the british psychological society
promoting excellence in psychology

British Journal of Clinical Psychology (2020)

www.wileyonlinelibrary.com

Traumatic experiences, family functioning, and mood disorder development in bipolar offspring

Manja A. Koenders[1,2,a], Esther Mesman[3,a]*, Erik J. Giltay[4], Bernet M. Elzinga[2] and Manon H. J. Hillegers[3]

[1]Outpatient Treatment Department of Bipolar Disorders, PsyQ Rotterdam, The Netherlands
[2]Department of Clinical Psychology, Leiden University, The Netherlands
[3]Department of Child and Adolescent Psychiatry/Psychology, Erasmus MC-Sophia, Rotterdam, The Netherlands
[4]Department of Psychiatrie, Leiden University Medical Center, The Netherlands

Objectives. Studies in children of patients affected with bipolar disorder (BD; bipolar offspring) are at high risk to develop mood disorders. Our aim is to investigate how environmental factors such as childhood trauma and family functioning relate to the development of mood disorders in offspring at familial risk for BD.

Design. The current study is part of a longitudinal prospective cohort study among offspring of parents with BD.

Methods. The current study is part of the Dutch Bipolar Offspring Study, an ongoing prospective cohort study among adolescent offspring of a parent with BD. Bipolar offspring were psychiatrically evaluated at baseline and at 1-, 5-, and 12-year follow-up. Complete follow-up data over de 12-year follow-up were available for 102 offspring. Childhood trauma was measured with the Childhood Trauma Questionnaire (CTQ) and filled out by the offspring. Family functioning was reported by the mother with the 130-item Questionnaire for Family Problems (QFP).

Results. Emotional maltreatment was significantly associated (HR = 1.82, CI 1.18–2.82, p = .007) with mood disorder onset in bipolar offspring. No association was found with the family functioning total score (HR = 1.04, CI 0.94–15, p = .085) nor its subscales.

Conclusions. The current study suggests that emotional maltreatment is associated with mood disorder development in bipolar offspring. Remarkably, the association of offspring-reported emotional maltreatment and mood disorder onset was not reflected in parent-reported family functioning (e.g., support and communication, openness or involvement). Possible explanations are discussed and warrant further study.

*Correspondence should be addressed to Esther Mesman, Department of Child and Adolescent Psychiatry and Psychology, Erasmus University Medical Center-Sophia Children's Hospital, Wytemaweg 80, SP-2478, 3015 CN Rotterdam, The Netherlands (email: esther.mesman@erasmusmc.nl).

[a]Authors share first authorship.

DOI:10.1111/bjc.12246

Practitioner points

- Offspring of bipolar patients are at increased risk of developing mood disorders across the life-time.
- Emotional trauma contributes to the likelihood of developing mood disorders in bipolar offspring.
- In the daily treatment of bipolar patients having children, attention should be given to parental style and difficulties.
- Further research using multiple informant methods on childhood trauma an family functioning is needed to further disentangle the effects of these variables on the onset of psychopathology in bipolar offspring.

Bipolar disorder (BD) is a severe mood disorder characterized by episodes of depression and (hypo)mania. BD affects 1–2% of the population and is known for its recurrent and chronic display with high interpersonal and societal impact, such as job loss, and suicide (Conus, Macneil, & McGorry, 2014). One of the key challenges in the field of BD is early recognition. The early trajectories of the illness are non-specific and often result in a diagnostic delay of 5–10 years (Altamura *et al.*, 2010; Drancourt *et al.*, 2013). As the peak age of onset of BD is between adolescence and young adulthood, there is a lost opportunity for adequate treatment during a crucial time window for interpersonal and psychosocial development (e.g., educational performance and first work experience). Twin and family studies show a major genetic contribution in the development of BD (Craddock & Sklar, 2013; Kieseppa, Partonen, Haukka, Kaprio, & Lonnqvist, 2004; McGuffin *et al.*, 2003). A recent Danish National Register study showed that in relatives of bipolar patients 58% of the variance of familial risk was explained by heritable components versus 32% for major depressive disorders (MDD), suggesting a stronger contribution for genetics in BD than MDD (Song *et al.*, 2015). Nonetheless, a better understanding of the (interaction with) environmental protective factors and stressors is important.

A positive family history for BD is the most evident risk factor for BD, and children of patients affected with BD (bipolar offspring) are a vulnerable population. Indeed, studies show that bipolar offspring are at high risk to develop mood disorders and bipolar disorders (Duffy *et al.*, 2011; Lau *et al.*, 2018). Apart from the genetic risk, bipolar offspring grow up in a complex environment challenged by the illness of the affected parent. To pursuit improvement of preventative mental health care for this vulnerable population, it is essential to focus on potential determinants of risk.

In prior studies, we found evidence for an association between stressful life events and mood disorder development in bipolar offspring (Kemner, Mesman, Nolen, Eijckemans, & Hillegers, 2015). There is also robust evidence for the negative impact of childhood trauma (physical, emotional, and sexual abuse) and the development of psychopathology (Hovens, Giltay, Spinhoven, van Hemert, & Penninx, 2015; McLaughlin *et al.*, 2012; Norman *et al.*, 2012). To date, only a few studies have investigated childhood trauma in bipolar offspring. Studies show that bipolar offspring report higher levels of traumatic experiences than controls (Goldstein *et al.*, 2010; Schreuder *et al.*, 2016). However, none of these studies investigated traumatic experiences in relation to mood disorder development nor the family context.

