Alterations of empathy in mothers with a history of early life maltreatment, depression, and borderline personality disorder and their effects on child psychopathology

Original Article

Author for correspondence: Katja Dittrich,
E-mail: katja.dittrich@charite.de

Katja Dittrich[1], Felix Bermpohl[2], Dorothea Kluczniok[2], Catherine Hindi Attar[2], Charlotte Jaite[1], Anna Fuchs[3], Corinne Neukel[4], Sabine C. Herpertz[4], Romuald Brunner[5], Sibylle Maria Winter[1], Ulrike Lehmkuhl[1], Stefan Roepke[6], Michael Kaess[7], Christine Heim[8,9] and Katja Boedeker[1]

[1]Department of Child and Adolescent Psychiatry, Psychosomatics and Psychotherapy, Charité – Universitätsmedizin Berlin, corporate member of Freie Universität Berlin, Humboldt-Universität zu Berlin, and Berlin Institute of Health (BIH), Campus Virchow-Klinikum, Berlin, Germany; [2]Department of Psychiatry and Psychotherapy, Charité – Universitätsmedizin Berlin, corporate member of Freie Universität Berlin, Humboldt-Universität zu Berlin, and Berlin Institute of Health (BIH), Campus Charité Mitte, Berlin, Germany; [3]Department of Child and Adolescent Psychiatry, University Hospital Heidelberg, Centre for Psychosocial Medicine, Heidelberg, Germany; [4]University Hospital Heidelberg, Centre for Psychosocial Medicine, General Psychiatry, Heidelberg, Germany; [5]Department of Child and Adolescent Psychiatry, Psychosomatics and Psychotherapy, University of Regensburg, Regensburg, Germany; [6]Department of Psychiatry and Psychotherapy, Charité – Universitätsmedizin Berlin, corporate member of Freie Universität Berlin, Humboldt-Universität zu Berlin, and Berlin Institute of Health (BIH), Campus Benjamin Franklin, Berlin, Germany; [7]University Hospital of Child and Adolescent Psychiatry and Psychotherapy, University of Bern, Bern, Switzerland; [8]Charité –Universitätsmedizin Berlin, corporate member of Freie Universität Berlin, Humboldt-Universität zu Berlin, and Berlin Institute of Health (BIH), Institute of Medical Psychology, Berlin, Germany and [9]Department of Biobehavioral Health, Pennsylvania State University, College of Health and Human Development, Pennsylvania, USA

Abstract

Background. Early life maltreatment (ELM), borderline personality disorder (BPD), and major depressive disorder (MDD) have been associated with empathy deficits in different domains. Lack of maternal empathy has also been related to child behavioral problems. As ELM, BPD, and MDD often co-occur, we aimed to identify dissociable effects on empathy due to these three factors. In addition, we aimed to investigate their indirect effects via empathy on child psychopathology.
Methods. We included 251 mothers with and without MDD (in remission), BPD and ELM and their children, aged 5–12. We used the Interpersonal Reactivity Index as a measure of empathy on four different dimensions (personal distress, empathic concern, perspective taking, and fantasy) and the Child Behavior Checklist as a measure of child psychopathology.
Results. Having included all three factors (ELM, MDD, BPD) in one analysis, we found elevated personal distress in MDD and BPD, and lower levels of perspective-taking in BPD, but no effects from ELM on any empathy subscales. Furthermore, we found indirect effects from maternal BPD and MDD on child psychopathology, via maternal personal distress.
Conclusion. The present study demonstrated the dissociable effects of maternal ELM, MDD, and BPD on empathy. Elevated personal distress in mothers with BPD and MDD may lead to higher levels of child psychopathology.

Introduction

Broadly defined, empathy refers to an individual's reaction to observing another person's experiences (Davis, 1983). For some authors the term 'empathy' exclusively describes the ability to share the feelings of others; the ability to understand the mental states (including emotional states) on a cognitive level is then referred to as the theory of mind (de Vignemont and Singer, 2006; Preckel *et al.*, 2018). The general consensus exists that when describing social functioning in reaction to interpersonal situations one should distinguish between a more cognitive reaction, including reasoning about other people's mental states, and a more affective reaction, including the sharing of affective states and feeling of concern for others (Davis, 1983; Preckel *et al.*, 2018). Taking into account the multi-dimensionality of the concept, Davis (1983) developed the Interpersonal Reactivity Index (IRI) that assesses four different dimensions of trait empathy or social functioning. Briefly, *personal distress* describes uncomfortable feelings when confronted with another's suffering and *empathic concern* describes

CAMBRIDGE
UNIVERSITY PRESS

compassion and concern for others. Both are considered rather affective empathic responses. *Perspective-taking*, a measure of cognitive empathy, touches on the understanding of other people's emotional states and *fantasy*, the tendency to imaginatively transpose oneself into fictitious characters. Impaired empathy has been found in certain mental disorders including major depressive disorder (MDD) (Schreiter *et al.*, 2013) and borderline personality disorder (BPD) (Dziobek *et al.*, 2011), and in individuals with an experience of early life maltreatment (ELM) (Parlar *et al.*, 2014).

A number of studies have already addressed the effects of MDD on trait empathy (review by Schreiter *et al.*, 2013). Investigations in which trait empathy is measured with the IRI in BPD, are scarcer and the findings are more inconsistent (review by Roepke *et al.*, 2012). For individuals with ELM, the number of investigations is still limited and characterized by the use of diverse instruments. In general, the most consistent findings have been reported on the affective dimensions, in that the majority of studies found higher levels of personal distress in patients with MDD and BPD (Guttman and Laporte, 2000; O'Connor *et al.*, 2002; Wilbertz *et al.*, 2010; Dziobek *et al.*, 2011; Thoma *et al.*, 2011; Derntl *et al.*, 2012; New *et al.*, 2012; Schneider *et al.*, 2012; Schreiter *et al.*, 2013), but no effects on empathic concern (Guttman and Laporte, 2000; O'Connor *et al.*, 2002; Wilbertz *et al.*, 2010; Thoma *et al.*, 2011; Derntl *et al.*, 2012; New *et al.*, 2012; Schneider *et al.*, 2012; Schreiter *et al.*, 2013). Similarly, Parlar *et al.* (2014) found higher levels of personal distress, but also lower levels of empathic concern in individuals with ELM who also suffered from PTSD. Results for cognitive empathy in MDD and BPD have been mixed (Guttman and Laporte, 2000; Dziobek *et al.*, 2011), but a number of studies which applied the IRI, found lower levels of perspective-taking in depressed patients (Wilbertz *et al.*, 2010; Cusi *et al.*, 2011; Schreiter *et al.*, 2013), BPD patients (Harari *et al.*, 2010; New *et al.*, 2012) and individuals with ELM-related PTSD (2014). While there seems to be a lack of studies addressing the isolated effects of an ELM on empathy assessed with the IRI, other investigations which used different measures, found similar impairments in cognitive (Locher *et al.*, 2014; Nazarov *et al.*, 2014), and affective empathy (Locher *et al.*, 2014; Parlar *et al.*, 2014). It should be noted that none of the studies mentioned above found significant effects on the fantasy dimension.

