Family Aggregation of Childhood Maltreatment and Parental Bonding and the Association with Depression Severity

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Abstract

Childhood Maltreatment (CM) and Parental Bonding (PB) are associated with depression severity. Often, siblings of one family report the same types of maltreatment, suggesting that maltreatment is a phenomenon occurring on the family level. In this study we address the question what forms of CM cluster most in families and whether PB also clusters in families. Furthermore, we are interested in the question whether depression severity can be predicted by own CM and PB experiences as well as the deviation between own and siblings' CM and PB experiences. Our sample consisted of 256 participants of the NESDA study as well as their 380 siblings. Retrospective reports of CM and PB were assessed by the Childhood Trauma Questionnaire (CTQ) and the Parental Bonding Inventory (PBI). Depression severity was measures by the Inventory of Depressive Symptoms (IDS). Intraclass correlations suggest that especially reports of parental bonding and emotional forms of maltreatment as well as physical neglect are similar across siblings of one family. A multiple linear regression reveals that own maltreatment experiences and own quality of bonding is predictive of depression severity ($p < .01$), whereas adding information about sibling experiences does not further improve this prediction ($p = .21$). We suggest that PB is an important candidate when aiming to understand CM and its relation to adult depression. We discuss how CM and PB might relate to each other. Implications for clinical practice with regard to the clustering of CM and PB in families are made.

Introduction

Childhood maltreatment (physical abuse, physical neglect, emotional abuse, emotional neglect and sexual abuse) places an enormous burden on the sufferer and the society: among others, concerns about psychological disturbances, increased risk for somatic diseases, decreased psychosocial functioning, decreased quality of life, increased morbidity and economic consequences on personal as well as societal level have been addressed in the literature (Cuijpers et al., 2011; Henry, Fulco, & Merrick, 2018; McCarthy et al., 2016; Moore et al., 2015; Norman et al., 2012).

The relationship between childhood maltreatment (CM) and the development of psychopathology, more specifically depression later in life is well described in the literature (Kessler, Davis, & Kendler, 1997; Kessler et al., 2010; Mandelli, Petrelli, & Serretti, 2015). Moreover, several studies demonstrated a link between CM and severity of symptoms of psychopathology (Hovens et al., 2009; Martins, Von Werne Baes, de Carvalho Tofoli, & Juruena, 2014; McGinn, Cukor, & Sanderson, 2005) as well as between the severity of maltreatment and severity of depression (McGinn et al., 2005).

There is a strong association between the type of the bonding an individual has with his or her parents (parental bonding, PB) and CM: individuals without experience of CM are more likely to have better PB patterns than individuals with a history of CM (Rikhye et al., 2008). Concerning the association between suboptimal bonding and psychopathology, a link between poor parental bonding and increased risk for emotional disorders such as anxiety and depression has been confirmed (Oakley-Browne, Joyce, Wells, Bushnell, & Hornblow, 1995; Parker, 1983; Parker & Hadzi-Pavlovic, 1992; Parker, Kiloh, & Hayward, 1987; Silove, Parker, Hadzi-Pavlovic, Manicavasagar, & Blaszczynski, 1991).

All this underlines the detrimental effect CM and poor PB have on the individual. However, little is known about the family context in which CM and PB occur. Bringing more light into the family context of CM and PB is important because it has been found that siblings of maltreated targets are at risk to experience maltreatment themselves (Baldwin & Oliver, 1975; Farnfield, 2017; Hamilton-Giachritsis & Browne, 2005; Hines, Kantor, & Holt, 2006; Jean-Gilles & Crittenden, 1990; MacMillan, Tanaka, Duku, Vaillancourt, & Boyle, 2013; Witte, Fegert, & Walper, 2018).

To illuminate the extent to which CM aggregates in families and in how far maltreatment experiences in the family context is predictive of depression severity, data from

siblings of the same family was evaluated. We have data of NESDA participants (targets), as well as of their siblings.

In this study, we aimed to investigate to what extent CM and PB are similar between siblings. To this point, it has not been researched to what extent siblings experience similar bonding patterns with their parents. In the same line, there are only a few studies published that investigate maltreatment with regard to siblings and their differential experience of CM. Exceptions are the work by Jean-Gilles and Crittenden (1990), Hamilton-Giachritsis and Browne (2005) and, most recently, Witte, Fegert and Walper (2018). These studies have shown that emotional and physical neglect, emotional abuse and mixed maltreatment seem to affect more than one or all children of a family (Hamilton-Giachritsis & Browne, 2005). Likewise, for both clinical and community samples, siblings' reports of neglect have been found to be quite similar (Hines et al., 2006), suggesting that neglect appears to be a family-wide phenomenon rather than a child-specific one. For physical and sexual abuse on the other hand, there is mixed evidence: physical and sexual abuse have been described to be rather child-specific (Hamilton-Giachritsis & Browne, 2005), at the same time there is also evidence that physical and sexual abuse aggregate in families as well (MacMillan et al., 2013).

Furthermore, as described before, it is known that there is an association between depression severity and individual experience of CM and poor PB, respectively. What is not known, and we wanted to find out with this study is whether the individual experience of CM compared to family level of CM (experienced by all siblings) adds predictive value of depression severity. In other words, is an individual more likely to get more severely depressed if her level of CM or suboptimal PB is higher than compared to her siblings?

If CM and suboptimal PB are similar between siblings of one family, and if we find that the family level plays a role in prediction of depression severity, the necessity of addressing problems with regard to caregiving in treatment would be underlined because suboptimal circumstances in the home environment would affect all children of the household and have consequences for their adult life (Ma, Roberts, Winefield, & Furber, 2015).

To sum it up, there are two main aims of the study. As a first objective, we aimed to illuminate family aggregation of CM and PB which was done by describing how similar the reports of siblings in the same family are with regard to CM and PB. The second objective of the study was whether the individual experience of CM and PB as well as the deviation of

individual experience of CM and PB from the family level is predictive of depression severity. We studied maltreatment from a family perspective by including affected targets and their affected and unaffected siblings in our analyses.

