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Getting to the heart of child maltreatment : a multidimensional investigation using an extended family design

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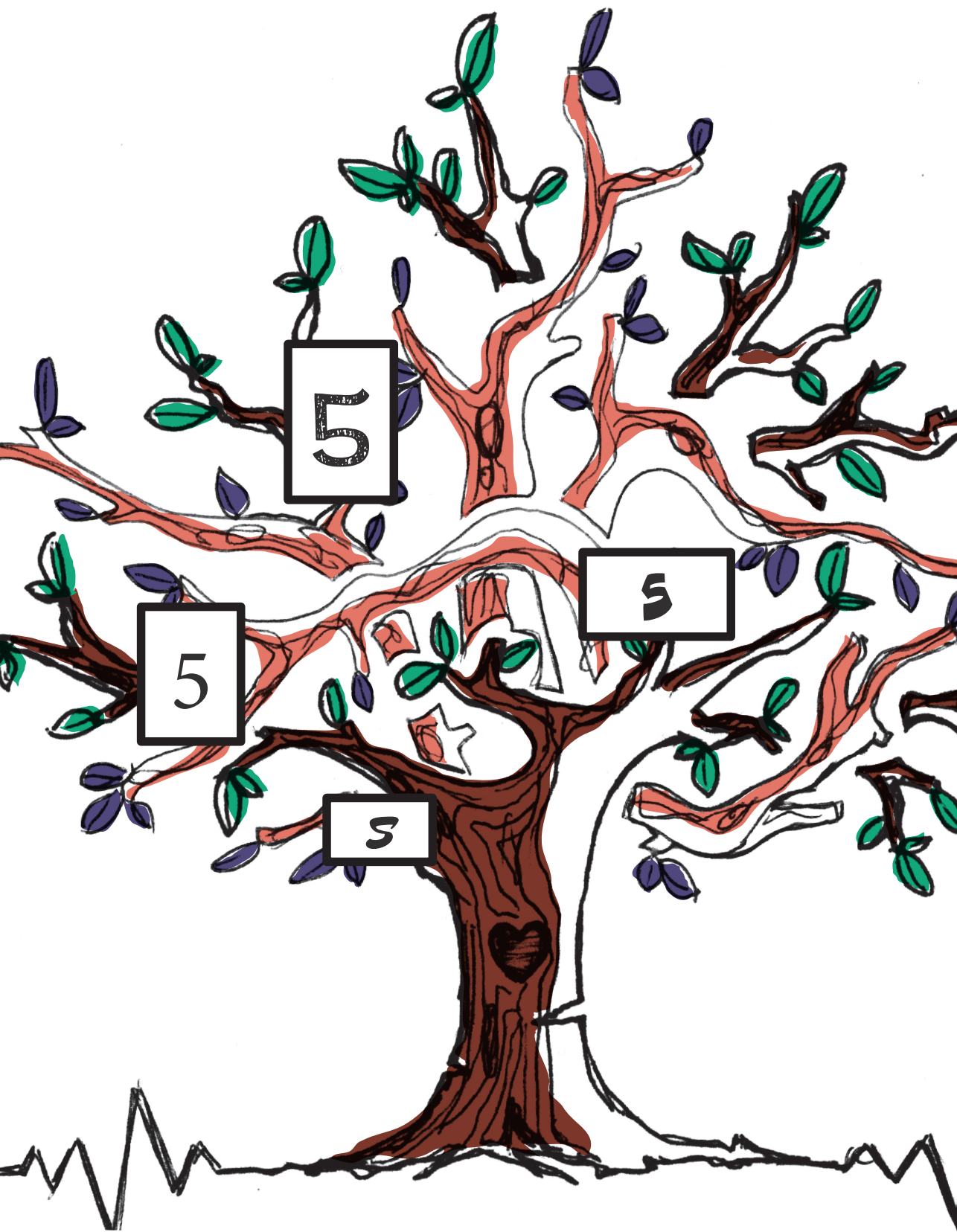


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Chapter 5

Child maltreatment and parent-offspring interaction: A multigenerational extended family design