Another important environmental aspect is family context. Studies investigating family functioning in bipolar offspring are relatively scarce. In general, bipolar families show, in comparison with control families, higher levels of conflict, less cohesion, and organization (Barron *et al.*, 2014; Chang, Blasey, Ketter, & Steiner, 2001; Ferreira *et al.*, 2013; Freed *et al.*, 2015; Shalev *et al.*, 2018). Freed *et al.* (2015) found that low family cohesion was also associated with the presence of mood disorders in bipolar offspring. In another study,

Ferreira *et al.* (2013) found that higher levels of parental control were associated with psychopathology in the offspring. Also, Chang *et al.* (2001) reported an association between psychopathology and family functioning in bipolar offspring. In a more recent study, Iacono *et al.* (2018) were the first to investigate family functioning in bipolar offspring within a longitudinal context. In this study, BD families showed problems in parenting practices, that is providing less support, structure and control relative to control families. Especially low levels of parental control (i.e., inability to ensure adequate supervision, set boundaries and consequences) in middle childhood were a strong mediator for the development of psychopathology later in life, that is higher levels of depressive and substance use symptoms.

To our knowledge, there are no studies investigating both traumatic experiences during childhood within the context of family functioning and mood disorder development in bipolar offspring using a longitudinal design. The aims of this study are to investigate (1) the association of traumatic experiences during childhood on mood disorder development; (2) the association between family functioning and mood disorder development; and whether family functioning and childhood trauma interact with each other and could potentially buffer or enhance each other.

Methods

Study design

The current study is part of a longitudinal prospective cohort study among offspring of parents with BD (for a detailed description of the study design see: Mesman, Nolen, Reichart, Wals, & Hillegers, 2013). The Dutch bipolar offspring cohort was recruited between 1997 and 1999 and consisted of 140 offspring (age range at baseline, 12–21 years) of 86 parents with bipolar disorder (34 fathers and 52 mothers; 64 BD type I and 22 BD type II). DSM-IV diagnoses of the bipolar parent were confirmed by a face-to-face interview using the International Diagnostic Checklist (Hiller, Zaudig, Mombour, & Bronisch, 1993) and further confirmed by the clinical diagnosis by the treating physician. Lifetime diagnoses of the co-parent were assessed using the Family History Research Diagnostic Criteria (Andreasen, Endicott, Spitzer, & Winokur, 1977). Bipolar offspring were examined at baseline (n = 140, mean age 16) and at 1-(n = 132, 94.2%, mean age 17), 5-(n = 129, 92.1%, mean age 21), and 12-year (n = 108, 77.1%, mean age 28) follow-up. For the current study, we had complete data for 102 offspring of 68 families. All assessments were approved by the institutional review board, and written informed consent was obtained from both parents and offspring.

Measures

Offspring psychopathology

During the 12 years of follow-up, four psychiatric assessments took place which were administered by intensively trained interviewers with graduate degrees in psychology and supervised by a child and adolescent psychiatrist. Outcomes of diagnostic interviews were evaluated by psychiatrists certified in both child psychiatry, adolescent psychiatry, and adult psychiatry. At baseline and at 1-year follow-up, DSM-IV axis I diagnoses were obtained by face-to-face interviews with the Schedule of Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime version (K-SADS-PL; Kaufman *et al.*, 1997). After offspring reached age 18, the Structural Clinical Interview for DSM-IV

Axis I Disorders (SCID; First, Spitzer, Gibbon, & Williams, 1997) was used. Lifetime DSM-IV diagnoses at fourth measurement at 12-year follow-up are the result of the four psychiatric assessments during all measurements. All lifetime and current diagnoses according to the K-SADS-PL were dated, and information regarding the age of onset and duration of the episode was collected. For the current analyses, age of onset of bipolar spectrum and unipolar mood disorders was used.

Family functioning

For the assessment of family functioning, a Dutch version of the self-report Questionnaire for Family Problems (QFP) was used (Koot, 1997). The QFP questionnaire is based on several sources, including the Family Assessment Measure (Skinner, Steinhauer, & Santa-Barbara, 1983) and the McMaster Family Assessment Device (Miller, Bishop, Epstein, & Keitner, 1985). The QFP consists of 130 items (α = .97 current data) measured on a 3-point likert scale. Higher scores reflect higher levels of family problems over the last 6 months. The instrument measures 10 different subscales that are defined by the authors through principal component analyses. The subscales are as follows: *support and communication* (13 items), that is trust, understanding, problem-solving, sharing, and attention; *parenting* (eight items), that is emotional problems, relationship child–parent, punishment, and obeying the rules; *hostility* (18 items), that is cursing, physical punishment, irritation, lying, and taking other into account; *openness* (13 items), that is lack of communication, not showing emotions, boredom, hiding things, and handling setbacks; *execution of tasks* (nine items), that is finishing tasks, taking care of oneself, keeping appointments, and quarrel about tasks*; involvement* (eight items) indifference, interested in others, happy to see others, sympathize, and physical affection; *security* (six items), that is make others feel safe, helpfulness, and listening to personal problems; *relation with partner* (five items), that is strictness, support, and shared ideas; *problems with children* (10 items), that is control over children, worries about relationship with children, punishment, attention, and inability to handle children; *other problems* (39 items), that is finances/work, leisure time, intimacy, relationships with others, and self-actualization. The QFP shows good internal consistency in the current sample, with Cronbach's alpha's of the different domains ranging between .76 and .89. The QFP has acceptable convergent validity, showing moderate to high correlations between the total score of the QFP and the Family Assessment Device (Koot, 1997). The authors of the QFP note that age of the children in the family is associated with problem severity, with families with older children reporting more family problems. For this reason, all analyses were corrected for a possible age effect. The questionnaire was conducted at baseline for all offspring (N = 137) and filled out both by the mother (on N = 102 offspring) and/or father (on N = 70 offspring). For the main analyses on the association between the total scores on the QFP and the development of psychopathology, the scores of the mothers were used because of most complete data. Additional analyses were performed using a subset, consisting of the data of the fathers.