MDD and BPD show high comorbidity (Zanarini *et al.*, 1998) and are common sequelae of ELM (Liotti *et al.*, 2001; Plant *et al.*, 2013; Li *et al.*, 2016). Thus, the separate investigation of one of these three factors carries the risk of being confounded by one of the other two factors. While the mentioned studies investigated the effects of MDD and BPD separately and while the effects of ELM have not been investigated independently of PTSD so far, our study aims to extend this research by including all three risk factors in one study in order to identify their specific contribution to empathy. We included all four dimensions of empathy to gain a comprehensive picture of alterations when considering the co-occurrence of all three risk factors.

As deficits in maternal empathy have been related to child psychopathology and attachment problems (Grienenberger *et al.*, 2005; Psychogiou *et al.*, 2008), it might also be of interest to investigate indirect effects, via empathy, on the next generation. Psychogiou *et al.* (2008) used a modified version of the IRI to specifically assess maternal empathy toward her own child. They found positive associations between personal distress and child hyperactivity, conduct problems, and emotional problems. Maternal empathy (collapsed score of perspective-taking and empathic concern) was negatively associated with higher child conduct problems.

As impaired empathy has been reported in individuals with ELM, MDD, and BPD, it might be an important aspect for explaining elevated levels of psychopathology in children of mothers with these conditions (Goodman and Rouse, 2011; Eyden *et al.*, 2016; Plant *et al.*, 2017). So far, however, alterations in trait empathy have not specifically been addressed as a potential mechanism leading to child psychopathology in mothers with MDD, BPD, and ELM. It appears desirable to investigate the mediating role of different dimensions of trait empathy, to promote a deeper understanding of the potential role of maternal empathy in the intergenerational transmission of abuse and psychopathology.

Aims of the study

The first aim of this study was to disentangle the effects of MDD, BPD, and ELM on empathy, by including all three factors in one study. Our second aim was to investigate whether alterations in maternal empathy would mediate the effects of maternal ELM, MDD, and BPD on child psychopathology.

Method

Participants and procedure

This study was performed within the framework of the UBICA (Understanding and Breaking the Intergenerational Cycle of Abuse, http://www.ubica.de) multicenter project in Berlin and Heidelberg (Dittrich *et al.*, 2018*a*; 2018*b*; Kluczniok *et al.*, 2018). The present study included 251 mothers and their children aged between 5 and 12 years. BPD was diagnosed in 33 mothers and MDD in remission (rMDD) in 131 mothers. One hundred and forty-two mothers had experienced ELM before the age of 17 of at least moderate severity. However, in our analyses, we used a dimensional score for ELM composed of the main scales (sexual, physical, and emotional abuse, neglect, and parental antipathy) of the Childhood Experience of Care and Abuse Interview (CECA, Bifulco *et al.*, 1994). There was an intentional co-occurrence of two or all three risk factors in parts of our sample, consisting of mothers with/without ELM and/or rMDD and/or BPD (see Table 1 for detailed information).

Mothers with ELM, rMDD, and BPD, as well as healthy mothers and their children were recruited by advertisement (poster and flyer) in psychotherapeutic, psychiatric, gynecological, and pediatric outpatient clinics. Mothers with MDD had to be in a remitted state to exclude the risk that the effects of acute depression would override the effects of BPD and ELM. Acute MDD symptoms might have caused bias in response behavior (Gartstein *et al.*, 2009) and interfered with participation in the study. Thus, we chose to investigate mothers with MDD in remission, with depressive symptoms at a sub-clinical level rather than acute MDD, and only mothers with a Hamilton Depression Scale (Hamilton, 1960) score of seven or less were included. Mothers with BPD had to be non-suicidal and sufficiently stable (i.e. not hospitalized) to participate in the study.

The exclusion criteria for the mothers included a lifetime history of schizophrenia, neurological diseases, manic episodes, an acute depressive episode, and anxious-avoidant, or antisocial personality disorder as these conditions could potentially impair their participation in the study. Mothers with BPD or rMDD were allowed to have a comorbid current or lifetime DSM-IV axis I diagnosis (other than acute MDD); this was controlled

Table 1. Demographic and clinical characteristics

Mothers	M (s.d.)/%
Age in years	38.84 (5.80)
Years of education	16.84 (3.63)
Partnership status	
Married/in a relationship with the father of the child	57.4
Married/in a relationship with a partner that is not the father of the child	13.1
Single, separated from partner/husband, divorced, or widowed	29.6
Nationality (German)	91.2
Mothers with moderate/severe ELM	56.6
Sexual abuse	45.8
Physical abuse	66.9
Emotional abuse	24.0
Neglect	31.7
Parental antipathy	61.2
Mothers with a diagnosis of rMDD	52.2
Age at onset (years)	26.94 (8.90)
Number of episodes	2.47 (2.13)
Depression score (HAMD)	2.82 (2.41)
Any psychiatric hospitalization	35.1
Moderate/severe ELM	71.7
Additional diagnosis of BPD	19.1
Other current diagnoses (see below)	26.0
Mothers with a diagnosis of BPD	13.1
Age at onset/first diagnosis (years)	26.64 (7.25)
Self-harming behavior within the last 3 months	39.1
Any psychiatric hospitalization	66.7
Moderate/severe ELM	81.8
Additional diagnosis of rMDD	75.8
Other current diagnoses (see below)	42.4
Other current diagnoses (additional to rMDD and/or BPD)	13.9
Dysthymia	2.8
Panic disorder	6.8
Agoraphobia without panic	2.0
Obsessive compulsive disorder	0.4
Social Phobia	1.6
Post-traumatic stress disorder	1.6
Alcohol abuse	1.6
Eating disorders	0.8
Generalized anxiety disorder	3.2
Empathic concern (IRI)	48.73 (9.80)
Perspective-taking (IRI)	46.07 (10.64)
Personal distress (IRI)	46.99 (9.79)

(Continued)

Table 1. (Continued.)

