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## Research Article

# Maternal health problems such as depression and anxiety and parent-child interaction

## Abstract

**Background:** The emotional climate between mothers and their children is known to be a significant indicator for the development of childhood psychopathology. One index that allows measuring family-emotional climate is the expressed emotion measure (EE). Maternal mental strain is known to affect maternal EE, as it can shape the way a mother thinks about, and interacts with her child.

**Context and purpose of the study:** The main objective of our study was to highlight the links between maternal EE, mother-child interaction and maternal mental problems on behavior problems in children.

Data were examined from 49 children aged 5 to 7 and their mothers. The Five-Minute Speech Sample (FMSS) was used to evaluate maternal EE. Behavioral disorders have been assessed with the German version of the Child Behavior Checklist (CBCL-4/18). To evaluate maternal symptoms of psychopathology, we used the German version of the Brief Symptoms Inventory (BSI). The quality of the mother-child interaction was observed during a standardized problem-solving task.

**Results:** High maternal criticism was linked to more child psychopathology, more maternal mental health problems, less maternal sensitivity and less responsiveness in children during the interactional task. The effect of maternal mental problems on externalizing problems in children was mediated by high criticism in mothers.

**Conclusions:** The results highlight noteworthy links between mother's criticism, child psychopathology and mother-child interactional patterns. According to our results, intervention programs focusing on children, mother-child-interaction and maternal psychopathology seem to be of major importance.

## Background

There is convincing evidence indicating that parental mental problems substantially raise the risk for emotional and behavioral problems in their children [1]. In addition, it was shown that parental mental health problems negatively impact parenting and parent-child interaction [2]. Whereas proactive parenting characterized by clear instruction, limit setting and supportive presence longitudinally predicted fewer behavior problems over time in children with disruptive behavior disorder, parental anger predicted a continuation of problem behavior [3]. Thus, parental-driven factors, especially mental illness and negative parenting seem to be one of the most important risk factors in the development of childhood mental health problems.

However, up to now it is not sufficiently investigated whether parental mental health problems are associated directly with child mental problems or whether this association

might be mediated by parental expressed emotion towards the child [4-6]. The assumption underlying the concept of expressed emotion (EE) is that the way parents talk about their child is indicative of the way they treat their child in daily-life and thus is an index of the emotional quality of the parent-child relationship and -interaction [7]. According to Brown et al. (1962) EE includes a critical (EE CRIT) and an emotional over-involvement dimension (EOI). EE CRIT comprises possible negative comments from the parent talking about their child and is indicative for possible negative relationship structure. EOI refers to the level of emotional over-involvement between parent and child, including self-sacrificing and overprotective behavior. High levels of parental EE have consistently been associated with externalizing behavior, ADHD and conduct disorders [8-11]. Additionally, high rates of EE have also been found in parents of children with internalizing disorders, e.g. depression [12-14], anxiety disorders [15] and self-injurious thoughts or behaviors [16]. Moreover, there is

evidence indicating that EE is associated with depression in mothers [4, 17]. Whereas EE might be a key mechanism of risk transmission, it was not yet investigated whether EE directly impacts parental-child interaction. Thus, the main objective of this study was to investigate whether in mothers with high EE the mother-child interaction is negatively affected and whether EE is associated to other mental problems in mothers besides depression. In order to assess objective indices of the mother-child interaction (e. g. maternal sensitivity, child responsiveness) a structured problem-solving task was used. Second, based on previous literature we further investigated whether maternal EE is associated both with externalizing and internalizing behavior symptoms. Moreover, we examined if mothers with high EE differ in mental health problems. Finally, we tested whether the association between maternal and child mental health problems is mediated by maternal EE towards the child.

## Materials and Methods

### Procedure

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee. The study protocol was approved by the ethics committee of Basel (EKBB) and is consistent with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study. No funding was received.

In order to recruit children varying in the level of emotional and behavioral problems, recruitment was conducted both in community and clinical settings via newspapers and flyers. Subjects were included if the mother could communicate in German sufficiently, and the child was 5 to 7 years of age. To ensure comparability and understanding of tasks, children with a history of a pervasive developmental disorder were not included.

After giving informed consent, mothers and their children were asked to participate in a structured problem-solving task to assess the quality of dyadic interaction. EE was assessed by the Five-Minute Speech Sample (FMSS). Questionnaires on maternal and child mental health problems were provided to the mothers after completing the FMSS.

### Sample description

The participants included a total of 49 children and their mothers. The mean age of the children was 6.5 (SD = 1.2) years, 66.7% were boys and had primarily (70%) Swiss or European Union citizenship. The mean age of the mothers was 37.5 (SD = 5.6) years. About 67% of mothers were married or lived with their partner and 85% had 10 or more years of schooling.