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Abstract

In the current study we examined the associations between multiple types of maltreatment (abuse and neglect), parent-offspring interactions and family cohesion in an extended family study. A total of 366 parent-offspring pairs from 137 nuclear families participated. Parents ($M_{\text{age}} = 52.8$ years, age range: 26.6–88.4 years, 57% female) reported about perpetrated child maltreatment and offspring ($M_{\text{age}} = 25.7$ years, range: 7.5–65.5 years, 58% female) about experienced maltreatment during their childhood. Parent-offspring interactions were observed during a conflict interaction task. Cohesion within the nuclear family was observed during a playful tower building task. Results showed that parents and offspring displayed more aversive behavior in parent-offspring dyads characterized by higher levels of child abuse, but not in dyads characterized by higher levels of child neglect. In addition, more dyadic affective dissimilarity was observed in parent-offspring dyads characterized by higher levels of childhood neglect, whereas dyadic affective dissimilarity was lower in dyads characterized by higher levels of childhood abuse. Findings imply that interventions focused on parent-offspring interactions with a somewhat different content for neglectful and abusive families, may be efficacious for families in the child welfare system.

Keywords: child maltreatment, parent-offspring interactions, conflict interaction task, family cohesion

Introduction

Both social learning theory (Bandura, 1973) and attachment theory (Bowlby, 1969) assume that interaction patterns learned and enacted during childhood and adolescence provide the foundation for relationships later in life. High quality parent-child interactions incorporate mutual warmth and affection, parental contingent responsiveness, and sensitivity to children's state and interests (e.g., Ainsworth et al., 1978). An extensive body of research has provided evidence that the quality of parent-child interactions is essential for children's social emotional as well as cognitive development (e.g., Eisenberg et al., 2001; Tamis-LeMonda, Bornstein, & Baumwell, 2001). However, these interaction patterns seem to be disrupted in maltreating families (e.g., Madigan et al., 2006; Wilson, Rack, Shi, & Norris, 2008). A common approach to the treatment of maltreating families, therefore, is parent-child interaction therapy (Batzer, Berg, Godinet, & Stotzer, 2018). Yet, research on the association between parent-offspring interactions and maltreatment types other than abuse (i.e., neglect) is scarce and no studies have investigated the link between child maltreatment and parent-offspring interactions with adult offspring. In addition, few observational studies have investigated father-offspring interactions or examined parent-offspring interactions in the context of the nuclear family. The current study addresses these gaps in the literature.

Observational methods provide important data about parenting since convergence between self-reported and observed parental behavior is typically low, particularly in mothers from high-social-risk populations, likely due to socially desirable responding (Bennett, Sullivan, & Lewis, 2006; Fitzgerald, Shipman, Jackson, McMahon, & Hanley, 2005). However, observational studies are labor intensive, often resulting in small sample sizes, which may in part explain mixed findings. A meta-analysis of 30 observational studies comparing maltreating and non-maltreating parents in terms of their aversiveness, positivity, and involvement during interactions with their children, found medium effect sizes for all three types of behavior (Wilson et al., 2008). Moreover, physically abusive parents could be distinguished from non-maltreating parents more so than neglectful parents in terms of aversive behavior, whereas involvement better distinguished neglectful from non-maltreating parents. Notably, only a handful of studies included neglectful parents or fathers and there were no studies with emotional abusive parents, thus limiting conclusions about these groups. Few observational studies on maltreatment and parent-child interactions have been published after this 2008 meta-analysis (but see, e.g., Skowron et al., 2011). Moreover, to our knowledge, no studies have examined the association between maltreatment and parent-offspring interactions with adult offspring, even though the parent-offspring relationship constitutes one of the most long-lasting social relationships and continues to be of importance in the lives of most adults (Van Wel, Linssen, & Abma, 2000).

Several observational studies on parent-offspring interactions have investigated the behavior of the offspring in relation to child maltreatment. Some studies show that offspring in maltreating families displayed different behavior compared to offspring in non-maltreating families. For example, Cerezo & D'Ocon (1999) reported that during parent-child interactions abused children exhibit aversive behaviors more frequently than non-abused children. A longitudinal study of mother-child interactions found that toddlers who were abused by their mother during infancy engaged in less child-initiated play, indicative of less socially competent behavior, than did toddlers from neglecting and non-maltreating mothers (Valentino, Cicchetti, Toth, & Rogosch, 2011). Nevertheless, other observational studies on parent-child interactions suggest that observed child behaviors do not reliably differentiate maltreated children from non-maltreated children. For example, Lau and colleagues (2006) showed that even though parents in the abuse group displayed more emotionally controlling and less supportive behavior during an interaction task, there was no association between abuse history and observed child behaviors during interactions with their parents.

