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Brief report

Assessing expressed emotion during pregnancy

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ABSTRACT

We assessed Expressed Emotion (EE) with an adapted version of the Five-Minute Speech Sample in 847 pregnant women. The prevalence of high EE was 6%. High EE was significantly associated with having a first child, low income, maternal childhood trauma and lack of parental emotional warmth during childhood.

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1. Introduction

Expressed Emotion (EE) is a construct which measures the amount of criticism, hostility and emotional over-involvement expressed by parents toward a family member of various ages with a psychiatric illness (Kazarian, 1992). EE research shows that patients whose relatives score high on EE have a higher chance of relapse after treatment (Asarnow et al., 1993; Barrelet et al., 1990; Leff et al., 1982; Moline et al., 1985).

The standard method to assess EE is the Camberwell Family Interview (CFI) (Vaughn and Leff, 1976), which is a semi-structured interview conducted over 1.5 h with the parents shortly after the patient's admission to a hospital. Due to the length of administering the CFI, the Five-Minute Speech Sample (FMSS), which includes an assessment of criticism and emotional over-involvement but not a separate construct of hostility (Magaña et al., 1986), was used as a validated measure of EE (Malla et al., 1991). First, high levels of parental EE were found in psychiatric patients; later studies in non-clinical samples using the FMSS indicated that high maternal EE predicts insecure attachment and internalizing or externalizing behavior problems in children (Jacobsen et al., 2000; Vostanis and Nicholls, 1992). Also, in populations in which it was not possible to

use the original assessment instrument of parental EE, adapted versions of the FMSS have been developed. For example, the Revised Five-Minute Speech Sample (R-FMSS) for low birth weight children (St Jonn-Seed and Weiss, 2002), the Preschool Five-Minute Speech Sample (PFMSS; Daley et al., 2003) and the Autism-Specific Five-Minute Speech Sample (ASFMSS; Benson, 2011).

Until now, EE has not been used with regard to the unborn child. Prenatal assessment of EE is of potential importance to gain insight into the evolution of maternal EE. For example, previous EE studies showed that a mother's report on the child can be influenced by child factors, like intellectual disabilities and behavioral problems (Baker et al., 2000; Beck et al., 2004; Peris and Baker, 2000). Reversed causality, i.e. characteristics of the child influence maternal EE, cannot be fully ruled out by prenatal assessment, as in theory the intrauterine behavior of the fetus could affect the mother. Yet in contrast to previous clinical or population-based studies of the relation between EE and child behavior, reversed causality is much less likely to explain the observation in a study that assesses EE prenatally.

The main aim of this study was to introduce and test an adapted version of the FMSS that assesses EE during pregnancy. First, we describe the development and interrater reliability of the scoring procedure. We hypothesized that the intraclass correlation coefficient (ICC) would be comparable to those found in other EE reliability studies (Baker et al., 2000; Benson et al., 2011; Daley et al., 2003; Magaña et al., 1986; McCarty et al., 2004). Next, we investigated whether socio-demographic,

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psychopathology, childhood experiences and family functioning, which have been shown to be associated with postnatal EE, are also related to prenatal EE. Since no golden standard exists for measuring EE during pregnancy, we used these associated factors as a proxy of construct validity.

2. Methods

2.1. Sample

The study is embedded in the Generation R Study, a population-based prospective cohort from fetal life onwards in Rotterdam, The Netherlands (Jaddoe et al., 2010). We collected 847 speech samples from a randomly selected subgroup of Dutch women. Children were born between February 2003 and August 2005 in Rotterdam, one of the major cities of the Netherlands.

The study was conducted in accordance with the guidelines proposed in the World Medical Association Declaration of Helsinki and has been approved by the Medical Ethics Committee of the Erasmus Medical Center, Rotterdam. Written informed consent was obtained from all participants.

2.2. Measures

Participants were visited at home close to the 30th week of gestation to assess EE. In piloting the FMSS in pregnant women, we found that almost all of the women stated that 5 min was too long. In the original FMSS it is functional to complete the total of 5 min, since parents sometimes continue to give different examples of how they relate to their children. In our pilot sample virtually all women remained silent after they had talked 3 min and noted that they could not mention anything else. In the 3-min speech sample, one quarter of women did not fill the 3 min with statements. After this pilot testing we shortened the 5-min instruction to 3 min.