The data of participants was excluded when screening data on maternal or child mental health problems was missing or incomplete. Furthermore, some FMSS videos could not be rated because of technical problems during recording. Finally, 49 mother-child interaction dyads could be included in the analyses.

In a preliminary analysis, we examined whether EE categories (EE CRIT / EOI) were related to the socioeconomic patterns of the family (financial situation, apartment size, number of siblings in household, years of schooling, etc.), demographic characteristics (sex, age, nationality, etc.) or any child or mother variables of the study, to address the need for potential control variables in subsequent analyses. Child age, gender, and nationality were not significantly associated with any of the study variables.

Children's behavioral and emotional problems regarding externalizing behavior symptoms ranged from T=50 to T=83 (M=57, SD=10) and internalizing behavior symptoms from T= 50 to T= 78 (M=55, SD=11). Of the 49 dyads, 37 (75.5%) mothers were rated as having low EE CRIT and 12 (24.5%) mothers were rated as having high EE CRIT. EE CRIT was unrelated to demographic variables, including family structure (single vs. dual parent family), child sex or age, mother's age or mother's level of education. All ratings were based on EE CRIT. No mother in our sample displayed EOI during the FMSS.

### Measures

Behavioral and Emotional Problems of the children (CBCL).

Behavioral disorders were assessed using the German version of the Child Behavior Checklist (CBCL-4/18) [18]. The CBCL-4/18 allows an assessment to be made of behavioral and emotional abnormalities, as well as somatic complaints using eight symptom scales: Withdrawn, Somatic Complaints, Anxious/Depressed, Social Problems, Thought Problems, Attention Problems, Rule-breaking Behavior and Aggressive Behavior. From these scales, an Internalizing Problems Index, an Externalizing Problems Index and a Total Score can be derived. The CBCL scales showed good internal consistencies ( $\alpha \geq .93$ ).

### Mental problems of the mother (BSI)

To evaluate a broad range of psychological problems in mothers, we used the German version of the Brief Symptoms Inventory (BSI) [19]. The BSI is the short version of the Symptom Checklist-90-R (SCL-R-90) [20], which consists of 53 items, covering nine symptom dimensions: Somatization, Obsession-Compulsion, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic anxiety, Paranoid ideation, Psychoticism and a Global Severity Index.

### Expressed Emotion (EE)

EE was measured using the Five-Minute Speech Sample (FMSS) [21]. Trained interviewers asked the mothers to describe their relationship with the child and what their child is like in a five-minute monologue (e.g., "For the next 5 minutes, I would like you to describe [name of child] to me; what is he/she like?", "How would you describe your relationship with each other?"). The mother was encouraged to talk freely with no interruptions. However, if the mother found this difficult, the interviewer could aid the mother with a series of semi-structured probes.

According to the most updated FMSS coding manual [22], high expressed emotion criticism (EE CRIT) was scored as present if there was a negative relationship rating or if there were one or more critical statements/negative tone of voice about the child. A negative relationship was rated if there was a statement indicating that the mother and the child did not get along (e.g., if the mother said, “My child is impossible to deal with”). Critical comments are negative comments about the child’s behavior or personality and they were scored on the basis of critical content and/or critical tone. Criticisms based on the content were scored, when the child’s behavior or characteristics were described by the mother with a critical phrase (e.g., “I don’t like the way he dresses”) or in a negative manner (e.g., “she is very self-centered”). Similarly, criticisms were scored if there was harsh voice even in the absence of critical content.

EOI rating refers to the level of emotional over-involvement between mother and child. High EOI was rated as present, if there was self-sacrificing/overprotective behavior or emotional display during the interview. Self-sacrificing/overprotective behavior was scored as present, when the mother reported extreme or unusual sacrifice (e.g., “I don’t spend that much money on things for myself so that I can give it to my son”), examples of extreme enmeshment (e.g., “We’re so close, I just don’t want her to grow up”) or extreme or unusual over-protection (e.g., “Even though he is ten years old, I like him to be in front of my eyes all the time, even when he is playing with his friends”). Next, emotional display was rated as present when the mother cried or was unable to speak during the interview due to emotional sentiment.

To ensure reliability, every videotaped EE interview was scored independently by two well-trained raters. Inter-rater reliability was moderate (Kappa = 0.42).