The total (continuous) QFP scores are used for the Cox regression analyses. In order to make the associations visible with Kaplan–Meier curves, total scores were categorized into 3 severity categories based on the QFP norm scores (none (N = 23): percentile 50 = <23; mild (N = 24): percentile 75 = <41; and severe family problem (N = 55): percentile 75 = ≥41).

Childhood trauma

Childhood trauma was assessed in retrospect at the fourth measurement (12-year follow-up) and was completed by 104 offspring. The Dutch translation of the Childhood Trauma Questionnaire – Short Form (CTQ; Bernstein *et al.*, 2003; Thombs, Bernstein, Lobbestael, & Arntz, 2009) is a 25-item self-report measure that aims to assess five types of maltreatment – emotional, physical and sexual abuse, and emotional and physical neglect. Each scale consists of five items, which are scored on a 5-point likert scale, where '1 = never true' and '5 = very often true'. The instrument shows excellent internal consistency, with Cronbach's alpha's exceeding .85 for most subscales. Because of strong overlap between the emotional abuse and neglect scale (Baker & Festinger, 2011), these two will be combined to compose one 'emotional maltreatment' subscale as proposed by van Harmelen *et al.* (2010). The scores of the two CTQ subscales are added into one total emotional maltreatment score. The total continuous scores are used for the Cox regression analyses. In order to make the associations visible with Kaplan–Meier curves, total scores were categorized into three severity categories, based on the cut-off scores proposed by Bernstein *et al.* (2003). Below, we describe how the cut-off for the combined emotional maltreatment scale was determined based on the cut-off scores described by Bernstein *et al.,* (2003) for the separate subscales. This leads to the following cut-off points:

None/mild: Emotional maltreatment: <17
Low to moderate: emotional maltreatment > 17 and <26
Moderate to severe: emotional maltreatment > 26 and <32.

Statistical analyses

Sociodemographic and baseline characteristics were summarized as means (standard deviation [*SD*]) for continuous variables and as numbers (proportions) for categorical variables. For the description of differences between subgroups, ANOVA's were used. To investigate the association of childhood trauma, family functioning and the development of mood disorders among the offspring sample, we used Cox proportional hazard models with corrections for within-family correlations (frailty model). Survival time was defined as the age (in years) of onset of the mood disorder diagnosis, or the end of follow-up (for censored offspring who developed no mood disorder). Analyses were first performed in a crude model and subsequently in an adjusted model with family functioning/childhood trauma and the covariates sex, age, with corrections for within-family correlations. Additional subscale analyses were performed on the family functioning subscales. Due to the relatively low *N* and to overcome overfitting of our statistical models, we applied a two-step approach. In a first step, all domains from the QFP were tested in univariate models. Next, to investigate a potential interaction effect between childhood trauma and family functioning all significant domains were included in multiple (predictor) Cox regression models. Time-to-incidence data were analysed using the Kaplan–Meier (KM) method and log-rank tests. Hazard ratios (HR) and 95% confidence intervals (CI) were computed using Cox proportional hazard models. The proportional hazard assumption was tested and satisfied using the log − log graphical method. Analyses were performed in SPSS (version 23, IBM Corp., Armonk, NY, USA). For all analyses, the two-sided alpha level for statistical significance was set at .05.

Results

Sample characteristics

Table 1 summarizes basic demographic and clinical characteristics of all offspring who participated until the latest measurement and for whom data were complete (diagnoses, trauma score, and family problems). Of the current subsample (mean age at baseline 16 years), 52.9% (N = 54) developed a lifetime mood disorder of which 39.2% (N = 40) a depressive disorder and 12.7% (N = 13) BD. Of all families, 19.6% (N = 20) reported to be divorced. Of all offspring, 70.6% (N = 72) lived with both biological parents, 13.8% (N = 14) with their biological mother and 5.9% (N = 6) with the father.

Mean scores on the emotional neglect (EN) scale were 10.18 (SD = 3.79, range: 5–22) and 6.95 (SD = 2.75, range 5–20) on the emotional abuse (EA) scale, and the mean of the total emotional maltreatment score was 17.1 (SD = 5.8, range 10–38). Of all offspring, 54.9% (N = 56) fall into the non-maltreatment group, 40.2% (N = 41) in the mild category, and 4.9% (N = 5) in the moderate/severe category. Due to very low variance on the physical abuse, physical neglect and sexual abuse scale (more than 95% scoring 1 ('never true') on all items), it is not valid to incorporate these scales in our analyses.