Mothers	M (s.d.)/%
Fantasy (IRI)	46.73 (9.67)
Children	
Age in years	8.06 (1.64)
Sex (female)	53.4
Psychopathology (CBCL)	55.58 (10.04)

M, mean; s.d., standard deviation; ELM, early life maltreatment; rMDD, major depressive disorder in remission; BPD, Borderline Personality Disorder; HAMD, Hamilton Rating Scale of Depression; IRI, Interpersonal Reactivity Index (norm scores); CBCL, Child Behavior Checklist (norm scores)
N = 251.

for in our analyses. A further exclusion criterion was the taking of benzodiazepines within the last 6 months. Medication with other psychotropic drugs did not represent an exclusion criterion, as long as the dosage had been stable for at least 2 weeks prior to entering the study. The exclusion criteria for the child participants included a previous diagnosis of autistic disorder or intellectual disability. Because the aim of our project was to investigate the effect of maternal factors on child behavior, the mothers and children had to live together. The study was approved by the ethics committee of the Charité – Universitätsmedizin Berlin. Written informed consent was obtained from all the participants after the procedure had been fully explained.

Measures

Empathy

We administered the German version (Paulus, 2009) of the IRI (Davis, 1980; 1983), a self-rating questionnaire which differentiates four dimensions of empathy (seven items each): *Perspective-taking* refers to the cognitive aspect of empathy, measuring the ability to spontaneously adopt another's point of view. *Fantasy* assesses a person's tendency to imaginatively transpose themselves into the actions and feelings of fictitious characters in movies, books, or plays. *Empathic concern* and *personal distress* both touch on emotional reactions to interpersonal situations. *Personal distress* assesses more 'self-oriented' feelings such as discomfort, anxiety, unease in emotional and tense interpersonal situations while *empathic concern* measures more 'other-oriented' reactions to others' misfortune, such as concern or sympathy. The German version of the IRI has shown good values in reliability, factorial validity and item analyses (Paulus, 2009). German sex- and age-adjusted T-norm scores for each of the four dimensions were entered in our analyses.

Maternal ELM, rMDD, and BPD

The maternal history of depression (and other diagnoses of DSM-IV axis I disorders) was assessed using the Mini-International Neuropsychiatric Interview (M.I.N.I.; Lecrubier *et al.*, 1997) which is a fully structured, diagnostic interview which has been reported to achieve good inter-rater reliability (Sheehan *et al.*, 1997, 1998). The International Personality Disorder Examination (Mombour *et al.*, 1996; Loranger *et al.*, 1997), a structured clinical interview with an established reliability and validity, was administered to assess BPD and other personality disorders (antisocial and anxious-avoidant). The interviews were conducted by clinical psychologists (holding bachelor or master's degrees), following

training by experienced users. For rMDD and BPD, a binary variable (yes/no) was entered in our analyses.

Maternal experiences of ELM were assessed using the CECA (Bifulco *et al.*, 1994; Kaess *et al.*, 2011). This is a semi-structured, clinical interview which uses investigator-based ratings to collect retrospective accounts of adverse childhood experiences (up to an age of 17 years), such as sexual, physical, and emotional abuse, neglect, and parental antipathy. The data were rated according to manualized threshold examples and predetermined criteria, using a four-point scale of severity. We entered the sum score of the five main CECA dimensions into the analyses, with higher scores indicating higher severity.

Child psychopathology

To assess child psychopathology, we used the Child Behavior Checklist (CBCL; Achenbach, 1991; Arbeitsgruppe Deutsche Child Behavior Checklist, 1998) which is a parental questionnaire about children's emotional and behavior problems. The German version of the instrument has shown good reliability and validity (Döpfner *et al.*, 1994). The *T*-value norms of the total problem score were entered in our analyses. The total problem score including 118 items showed excellent internal consistency (Cronbach's $\alpha = 0.95$). It has been demonstrated to correlate well with child psychiatric diagnoses in children, and thus to provide a valid indicator for mental health problems in children (Kasius *et al.*, 1997; Jensen and Watanabe, 1999). The high correlation between the internalizing and the externalizing scales on the CBCL in the present study ($r = 0.62$, $p < 0.001$) indicates that the use of the total problem score did not result in undue aggregation of divergent information (Burt *et al.*, 2005; Bödeker *et al.*, 2018). However, to provide a more comprehensive picture of different aspects of child psychopathology, details on the results for the two main subscales (internalizing and externalizing behavior) and the more differentiated subscales (e.g. withdrawn, somatic complaint, anxious/depressed) are reported in the online supplementary material.

Data analyses

We first explored correlation coefficients between maternal characteristics (age, years of education, current relationship status, current DSM-IV axis I disorders) and the four IRI dimensions in order to identify possible confounding variables. If the correlation was significant ($p < 0.05$), the respective variable was used as a covariate in regression analyses. Significant associations only emerged for the presence of current axis I disorders and empathy (dimensions *personal distress* and *empathic concern*), which was therefore included as a covariate in all the regression analyses. The same procedure was applied for mediation analyses: any maternal (mentioned above) and child demographic characteristics (age, sex) which showed significant correlations with child psychopathology, were entered as covariates. Significant associations emerged for the child's age, maternal relationship status, and current axis I disorder. Thus, all mediation analyses were controlled for maternal axis I disorder, relationship status, child age, and the two maternal risk factors not included as the predictor in the respective analysis.