### Mother-Child Interaction

According to Wolke, Rios and Unzer [23], the quality of the mother-child interaction was observed during a standardized problem-solving task. We used an Etch-a-Sketch, a toy that allows for the sketching of pictures by turning two buttons: one allows horizontal lines and the other vertical lines to be drawn. We asked each mother-child dyad to copy a house according to a template. Each interaction partner was allowed to use only one of the buttons. This should induce coordinative communication between mother and child. All interactions were videotaped and were stopped by the experimenter after 5 minutes.

To assess the quality of parent-child interactions a coding system developed on the concept of emotional availability [24] and Bowlby’s attachment theory [25] comprising three maternal dimensions (sensitivity, structuring and intrusiveness), one child dimension (child responsiveness) and one dimension concerning the quality of interaction (harmony and warmth) was applied (Table 1). To ensure reliability, every videotaped mother-child interaction was scored independently by two well-trained raters. Inter-rater-reliability was very good (Kappa 0.78 to 0.92.)

**Table 1:** Mother-Child-Interaction Scales

Interactional scales	Description	Scale
Harmony and Warmth	The amount of conflict in the mother-child-interaction	1 = many conflicts 5 = great harmony
Structuring	The mother’s ability to structure the interaction appropriately to child age and needs	1 = no structuring at all or too much structuring 5 = appropriate structuring
Sensitivity	Mother’s capacity to perceive and interpret infant emotions accurately and to respond to them appropriately	1 = Low maternal sensitivity 5 = High sensitivity
Intrusiveness	The degree to which the mother interferes with the child’s autonomy and space	1 = No maternal intrusiveness 2 = High maternal intrusiveness
Responsiveness	Indicates how well the child responds to the mother’s bids and structuring behavior	1 = Low responding child 5 = High responding child

### Data analysis

The data was analyzed using SPSS statistical software for Windows, release 22 (SPSS Inc., Chicago, Illinois).

First, in order to investigate whether mother and child interactional behaviors differ in high and low maternal EE CRIT, we performed a one-way analysis of variance between groups (ANOVA). Using the same statistical procedures, we examined the association between child emotional and behavioral problems (CBCL) and maternal mental health problems (BSI) on maternal EE occurrence. Investigating the link between child problems and EE CRIT, we controlled for maternal mental problems (ANCOVA). Finally, to determine the mediating effect of EE CRIT on the association between maternal psychopathology and children’s behavioral problems, we ran a linear regression analysis.

### Results

Association between maternal expressed emotion criticism and mother-child interactional behaviors

Result of the conducted ANOVA indicate that children of mothers expressing high levels of EE CRIT were less responsive ( $F = 5.20, p = 0.03, d = 0.37$ ) to their mothers and that there was significantly less harmony and warmth during the interaction ( $F = 4.55, p = 0.038, d = 0.71$ ). In addition, there was a trend showing that mothers expressing high rates of criticism were rated as acting less sensitively ( $F = 4.18; p = 0.05; d = 0.56$ ) towards their children (Figure 1).

There was no significant group difference regarding maternal structuring behavior or maternal intrusiveness.

Association between maternal expressed emotion criticism and internalizing and externalizing problems of the child

Results further indicate that children of mothers who showed high levels of EE CRIT had significantly more behavioral problems than children of mothers showing less criticism (Withdrawn:  $F = 5.44, p = 0.24, d = 0.78$ ; Anxious/Depressed:  $F =$

= 13.61,  $p = 0.001$ ,  $d = 1.23$ ; Social problems:  $F = 17.43$ ,  $p = 0.001$ ,  $d = 1.39$ ; Attention problems:  $F = 6.10$ ,  $p = 0.017$ ,  $d = 0.08$ ; Rule-breaking behavior:  $F = 7.20$ ,  $p = 0.010$ ,  $d = 0.89$ ; Aggressive behavior:  $F = 9.04$ ,  $p = 0.004$ ,  $d = 1$ ; Internalizing problems:  $F = 12.13$ ,  $p = 0.001$ ,  $d = 1.16$ ; Externalizing problems:  $F = 8.23$ ,  $p = 0.006$ ,  $d = 0.95$ ; Global strain:  $F = 12.95$ ,  $p = 0.001$ ,  $d = 1.19$ ) (Figure 2).

When controlling for maternal psychopathology by using the global severity index of BSI (GSI) as a covariate, the difference in child behavioral and emotional problems (total CBCL score) between those with mothers with high compared to low EE CRIT was still significant ( $F = 4.48$ ,  $p = 0.04$ ,  $d = 3.7$ ).