Research on maltreatment in the family context helps to prevent an underestimation of the problem, i.e. overlooking that siblings of children that are known to be victim to maltreatment are also at risk and provides us with information for prevention in practice. For clinicians, it is important to understand the interplay between family factors and individual factors so that they have a solid base to decide about the extent to include the family environment in the patient's case formulation (Farnfield, 2017).

Based on the existing literature, we expect to replicate that...
(1) The levels and types of reported CM/PB are highly correlated within siblings and targets from the same family. Especially emotional abuse and emotional neglect and maternal or paternal bonding type are expected to aggregate in families.

Furthermore, extending existing literature, we expect to find that....
 (2) Depression severity of targets is predicted by own maltreatment experiences and parental bonding quality, as well as by the deviation of their own report compared to siblings' maltreatment and PB experiences.

Methods

Participants and Procedure

This study is part of the Netherlands Study of Depression and Anxiety (NESDA), a since 2004 ongoing longitudinal study with the rationale to investigate determinants, course and consequences of depressive and anxiety related disorders. Participants (N=2981) for the NESDA study were recruited through mental health care organizations, the community setting and primary care. Sampled were persons with a history of depression or an anxiety disorder, a current depression or anxiety disorder as well as healthy controls. Baseline assessments and other face-to face assessments took place in one of the seven clinic sites involved. For more detailed description of sampling and assessment process and inclusion criteria, consult the work by Penninx and colleagues (2008).

In this study we used the data of 256 NESDA participants (targets) and their 380 siblings that was collected in a family study added to NESDA in 2014. The targets and their

respective siblings can be linked by a common family number. The number of included siblings per target ranges between one and five.

For the sibling study at hand, targets were eligible for inclusion if they (1) have met diagnostic criteria for depression or anxiety disorder at two or more measurement points of NESDA, (2) have one or more biological sibling with the same parents, (3) have participated in at least 3 out of the 4 face-to-face assessments of NESDA and (4) give consent that their siblings are approached for the research. Siblings meet inclusion criteria for this study if they (1) reside in the Netherlands, (3) are between 18 and 77 years old, (2) meet baseline inclusion criteria for NESDA with regard to psychopathology. That is, the sibling has no severe psychopathological condition other than anxiety or depression that is marked as the primary diagnosis.

Research design

This project is a retrospective study of our target group. For the responses of NESDA participants (targets) and siblings, the independent variable "depression severity" was evaluated against the dependent variables "level of childhood maltreatment" (own/ own as compared to family), and "maternal and paternal parental bonding" (own/ own as compared to family).

Measures

Childhood maltreatment. Childhood maltreatment was assessed with the Childhood Trauma Questionnaire (CTQ) which is a 25-item self-report questionnaire and distinguishes between five types of childhood maltreatment: emotional abuse, emotional neglect, physical abuse, physical neglect and sexual abuse (Bernstein & Fink, 1998). Validity and reliability of the Dutch translation of the CTQ is well established (Thombs, Bernstein, Lobbestael, & Arntz, 2009). For our sample, we obtained a Cronbach's alpha of .95 as an indication of reliability for the CTQ. Answers are given on a 5-point Likert scale. Total scores range between 25 (no maltreatment at all) and 125. Higher scores represent more severe maltreatment. The total score of the CTQ is the sum score of all items, excluding the item on molesting (item 21) because in the Dutch translation it rather described physical than sexual abuse as it was intended (Spinhoven et al., 2014).

Parental bonding. Parental bonding was assessed by the Parental Bonding Inventory (PBI) originally developed by Parker, Tupling and Brown (1979). We used a shortened 16-item version of the Parental Bonding Inventory first used by Kendler (1996). The instrument

is a self-report measure and responses on the 16 items are given on a 4-point Likert scale for fathers and mothers respectively. The resulting scores for fathers and mothers can then be combined to a total score. Parental characteristics as perceived by the individual are measured, wherein lower scores represent more optimal parental bonding. Total scores range between 32 and 128. The instrument constitutes of three factors: one care dimension (parental warmth) and two overprotection dimensions (protectiveness and authoritarianism). The three-factor structure of this version has been found to be superior over the original 25-item model and to be stable and replicable in clinical as well as community samples, and also with regard to differences in age, gender and culture (Cox, Enns, & Clara, 2000; Xu, Morin, Marsh, Richards, & Jones, 2016). For our sample, we found a Cronbach's alpha of .80 for the PBI. Reliability for the maternal subscale (α = .94) was higher than for the paternal subscale (α = .51).

Symptom severity. To assess the severity of depressive symptoms, the Inventory of Depressive Symptomatology (IDS) was used, which is a self-report questionnaire that is composed of 28 items and rated on a 4-point scale. Summed scores on the items range from 0 to 84, with higher values indicating more severe symptoms of depression. The IDS was found to correlate highly with observer-rated scales. Validity and reliability of the instrument are satisfactory (Rush, Gullion, Basco, Jarrett, & Trivedi, 1996). In our sample, we found a reliability estimate of α = .95.

Statistical Analysis

Descriptive statistics concerning demographic characteristics (age, gender and educational background) as well as clinical characteristics i.e. severity of symptoms and information on the levels and types of CM and PB are reported.

To investigate how maltreatment and parental bonding aggregate in families, we made use of a multilevel model and calculated the intraclass correlation (ICC) for each of the different levels and types of CM and PB. The Intraclass correlation was obtained by running an empty regression model to get the within-family variance σ_ε^2 and the between-family variance σ_α^2 of the different subscales. Application of the formula

$$ICC = \frac{\sigma_\alpha^2}{\sigma_\alpha^2 + \sigma_\varepsilon^2}$$

gave us the ICCs for every subtype of childhood maltreatment. Intraclass correlations inform us about the proportion of variance that can be attributed to the family and therefore enable us

to estimate the extent to which the context (the family) influences the individual (Field, 2013). The higher the ICC, the greater the role of the family context, that is, the greater the support that a respective level or type of CM or a feature of PB occurs on family-level rather than on a child-specific level. Values for the design-effect are also provided to make the results better interpretable. Whereas the ICC is a measure of how similar observations in the same cluster are, the design effect translates this value by giving an estimate of how far the observations in the clustered sample deviate from observations that would be expected in a simple random sample (Muthén & Satorra, 1995). For example, a design effect of 2 would mean that the observed variance is two times larger than what was expected using a simple random sample. We use a design effect of 2 as a reference point to decide whether observations cluster or not.