The original instructions for the FMSS (Magaña and Zaden, 1998) were slightly adapted to make it more applicable to pregnancy, i.e. we changed the present tense about the actual relation with the child to expectations in the future tense and shortened the 5-min instruction to 3 min, 'I'd like you to tell me about your unborn child. What I would like to hear from you is what you expect or hope your child will be like and how you would like to relate to your child. After you begin to speak, I prefer not to answer any questions until after the 3 min.' The parents' statements were scored using the two categories from the original FMSS procedure: Criticism and Emotional Overinvolvement (EOI). Criticism consists of a negative initial statement a parent makes about the child or comments that contain disapproval, dislike or annoyance expressed in content or tone during the sample. EOI consists of emotional display, statements of attitude (i.e. statements of love or willingness to do anything for the child), self-sacrificing or overprotective remarks, excessive detail and excessive praise (i.e. five or more positive remarks).

In a pilot phase, after scoring 50 tapes according to FMSS guidelines, it emerged that the original scoring guidelines were not completely applicable. In the original FMSS the parents are asked to talk about the present, and statements about the past or future are not to be scored. By definition, parents in our study were asked to talk about the future. Hence, we scored statements about the future in the 3-min speech sample in the same way as statements in the original FMSS. Also, many women made very elaborative remarks about the pregnancy and/or delivery despite the instruction to talk about expectations of their unborn child. This was similar to the subcategory 'excessive details' of EOI. We found a correlation between these pregnancy-related remarks and 'excessive details' ($r=0.15$; $p<0.001$). These pregnancy-related remarks probably are a pregnancy-specific expression of 'excessive details'. Results including this category as part of EE were similar to those without this category (Supplementary Table 1). The full adapted protocol for scoring is available upon request.

Parity, family income and educational level were collected at 12 weeks' gestational age. Family income was divided into three categories, using 'less than 1200 Euro net a month', which is at the social security level payment for a Dutch household, 'between 1200–2000 Euro net a month' and 'more than 2000 Euro net a month'. Educational level was divided into three categories for highest education finished: 'primary education', 'secondary education' and 'higher education'.

Questionnaires about psychopathology, childhood trauma, perceived parental rearing and family functioning were assessed at 20 weeks' gestational age. The Brief Symptom Inventory (BSI) is a validated self-report psychopathology questionnaire existing of nine symptom dimensions (somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism) with a total of 53 items ranging from 0 to 4 (Derogatis, 1993). The Global Severity Index was used as a measure of overall psychological distress, which consists of a total weighted score obtained by the total score of all symptom dimensions of the BSI divided by the number of completed items (range 0–4). The internal consistency of the current sample was excellent ($\alpha=0.94$).

Maternal childhood trauma was assessed with the validated Childhood Trauma Questionnaire—Short Form (CTQ; Bernstein et al., 1994). The measure

consists of 34 items (range 1–5) covering five subscales: physical abuse, sexual abuse, emotional abuse, physical neglect, and emotional neglect. The internal consistency of the current sample was fair ($\alpha=0.63$). A total weighted score was used, consisting of a weighted score of each subscale obtained by adding up the total scores of each subscale divided by the number of completed items per subscale and then by adding up the weighted scores of each subscale (range 5–25).

Perceived parental rearing was assessed by the short form of the original 81-item *Egna Minnen Beträffande Uppfostran-Swedish* (EMBU; memories on parenting questionnaire) (Arrindell et al., 2001). This is a validated 23-item inventory in which the mother rates each of her parents separately on three scales: emotional warmth (range 6–24), rejection (range 7–28), and over-protection/control attempts (range 10–40). The internal consistency of the current sample was excellent ($\alpha=0.96$ –0.99).

Actual family functioning was measured using the seventh subscale 'General Functioning' (GF) of the Family Assessment Device (FAD), a self-report questionnaire (Byles et al., 1988). GF is a validated overall measure consisting of 12 items (range 1–4) of well-being and/or pathology of the family situation. A weighted score was used, obtained by the total score of items divided by the number of completed items (range 1–4). The internal consistency of the current sample was good ($\alpha=0.89$).