Using the severity of ELM, presence of rMDD, and BPD as predictors, we conducted four linear regression analyses for the four different empathy dimensions as an outcome. We used mediation analyses based on ordinary least squares regression according to Hayes (2013) to investigate the indirect effects of these maternal factors, via empathy, on child psychopathology. Percentile bootstrap confidence intervals (95%) for the indirect effects (based on 10 000 bootstrap samples) entirely above or below zero were considered significant. The regression diagnostics did not reveal any signs of multicollinearity, violation of assumptions, or influential outliers. Information on the mother's years of education was missing in two cases, as well as the CBCL in two cases and information on perspective-taking in three cases. All analyses were performed with IBM SPSS Statistics 24 for Windows (IBM, Armonk, NY, USA) with the *process* macro also being used for the mediation analyses (Hayes, 2013).

Results

To estimate the effects of the severity of ELM, the presence of rMDD, and the presence of BPD on empathy, we conducted linear regression analyses with all three predictors in one model (Table 2). All the regression analyses were controlled for maternal current axis I disorder. The results showed that both BPD and rMDD were significantly associated with higher personal distress and BPD was significantly associated with lower perspective-taking. Other regression analyses were not statistically significant (Table 2).

Mediation analyses were only conducted for those dimensions of empathy which had shown significant associations with maternal ELM, rMDD, or BPD. In each analysis, we controlled for the two maternal risk factors that were not the predictors in the respective analysis (e.g. when estimating the indirect effect of BDP on child psychopathology, we controlled for ELM and rMDD) and for child's age, maternal relationship status, and the presence of maternal current axis I disorder.

The indirect effect of maternal BPD on child psychopathology through maternal personal distress was significant (Fig. 1*a*). Similarly, a significant, indirect effect from maternal rMDD on child psychopathology through maternal personal distress was found (Fig. 1*b*). The indirect effect of maternal BPD on child psychopathology through maternal perspective-taking was not significant [$ab = 0.15$, 95% CI (-0.73 to 1.27)]. In the mediation model (as in the regression analysis), BPD predicted perspective-taking ($a = -7.33$, $p < 0.001$) but perspective-taking was not associated with child psychopathology ($b = -0.02$, $p = 0.729$).

All analyses were conducted with the CBCL total problem score as an outcome. Similar findings were obtained when the two subscales (internalizing and externalizing behavior) and the more differentiated subscales (e.g. withdrawn, somatic complaint, anxious/depressed) were considered separately (see online supplementary material).

Discussion

We examined the effects of rMDD, BPD, and the severity of ELM on different facets of empathy and the indirect effects of maternal rMDD, BPD, and severity of ELM on child psychopathology through maternal empathy. By including all three risk factors in one analysis, we disentangled their specific effects on empathy. Having investigated the psychological mechanism underlying the effects of ELM, MDD, and BPD on child psychopathology by addressing the mediating role of empathy, the main findings of our study are: BPD and rMDD predicted higher personal distress and BPD also predicted lower perspective-taking. The severity of ELM did not have an effect on empathy when rMDD and BPD were controlled for. We found a significant indirect effect

Table 2. Effects of early life maltreatment, depression and borderline personality disorder on dimensions of empathy

	Empathic concern			Perspective-taking			Personal distress			Fantasy		
	ΔR^2	β	p	ΔR^2	β	p	ΔR^2	β	P	ΔR^2	β	p
Step 1 – covariates[a]	0.025		0.013	0.007		0.191	0.052		<0.001	0.010		0.108
Step 2	0.024		0.101	0.076		<0.001	0.090		<0.001	0.023		0.125
ELM		−0.093	0.168		−0.098	0.143		−0.051	0.428		−0.121	0.078
rMDD		0.101	0.142		−0.097	0.151		0.195	0.003		0.072	0.300
BPD		−0.102	0.128		−0.222	0.001		0.250	<0.001		0.116	0.087
Total R^2	0.049			0.083			0.141			0.033		

ELM, early life maltreatment (CECA sum score); rMDD, major depressive disorder in remission; BPD, borderline personality disorder.

$N = 251$ (perspective-taking $N = 248$).

[a]Only presence of any current DSM IV axis I disorders was included as a covariate (no other demographic characteristics showed significant association with the outcome variables).
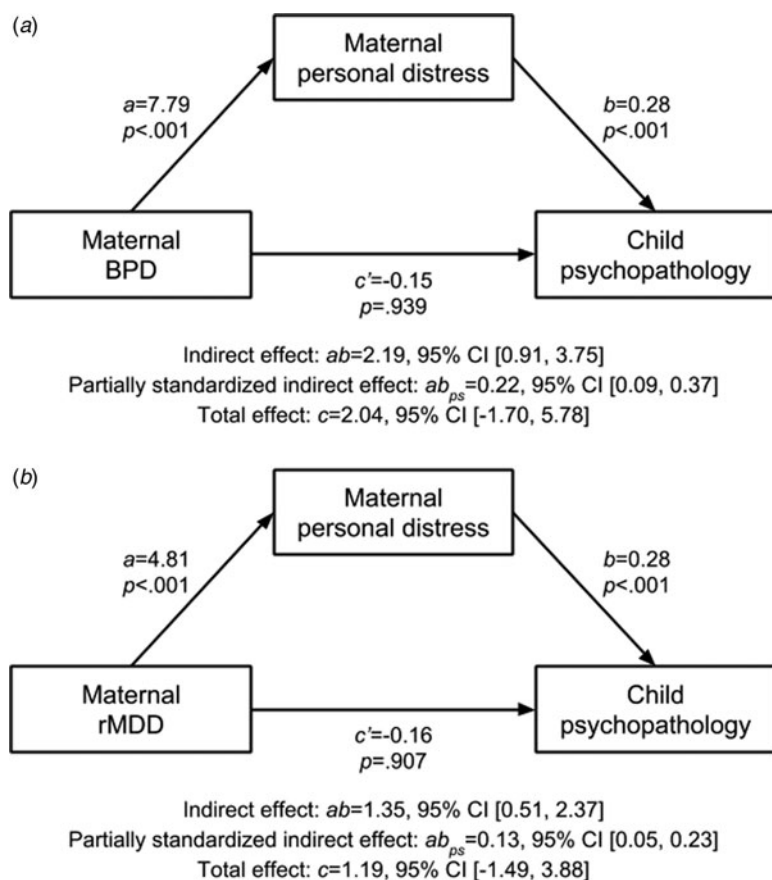
Fig. 1. Mediation analyses with maternal personal distress as a mediator and (a) maternal borderline personality disorder (BPD) and (b) maternal depression in remission (rMDD) as predictors and child psychopathology as an outcome. Both indirect effects are significant as confidence intervals (CI) exclude zero. N = 249.