To test our second hypothesis, family means of CM and maternal and paternal bonding levels were computed as well as scores that represent the deviation from the family mean of CM level/ PB score. In a multiple linear regression, we determined to what extent the outcome measure "depression severity" (IDS score) is predicted by the independent variables "CM level individual", "deviation from CM family mean", "individual PB maternal", and "individual PB paternal", "deviation from family mean maternal PB" and "deviation from family mean paternal PB". In a first model, "CM level individual", "PB maternal individual" and "PB paternal individual" were entered. The second model comprised "deviation from CM family mean", "deviation from family mean maternal PB" and "deviation from family mean paternal PB". Decisions about significance were made on a $p = .01$ level to adjust for multiple comparisons using Bonferroni correction. In order to assess linearity and homoscedasticity, scatterplots were inspected. Multicollinearity between the predictors were ruled out by assessing the VIF.

Results

Descriptives

The total sample size was 636, of which 256 targets and 380 siblings. Of the total sample, 239 participants (37.6 %) were male, and 397 (62.4 percent) were female. Average age was $M = 45.85$ ($SD = 14.42$). The youngest participants were 18 years old and the oldest 78. Concerning educational background, 18.2 % ($n = 116$) indicated to have received a general intermediate education or lower, 23.1% ($n = 147$) indicated an intermediate vocational

education, 14% (n = 89) a general secondary education, 25.6% (n = 163) a higher vocational education, 16.4% (n = 104) a university education the remaining 2.2% (n = 14) received other education.

Most participants ($n = 619$) indicated that they were born in the Netherlands. Other birth countries were other European countries ($n = 5$), Surinam ($n = 3$), Dutch Antilles ($n = 1$), Indonesia ($n = 4$) and other non-European countries ($n = 4$). The Majority ($n = 632$, 99.4%) of the Participants had Dutch Nationality, one participant had Iranian nationality, one had German nationality and one British nationality.

Childhood maltreatment. The total score on the CTQ had a mean value of 36.74 ($N = 618$, $SD = 10.35$) with a maximum of 103 and a minimum of 24. Descriptives on the subscale scores of the CTQ are provided in table 1.

Table 1

Means and Standard Deviations of the Subscale Scores of the CTQ, PBI and IDS for the Overall Group and Targets and Siblings respectively.

Subscale	Targets		Siblings		Total Sample	
	M	*SD*	*M*	*SD*	*M*	*SD*
Emotional Abuse	8.41	3.90	7.62	3.42	7.93	3.63
Physical Abuse	5.62	2.00	5.63	1.66	5.63	1.79
Sexual Abuse (4 items)	4.72	2.26	4.60	2.10	4.65	2.16
Emotional Neglect	11.88	4.72	11.60	4.40	11.71	4.53
Physical Neglect	6.96	2.33	6.74	2.24	6.83	2.28
Maternal Bonding	31.70	8.88	30.65	8.31	31.07	8.55
Paternal Bonding	31.90	8.57	31.21	8.28	31.48	8.39
Depressive Symptoms	16.49	10.61	13.23	9.99	14.53	10.36

Note: for CTQ measures $N = 243$ (target), $N = 373$ (siblings), $N = 618$ (total), for paternal bonding $N = 238$ (targets), $N = 363$ (siblings) $N = 601$ (total), for maternal bonding $N = 249$ (targets), $N = 372$ (siblings) $N = 621$ (total), for depressive symptoms $N = 250$ (targets), $N = 376$ (siblings), $N = 626$ (total).

Parental bonding. The mean value of the total score of the PBI for maternal and paternal combined was found to be 62.54 with a minimum of 34 and a maximum of 109 ($N = 596$, $SD = 14.62$). Table 1 additionally displays scores on maternal and paternal bonding separately as well as a distinction between targets and siblings. For participants for which less

than six items were missing, missing values were substituted with the mean of the remaining items. Cases with more than six missing values were excluded from the analysis.

Depressive symptoms. The mean value for the total score of the IDS was 14.53 ($N = 626$, $SD = 10.36$). For depression severity scores for the target and sibling groups separately, consult Table 1. Regarding the severity classification, 335 (52.7 %) participants would be diagnosed with no depression, 202 (31.8 %) with a mild depression, 72 (11.3 %) with a moderate depression and 14 (2.2 %) and 3 (0.5 %) with a severe and a very severe depression respectively. Ten questionnaires were not returned, and 5 were excluded because of too many missing values.

Correlations between the measures. Results indicated that there was significant correlation between the measures of depressive symptoms, parental bonding and childhood maltreatment which are illustrated in Table 2.

Table 2
Pearson Correlations of PBI, CTQ and IDS

Measure	PBI maternal	PBI paternal	CTQ	IDS
PBI maternal	-	.48**	.56**	.29**
PBI paternal		-	.53**	.30**
CTQ			-	.35**
IDS				-

Note: ** $p < .01$.

Assessing Aggregation of Childhood Maltreatment and Bonding Type in Families

For emotional abuse we found an ICC of $r = .29$, for emotional neglect an ICC of $r = .36$, for physical abuse $r = .16$, for physical neglect $r = .28$ and for sexual abuse $r = .01$.

The values for the design effect for emotional abuse ($D_{eff} = 3.01$) emotional neglect ($D_{eff} = 4.87$) and physical neglect ($D_{eff} = 2.64$) were greater than 2, indicating clustering in families of these types of maltreatment, whereas for physical abuse and sexual abuse clustering was less strong (physical abuse: $D_{eff} = 1.74$, sexual abuse: $D_{eff} = 1.04$).

Concerning maternal parental bonding, an ICC of $r = .47$ with a design effect of $D_{eff} = 15.13$ was found. For paternal parental bonding the ICC was $r = .37$, with a design effect of $D_{eff} = 12.28$.