2.3. Data analysis

For interrater reliability, EE was scored with the slightly adapted version of the FMSS guidelines and categorized as low, borderline and high EE according to the subscales 'Criticism (CRIT)' and 'Emotional Overinvolvement (EOI)' of the FMSS manual. Subjects obtained a borderline score if they met some of the criteria to obtain a high score, but did not qualify for a high EE score. Borderline scores are ultimately scored as low EE, but in the calculation of the ICC the original scores were used to obtain more variability. First, one of the co-authors, who was trained by members of the UCLA Family Project, trained three raters. Interrater reliability of the three raters was calculated over 30 tapes, using a two-way mixed ICC, as in previous FMSS studies. The raters were blind as to which tapes would be used to measure reliability. To study the association between high EE and possibly related variables, logistic regression analyses were used with the dichotomized EE scores (low versus high). For our analyses we used the Statistical Package for the Social Sciences (SPSS) version 18.

3. Results

The ICC for the EE scorers was 0.69.

High EE was observed in 6.0% ($N=51$) of participants: 3.8% ($N=34$) of participants scored high on CRIT and 2.1% ($N=18$) scored high on EOI; 0.1% ($N=3$) scored high on both scales.

Descriptives of the study are presented in Table 1. Parental emotional warmth during childhood was negatively associated with the combined subscales (CRIT and EOI) of high EE. Low income and childhood trauma were positively associated with high EE. Additional analyses performed to investigate the association between the subscales CRIT and EOI and the same variables revealed that younger mothers were significantly more critical ($OR=0.9$; 95% CI 0.8–1.0; $P=0.04$) and older mothers were significantly more emotionally overinvolved ($OR=1.3$; 95% CI 1.1–1.4; $P<0.01$). High EE on EOI was significantly associated with psychopathology ($OR=3.4$; 95% CI 1.1–11.0; $P=0.04$), childhood trauma ($OR=1.4$; 95% CI 1.1–1.7; $P<0.01$), emotional warmth of the father and mother during childhood ($OR=0.8$; 95% CI 0.8–0.9; $P<0.01$ and $OR=0.8$; 95% CI=0.7–0.9; $P<0.01$) and rejection of the father and mother during childhood ($OR=1.2$; 1.0–1.3; $P<0.01$ and $OR=1.2$, (1.0–1.3; $P=0.02$).

We repeated our analyses with the borderline and high EE groups combined. This resulted in a prevalence of 47.1% ($N=399$) high/borderline overall EE and 23.6% ($N=200$) high/borderline Critical and 30.5% ($N=258$) for high/borderline EOI. Results changed slightly when high and borderline EE were combined. If anything, findings for Critical EE were stronger, and findings for EOI EE less marked (see Supplementary Table 2).

4. Discussion

Results showed that the ICC for scoring EE during pregnancy was comparable to those found in other studies examining EE

Table 1
Prenatally high maternal Expressed Emotion in relation to selected determinants ($n=847$).

Variable	N	%Mean (S.D.)	High EE ($n=51$; 6.0%)		High Crit ($n=32$; 3.8%)		High EOI ($n=18$; 2.1%)	
			OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P
Age (years)	847	31.8 (3.9)	1.0 (0.9–1.1)	0.67	0.9 (0.8–1.0)	0.04	1.3 (1.1–1.4)	< 0.01
First child	513	61.7	2.3 (1.2–4.6)	0.02	3.4 (1.3–8.9)	0.01	1.6 (0.6–4.7)	0.35
Education								
Primary	16	1.9	2.5 (0.5–11.5)	0.24	4.0 (0.9–18.9)	0.08	– ¹	–
Secondary	269	31.8	1.0 (0.6–2.0)	0.89	1.5 (0.8–2.9)	0.18	–	–
Higher	562	66.3	Reference		Reference		–	–
Income								
< 1200	19	2.4	3.7 (1.0–13.2)	0.05	1.7 (0.2–13.4)	0.60	6.2 (1.3–29.7)	0.02
1200–2000	74	9.3	1.7 (0.7–4.3)	0.24	2.2 (0.8–6.1)	0.11	0.7(0.1–5.6)	0.76
> 2000	700	88.3	Reference		Reference		Reference	
Psychopathology (BSI)	798	0.2 (0.2)	2.2 (0.8–5.9)	0.10	1.1 (0.2–5.7)	0.85	3.4 (1.1–11.0)	0.04
Childhood trauma (CTQ)	762	6.6 (1.6)	1.2 (1.0–1.4)	0.02	1.0 (0.8–1.3)	0.83	1.4 (1.1–1.7)	< 0.01
EMBU ²								
Emotional warmth father	738	17.6 (4.3)	0.9 (0.9–1.0)	< 0.01	1.0 (0.9–1.0)	0.24	0.8 (0.8–0.9)	< 0.01
Emotional warmth mother	762	18.8 (3.8)	0.9 (0.9–1.0)	0.01	1.0 (0.9–1.0)	0.95	0.8 (0.7–0.9)	< 0.01
Rejection father	744	8.7 (2.6)	1.1 (1.0–1.2)	0.07	1.0 (0.9–1.2)	0.65	1.2 (1.1–1.3)	< 0.01
Rejection mother	763	8.7 (2.5)	1.0 (0.9–1.1)	0.96	0.7 (0.5–1.0)	0.06	1.2 (1.0–1.3)	0.02
Overprotection father	729	20.4 (4.6)	1.0 (0.9–1.0)	0.52	0.9 (0.9–1.0)	0.14	1.1 (1.0–1.2)	0.26
Overprotection mother	759	21.7 (4.9)	1.0 (0.9–1.0)	0.56	1.0 (0.9–1.0)	0.22	1.0 (0.9–1.1)	0.39
Family stress (FAD)	787	1.4 (0.4)	1.8 (0.5–6.3)	0.33	1.8 (0.4–7.9)	0.44	1.7 (0.2–13.4)	0.61

