responsive to their infants were potentially at risk of reporting their infants' behavior as problematic on the BITSEA. Taken together, these findings may indicate differential parent-report results when parental psychological distress is high.

Our second aim was to investigate associations between mothers' reports on infant socioemotional functioning with mother-reported psychological distress. Several studies have pointed to the close relationship between mother–infant interaction and maternal depression (Carter et al., 2001; Field, 2002; Field et al., 1988; Tronick & Weinberg, 1997). Many of them have mapped out how infants of depressed mothers tend to exhibit behaviors indicative of social and emotional problems. Our results showing close associations between all the questionnaires could therefore be taken to confirm the effects of maternal psychological distress on infant functioning. On the other hand, the interquestionnaire associations might be explained by a methodological bias. Thus, a similar response pattern across several questionnaires may not automatically reflect the same degree of disturbance on each construct measured but rather a bias toward certain ways of responding.

If our results reflected a methodological bias, we would have expected similar response patterns regardless of maternal psychological status. If, on the other hand, mothers' perceptions of infant socioemotional functioning were affected by their levels of distress, associations would differ according to these levels. To investigate this, we compared mothers classified as depressed and nondepressed according to EPDS scores and found that the strong interquestionnaire associations applied only to depressed mothers. Thus, maternal depression seems strongly linked with

responses on the questionnaires, including those on the ASQ:SE. We therefore argue that the ASQ:SE scores cannot be taken to solely reflect infant socioemotional functioning. A component reflecting maternal psychological distress seems to be included in the mother's response pattern. This interpretation especially would be the case for depressed mothers.

With our growing insight into the importance of infancy for the individual's future development and mental health, and with increased resources of detecting and treating mother–infant relational disturbances, there is a need for valid and reliable instruments to detect dyads at risk. Several questionnaires have been devised for such purposes: Some target the mother's mental health, under the assumption that a troubled mother implies a baby in need of attention and possibly treatment, whereas others target the baby's functioning as assessed by the mother.

In the sample used in this study, with its clear level of clinical disturbance, we found a close association between the ASQ:SE and the other questionnaires on maternal psychological distress and stress. Since the ASQ:SE was not closely associated with external ratings that included the baby's observed state and behavior, one interpretation might be that the ASQ:SE functions as an alarm signal of the mother's psychological state rather than as an instrument specifically measuring infant need. This could be taken as an argument that any of the questionnaires would capture dyads in need of help; however, we know too little to understand which questionnaire captures which kind of mother–infant relational disturbance. The ASQ:SE and other similar instruments need further investigation, and we believe this is especially important within clinical and at-risk samples.

Limitations and Further Studies

There are some limitations in the sample used for this study. The mothers' levels of social adversity were relatively low, and their educational levels were somewhat higher than that of the Stockholm population of a similar age. In addition, the high level of clinical need on external ratings and questionnaire scores might be seen as a limitation because it reduces the variability in the measures used; however, this was indeed the focus of our study (i.e., to investigate how mother-report questionnaires fare in a clinical sample). We suggest replication studies on samples with high levels of social adversity as well as comparisons with low-risk, nonclinical samples.

We aimed to look at how the ASQ:SE functions with very young infants, and about one fourth of our sample consisted of infants younger than 3 months. As the ASQ:SE is only advocated for infants aged 3 months or older, this may be seen as a limitation; however, our findings were the same whether we included or excluded babies below 3 months of age. We suggest that further research should look at how ASQ:SE-ratings of infants in differently aged samples compare with observed measures.

Conclusions and Clinical Implications

Screening instruments are currently advocated for detecting early indicators of dysfunction in the baby. The idea behind such recommendations is that screening instruments could detect mothers and infants at risk and help them to obtain treatment. It is important that these instruments are simple to use and as sensitive and specific as possible. The screening instrument that we have been investigating, the ASQ:SE, is indeed simple to use and comprehensible.

When we studied ASQ:SE ratings in a clinical sample, however, we found that they correlated with self-reported maternal psychological distress rather than with clinically assessed mother–infant relationship and externally rated interaction quality. This was especially true for

depressed mothers. Therefore, for distressed mothers, we cannot be sure to what extent the ASQ:SE specifically measures infant functioning or maternal distress.

APPENDIX

The Interview Format

Items are assessed during a 90-minute interview within a semi-structured format. Some items may be addressed in a straightforward manner. For example, number 5 may be tapped by asking the mother, “What do you think of the help you received at the Child Health Centre”? Other items need to be assessed in a more inferred manner (e.g., number 11 tapping the mother’s self-esteem).

All items are formulated as positive statements. After the interview, the interviewer rates their correctness on a 4-point Likert scale. One point implies maximum disagreement with the statement and 4 implies total agreement. It is the mother’s experiences that are rated, not objective facts. A mother might, for example, have had a medically normal delivery but feels it was traumatic. This would yield a low score.

1. The mother felt safe before delivery.
2. The mother feels delivery went well.
3. The mother felt psychologically stable after delivery.
4. The mother feels nursing went well.
5. The mother feels the Child Health Centre supports her.
6. The mother feels confident in speaking with the interviewer.
7. The mother feels her contact with her parents is good.
8. The mother feels the baby’s father supports her.
9. The mother is fond of the baby’s father.
10. The mother has no guilt feelings.
11. The mother’s self-esteem is good.
12. The mother feels safe now.
13. The mother’s feelings for her baby are well integrated.
14. The mother describes her baby as a person in his own right.
15. The mother is insightful about how her life history influences the present situation.
16. The mother feels the baby is somatically well.
17. The mother feels the baby sleeps well.
18. The mother feels the baby has a good appetite.
19. The mother feels her baby is cheerful.
20. The mother feels her baby has a friendly relation with her.

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