Predicting Depression Severity from Parental Bonding and Childhood Maltreatment

Our second hypothesis proposed that target's depression severity is predicted by own maltreatment and parental bonding scores as well as by the deviation from the family mean. Assumptions of normality, linearity, homoscedasticity and multicollinearity were checked by

visual inspection of q-q-plots, a residual plot and the VIF and no violations were detected, only the VIF for total maltreatment score was found to be 2.49, indicating moderate multicollinearity. A VIF of 10 is considered seriously problematic for the model and a VIF greater than one indicates that the regression could be biased (Bowerman & O'Connell, 1990).

Entering the predictors blockwise into the regression (model 1: own maltreatment score, own maternal bonding and own paternal bonding, model 2: deviation of the family mean for maltreatment, maternal bonding as well as paternal bonding), both models were statistically significant ($F(3, 627) = 35.75$, $p < .001$ and $F(6, 624) = 18.67$, $p < .001$) with an overall fit of $R^2 = .15$ for both models. The change from model 1 to model 2 was not significant ($p = .21$). Predictors of the regression models and their respective statistics can be found in table 3.

Table 3

Multiple Linear Regression (Blockwise) with the Outcome Depression Severity

Model	Predictor	Standardized coefficients (β)	SE
Model 1	Childhood Maltreatment	.21***	.05
	Paternal Bonding	.14***	.06
	Maternal Bonding	.11	.06
Model 2	Childhood Maltreatment	.20**	.06
	Paternal Bonding	.11	.07
	Maternal Bonding	.09	.07
	Childhood Maltreatment - Deviation of Family Mean	.03	.09
	Paternal Bonding - Deviation of Family Mean	.06	.12
	Maternal Bonding - Deviation of Family Mean	.03	.12

Note: **p < .01. *** *p* < .001.

Discussion

In line with our expectations, our findings suggest that emotional abuse and emotional neglect and maternal and paternal bonding aggregate in families. That means, our finding implies that these experiences are reported similarly by siblings of the same family. We also found that, to a slightly lesser extent than emotional maltreatment forms, physical neglect aggregates in families. Opposed to this, physical and sexual abuse were found to aggregate less in families. In general, aggregation was stronger for bonding type than for forms of maltreatment. These findings support the view that siblings of one family are especially similar in the way that they report bonding type with parents, as well as maltreatment experiences, mainly with regard to emotional maltreatment forms and physical neglect.

In our second hypothesis we expected to find that depression severity can be predicted from information of own childhood maltreatment (CM) experiences and quality of parental bonding (PB) as well as own experience of CM and PB compared to sibling experiences. We found support for the claim that own paternal parental bonding as well as own CM experiences predict depression severity, whereas the information on individual maternal bonding as well as own versus sibling report did not add predictive value for depression severity. Overall, our findings confirm that quality of paternal parental bonding as well as maltreatment experiences predict depression severity, whereas deviation from family level of CM and PB does not.

Our findings are in line with other studies that have documented the relationship between maltreatment and depression (Hovens, Giltay, Hemert, & Penninx, 2016; Hovens et al., 2012, 2009; Kessler et al., 1997, 2010; Mandelli et al., 2015). Also, the finding that poor parental bonding was predictive of depression severity is in line with our expectations and with previous research (Enns, Cox, & Larsen, 2000; Marshall, Shannon, Meenagh, Corry, & Mulholland, 2018; Parker, 1983).

Because most accounts suggest that maternal bonding plays a more important role with regard to psychopathology (Enns et al., 2002) it was somewhat surprising that we found that paternal bonding was predictive of depression severity whereas maternal bonding was not. Schreiber and Lyddon (1998) found that high paternal care was associated with better psychological functioning in victims of sexual abuse. Also, paternal care was a stronger predictor of quality of life than CM (Rikhye et al., 2008). The superiority of paternal bonding over maternal bonding in predicting depression severity could be explained by decreased vulnerability to depression resulting from abuse victims with good paternal care being less likely to adopt the belief "all men are bad" (Schreiber & Lyddon, 1998), considering that the majority of sexual abuse offenders are male (Finkelhor, Hotaling, Lewis, & Smith, 1990). This account offers a possible indication of direction of interpretation for our results. However, in our case we researched all forms of abuse and have no information about offenders, making it difficult to draw conclusions about the role of maternal and paternal bonding and their distinct relevance for depression severity later in life. It may also be that suboptimal maternal bonding shares more characteristics with CM than suboptimal paternal bonding and the predictive value of maternal bonding is already included in what CM adds to the model. However, our correlation analyses indicated only a very slightly higher correlation for maternal PB with CM than paternal PB with CM.

PB and CM are highly correlated (Seganfredo et al., 2009), as also shown in our correlation analyses, and both concepts were found to be predictive of depression severity. This raises the question how exactly CM and PB relate to each other, what part of which construct adds to the prediction of depression severity and what our study adds to the existing knowledge of this relation. One way to explain how the two concepts are related is that the parents are maltreating and therefore the quality of the parent-child bond suffers. Opposed to this, although this seems to be the case rather less frequently, there are accounts that state that it is possible that parent and child show optimal bonding and at the same time the child is

psychologically maltreated by the parents. To mention one example, a parent could be caring and accepting of the child as a person but manipulative and dismissing regarding the child's relationship with the other parent (Baker & Verrocchio, 2015).

Another possibility is that suboptimal bonding makes the child more susceptible for adverse experiences in- and outside the family, so that it is actually more likely to experience CM by their own parents but also more distant contacts. The increased danger for adverse experiences outside the family context could be explained by the fact that parents that score low on care are less capable or willing to protect their child from adverse experiences (Enns, Cox, & Clara, 2002; Hill et al., 2000). Looking from this point of view, negative bonding experiences can be seen as mediating factor between stressful life events and depression by producing a vulnerability to depression. This vulnerability is the result from feelings of inadequacy that root in negative bonding experiences with parents. A negative view of the self is then reinforced by negative life events like trauma or CM (Marshall et al., 2018; Meites, Ingram, & Siegle, 2012). Our design does not allow to pinpoint how exactly CM and PB relate to each other and via which pathways they result in depression in adult life. Despite this fact, our findings demonstrate that the role of PB in development of depression is crucial and underline the importance for further research about possible pathways between PB, CM and depression.