S.D.=standard deviation; OR=odds ratio; CI=confidence interval; BSI=Brief Symptom Inventory; CTQ=Childhood Trauma Questionnaire; EMBU=Egna Minnen Beträffande Uppfostran; FAD=Family Assessment Device; High EE reflects the combined scales Criticism and Emotional Overinvolvement.

¹ Insufficient numbers to calculate stable odds ratio.

² The scores reflect the perception of each of the parents in childhood of the pregnant woman.

(Baker et al., 2000; Benson et al., 2011; Daley et al., 2003; Magaña et al., 1986; McCarty et al., 2004), which support the reliability of assessing EE during pregnancy with the slightly adapted procedure of the FMSS. As the results also show, 6.0% of all participants scored high on EE. This is lower compared to other studies using non-clinical samples, which found a range from 8% (Baker et al., 2000) to 27% (Wamboldt et al., 2000) of mothers scoring high on EE toward their children. This might be explained by the difficulty or reluctance of pregnant women to express excessive emotions about their unborn child or it could be related to the absence of pronounced child factors during pregnancy that play a more prominent role in high EE after the child is born.

Overall classification of high EE showed significant associations with having a first child, income and maladaptive childhood experiences, suggesting that EE assessed during pregnancy may be seen as a central construct with many determinants. However, additional analyses performed within the subscales of EE showed differences in associated factors and no correlation between high EE on CRIT and EOI subscales. This indicates that overall EE might be seen as a general predictor, but also that CRIT and EOI are different constructs within EE. Support for a differential construct underlying EE subscales comes from postnatal studies assessing maternal EE toward children (St. Jonn-Seed and Weiss, 2002; Wamboldt et al., 2000). Also, some studies examining EE in parents of young children raised questions about the reliability and validity of the EOI construct (Daley et al., 2003; McCarty et al., 2004), but our study, by contrast, found associations with EOI and several determinants.

4.1. Limitations

Some slight adjustments were made to adapt the FMSS for the assessment of EE in pregnant women. Therefore, it remains uncertain whether the construct of EE we coded is comparable to EE coded postnatally. No golden standard is available as the

major change was the time of assessment. However, we found significant associations with factors that also were related to postnatal EE, indicating construct validity. Also, the current study is a non-clinical sample with many higher educated participants, which may have reduced the prevalence of high EE.

4.2. Future directions

As we measured EE during pregnancy, reversed causality is much less likely to explain the association between child factors, like child behavior and cognitive problems and high maternal EE, that have been found in other studies (Baker et al., 2000; Beck et al., 2004; Peris and Baker, 2000). In future research it is important to study the stability of maternal EE from pregnancy to childhood. This will give more insight into maternal and child contributions to EE. Also, the predictive value of EE assessed during pregnancy on child outcomes like mother–child attachment, behavioral, emotional and cognitive problems is of interest.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.psychres.2012.08.037>.

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