Family functioning and emotional maltreatment

Emotional maltreatment (offspring-reported) and family functioning (parent-reported) were only moderately correlated in this study (r = .37. p < .01). Also, correlations

Table 1. General characteristics of study population (N = 102)

Sample characteristics		Range
Age baseline (mean/*SD*)	16.0 (2.7)	11.6–21.0
Sex (female; *N*/%)	50 (46.3)	
Psychopathology		
Mood disorder (*n*, %)	54 (52.9 %)	
Age of onset mood disorder (mean/*SD*)	17.4 (5.3)	
Environmental factors		
Emotional maltreatment (mean/*SD*)	17.1 (5.8)	10–38
Emotional neglect	10.18 (3.8)	5–22
Emotional abuse	6.95 (2.8)	5–20
Physical trauma		
Physical abuse	5.2 (.7)	5–9
Physical neglect	5.9 (1.4)	5–11
Sexual abuse	5.4 (1.5)	5–15
Family functioning (mother; mean/*SD*)	46.6 (27.9)	2.0–140
Support and communication	5.9 (4.5)	0–21
Parenting	4.3 (2.9)	0–11
Hostility	7.3 (5.6)	0–32
Openness	6.8 (5.0)	0–22
Execution of tasks	3.9 (3.3)	0–13
Involvement	1.8 (2.5)	0–14
Security	4.5 (3.7)	0–12
Relation with partner	2.6 (2.5)	0–9
Problems with children	1.8 (2.0)	0–9

between emotional maltreatment and the separate subscales of the family functioning questionnaire were weak to moderate, with correlations ranging between r = .035 and r = .403 (see Table S1). For family functioning, both reported scores by mothers (N = 102) and fathers (N = 70) were available. There were no significant differences between scores of mothers (μ = 46.6, SD = 27.9) versus fathers (μ = 43.6, SD = 27.9), and there was a Pearson's correlation of strong strength between the two scores (r = .582).

The association between emotional maltreatment and family functioning and the development of offspring mood disorders

Table 2 and Figure 1 show the results of the Cox regression analyses. Emotional maltreatment was significantly associated (adjusted model: HR = 1.07, CI 1.18–2.82, p = .007) with the development of offspring mood disorders (Figure 1A). Follow-up analyses show that both subscales of emotional maltreatment have a similar contribution to the association with mood disorder onset, emotional neglect (HR = 1.12, CI = 1.05–1.2, p = .001) and emotional abuse (HR = 1.13, CI = 1.03–1.23, p = .007).

Family functioning as reported by mothers was not associated with the onset of offspring mood disorders (Figure 1B). The analysis was repeated for family functioning as reported by the father (N = 70 offspring). Also based on father reports on family functioning, no association was found with the onset of mood disorders in the fully adjusted model (HR = 1.01, 95% CI: .89–1.14, p = .889).

Subscale analyses of family functioning (mother reports) show that only the subscale problems with children (HR = 1.12, p = .048) and other problems (HR = 1.03, p = .022) have a significant association with mood disorder onset (see Table S2). However, when we performed more strict analyses with all subscales and emotional maltreatment included in one model (fully adjusted model, correcting for multiple testing), again only emotional maltreatment remained significant. This confirms that family functioning, nor its subscales, shows meaningful nor significant associations with mood disorder onset in this study. In order to investigate whether there are any interaction effects between emotional maltreatment and family functioning on the onset of mood disorders, additional interaction analyses were performed. The interaction was non-significant (HR = 1.01, CI = 0.87–1.17, p = .986).

Table 2. Emotional maltreatment/family functioning and mood disorder onset

	Mood disorder (N = 102) HR (95% CI)	p-Value
Emotional maltreatment		
Crude[a]	1.97 (1.34–2.89)	<.001**
Adjusted[b]	1.82 (1.18–2.82)	.007**
Family functioning		
Crude[c]	1.08 (0.99–1.18)	.085
Adjusted[b]	1.04 (0.94–1.15)	.412

[a]Model includes mood disorder and emotional maltreatment; [b]Model contains: family functioning, emotional maltreatment, sex, age, with corrections for within-family correlations; [c]Model includes mood disorder and family functioning; *p<.05; **p<.01.

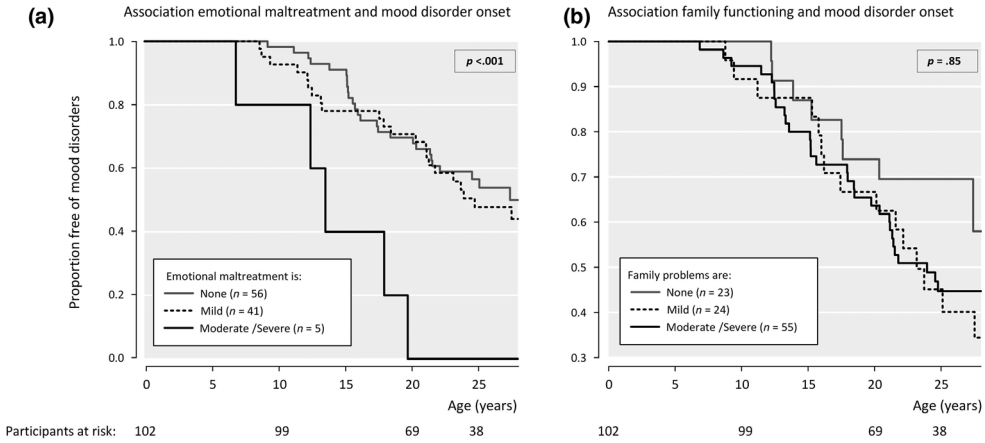

Figure 1. Emotional maltreatment/family functioning and mood disorder onset. The total (continuous) CTQ and QFP scores are used for the Cox regression analyses. In order to make the associations visible with Kaplan–Meier curves in this figure, total scores were categorized into three severity categories based on Bernstein et al. (2003) for the CTQ and on the norm scores of the QFP.