Our data showed that both CM and PB are predictive of depression severity. PB is rarely taken into account in the context of CM and depression severity research. In the following, the role of PB with regard to depression severity is discussed. Research demonstrating that childhood trauma is not as important as parental bonding experiences to predict poor mental health outcomes (Marshall et al., 2018) underlines the relevance of PB with regard to depression severity. Similarly, it was found that PB was a better predictor of quality of life than maltreatment itself (Rikhye et al., 2008). Furthermore, it has been proposed that depression can be seen rather as a consequence of a broad dysfunctional childhood environment than as a direct consequence of abuse or other traumatic experiences (Gladstone, Parker, & Mitchell, 1999; Hovens et al., 2009).

Another important note is that whereas PB extends over a positive and a negative end and can therefore influence the relation between PB and depression as a resilience factor as well as a risk factor, CM can only have a negative or a neutral influence on depression severity. Furthermore, every individual has some kind of bonding with their parents, whereas

maltreatment is not necessarily present in every family. For these reasons, PB seems like a construct that is applicable to a larger population than CM and therefore could provide us with more information. These ideas underline the relevance of PB and its value as a predictor for depression severity.

Our findings on family aggregation demonstrate that emotional abuse, emotional neglect and physical neglect are the forms of maltreatment that aggregate most. These findings are in line with the reports of Hamilton-Giachritsis (2005) and Witte, Feger and Walpert (2018) both of which found the same pattern, that physical and sexual abuse are rather child-specific whereas emotional abuse, and physical neglect and emotional neglect aggregate. In a similar way, neglect has also been described to have especially high concordance between siblings (Hines et al., 2006; Jean-Gilles & Crittenden, 1990). Conflicting with our results is one study that reports numbers of concordant sibling reports of physical and sexual abuse of 50 and 30 percent respectively (MacMillan et al., 2013), whereas we found that those forms of maltreatment cluster weakly in families. The sample in the study at question includes only young people around 20 years of age and another instrument, the CEVQ, was used. The CEVQ is comparable with the CTQ (Saini, Hoffmann, Pantelis, Everall, & Bousman, 2019), but designed to be answered by youth. The higher numbers of sexual and physical abuse in the Macmillan and colleagues (2013) study relative to ours can be explained by the fact that young peoples' maltreatment experiences date back a short amount of time and therefore are less under-reported in these samples (Tanaka et al., 2012). For the interpretation of our results this means that the results are not contradictory but draw attention to the magnitude of the problem of maltreatment and the possibility that we underestimate the amount of people that are actually maltreated as children.

Most of the other aforementioned records appear to reflect approximately the same degree of aggregation as our results. Only the intraclass correlations for the two neglect forms described by Hines and colleagues (2006) are much higher than the ones we found, namely .55 for emotional neglect and .53 for physical neglect. We attribute the difference to the use of different instruments, as Hines and colleagues (2006) used a more extensive questionnaire with questions on neglect only. Both, our findings as well as findings by Hines (2006) support the view that neglect is the form of maltreatment that aggregates most. In line with this, risk factors associated with neglect are more often categorized as familial and parental risk factors, whereas for risk factors associated with abuse there appears to be a balance between child-

factors and family-factors (Brown, Cohen, Johnson, & Salzinger, 1998). Moreover, often, deficits on the family level define neglect, such as not enough food or a dirty home (Brown et al., 1998; Hines et al., 2006). Furthermore, associations between lower level of education, larger family size, low income, parental psychopathology and physical neglect have been described (Brown et al., 1998; Witte et al., 2018) providing further support that a neglectful environment results from broader family characteristics that are likely to influence all children, rather than only one.

This study also demonstrated that PB aggregates in families. It had not been researched before how similar bonding patterns are between siblings in one family. Integrating our results into existing knowledge, our findings can be aligned with research on attachment styles. It has been shown that attachment styles (secure/ non-secure) between siblings are concordant and that non-security is associated with maternal insensitivity (van IJzendoorn et al., 2000), implying that maternal insensitivity is a shared factor that tends to make attachment of children of the same family more similar. Likewise, concordance of attachment strategies was more similar in sibling pairs that lived in worse environments (Farnfield, 2017). Both of these accounts emphasize the significance of the shared environment factors with attachment styles. Our findings propose that the same could hold for bonding.

In our study, we found no evidence for a linear relationship between deviation of CM and PB experiences from the family mean and depression severity. This is somewhat surprising given that adverse life events posing a risk on the proximal family level, to which maltreatment in the family would be counted, have been found to be predictive of psychopathology (Eirini, Nikos, & Constantinos, 2010). Furthermore, reports of lower parental warmth as compared to a sibling have been linked to an increase in depressive symptoms in girls (Shanahan, Mchale, Crouter, & Osgood, 2008). On the other hand, other studies on the relationship between differential treatment and wellbeing suggested that perceptions of fairness about being treated differently from one's siblings play a more important role than differential treatment itself (Kowal, Kramer, Krull, & Crick, 2002; McHale, Updegraff, Jackson-Newsom, Tucker, & Crouter, 2000), implying that differential treatment may not a good measure to investigate depression severity because it is influenced by perceptions, which are, in turn, influenced by self-esteem and sibling positivity among others (McHale et al., 2000). Furthermore, it has been suggested that differential treatment

could play a bigger role in eliciting externalizing behaviors rather than internalizing symptoms (Richmond, Stocker, & Rienks, 2005), yielding another explanation for the fact that we did not find a predictive effect of the difference between own and sibling's CM and PB scores. Therefore, it could be that the relative gravity of maltreatment as compared to siblings actually has no influence on depression severity. However, the same null-finding could be due to statistical problems that are outlined in the limitation section.

Implications

Our study illustrates that PB is relevant for clinical practice for three reasons. Firstly, because children of the same family appear to have similar bonding patterns and therefore the impact of suboptimal bonding in a family reaches farther than only affecting one individual. Secondly, because we have shown that worse parental bonding is highly predictive of more severe depressive symptoms. In depression treatment, early childhood experiences and relationship with parents should therefore always be addressed. Preventive programs for children could aim at improving bonding patterns with parents. A third reason is that PB is a possible candidate for further defining the often-reported relationship between CM and depression and embedding it in a family context.