of maternal BPD on child psychopathology via maternal personal distress while controlling for rMDD and ELM. Similarly, a significant indirect effect from rMDD was found on child psychopathology via personal distress while controlling for BPD and ELM. While the majority of studies to date have focused solely on acute depression or acute depressive symptoms, to the best of our knowledge, this is the first study to investigate empathy in individuals with depression in remission. Our results for elevated personal distress in women with rMDD, are in line with previous research on acute depression (O'Connor et al., 2002; Wilbertz et al., 2010; Thoma et al., 2011; Derntl et al., 2012; Schneider et al., 2012; Schreiter et al., 2013), but extend these findings by showing that these disturbances could possibly persist even after remission. Our findings of BPD as a predictor of higher personal distress and lower perspective-taking are also in accordance with previous results (Guttman and Laporte, 2000; Dziobek et al., 2011; New et al., 2012). However, we combined all three conditions, ELM, BPD, and MDD, in one study in order to take into account the close association between these conditions.

MDD is often characterized by an attentional focus on the self as part of a dysfunctional, self-regulatory cycle in which patients ruminate and lack the ability to disengage from unattainable goals (Mor et al., 2010). During empathic processes, such as when watching someone in a stressful situation, this attentional self-focus may cause depressed individuals to imagine how they would react themselves in such a situation, rather than focusing on the other's reaction (Schreiter et al., 2013). It is also conceivable that depressed patients show a blurred self-other distinction, which in certain situations may lead to emotional contagion, so that the other person's emotion, with which one resonates,

might even be mistaken for one's own emotion (Singer and Klimecki, 2014). Individuals with BPD show a different pattern of difficulties in controlling their attention: they show a focus on current distress and signals of threat and anger (Baer et al., 2012), as well as emotional hyper-reactivity with respect to interpersonal situations (Sauer et al., 2014). In the unfortunate combination with difficulties in emotional regulation which is often shown by patients with BPD in particular but also those with rMDD (Dittrich et al., 2018a), personal distress levels may rise. This is relevant because personal distress may lead to social impairments and interpersonal problems due to unfavorable reactions, such as stress, withdrawal, and non-social behavior, to these emotional situations (Schreiter et al., 2013; Singer and Klimecki, 2014).

These social impairments might be especially important in the close relationship between mother and child. Our study indicates that elevated personal distress seems to mediate the effects of BPD and rMDD on child psychopathology. A link between maternal personal distress (measured using the IRI) and child emotional and behavioral problems has been reported before (Psychogiou et al., 2008). However, we provide first indications for an intergenerational, indirect effect leading from maternal BPD and rMDD via maternal personal distress to child psychopathology. Mothers with high personal distress might perceive their child's negative emotions as aversive and stressful, which might limit their flexibility for reacting to the child's distress and even lead to withdrawal and non-comforting, or aggressive reactions. Another explanation could lie in children's emotional development, which is normally facilitated by a maternal scaffolding of emotional expressions and modulation (Cole et al., 2018). When mothers show intense

emotional reactions to their child's emotional expressions, the child may experience less dyadic co-regulation of emotions which might impair the acquisition of valuable emotional regulation strategies.

While personal distress relates to a more 'self-oriented' aspect of affective empathy, empathic concern describes the 'other-oriented' reaction to others' misfortune, sometimes also referred to as compassion (Singer and Klimecki, 2014). In accordance with previous research (Thoma *et al.*, 2011; Derntl *et al.*, 2012; New *et al.*, 2012), no effects from rMDD and BPD on empathic concern emerged in our study. It is conceivable that individuals with rMDD and BPD can feel compassion toward others while experiencing high personal distress at the same time. However, future studies might explore whether high personal distress could cause people to refrain from actual helping behavior, as self-report instruments on empathy only measure compassionate feelings toward others but not the capacity to act upon them (Schreiter *et al.*, 2013). Of interest, Wingenfeld *et al.* (2018) found that only after psychosocial stress induction borderline patients showed significantly lower empathic concern, measured in a behavioral task, than the control group.

Interestingly, lower levels of perspective-taking emerged for women with BPD but not rMDD. Impaired capacity to reflect upon the mental states of others has been argued to be a key feature of BPD and the main cause of interpersonal problems in these patients (Fonagy and Bateman, 2008). Accordingly, most previous studies on cognitive empathy or perspective-taking in BPD found lower scores for these patients in trait and state (behavioral) measures (Harari *et al.*, 2010; Dziobek *et al.*, 2011; New *et al.*, 2012). While other authors have reported lower levels of perspective-taking in acutely depressed patients (Wilbertz *et al.*, 2010; Cusi *et al.*, 2011; Schreiter *et al.*, 2013), no significant effects emerged in our study of patients with MDD in remission. Perspective-taking describes the cognitive ability to draw inferences about other people's intentions, thoughts, and beliefs, also referred to as the theory of mind (Singer and Klimecki, 2014). Longitudinal studies have shown significant improvements in the theory of mind tasks for MDD patients after remission (review by Berecz *et al.*, 2016). However, mild forms of social cognitive deficits still appear to persist, even in a remitted state (Ladegaard *et al.*, 2015). While these studies assessed state (behavioral) theory of mind measures, we applied a trait measure of cognitive empathy, which also reflects a subjective impression of the participant. It seems conceivable that patients with MDD in remission estimate their own current performance similarly to healthy controls, given their experience of former periods of acute depression that may have implied more severe, social-cognitive impairments.