In situations where the victim and the perpetrator have an ongoing relationship – as is the case when a parent maltreats their child – relationship dynamics can play an important role (Urquiza & Timmer, 2002). Yet, we know little about the association between maltreatment and parent-child interactions on a dyadic measurement level. In the present study we therefore explored the discrepancy between parents' and offspring's overall affective expression, hereafter referred to as dyadic affective dissimilarity. Some studies have examined the temporal organization of affective expressions in parent-child dyads. Mothers at high risk for child maltreatment were found to show more interactive affective mismatch and more mother-initiated ruptures (Skowron, Kozlowski, & Pincus, 2010). In addition, Guilliano and colleagues (2015) observed parent-child interactions during a puzzle task and found decreases in mutually positive mother-child behaviors over time in dyads with maltreating mothers. Based on these studies, we expected higher dissimilarity in parent-offspring dyads of whom the parents perpetrated higher levels of maltreatment.

Parent-offspring interactions occur within the context of the family. However, to date, the majority of the observational studies on parent-offspring interactions and maltreatment investigated parent-child interactions with only one parent (mostly the mother) and one child. Dependent on the method used to assess parental behavior, less than 50% of the variance in parental negativity and positivity is the same across siblings in studies using parental reports and this is reduced to approximately 25% in observational studies (Browne et al., 2012; Jenkins et al., 2003). Moreover, research has shown that similarity in parenting behavior is higher for monozygotic twins than for dizygotic twins or full siblings (Avinun & Knafo, 2014; Bakermans-Kranenburg et al., 2019) indicating that genetic characteristics of children may elicit certain types of parenting behavior. Although research on the degree of

correspondence between maternal and paternal parenting behavior is somewhat limited, there is evidence suggesting only modest similarity in parenting styles of two parents within the same home (Winsler, Madigan, & Aquilino, 2005). A family design offers opportunities to study how much of the variance in parents' interaction style is the same across siblings and whether father and mother interact with their children in the same manner.

In addition, families can be understood as entities and as greater than the sum of parts (Bowen, 1971). According to Bowen's family systems theory the family should be viewed as an emotional unit. Although treatment at the family level has been advocated for several years in the field of child maltreatment (e.g., Cicchetti & Toth, 1995), few observational studies have investigated maltreating families as a unit. Research examining family interactions has shown that abusive and neglectful families are less organized and less effective in working together toward the achievement of common goals compared to non-maltreating families (Gaudin, Polansky, Kilpatrick, & Shilton, 1996; Howes, Cicchetti, Toth, & Rogosch, 2000). In the present investigation, therefore, we also observed family cohesion as a proxy for family interactions at the system level.

The current study

In order to gain further insight into the link between maltreatment and family interactions, the present study examined the associations of two types of childhood maltreatment (abuse and neglect) with dyadic parent-offspring interactions during a conflict interaction task and family cohesion during a playful tower building task in an extended family design. We examined maternal *and* paternal interactions with multiple offspring spanning a wide age range. Multilevel modeling was used to account for the hierarchical structure of the data and to examine the amount of variance in dyad interactions that is the same across siblings and across parents. Based on previous literature (Browne et al., 2012; Jenkins et al., 2003; Howes et al., 2000; Wilson et al., 2008) our main hypotheses were:

1. Parents and offspring communicate more negatively towards each other in dyads with higher levels of childhood abuse and neglect.
2. Dyadic affective dissimilarity will be higher in dyads with higher levels of childhood abuse and neglect, but no assumptions were made regarding whether parents or offspring would be more negative due to a lack of comparable research.
3. There is similarity in parenting behavior across siblings and modest similarity in parenting behavior displayed by two parents of the same offspring.
4. Family cohesion is lower in families characterized by higher levels of childhood abuse and neglect.

In addition, we explored whether abuse and neglect were differentially associated with parent-offspring interactions. Finally, we explored whether the association between maltreatment and dyadic parent-offspring interactions is moderated by age and gender of the parents, since the majority of observational studies included mother-child

interactions but not father-child interactions and studies on parent-offspring interactions with adult offspring are lacking.

Method

Sample

Participants of the current study were part of the larger 3G Parenting Study, a family study on the intergenerational transmission of parenting styles, stress and emotion regulation. (See also Buisman et al., 2018; Buisman et al., 2019). A total of 395 participants from 63 families with two to four generations and an average of 6.27 family members per family (range: 2 to 23) agreed to participate. All participating parent-offspring dyads were included in the current study. See Buisman et al. (2018) and van den Berg et al. (2018) for a description of the recruitment and procedure.