Our study furthermore informs child care services in a way that it underlines the importance of checking up on all children of the family when one child is reported for being maltreated because we showed that aggregation of CM occurs.

Limitations and Future Directions

One limitation of this study is that we only looked at total maltreatment scores in the linear regressions. Combining the different subscales allows to determine an overall effect of maltreatment. On the other hand, it comes at the expense of loss of information about the specific maltreatment types. Because it is known that for emotional forms of CM the majority of perpetrator is a parent whereas for the majority of sexual abuse cases the perpetrator is somebody else than the parents (Glaser, 2002; Hovens et al., 2009) it could be expected that the different forms of maltreatment are quite diverse in their interaction with PB as well as their predictive value of depression severity.

Our finding that adding information about sibling reports does not add predictive value to depression severity is limited. Looking from a statistical point of view, the null-finding could be due to the fact that maltreatment aggregates in families: if maltreatment aggregates in families, the scores of siblings of one family are expected to be similar. Similar

scores, however, do not add predictive value, because a large part of their prediction is already included in the model. Also, the predictors contained in the model have been computed from the same variable (the target score), which introduced multicollinearity, therefore making it impossible to draw conclusions about the individual predictors. On the grounds of this, it is very likely that our null-fining is due to flaws in the construction of the statistical model. In future studies this flaw could be eliminated by designing a study using multilevel modelling. This would also control for another drawback, namely that in our study, combining the sibling data on CM and PB into an average value probably lead to loss of information.

As discussed before, albeit we found that quality of PB was predictive of depression severity, our design does not allow to make conclusions about how PB and CM work together in the prediction of depression severity. There is evidence that CM and PB have a large conceptual overlap and it would be useful to address the interaction of the two concepts for the prediction of depression severity in a future study in order to better understand how CM and PB relate to each other and what gives way to depression later in life.

Conclusion

CM and suboptimal PB have appalling consequences for the affected person and we showed that they are phenomena that do not occur in isolation but often cluster in families. We showed that especially paternal PB plays a crucial role with regard to determining depression severity later in life and argue that it is likely that the two concepts are highly related and work together closely. In what way the two concepts interact and give way to depression later in life could not be determined in this study, but it is an interesting question for future research. Our study informs clinical practice as well as child care services in that it underlines the importance to see a patient as a part of a broader environmental context and to always check whether siblings of children reported for CM are affected as well.

References

Baker, A. J. L., & Verrocchio, M. C. (2015). Parental Bonding and Parental Alienation as

Correlates of Psychological Maltreatment in Adults in Intact and Non-intact Families.

Journal of Child and Family Studies, *24*(10), 3047–3057.

https://doi.org/10.1007/s10826-014-0108-0

Baldwin, J. A., & Oliver, J. E. (1975). Epidemiology and family characteristics of severely-

abused children. *Journal of Epidemiology & Community Health*, *29*(4), 205–221.

https://doi.org/10.1136/jech.29.4.205

Bernstein, D. P., & Fink, L. (1998). *Childhood trauma questionnaire: A retrospective self-

report: Manual*. Psychological Corporation.

Bowerman, B. L., & O'Connell, R. T. (1990). *Linear statistical models: An applied approach*

(2nd ed.). Belmont, CA: Duxbury.

Brown, J., Cohen, P., Johnson, J. G., & Salzinger, S. (1998). A longitudinal analysis of risk

factors for child maltreatment: findings of a 17-year prospective study of officially

recorded and self-reported child abuse and neglect. *Child Abuse & Neglect*, *22*(11),

1065–1078. https://doi.org/10.1016/S0145-2134(98)00087-8

Cox, B. J., Enns, M. W., & Clara, I. P. (2000). The Parental Bonding Instrument:

confirmatory evidence for a three-factor model in a psychiatric clinical sample and in

the National Comorbidity Survey. *Social Psychiatry and Psychiatric Epidemiology*,

35(8), 353–357. https://doi.org/10.1007/s001270050250

Cuijpers, P., Smit, F., Unger, F., Stikkelbroek, Y., ten Have, M., & de Graaf, R. (2011). The

disease burden of childhood adversities in adults: A population-based study. *Child

Abuse & Neglect*, *35*(11), 937–945. https://doi.org/10.1016/j.chiabu.2011.06.005

Eirini, F., Nikos, T., & Constantinos, K. (2010). Area and family effects on the

    psychopathology of the Millennium Cohort Study children and their older siblings.

    Journal of Child Psychology and Psychiatry, *51*(2), 152–161.

    https://doi.org/10.1111/j.1469-7610.2009.02156.x

Enns, M. W., Cox, B. J., & Clara, I. (2002). Parental bonding and adult psychopathology:

    results from the US National Comorbidity Survey. *Psychological Medicine*, *32*(6),

    997–1008. https://doi.org/10.1017/S0033291702005937

Enns, M. W., Cox, B. J., & Larsen, D. K. (2000). Perceptions of Parental Bonding and

    Symptom Severity in Adults with Depression: Mediation by Personality Dimensions.

    The Canadian Journal of Psychiatry, *45*(3), 263–268.

    https://doi.org/10.1177/070674370004500305

Farnfield, S. (2017). Fix my child: The importance of including siblings in clinical

    assessments. *Clinical Child Psychology and Psychiatry*, *22*(3), 421–435.

    https://doi.org/10.1177/1359104517707995

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (5th ed.). London: Sage.

Gladstone, G., Parker, G., & Mitchell, P. (1999). Characteristics of Depressed Patients Who

    Report Childhood Sexual Abuse. *Am J Psychiatry*, 7.