In contrast to our findings on personal distress, we did not find that lower perspective-taking mediated the effects of BPD on child psychopathology. This result contradicts the findings of Psychogiou *et al.* (2008), who reported negative associations between maternal empathy and child conduct problems. However, as Psychogiou *et al.* assessed a community sample and collapsed two scales into one, the results are hardly comparable. Notably, in their study, personal distress similarly seemed to play a more important role for child psychopathology than perspective-taking, as personal distress showed significant correlations with more child behavior scales. One might question why the two aspects of empathy show different impacts on child psychopathology: while both scales have been related to deficits in social competence, heightened personal distress has also been

related to emotional vulnerability and fearfulness (Davis, 1983). Thus, as low perspective-taking represents a lack of certain cognitive skills which might otherwise be compensated, personal distress can lead to stressful emotional states followed by aversive reactions or withdrawal from the child, which in turn may negatively affect the close emotional bond between mother and child.

Finally, when controlling for BPD and MDD, we did not find effects from ELM on any of the empathy dimensions studied here. Other studies investigated specific effects of PTSD related to childhood trauma and reported effects on cognitive and affective empathy (Nazarov *et al.*, 2014; Parlar *et al.*, 2014). Parlar *et al.* (2014) for example, reported lower levels of empathic concern and perspective-taking and higher levels of personal distress, using the IRI, in individuals with PTSD related to ELM. However, as they did not study the effects of ELM on empathy independently of PTSD, results are hard to compare. We controlled for mental disorders to estimate the isolated effect of ELM and have concluded that trait empathy deficits in adults with ELM seem to be provoked mainly by common sequelae such as MDD or BPD. Further research replicating this finding with state empathy tasks would be desirable.

Limitations

Several limitations of the present study may be considered. First, we used self-report measures of empathy, which require some level of self-reflection from the participants, instead of behavioral tasks. The two approaches might produce different results. For example, Schreiter *et al.* (2013) in their review showed that impairments in cognitive empathy in MDD were more often observed when using objective rather than subjective measures. However, behavioral tasks are usually a state measure while the IRI instead captures the trait aspects of empathy, which might also explain the divergent results. Future studies would ideally incorporate both. Also, other factors than a psychiatric disorder that have not been considered in this study could contribute to empathy in mothers. Second, we only focused on mothers; it would appear desirable to investigate this issue also in fathers as they could be an equally important attachment figure for the child. Third, the total effects of our mediation model were not significant. While this was considered a prerequisite of mediation analyses in traditional approaches, more contemporary and more statistically powerful methods of mediation testing have disproven this assumption (Hayes, 2009). Fourth, in our study, the proportion of mothers with BPD was lower than the proportion of mothers with depression or a history of maltreatment. Fifth, Banzhaf *et al.* (2018) found that perspective-taking deficits in MDD could be attributed to comorbid alexithymia, which we did not assess in our study. Sixth, recruitment by advertisement might have caused a selection bias of participants in our study. Seventh, we included children at elementary school age. It would be interesting to investigate whether the observed effects can already be found in younger children. Finally, as this is a cross-sectional study, no conclusions can be drawn about causal direction. Although the onset of the maternal risk factors lay in the past, the assessment of maternal empathy and child psychopathology was carried out at the same time-point. Therefore, the causal direction underlying the association between empathy and offspring psychopathology could not be established unambiguously. Also, a disposition toward high personal distress could function as a vulnerability factor for certain mental disorders and severe child behavioral problems could possibly impact

on maternal well-being. Longitudinal research designs would be needed to identify causal directions or reveal possible, bi-directional relationships in this context.

We conclude that empathy impairments in mothers with rMDD and BPD may pose a risk for child psychopathology. Elevated personal distress in mothers with BPD and MDD but not lower perspective-taking in BPD was found to lead to higher levels of psychopathology in their children and may thus be an important aspect for explaining intergenerational effects in maternal psychopathology. In our study, ELM did not affect empathy when potentially co-occurring sequelae like MDD and BPD were taken into account. Intervention programs which address the attentional focus in empathic processes and promote emotion regulation, in order to lower personal distress in mothers diagnosed with BPD or MDD, may have a positive influence on the next generation.

References

Achenbach TM (1991) *Manual for the child behavior checklist/4–18 and 1991 profile.* Burlington VT. Department of Psychiatry, University of Vermont.

Arbeitsgruppe Deutsche Child Behavior Checklist (1998) *Elternfragebogen über das Verhalten von Kindern und Jugendlichen; deutsche Bearbeitung der Child Behavior Checklist (CBCL/4–18). Einführung und Anleitung zur Handauswertung mit deutschen Normen, bearbeitet von M. Döpfner, J. Plück, S. Bölte, K. Lenz, P. M.* Arbeitsgruppe Kinder-, Cologne, Germany: Jugend- und Familiendiagnostik (KJFD).

Baer RA, Peters JR, Eisenlohr-Moul TA, Geiger PJ and Sauer SE (2012) Emotion-related cognitive processes in borderline personality disorder: a review of the empirical literature. *Clinical Psychology Review* 32, 359–369.

Banzhaf C, Hoffmann F, Kanske P, Fan Y, Walter H, Spengler S, Schreiter S, Singer T and Bermpohl F (2018) Interacting and dissociable effects of alexithymia and depression on empathy. *Psychiatry Research* 270, 631–638.

Berecz H, Tényi T and Herold R (2016) Theory of mind in depressive disorders: a review of the literature. *Psychopathology* 49, 125–134.

Bifulco A, Brown GW and Harris TO (1994) Childhood experience of care and abuse (CECA): a retrospective interview measure. *Journal of Child Psychology and Psychiatry and Allied Disciplines* 35, 1419–1435.

Bödeker K, Fuchs A, Führer D, Kluczniok D, Dittrich K, Reichl C, Reck C, Kaess M, Hindi Attar C, Möhler E, Neukel C, Bierbaum A-L, Zietlow A-L, Jaite C, Lehmkuhl U, Winter SM, Herpertz S, Brunner R, Bermpohl F and Resch F (2019) Impact of maternal early life maltreatment and maternal history of depression on child psychopathology: mediating role of maternal sensitivity? *Child Psychiatry and Human Development* 50, 278–290.