Discussion

In an attempt to further disentangle the complex gene–environment interaction in individuals at familial risk for BD, we present a first study investigating the association between emotional maltreatment, family functioning, and mood disorder development in a longitudinal study among bipolar offspring. In this study, we found a significant association between offspring-reported emotional maltreatment and mood disorder development. No significant association was found between parent-reported family functioning and mood disorder onset.

The main finding of this study was the association between emotional maltreatment and mood disorder development in bipolar offspring. Emotional maltreatment, also known as psychological maltreatment, involves both emotional neglect and emotional abuse. As discussed in the introduction, prior studies demonstrated higher levels of traumatic experiences in bipolar offspring as compared to controls, but did not focus specifically on the relation with mood disorder development. In line with our findings, Doucette *et al.* (2016) reported that maternal neglect in bipolar families is associated with mood disorder onset in offspring. Unfortunately, our study did not allow us to further investigate the difference between paternal neglect and maternal neglect. Another study from our own group showed that perceived rejection from the parent was associated with psychopathology in bipolar offspring (Reichart *et al.*, 2007). Also, in a recent study associations between maternal and paternal BD and family environment were found (Stapp *et al.*, 2019). Findings of our study also align with the general literature of mood disorders and the specific relationship between emotional maltreatment and the development of mood disorders (Hovens *et al.*, 2015; McLaughlin *et al.*, 2012; Norman *et al.*, 2012). It should be noted that in our cohort, the prevalence of sexual and physical abuse was too low to analyse its potential link with BD. Some studies suggest that emotional maltreatment is equally or even more strongly associated with adverse outcome than physical or sexual maltreatment (Hovens *et al.*, 2015; Norman *et al.*, 2012; Spinhoven *et al.*, 2010).

Interestingly, although emotional maltreatment is reported by the offspring, this finding is not mirrored directly in one of the specific domains of family functioning as reported by the parents (e.g., support and communication, openness or involvement). This discrepancy might be explained by the fact that different participants (parents vs. children) completed the scales, and that emotional maltreatment of the childhood trauma questionnaire and the different domains of the self-report Questionnaire for Family Problems measure different concepts. Additionally, the two questionnaires were not administered at the same time point, and the childhood questionnaire may potentially be affected by recall bias. However, recent studies also reveal a lack of correspondence between child and parent reports about maltreatment, with parents generally reporting less maltreatment than children (Chan, 2015; Compier-de Block *et al.*, 2017; Kolko *et al.*, 1996). This might partially explain the fact that only the offspring-reported and perceived emotional maltreatment shows a substantial association with mood disorder onset, and not so much with the parent-reported family functioning. Since we did not assess the same measures in both the parents and the children, we could not investigate a possible underreporting by the parents. However, in future research on family environment multi-informant assessment is essential to further disentangle these aspects.

The current study has several strengths and limitations. First, this is one of the few studies in the world that has followed bipolar offspring and parents over an extensive period of time. Further, the few studies that previously investigated the effects of maltreatment and family functioning among bipolar offspring did not include both variables in the same analyses, and therefore were not able to show any differential effects on the onset of psychopathology (Doucette *et al.*, 2016; Freed *et al.*, 2015).

One of the major limitations of the current study is that no conclusions can be drawn on causal directions. The offspring was not followed from birth, and even under these optimal conditions, strong causal inferences are difficult to make. The same problem is seen in other bipolar offspring studies, in which the assessment of offspring started around early adolescence (Freed *et al.*, 2015; Goodday *et al.*, 2015). Moreover, it is unknown to what extent psychological problems and negative perceptions of parental rearing are related constructs (Reichart *et al.*, 2007), which might lead to circular associations between the emotional maltreatment and the development of psychopathology.

Further, it is important to mention that reported emotional maltreatment severity in the current sample is lower than those generally reported by clinical samples and are – at least at a group level – more comparable to mean scores in community samples (MacDonald *et al.*, 2016). Only half of the subjects in the current sample report some form of emotional maltreatment, with the majority only reporting mild to moderate emotional maltreatment. Nonetheless, in a prior study we found, like others, higher levels of traumatic experiences than controls (Schreuder *et al.*, 2016). Unfortunately, norm scores of large clinical populations are not available for the family functioning questionnaire. However, the mean scores on the family functioning questionnaire were higher than the mean norm scores (healthy population, $N = 368$), as provided by the authors of the questionnaire (Koot, 1997), indicating more family functioning problems in the current sample than in the healthy norm groups. Present findings may suggest underreporting of parental emotional maltreatment in the current (mostly clinical) sample by the offspring, which is a well-known phenomenon when it comes to self-report on trauma and maltreatment in the context of family studies (MacDonald *et al.*, 2016). Children may struggle with loyalty to their parents and be reluctant to report negatively about their parents in such a context. This limitation would indicate an underestimation of the true

associations. Another potential bias may be due to sample selection, with families participating in longitudinal studies being less affected by the negative consequences of the illness. The relatively low prevalence of both divorce and trauma and the fact that all affected parents sought treatment and/or were member of the national association for patients with bipolar disorders might indicate that current cohort consists mostly of high functioning families, thus implying potential selection bias. Also for family functioning, this may cause a bias as Shalev *et al.* (2018) found in their recent study that poorer family functioning is strongly mediated by parental psychosocial functioning.