Association between maternal expressed emotion criticism and maternal psychiatric symptoms

Except for the subscales somatization and phobia, all subscales differed significantly in low and high EE CRIT rates. Mothers with high EE CRIT showed significantly more mental health problems in the GSI compared to mothers expressing low rates of EE CRIT (Obsessive-compulsive:  $F = 8.70$ ,  $p = 0.005$ ,  $d = 1.13$ ; Interpersonal sensitivity:  $F = 13.31$ ,  $p = 0.001$ ,  $d = 1.35$ ; Depression:  $F = 10.85$ ,  $p = 0.002$ ,  $d = 1.33$ ; Anxiety:  $F = 8.01$ ,  $p = 0.007$ ,  $d = 1.12$ ; Hostility:  $F = 11.39$ ,  $p = 0.001$ ,  $d = 1.15$ ; Paranoia:  $F = 13.16$ ,  $p = 0.001$ ,  $d = 1.25$ ; Psychoticism:  $F = 8.99$ ,  $p = 0.004$ ,  $d = 0.91$ ; Global severity index:  $F = 12.70$ ,  $p = 0.001$ ,  $d = 1.61$ ) (Figure 3).

### Mediating effect

Results of the linear regression analyses revealed that children of mothers who scored higher on the GSI had a significantly higher probability of being classified as having clinically relevant externalizing behavioral problems (corrected  $R^2 = 0.112$ ,  $F = 7.04$ ,  $\beta = 0.361$ ,  $p = 0.011$ ,  $d = 0.54$ ). The direct effect of this association decreased to a statistically non-significant level ( $\beta = 0.218$ ,  $p = 0.147$ ) while accounting for EE CRIT as a mediator (corrected  $R^2 = 0.171$ ,  $F = 5.96$ ,  $\beta = 0.310$ ,  $p = 0.04$ ,  $d = 0.50$ ) (Figure. 4).

### Discussion

Our first study goal was to investigate whether in mothers expressing high expressed emotion criticism (EE CRIT) the mother-child interaction is negatively affected. Our data partially supported our first hypothesis, as high rates of EE CRIT were associated with more negative mother-child interactional

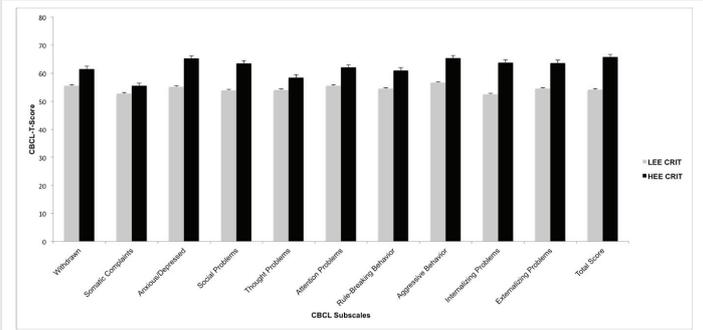


Figure 2:

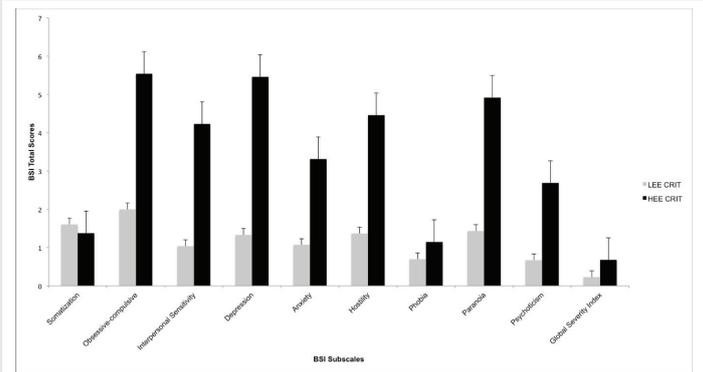


Figure 3:

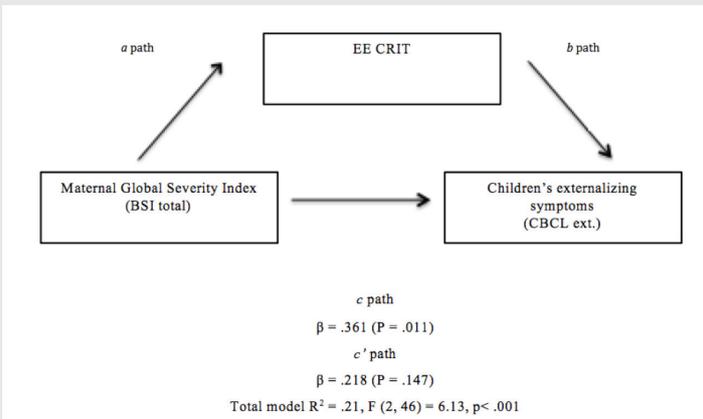


Figure 4:

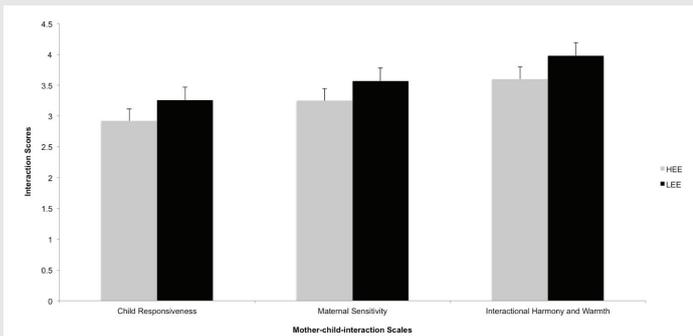


Figure 1:

patterns. We found that high maternal EE CRIT is related to less responsive children, indicating that these children show less willingness to touch upon communication signals sent by their mothers. This is consistent with the finding of McCarty, Lau, Valeri and Weisz [26]. In addition, overall maternal harmony and warmth was significantly lower during mother-child interactions when the mother belonged to the high EE CRIT group. Moreover, we found a trend that high rates of maternal EE CRIT have a negative effect on mothers' sensitivity towards their children. We could not find any differences between low/high maternal EE CRIT on maternal structuring behavior or intrusiveness.

Second, we investigated whether higher rates of expressed criticism in mothers are associated with both higher rates of internalizing and externalizing child mental problems. Our

second hypothesis was also supported. Children with elevated internalizing and externalizing symptoms had mothers who expressed significantly more criticism towards them. These associations are consistent with the literature on the subject [8, 9, 27, 28], and remained significant after controlling for maternal mental problems.

Additionally, we investigated whether higher rates of expressed criticism in mothers are associated with higher rates of mental problems in mothers. Our third hypothesis could also be supported by our data, as mothers with elevated psychiatric symptoms expressed significantly more criticism towards their children. Most studies examining the influence of maternal depression on EE found that high levels of maternal depression predicted high EE ratings [5, 17]. In our study, we assessed a whole range of maternal psychiatric symptoms, including symptoms of depression. Except for two subscales, all other maternal psychiatric symptoms (psychoticism, paranoia, hostility, anxiety, interpersonal sensitivity, obsessive-compulsive behavior, and psychiatric global strain) had as much influence on EE CRIT as depression symptoms did and showed large effect sizes.

Finally, our hypothesis that the association between maternal and children's mental health problems is mediated by EE CRIT was supported only for externalizing problems, not for internalizing ones. This result is consistent with a previous finding of Nelson, Hammen, Brennan and Ullman [5]. Thus, our results also indicate that EE CRIT is more important when it comes to the extent to which children exhibit under-controlled, impulsive, rule-breaking and aggressive behavior than it is regarding internalizing problem behavior. As there is convincing evidence that a harsh and negative parenting style is a risk factor for externalizing problem behavior in children, e.g. conduct disorder [3], our results indicate that even already parental expressed emotion criticism might be considered as a risk factor for the development of externalizing behavior disorders. One possible explanation might be that the development of social norms, prosocial behavior and impulse/behavioral control in children is presumed to rather develop in social contexts of emotional learning in daily interactions. The development of internalizing symptoms might have other roots, e.g. temperamental factors as behavioral inhibition and anxious models have been discussed as main risk factors [29].

## Conclusions

Some study limitations merit acknowledgement. First, the relatively small sample size limited our ability to test some more complex associations or subgroup comparisons. Replications with larger sample sizes are strongly recommended. However, as we included children's responsiveness in an objective observational task and found significant associations with maternal EE CRIT, we can refute an exclusive maternal bias.

Nevertheless, future studies are strongly encouraged to incorporate multiple measures of child psychopathology symptoms in order to clarify the question on reports by mothers. Prospective longitudinal studies of larger numbers of children will be needed to confirm these conclusions and clarify a possible causal direction of effects.

Despite the limitations, study strengths should get some acknowledgment too. First, our findings provide new knowledge about direct associations between EE and mother-child interactional patterns using a structured and objective instrument to measure quality of mother-child interaction. Second, we did not only focus on maternal depression but included a broad spectrum of maternal symptoms of psychopathology indicating that other mental health problems have similar associations with EE than depression does.

Finally, the findings of the study have important implications for interventions and clinical practice. Criticism should be a target of interventions, as highly critical mothers might engage in negative interactions with their child, thus contributing to the escalation of negative mother-child interactions. In this regard, results provide important knowledge regarding possible starting points for more tailored intervention programs focusing on mother-child interaction.

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