Burt KB, Van Dulmen MHM, Carlivati J, Egeland B, Sroufe LA, Forman DR, Appleyard K and Carlson EA (2005) Mediating links between maternal depression and offspring psychopathology: the importance of independent data. *Journal of Child Psychology and Psychiatry and Allied Disciplines* 46, 490–499.

Cole PM, Michel MK and Teti LO (2018) The development of emotion regulation and dysregulation: a clinical perspective. *Monographs of the Society for Research in Child Development* 59, 73–102.

Cusi AM, MacQueen GM, Spreng RN and McKinnon MC (2011) Altered empathic responding in major depressive disorder: relation to symptom severity, illness burden, and psychosocial outcome. *Psychiatry Research* 188, 231–236.

Davis MH (1980) A multidimensional approach to individual differences in empathy. *JSAS Catalog of Selected Documents in Psychology* 10, 85.

Davis MH (1983) A mulitdimensional approach to individual differences in empathy. *Journal of Personality and Social Psychology* 44, 113–126.

de Vignemont F and Singer T (2006) The empathic brain: how, when and why? *Trends in Cognitive Sciences* 10, 435–441.

Derntl B, Seidel EM, Schneider F and Habel U (2012) How specific are emotional deficits? A comparison of empathic abilities in schizophrenia, bipolar and depressed patients. *Schizophrenia Research* 142, 58–64.

Dittrich K, Bödeker K, Kluczniok D, Jaite C, Hindi Attar C, Führer D, Herpertz SC, Brunner R, Winter SM, Heinz A, Roepke S, Heim C and Bermpohl F (2018a) Child abuse potential in mothers with early life maltreatment, borderline personality disorder, and depression. *British Journal of Psychiatry* 213, 412–418.

Dittrich K, Fuchs A, Bermpohl F, Meyer J, Führer D, Reichl C, Reck C, Kluczniok D, Kaess M, Hindi Attar C, Möhler E, Bierbaum AL, Zietlow AL, Jaite C, Winter SM, Herpertz SC, Brunner R, Bödeker K and Resch F (2018b) Effects of maternal history of depression and early life maltreatment on children's health-related quality of life. *Journal of Affective Disorders* 225, 280–288.

Döpfner M, Schmeck K, Berner W, Lehmkuhl G and Poustka F (1994) Reliability and factorial validity of the child behavior checklist: an analysis of a clinical sample and a field sample. *Zeitschrift für Kinder- und Jugendpsychiatrie* 22, 189–205.

Dziobek I, Preißler S, Grozdanovic Z, Heuser I, Heekeren HR and Roepke S (2011) Neuronal correlates of altered empathy and social cognition in borderline personality disorder. *NeuroImage* 57, 539–548.

Eyden J, Winsper C, Wolke D, Broome MR and MacCallum F (2016) A systematic review of the parenting and outcomes experienced by offspring of mothers with borderline personality pathology: potential mechanisms and clinical implications. *Clinical Psychology Review* 47, 85–105.

Fonagy P and Bateman A (2008) The development of borderline personality disorder – a mentalizing model. *Journal of Personality Disorders* 22, 4–21.

Gartstein MA, Bridgett DJ, Dishion TJ and Kaufman NK (2009) Depressed mood and maternal report of child behavior problems: another look at the depression–distortion hypothesis. *Journal of Applied Developmental Psychology* 30, 149–160.

Goodman S and Rouse M (2011) Maternal depression and child psychopathology: a meta-analytic review. *Psychology Review* 14, 1–27.

Grienenberger J, Kelly K and Slade A (2005) Maternal reflective functioning, mother-infant affective communication, and infant attachment: exploring the link between mental states and observed caregiving behavior in the intergenerational transmission of attachment. *Attachment and Human Development* 7, 299–311.

Guttman HA and Laporte L (2000) Empathy in families of women with borderline personality disorder, anorexia nervosa, and a control group. *Family Process* 39, 345–358.

Hamilton M (1960) A rating scale for depression. *Journal of Neurology, Neurosurgery and Psychiatry* 23, 56–62.

Harari H, Shamay-Tsoory S, Ravid M and Levkovitz Y (2010) Double dissociation between cognitive and affective empathy in borderline personality disorder. *Psychiatry Research* 175, 277–279.

Hayes AF (2009) Beyond Baron and Kenny: statistical mediation analysis in the new millennium. *Communication Monographs* 76, 408–420.

Hayes AF (2013). *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach.* New York, N.Y.: The Guilford Press.

Jensen PS and Watanabe H (1999) Sherlock Holmes and child psychopathology assessment approaches: the case of the false-positive. *Journal of the American Academy of Child and Adolescent Psychiatry* 38, 138–146.

Kaess M, Parzer P, Mattern M, Resch F, Bifulco A and Brunner R (2011) [Childhood Experiences of Care and Abuse (CECA) – validation of the German version of the questionnaire and interview, and results of an

investigation of correlations between adverse childhood experiences and suicidal behaviour]. *Zeitschrift für Kinder- und Jugendpsychiatrie und Psychotherapie* 39, 243–252.

Kasius MC, Ferdinand RF, Van den Berg H and Verhulst FC (1997) Associations between different diagnostic approaches for child and adolescent psychopathology. *Journal of Child Psychology and Psychiatry and Allied Disciplines* 38, 625–632.

Kluczniok D, Boedeker K, Hindi Attar C, Jaite C, Bierbaum AL, Fuehrer D, Paetz L, Dittrich K, Herpertz SC, Brunner R, Winter S, Heinz A, Roepke S, Heim C and Bermpohl F (2018) Emotional availability in mothers with borderline personality disorder and mothers with remitted major depression is differently associated with psychopathology among school-aged children. *Journal of Affective Disorders* 231, 63–73.

Ladegaard N, Videbech P, Lysaker PH and Larsen ER (2015) The course of social cognitive and metacognitive ability in depression: deficit are only partially normalized after full remission of first episode major depression. *British Journal of Clinical Psychology* 55, 269–286.

Lecrubier Y, Sheehan DV, Weiller E, Amorim P, Bonora I, Sheehan KH, Janavs J and Dunbar GC (1997). The Mini International Neuropsychiatric Interview (MINI). A short diagnostic structured interview: reliability and validity according to the CIDI. *European Psychiatry* 12, 224–231.