Glaser, D. (2002). Emotional abuse and neglect (psychological maltreatment): a conceptual

    framework. *Child Abuse & Neglect*, *26*(6–7), 697–714. https://doi.org/10.1016/S0145-

    2134(02)00342-3

Hamilton-Giachritsis, C., & Browne, K. D. (2005). A retrospective study of risk to siblings in

    abusing families. *Journal of Family Psychology*, *19*(4), 619–624.

    https://doi.org/10.1037/0893-3200.19.4.619

Henry, K. L., Fulco, C. J., & Merrick, M. T. (2018). The Harmful Effect of Child

Maltreatment on Economic Outcomes in Adulthood. *American Journal of Public Health*, *108*(9), 1134–1141. https://doi.org/10.2105/AJPH.2018.304635

Hill, J., Davis, R., Byatt, M., Burnside, E., Rollinson, L., & Fear, S. (2000). Childhood sexual abuse and affective symptoms in women: a general population study. *Psychological Medicine*, *30*(6), 1283–1291. https://doi.org/10.1017/S0033291799003037

Hines, D. A., Kantor, G. K., & Holt, M. K. (2006). Similarities in siblings' experiences of neglectful parenting behaviors. *Child Abuse & Neglect*, *30*(6), 619–637. https://doi.org/10.1016/j.chiabu.2005.11.008

Hovens, J. G. F. M., Giltay, E. J., Hemert, A. M., & Penninx, B. W. (2016). Childhood maltreatment and the course of depressive and anxiety disorders: the contribution of personality characteristics. *Depression and Anxiety*, *33*(1), 27–34.

Hovens, J. G. F. M., Giltay, E. J., Wiersma, J. E., Spinhoven, P., Penninx, B. W. J. H., & Zitman, F. G. (2012). Impact of childhood life events and trauma on the course of depressive and anxiety disorders. *Acta Psychiatrica Scandinavica*, *126*(3), 198–207. https://doi.org/10.1111/j.1600-0447.2011.01828.x

Hovens, J. G. F. M., Wiersma, J. E., Giltay, E. J., Van, O. P., Spinhoven P., Penninx, B. W. J. H., & Zitman, F. G. (2009). Childhood life events and childhood trauma in adult patients with depressive, anxiety and comorbid disorders vs. controls. *Acta Psychiatrica Scandinavica*, *122*(1), 66–74. https://doi.org/10.1111/j.1600-0447.2009.01491.x

Jean-Gilles, M., & Crittenden, P. M. (1990). Maltreating Families: A Look at Siblings. *Family Relations*, *39*(3), 323–329. https://doi.org/10.2307/584879

Kendler, K. S. (1996). Parenting: a genetic-epidemiologic perspective. *American Journal of Psychiatry*, *153*(1), 11–20. https://doi.org/10.1176/ajp.153.1.11

Kessler, R. C., Davis, C. G., & Kendler, K. S. (1997). Childhood adversity and adult psychiatric disorder in the US National Comorbidity Survey. *Psychological Medicine*, *27*(5), 1101–1119.

Kessler, R. C., McLaughlin, K. A., Green, J. G., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., … Williams, D. R. (2010). Childhood adversities and adult psychopathology in the WHO World Mental Health Surveys. *British Journal of Psychiatry*, *197*(05), 378– 385. https://doi.org/10.1192/bjp.bp.110.080499

Kowal, A., Kramer, L., Krull, J. L., & Crick, N. R. (2002). Children's perceptions of the fairness of parental preferential treatment and their socioemotional well-being. *Journal of Family Psychology: JFP: Journal of the Division of Family Psychology of the American Psychological Association (Division 43)*, *16*(3), 297–306.

Ma, N., Roberts, R., Winefield, H., & Furber, G. (2015). Utility of qualitative metasynthesis: Advancing knowledge on the wellbeing and needs of siblings of children with mental health problems. *Qualitative Psychology*, *2*(1), 3–28. https://doi.org/10.1037/qup0000018

MacMillan, H. L., Tanaka, M., Duku, E., Vaillancourt, T., & Boyle, M. H. (2013). Child physical and sexual abuse in a community sample of young adults: Results from the Ontario Child Health Study. *Child Abuse & Neglect*, *37*(1), 14–21. https://doi.org/10.1016/j.chiabu.2012.06.005

Mandelli, L., Petrelli, C., & Serretti, A. (2015). The role of specific early trauma in adult depression: A meta-analysis of published literature. Childhood trauma and adult

depression. *European Psychiatry*, *30*(6), 665–680.

https://doi.org/10.1016/j.eurpsy.2015.04.007

Marshall, M., Shannon, C., Meenagh, C., Corry, N. M., & Mulholland, C. (2018). The

association between childhood trauma, parental bonding and depressive symptoms

and interpersonal functioning in depression and bipolar disorder. *Irish Journal of

Psychological Medicine*, *35*(1), 23–32. https://doi.org/10.1017/ipm.2016.43

Martins, C. M. S., Von Werne Baes, C., de Carvalho Tofoli, S. M., & Juruena, M. F. (2014).

Emotional Abuse in Childhood Is a Differential Factor for the Development of

Depression in Adults: *The Journal of Nervous and Mental Disease*, *202*(11), 774–782.

https://doi.org/10.1097/NMD.0000000000000202

McCarthy, M. M., Taylor, P., Norman, R. E., Pezzullo, L., Tucci, J., & Goddard, C. (2016).

The lifetime economic and social costs of child maltreatment in Australia. *Children

and Youth Services Review*, *71*, 217–226.

https://doi.org/10.1016/j.childyouth.2016.11.014

McGinn, L. K., Cukor, D., & Sanderson, W. C. (2005). The Relationship Between Parenting

Style, Cognitive Style, and Anxiety and Depression: Does Increased Early Adversity

Influence Symptom Severity Through the Mediating Role of Cognitive Style?

Cognitive Therapy and Research, *29*(2), 219–242. https://doi.org/10.1007/s10608-

005-3166-1

McHale, S. M., Updegraff, K. A., Jackson-Newsom, J., Tucker, C. J., & Crouter, A. C.

(2000). When Does Parents' Differential Treatment Have Negative Implications for

Siblings? *Social Development*, *9*(2), 149–172. https://doi.org/10.1111/1467-

9507.00117

Meites, T. M., Ingram, R. E., & Siegle, G. J. (2012). Unique and Shared Aspects of Affective

Symptomatology: The Role of Parental Bonding in Depression and Anxiety Symptom

Profiles. *Cognitive Therapy and Research*, *36*(3), 173–181.

https://doi.org/10.1007/s10608-011-9426-3

Moore, S. E., Scott, J. G., Ferrari, A. J., Mills, R., Dunne, M. P., Erskine, H. E., … Norman,

R. E. (2015). Burden attributable to child maltreatment in Australia. *Child Abuse &

Neglect*, *48*, 208–220. https://doi.org/10.1016/j.chiabu.2015.05.006

Muthén, B. O., & Satorra, A. (1995). Complex Sample Data in Structural Equation Modeling.