Nuclear families

Within the 63 extended families, there were 137 nuclear families consisting of 366 parent-offspring dyads. Forty-eight nuclear families participated with two parents and two offspring, 30 families consisted of one parent and one offspring, 28 families consisted of two parents and one offspring, 22 families consisted of one parent and two offspring, six families consisted of two parents and three offspring, two families consisted of one parent and three offspring, and one family consisted of one parent and seven offspring. This resulted in 387 participants among whom 57 (15%) participated both as parent and as offspring.

Parents

Data were available for 219 parents (94 males, 125 females). The average age was 52.8 years ($SD = 13.3$, age range: 26.6–88.4 years). The vast majority of parents were Caucasian (94%), 1% were of Antillean descent, 1% were of Latin-American descent, and 1% were of mixed descent. Ethnicity was unknown for 3% of the participants. Eight percent of parents had completed elementary school, 62% had an advanced secondary school or vocational school diploma, and 27% held a college or university degree. The educational level of 3% of parents was unknown.

Offspring

Data for 225 offspring (95 males, 130 females) were included. The average age was 25.7 years ($SD = 14.1$, age range: 7.5–65.5 years). The vast majority of the children (91%) were Caucasian, 4% were of Antillean descent, 1% were of Latin-American descent, and 1% were of mixed descent. Ethnicity was unknown for 3% of the participants. Fifty percent of the

offspring were still in primary or high school, 30% had an advanced secondary school or vocational school diploma, and 20% held a college or university degree.

Measures

Dyadic parent-offspring interactions

Patterns of interaction between parents and offspring were observed during a parent-offspring conflict interaction task, also known as revealed differences task (Strodtbeck, 1951). Dyads consisting of one parent and one offspring were asked to discuss an issue on which they disagreed and try to reach consensus within ten minutes in a separate room. The interactions were filmed and no other people were in the room.

Interactions were coded with The Supportive Behavior Task Coding Manual, Version 1.1 (Allen et al., 2001). Parents and offspring received scores for *Warmth*, *Negativity* and *Emotional support*. In addition, we coded the *Discussion of a problem* and *Supportive role* (i.e., the extent to which a person was expected to be supportive during the conversation).

The dyadic parent-offspring interaction task was coded independently from the playful tower building game. Interactions were coded by the first author and three trained research assistants. Members of the dyads were coded independently. Coders were blind to maltreatment history and maltreatment perpetration of the individual they coded, as well as to the scores of the individual in interaction with other family members. Interrater reliability between all pairs of observers was adequate to good, with intraclass correlations for the separate pairs (ICCs; single measures, absolute agreement) ranging from .71 to .82 for *Warmth*, .66 to .78 for *Negativity* and .72 to .80 for *Emotional support*. Cohen's Kappa showed perfect interrater reliability ($k = 1.0$) for *Discussion of a problem* and good interrater reliability ($k_{\text{range}} = .70 - .80$) for *Supportive role*.

Based on these ratings, three new variables were constructed: 1) *Parent-to-offspring communication*, 2) *Offspring-to-parent communication*, and 3) *Dyadic affective dissimilarity*. A principal component analysis (PCA) on warmth, negativity and emotional support from parents towards offspring pointed to one underlying component, explaining 62% of the variance. Component loadings for *Warmth*, *Negativity* and *Emotional support* were .87, .76 and .72, respectively. Therefore, the ratings were aggregated to an average communication score from parents toward offspring. Higher scores indicate a more positive communication style from parents towards offspring. As expected, most offspring (68%) did not provide any emotional support towards their parents. As a result, the distribution of emotional support from offspring had a high kurtosis and was highly skewed. In addition, especially when it comes to underage offspring, emotional support from offspring may have a different meaning (e.g., role reversal) than emotional support from parents. We therefore decided to only aggregate the scores of *Warmth* and *Negativity* to yield an average score for *Offspring-to parent-communication*. Higher scores indicate a more positive communication from

offspring towards parents. Cronbach's alpha was good ($\alpha = .70$). Finally, a *dyadic affective dissimilarity* score was formed by subtracting communication of parents towards children from communication of children towards parents. For this variable, *Parent-to-offspring communication* was based on *Warmth* and *Negativity* only – as was the case for *Offspring-to-parent communication* – such that the scores of parents and offspring are comparable (parent to offspring communication and offspring to parent communication correlated positively, $r = .66$, $p < .001$). Positive values on *dyadic affective dissimilarity* indicate that parents communicate more positively than offspring, whereas negative values indicate that parents communicate more negatively than offspring. Dyadic parent-offspring interactions were missing for 22 dyads due to technical problems and for 10 dyads because parents and offspring could not attend at the same day. See Buisman et al. (2019) for a detailed description of the task and the coding of the constructs.