Li M, D'Arcy C and Meng X (2016). Maltreatment in childhood substantially increases the risk of adult depression and anxiety in prospective cohort studies: systematic review, meta-analysis, and proportional attributable fractions. *Psychological Medicine* 46, 717–730.

Liotti G, Pasquini P and Cirrincione R (2001) Predictive factors for borderline personality disorder: patients' early traumatic experiences and losses suffered by the attachment figure. *Acta Psychiatrica Scandinavica* 102, 282–289.

Locher SC, Barenblatt L, Fourie MM, Stein DJ and Gobodo-Madikizela P (2014) Empathy and childhood maltreatment: a mixed-methods investigation. *Annals of Clinical Psychiatry* 26, 97–110.

Loranger AW, Janca A and Sartorius N (1997). *Assessment and Diagnosis of Personality Disorders: The ICD-10 International Personality Disorder Examination (IPDE)*. Cambridge, U.K.: Cambridge University Press.

Mombour W, Zaudig M, Berger P, Gutierrez K, Berner W, Berger K, von Cranach M, Giglhuber O and von Bose M (1996) *IPDE: International Personality Disorder Examination*. Huber: Bern, Switzerland.

Mor N, Doane LD, Adam EK, Mineka S, Zinbarg RE, Griffith JW, Craske MG, Waters A and Nazarian M (2010) Within-person variations in self-focused attention and negative affect in depression and anxiety: a diary study. *Cognition and Emotion* 24, 48–62.

Nazarov A, Frewen P, Parlar M, Oremus C, Macqueen G, Mckinnon M and Lanius R (2014) Theory of mind performance in women with posttraumatic stress disorder related to childhood abuse. *Acta Psychiatrica Scandinavica* 129, 193–201.

New AS, aan het Rot M, Ripoll LH, Perez-Rodriguez MM, Lazarus S, Zipursky E, Weinstein SR, Koenigsberg HW, Hazlett EA, Goodman M and Siever LJ (2012) Empathy and alexithymia in borderline personality disorder: clinical and laboratory measures. *Journal of Personality Disorder* 26, 660–675.

O'Connor LE, Berry JW, Weiss J and Gilbert P (2002) Guilt, fear, submission, and empathy in depression. *Journal of Affective Disorders* 71, 19–27.

Parlar M, Frewen P, Nazarov A, Oremus C, MacQueen G, Lanius R and McKinnon MC (2014) Alterations in empathic responding among women with posttraumatic stress disorder associated with childhood trauma. *Brain and Behavior* 4, 381–389.

Paulus C (2009) *The Saarbrueck Personality Questionnaire on Empathy: Psychometric Evaluation of the German Version of the Interpersonal Reactivity Index*. Saarbrücken, Germany: Universität des Saarlandes, Available at http://psydok.sulb.uni-saarland.de/volltexte/2009/2363/.

Plant DT, Barker ED, Waters CS, Pawlby S and Pariante CM (2013) Intergenerational transmission of maltreatment and psychopathology: the role of antenatal depression. *Psychological Medicine* 43, 519–528.

Plant DT, Pawlby S, Pariante CM and Jones FW (2017) When one childhood meets another – maternal childhood trauma and offspring child psychopathology: a systematic review. *Clinical Child Psychology and Psychiatry* 23, 483–500.

Preckel K, Kanske P and Singer T (2018) On the interaction of social affect and cognition : empathy, compassion and theory of mind. *Current Opinion in Behavioral Sciences* 19, 1–6.

Psychogiou L, Daley D, Thompson MJ and Sonuga-Barke EJS (2008) Parenting empathy: associations with dimensions of parent and child psychopathology. *British Journal of Developmental Psychology* 26, 221–232.

Roepke S, Vater A, Preißler S, Heekeren HR and Dziobek I (2012) Social cognition in borderline personality disorder. *Frontiers in Neuroscience* 6, 195.

Sauer C, Arens EA, Stopsack M, Spitzer C and Barnow S (2014) Emotional hyper-reactivity in borderline personality disorder is related to trauma and interpersonal themes. *Psychiatry Research* 220, 468–476.

Schneider D, Regenbogen C, Kellermann T, Finkelmeyer A, Kohn N, Derntl B, Schneider F and Habel U (2012) Empathic behavioral and physiological responses to dynamic stimuli in depression. *Psychiatry Research* 200, 294–305.

Schreiter S, Pijnenborg GHM and Aan Het Rot M (2013) Empathy in adults with clinical or subclinical depressive symptoms. *Journal of Affective Disorders* 150, 1–16.

Sheehan DV, Lecrubier Y, Sheehan KH, Janavs J, Weiller E, Keskiner A, Schinka J, Knapp E, Sheehan MF and Dunbar GC (1997) The validity of the Mini International Neuropsychiatric Interview (MINI) according to the SCID-P and its reliability. *European Psychiatry* 12, 232–241.

Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E, Hergueta T, Baker R and Dunbar GC (1998) The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *Journal of Clinical Psychiatry* 59, 22–33.

Singer T and Klimecki OM (2014) Empathy and compassion. *Current Biology* 24, R875–R878.

Thoma P, Zalewski I, von Reventlow HG, Norra C, Juckel G and Daum I (2011) Cognitive and affective empathy in depression linked to executive control. *Psychiatry Research* 189, 373–378.

Wilbertz G, Brakemeier E-L, Zobel I, Haerter M and Schramm E (2010) Exploring preoperational features in chronic depression. *Journal of Affective Disorders* 124, 262–269.

Wingenfeld K, Duesenberg M, Fleischer J, Roepke S, Dziobek I, Otte C and Wolf OT (2018) Psychosocial stress differentially affects emotional empathy in women with borderline personality disorder and healthy controls. *Acta Psychiatrica Scandinavica* 137, 206–215.

Zanarini MC, Frankenburg FR, Dubo ED, Sickel AE, Trikha A, Levin A and Reynolds V (1998) Axis I comorbidity of borderline personality disorder. *American Journal of Psychiatry* 155, 1733–1739.