In sum, the current study suggests that emotional maltreatment of the child is specifically associated with mood disorder development in bipolar offspring. Clinicians should be alert on the child's perspective on possible emotional maltreatment. Findings of this study suggest that emotional involvement of the parents is an important target for prevention of mood disorders in this high-risk population.

Acknowledgements

The 12-year follow-up of this Dutch Bipolar Offspring Study was supported by grant 22963 from the 7FP of the European Commission and grant 9120818 from the Netherlands Organization for Scientific Research (NWO). Previous waves of this study were supported by the Stanley Medical Research Institute and NWO.

Conflicts of interest

All authors declare no conflict of interest.

Author contributions

Manja A. Koenders involved in conceptualization, formal analysis, methodology, visualization, writing–original draft, and writing–review and editing; E. Mesman involved in conceptualization, data curation, formal analysis, investigation, methodology, project administration, writing–original draft, and writing–review and editing; E.J. Giltay involved in formal analysis, methodology, and writing–review and editing; B.M. Elzinga involved in conceptualization and writing–review and editing; M.H.J. Hillegers involved in conceptualization, funding acquisition, investigation, project administration, resources, and writing–review and editing.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

References

Altamura, A. C., Dell'Osso, B., Berlin, H. A., Buoli, M., Bassetti, R., & Mundo, E. (2010). Duration of untreated illness and suicide in bipolar disorder: a naturalistic study. *European Archives of Psychiatry and Clinical Neuroscience*, *260*, 385–391. https://doi.org/10.1007/s00406-009-0085-2

Andreasen, N. C., Endicott, J., Spitzer, R. L., & Winokur, G. (1977). Family history method using diagnostic criteria – Reliability and validity. *Archives of General Psychiatry*, *34*, 1229–1235. https://doi.org/10.1001/archpsyc.1977.01770220111013

Baker, A. J. L., & Festinger, T. (2011). Emotional abuse and emotional neglect subscales of the CTQ: Associations with each other, other measures of psychological maltreatment, and demographic variables. *Children and Youth Services Review*, *33*, 2297–2302. https://doi.org/10.1016/j.childyouth.2011.07.018

Barron, E., Sharma, A., Le Couteur, J., Rushton, S., Close, A., Kelly, T., . . . Le Couteur, A. (2014). Family environment of bipolar families: A UK study. *Journal of Affective Disorders*, *152*, 522–525. https://doi.org/10.1016/j.jad.2013.08.016

Bernstein, D. P., Stein, J. A., Newcomb, M. D., Walker, E., Pogge, D., Ahluvalia, T., . . . Zule, W. (2003). Development and validation of a brief screening version of the Childhood Trauma Questionnaire. *Child Abuse & Neglect*, *27*(2), 169–190. https://doi.org/10.1016/S0145-2134(02)00541-0

Chan, K. L. (2015). Are parents reliable in reporting child victimization? Comparison of parental and adolescent reports in a matched Chinese household sample. *Child Abuse & Neglect*, *44*, 170–183. https://doi.org/10.1016/j.chiabu.2014.11.001

Chang, K. D., Blasey, C., Ketter, T. A., & Steiner, H. (2001). Family environment of children and adolescents with bipolar parents. *Bipolar Disorders*, *3*(2), 73–78. https://doi.org/10.1034/j.1399-5618.2001.030205.x

Compier-de Block, L. H. C. G., Alink, L. R. A., Linting, M., van den Berg, L. J. M., Elzinga, B. M., Voorthuis, A., . . . Bakermans-Kranenburg, M. J. (2017). Parent-child agreement on parent-to-child maltreatment. *Journal of Family Violence*, *32*(2), 207–217. https://doi.org/10.1007/s10896-016-9902-3

Conus, P., Macneil, C., & McGorry, P. (2014). Public health significance of bipolar disorder: Implications for early intervention and prevention. *Early Intervention in Psychiatry*, *8*, 38–38. https://doi.org/10.1111/bdi.12137

Craddock, N., & Sklar, P. (2013). Bipolar disorder 1 genetics of bipolar disorder. *Lancet*, *381*, 1654–1662. https://doi.org/10.1016/S0140-6736(13)60855-7

Doucette, S., Levy, A., Flowerdew, G., Horrocks, J., Grof, P., Ellenbogen, M., & Duffy, A. (2016). Early parent-child relationships and risk of mood disorder in a Canadian sample of offspring of a parent with bipolar disorder: Findings from a 16-year prospective cohort study. *Early Intervention in Psychiatry*, *10*, 381–389. https://doi.org/10.1111/eip.12195