Sociological Methodology, *25*, 267–316. https://doi.org/10.2307/271070

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

Oakley-Browne, M. A., Joyce, P. R., Wells, J. E., Bushnell, J. A., & Hornblow, A. R. (1995).

Adverse parenting and other childhood experience as risk factors for depression in

women aged 18–44 years. *Journal of Affective Disorders*, *34*(1), 13–23.

https://doi.org/10.1016/0165-0327(94)00099-U

Parker, G. (1983). Parental "affectionless control" as an antecedent to adult depression: A risk

factor delineated. *Archives of General Psychiatry*, *40*(9), 956–960.

https://doi.org/10.1001/archpsyc.1983.01790080038005

Parker, G., & Hadzi-Pavlovic, D. (1992). Parental representations of melancholic and non-

melancholic depressives: examining for specificity to depressive type and for evidence

of additive effects. *Psychological Medicine*, *22*(3), 657–665.

https://doi.org/10.1017/S0033291700038101

Parker, G., Kiloh, L., & Hayward, L. (1987). Parental representations of neurotic and

    endogenous depressives. *Journal of Affective Disorders*, *13*(1), 75–82.

    https://doi.org/10.1016/0165-0327(87)90076-0

Parker, G., Tupling H., & Brown L. B. (1979). A Parental Bonding Instrument. *British*

    Journal of Medical Psychology, *52*(1), 1–10. https://doi.org/10.1111/j.2044-

    8341.1979.tb02487.x

Penninx, B. W., Beekman, A. T., Smit, J. H., Zitman, F. G., Nolen, W. A., Spinhoven, P., …

    Assendelft, W. J. (2008). The Netherlands Study of Depression and Anxiety

    (NESDA): rationale, objectives and methods. *International Journal of Methods in*

    Psychiatric Research, *17*(3), 121–140.

Richmond, M. K., Stocker, C. M., & Rienks, S. L. (2005). Longitudinal associations between

    sibling relationship quality, parental differential treatment, and children's adjustment.

    Journal of Family Psychology, *19*(4), 550–559. https://doi.org/10.1037/0893-

    3200.19.4.550

Rikhye, K., Tyrka, A. R., Kelly, M. M., Gagne, G. G., Mello, A. F., Mello, M. F., …

    Carpenter, L. L. (2008). Interplay between childhood maltreatment, parental bonding,

    and gender effects: Impact on quality of life. *Child Abuse & Neglect*, *32*(1), 19–34.

    https://doi.org/10.1016/j.chiabu.2007.04.012

Rush, A. J., Gullion, C. M., Basco, M. R., Jarrett, R. B., & Trivedi, M. H. (1996). The

    Inventory of Depressive Symptomatology (IDS): psychometric properties.

    Psychological Medicine, *26*(3), 477–486.

    https://doi.org/10.1017/S0033291700035558

Saini, S. M., Hoffmann, C. R., Pantelis, C., Everall, I. P., & Bousman, C. A. (2019).

Systematic review and critical appraisal of child abuse measurement instruments.

Psychiatry Research, *272*, 106–113. https://doi.org/10.1016/j.psychres.2018.12.068

Seganfredo, A. C. G., Torres, M., Salum, G. A., Blaya, C., Acosta, J., Eizirik, C., & Manfro,

G. G. (2009). Gender differences in the associations between childhood trauma and

parental bonding in panic disorder. *Revista Brasileira de Psiquiatria*, *31*(4), 314–321.

Shanahan, L., Mchale, S. M., Crouter, A. C., & Osgood, D. W. (2008). Linkages Between

Parents' Differential Treatment, Youth Depressive Symptoms, and Sibling

Relationships. *Journal of Marriage & Family*, *70*(2), 480–494.

https://doi.org/10.1111/j.1741-3737.2008.00495.x

Silove, D., Parker, G., Hadzi-Pavlovic, D., Manicavasagar, V., & Blaszczynski, A. (1991).

Parental Representations of Patients with Panic Disorder and Generalised Anxiety

Disorder. *The British Journal of Psychiatry*, *159*(6), 835–841.

https://doi.org/10.1192/bjp.159.6.835

Spinhoven, P., Penninx, B. W., Hickendorff, M., van Hemert, A. M., Bernstein, D. P., &

Elzinga, B. M. (2014). Childhood Trauma Questionnaire: Factor structure,

measurement invariance, and validity across emotional disorders. *Psychological*

Assessment, *26*(3), 717–729. https://doi.org/10.1037/pas0000002

Tanaka, M., Wekerle, C., Leung, E., Waechter, R., Gonzalez, A., Jamieson, E., & MacMillan,

H. L. (2012). Preliminary Evaluation of the Childhood Experiences of Violence

Questionnaire Short Form. *Journal of Interpersonal Violence*, *27*(2), 396–407.

https://doi.org/10.1177/0886260511416462

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*(8), 518–523.

https://doi.org/10.1016/j.chiabu.2009.03.001

van IJzendoorn, M. H., Moran, G., Belsky, J., Pederson, D., Bakermans-Kranenburg, M. J., &

Kneppers, K. (2000). The Similarity of Siblings' Attachments to Their Mother. *Child

Development*, *71*(4), 1086–1098. https://doi.org/10.1111/1467-8624.00211

Witte, S., Fegert, J. M., & Walper, S. (2018). Risk of maltreatment for siblings: Factors

associated with similar and different childhood experiences in a dyadic sample of

adult siblings. *Child Abuse & Neglect*, *76*, 321–333.

https://doi.org/10.1016/j.chiabu.2017.11.009

Xu, M. K., Morin, A. J. S., Marsh, H. W., Richards, M., & Jones, P. B. (2016). Psychometric

Validation of the Parental Bonding Instrument in a U.K. Population–Based Sample:

Role of Gender and Association With Mental Health in Mid-Late Life. *Assessment*,

107319111666081. https://doi.org/10.1177/1073191116660813