Family cohesion

Family cohesion was observed during a playful tower building game (Jenga). Nuclear families were asked to collaborate in building a tower as high as possible with the provided wooden parts. They were instructed to work on it for 10 minutes, and to start over should the tower collapse. The tower building was filmed and no other people were in the room. Family cohesion was coded with the System for Coding Interactions and Family Functioning (SCIFF; Lindahl, & Malik, 2000).

The tower building task was coded by the first author and a trained research assistant (who did not code the dyadic parent-offspring interactions, see below). Coders were blind to maltreatment history and maltreatment perpetration. Interrater reliability (ICC; single measures, absolute agreement) between the two observers was .73, indicating good reliability. Observations of family cohesion were missing for 12 nuclear families due to technical problems and for 6 families because parents and offspring could not attend on the same day. For more details on the task and the coding of the constructs see Supplementary material Chapter 5.

Child maltreatment

Child maltreatment was measured using a combination of the Parent-Child Conflict Tactics Scales (CTS-PC; Straus, Hamby, Finkelhor, Moore, & Runyan, 1998) and the Childhood Trauma Questionnaire (CTQ; Bernstein et al., 1994; Thombs, Bernstein, Lobbstaël, & Arntz, 2009).

Offspring completed a version that assessed the extent to which they had experienced specific physically or psychologically neglectful or abusive behaviors from their father and/or mother before the age of 18 years. Parents reported the extent to which they had conducted these behaviors towards each of their offspring. For offspring under 12 years of age, the questionnaire about experienced maltreatment was administered orally and questions about very severe physical abuse were omitted. Offspring aged 12-18 years and living with their parents at the time of the study indicated whether they had experienced

maltreatment within the last year or in the years before. Per item, the higher score of these two was included in all calculations. For offspring aged 18 years or older, lifetime maltreatment (until 18 years) was assessed. See Buisman et al. (2019) for a detailed description of the scales, including its internal consistencies.

For each parent-offspring dyad one *neglect* and one *abuse* score was created, indicating the child maltreatment that had occurred within this particular dyad. *Abuse* scores were calculated by averaging offspring's self-reported experienced abuse from mother or father (offspring report) and parents' self-reported perpetrated abuse towards that particular offspring (parent report). *Neglect* scores were calculated in the same manner. Parent reported child maltreatment correlated significantly with offspring reported child maltreatment: $r = .25$; $p < .001$ for neglect and $r = .37$; $p < .001$ for abuse.

Because the distribution of the CTS data was skewed to the right, scores were log-transformed and then multiplied by 10 to scale up the variance. There were two outliers, which were winsorized, i.e., the difference between the two next highest values was added to the next highest value with standardized value < 3.29 (Tabachnik & Fidell, 2001) to fit the distribution.

Demographic information

Age, gender and socio-economic status (SES) of parents and offspring were assessed via questionnaires. SES was based on household income and highest completed education. Yearly household income was measured on a 7-point scale ranging from (1) less than € 15,000 to (7) more than € 65,000. Education was also rated on a 7-point scale. Based on standardized household income and standardized completed educational level a composite SES score was calculated.

Analyses

Multiple imputation

Missing values were imputed by means of multiple imputation (MI) with the package '*mice*' (van Buuren & Groothuis-Oudshoorn, 2011) in R (R Development Core Team, 2018). MI has the advantage of imputing each missing value multiple times, so that uncertainty of each imputation is reflected in the variance of the different estimates of the same missing value. This variance can be taken into account in the analyses (Allison, 2002). The package '*mice*' imputes incomplete multivariate data by chained equations (Van Buuren & Groothuis-Oudshoorn, 2011). The data were imputed 100 times incorporating all variables that are included in the main analyses. Three percent of all values were missing (range: 0 to 12%). Predictive mean matching (PMM; Little, 1988) was used as multiple-imputation method. Multiple imputation by PMM ensures that imputed values are plausible, because it borrows an observed value from a donor with a similar predictive mean. Autocorrelation function (ACF) plots revealed that imputations converged (Azur, Stuart, Frangakis, & Leaf, 2011). In addition, the correlations

between variables were approximately the same in the imputed datasets compared to the non-imputed dataset (see Supplementary material Table S5.1 and Table S5.2).