Drancourt, N., Etain, B., Lajnef, M., Henry, C., Raust, A., Cochet, B., . . . Bellivier, F. (2013). Duration of untreated bipolar disorder: Missed opportunities on the long road to optimal treatment. *Acta Psychiatrica Scandinavica*, *127*(2), 136–144. https://doi.org/10.1111/j.1600-0447.2012.01917.x

Duffy, A., Doucette, S., Lewitzka, U., Alda, M., Hajek, T., & Grof, P. (2011). Findings from bipolar offspring studies: Methodology matters. *Early Intervention in Psychiatry*, *5*(3), 181–191. https://doi.org/10.1111/j.1751-7893.2011.00276.x

Ferreira, G. S., Moreira, C. R. L., Kleinman, A., Nader, E. C. G. P., Gomes, B. C., Teixeira, A. M. A., . . . Caetano, S. C. (2013). Dysfunctional family environment in affected versus unaffected offspring of parents with bipolar disorder. *Australian and New Zealand Journal of Psychiatry*, *47*, 1051–1057. https://doi.org/10.1177/0004867413506754

First, M., Spitzer, R. L., Gibbon, M., & Williams, J. (1997). *User's guide for the Structured Clinical Interview for DSM-IV Axis I Disorders – Clinical Version (SCID-CV)*. Washington, DC: American Psychiatric Press.

Freed, R. D., Tompson, M. C., Wang, C. H., Otto, M. W., Hirshfeld-Becker, D. R., Nierenberg, A. A., & Henin, A. (2015). Family functioning in the context of parental bipolar disorder: Associations with offspring age, sex, and psychopathology. *Journal of Family Psychology*, *29*(1), 108–118. https://doi.org/10.1037/fam0000048

Goldstein, B. I., Shamseddeen, W., Axelson, D. A., Kalas, C., Monk, K., Brent, D. A., . . . Birmaher, B. (2010). Clinical, demographic, and familial correlates of bipolar spectrum disorders among

offspring of parents with bipolar disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, *49*, 388–396. https://doi.org/10.1016/j.jaac.2010.01.009

Goodday, S., Levy, A., Flowerdew, G., Horrocks, J., Grof, P., Ellenbogen, M., & Duffy, A. (2015). Early exposure to parental bipolar disorder and risk of mood disorder: The Flourish Canadian prospective offspring cohort study. *Early Intervention in Psychiatry*, *12*, 160–168. https://doi.org/10.1111/eip.12291

Hiller, W., Zaudig, M., Mombour, W., & Bronisch, T. (1993). Routine psychiatric examinations guided by ICD-10 Diagnostic Checklists (International Diagnostic Checklists). *European Archives of Psychiatry and Clinical Neuroscience*, *242*(4), 218–223. https://doi.org/10.1007/Bf02189966

Hovens, J. G. F. M., Giltay, E. J., Spinhoven, P., van Hemert, A. M., & Penninx, B. W. J. H. (2015). Impact of childhood life events and childhood trauma on the onset and recurrence of depressive and anxiety disorders. *Journal of Clinical Psychiatry*, *76*, 931–938. https://doi.org/10.4088/JCP.14m09135

Iacono, V., Beaulieu, L., Hodgins, S., & Ellenbogen, M. A. (2018). Parenting practices in middle childhood mediate the relation between growing up with a parent having bipolar disorder and offspring psychopathology from childhood into early adulthood. *Development and Psychopathology*, *30*, 635–649. https://doi.org/10.1017/S095457941700116x

Kaufman, J., Birmaher, B., Brent, D., Rao, U., Flynn, C., Moreci, P., … Ryan, N. (1997). Schedule for Affective Disorders and Schizophrenia for School-Age Children Present and Lifetime version (K-SADS-PL): Initial reliability and validity data. *Journal of the American Academy of Child and Adolescent Psychiatry*, *36*, 980–988. https://doi.org/10.1097/00004583-199707000-00021

Kemner, S. M., Mesman, E., Nolen, W. A., Eijckemans, M. J. C., & Hillegers, M. H. J. (2015). The role of life events and psychological factors in the onset of first and recurrent mood episodes in bipolar offspring: Results from the Dutch Bipolar Offspring Study. *Psychological Medicine*, *45*, 2571–2581. https://doi.org/10.1017/S0033291715000495

Kieseppa, T., Partonen, T., Haukka, J., Kaprio, J., & Lonnqvist, J. (2004). High concordance of bipolar I disorder in a nationwide sample of twins. *American Journal of Psychiatry*, *161*, 1814–1821. https://doi.org/10.1176/appi.ajp.161.10.1814

Kolko, D. J., Kazdin, A. E., & Day, B. T. (1996). Children's perspectives in the assessment of family violence: Psychometric characteristics and comparison to parent reports. *Child Maltreatment*, *1*, 156–167.

Koot, H. M. (1997). *Handleiding voor de vragenlijst van gezinsproblemen*. Rotterdam, the Netherlands: Academisch Ziekenhuis Rotterdam.

Lau, P., Hawes, D. J., Hunt, C., Frankland, A., Roberts, G., & Mitchell, P. B. (2018). Prevalence of psychopathology in bipolar high-risk offspring and siblings: A meta-analysis. *European Child & Adolescent Psychiatry*, *27*, 823–837. https://doi.org/10.1007/s00787-017-1050-7

MacDonald, K., Thomas, M. L., Sciolla, A. F., Schneider, B., Pappas, K., Bleijenberg, G., … Wingenfeld, K. (2016). Minimization of childhood maltreatment is common and consequential: Results from a large, multinational sample using the childhood trauma questionnaire. *PLoS ONE*, *11*(1), e0146058. https://doi.org/10.1371/journal.pone.0146058

McGuffin, P., Rijsdijk, F., Andrew, M., Sham, P., Katz, R., & Cardno, A. (2003). The heritability of bipolar affective disorder and the genetic relationship to unipolar depression. *Archives of General Psychiatry*, *60*, 497–502. https://doi.org/10.1001/archpsyc.60.5.497

McLaughlin, K. A., Green, J. G., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2012). Childhood adversities and first onset of psychiatric disorders in a national sample of US adolescents. *Archives of General Psychiatry*, *69*, 1151–1160. https://doi.org/10.1001/archgenpsychiatry.2011.2277

Mesman, E., Nolen, W. A., Reichart, C. G., Wals, M., & Hillegers, M. N. J. (2013). The Dutch bipolar offspring study: 12-Year follow-up. *American Journal of Psychiatry*, *170*, 542–549. https://doi.org/10.1176/appi.ajp.2012.12030401

Miller, I. W., Bishop, D. S., Epstein, N. B., & Keitner, G. I. (1985). The Mcmaster family assessment device – Reliability and validity. *Journal of Marital and Family Therapy*, *11*, 345–356. https://doi.org/10.1111/j.1752-0606.1985.tb00028.x

Norman, R. E., Byambaa, M., De, R., Butchart, A., Scott, J., & Vos, T. (2012). The long-term health consequences of child physical abuse, emotional abuse, and neglect: A systematic review and meta-analysis. *PLoS Medicine*, *9*(11), e1001349. https://doi.org/10.1371/journal.pmed.1001349

Reichart, C. G., van der Ende, J., Hillegers, M. H. J., Wals, M., Bongers, I. L., Nolen, W. A., . . . Verhulst, F. C. (2007). Perceived parental rearing of bipolar offspring. *Acta Psychiatrica Scandinavica*, *115*(1), 21–28. https://doi.org/10.1111/j.1600-0447.2006.00838.x

Schreuder, M. M., Vinkers, C. H., Mesman, E., Claes, S., Nolen, W. A., & Hillegers, M. H. J. (2016). Childhood trauma and HPA axis functionality in offspring of bipolar parents. *Psychoneuroendocrinology*, *74*, 316–323. https://doi.org/10.1016/j.psyneuen.2016.09.017

Shalev, A., Merranko, J., Goldstein, T., Miklowitz, D. J., Axelson, D., Goldstein, B. I., . . . Birmaher, B. (2018). A longitudinal study of family functioning in offspring of bipolar parents. *Journal of the American Academy of Child and Adolescent Psychiatry*, *58*, 961–970. https://doi.org/10.1016/j.jaac.2018.10.011

Skinner, H. A., Steinhauer, P. D., & Santa-Barbara, J. (1983). The family assessment measure. *Canadian Journal of Community Mental Health*, *2*, 91–105. https://doi.org/10.7870/cjcmh-1983-0018

Song, J., Bergen, S. E., Kuja-Halkola, R., Larsson, H., Landen, M., & Lichtenstein, P. (2015). Bipolar disorder and its relation to major psychiatric disorders: A family-based study in the Swedish population. *Bipolar Disorders*, *17*(2), 184–193. https://doi.org/10.1111/bdi.12242

Spinhoven, P., Elzinga, B. M., Hovens, J. G. F. M., Roelofs, K., Zitman, F. G., van Oppen, P., & Penninx, B. W. J. H. (2010). The specificity of childhood adversities and negative life events across the life span to anxiety and depressive disorders. *Journal of Affective Disorders*, *126*(1–2), 103–112. https://doi.org/10.1016/j.jad.2010.02.132

Stapp, E. K., Musci, R. J., Fullerton, J. M., Glowinski, A. L., McInnis, M., Mitchell, P. B., . . . Wilcox, H. C. (2019). Patterns and predictors of family environment among adolescents at high and low risk for familial bipolar disorder. *Journal of Psychiatric Research*, *114*, 153–160. https://doi.org/10.1016/j.jpsychires.2019.05.003

Thombs, B. D., Bernstein, D. P., Lobbestael, J., & Arntz, A. (2009). A validation study of the Dutch Childhood Trauma Questionnaire-Short Form: Factor structure, reliability, and known-groups validity. *Child Abuse & Neglect*, *33*, 518–523. https://doi.org/10.1016/j.chiabu.2009.03.001

van Harmelen, A. L., de Jong, P. J., Glashouwer, K. A., Spinhoven, P., Penninx, B. W. J. H., & Elzinga, B. M. (2010). Child abuse and negative explicit and automatic self-associations: The cognitive scars of emotional maltreatment. *Behaviour Research and Therapy*, *48*, 486–494. https://doi.org/10.1016/j.brat.2010.02.003

Received 7 August 2019; revised version received 13 January 2020

Supporting Information

The following supporting information may be found in the online edition of the article:

Table S1. Pearson correlation between family functioning sub-scales and emotional maltreatment.

Table S2. Subscales of family functioning and mood disorder onset (unadjusted).