Dyadic parent-offspring interactions

Using the pooled data, we computed three separate linear mixed models to evaluate the associations between maltreatment and the dyadic parent-offspring interaction variables: 1) parent to offspring communication, 2) offspring to parent communication, and 3) dyadic affective dissimilarity. Crossed random effects were specified for parents and offspring, since offspring were nested within parents (parents participated with multiple offspring) and parents were nested within offspring (offspring participated with father and mother). A family level was specified for the nesting of parents and offspring within extended families. For every outcome we started with an unconditional means model (Model 1) – which decomposed the variance in the outcome measures into four independent components: the unique component of each parent, i.e., level 2 random effect σ_{up0}^2 , the unique component of each offspring, i.e., level 2 random effect σ_{uo0}^2 , the unique component of each family, i.e., level 3 random effect σ_{p0}^2 , and the residual component σ_e^2 . This model was used to compute the intraclass correlation coefficient (ICC) at the family level, the parent level, and the offspring level. Covariates (age parent, gender parents and offspring, SES parents and offspring, supportive role, discussion of a problem) were added to the unconditional means model, and omitted when p -values exceeded .05 (Model 2). In the next step abuse and neglect were simultaneously entered to evaluate whether each maltreatment type had unique associations with the outcome of interest (Model 3). Next, family cohesion was added as predictor to evaluate the association between maltreatment and dyadic parent-offspring interactions when family cohesion is held constant (Model 4). Finally, maltreatment type and the interaction of maltreatment with gender and age were added one by one to see whether it resulted in an improved model fit. In case of no significant interactions and no model fit improvement the interactions were removed from the model (indicated in the footnote of the Tables). The linear mixed models were fitted using the 'lmer' function in the lme4 package (Bates, 2005) in R (R Core Team, 2018). Model fit was compared using an F reference distribution, since the likelihood ratio is only supported for multiply imputed data in models with a single cluster variable (Li, Raghunathan, & Rubin, 1991). Continuous predictors were centered on their mean.

Family cohesion

In addition, we computed a multilevel linear model to evaluate whether the average amount of maltreatment that occurred in a nuclear family was associated with family cohesion. Two levels were specified: the nuclear family level and the extended family level. We started with an unconditional means model (Model 1) – which decomposed the variance in family cohesion into two independent components: the unique component of each extended family σ_{u0}^2 and the residual component σ_e^2 . This model was used to compute the intraclass correlation

coefficient (ICC) at the extended family level. In an initial step covariates aggregated at the nuclear family level (age parents, gender parents and offspring, SES parents and offspring, and family size of the nuclear family) were included, and omitted when p -values exceeded .05 (Model 2). Because age of parents and offspring were highly correlated ($r = .95$) only the age of parents was included as a covariate. In a second step the mean scores of abuse and neglect in the nuclear family were simultaneously entered to evaluate whether each maltreatment type had unique associations with family cohesion (Model 3).

Bootstrap analyses

Because the dependent variables offspring-to-parent communication and dyadic affective dissimilarity were skewed to the right, we performed clustered bootstrap analyses on the final models to estimate standard errors and to determine confidence intervals for the model parameters (with a 5% error level). The advantage of this bootstrap method is that it yields correct standard errors and confidence intervals even when key assumptions of the mixed model are violated (Deen & De Rooij, 2016). Because data were multiply imputed and running the bootstrap for each imputed data set is very labor intensive, we randomly selected 5 imputed datasets on which the bootstrap analysis was performed. We examined whether the conclusions obtained from the bootstrap analyses paralleled the conclusions obtained from the mixed models.

Results

Preliminary analyses

Correlations between the pooled study variables are presented in Table S5.2 of the Supplementary material. Descriptive statistics and correlation of non-imputed variables can be found in Table S5.1 of the Supplementary material.

Table S5.2 shows that abuse was significantly negatively associated with parent-to-offspring communication ($r = -.24, p < .001$) and with offspring-to-parent communication ($r = -.22, p < .001$). Neglect was significantly negatively associated with offspring-to-parent communication ($r = -.13, p = .015$). Family cohesion was significantly positively associated with parent-to-offspring communication ($r = .15, p = .009$) and offspring-to-parent communication ($r = .34, p < .001$).

Dyadic parent-offspring interactions

Parent-to-offspring communication

Results of the mixed linear model on parent-to-offspring communication are presented in Table 5.1. The unconditional means model (Model 1) revealed that the proportion of explained variance (ICC) was 0.42 at the parent level, indicating that 42% of the total variance in parent-to-offspring communication can be explained by differences between parents, i.e., the correlation

between parents' communication style with different offspring is 0.42. The proportion of explained variance (ICC) at the offspring level was 0.10, indicating that 10% of the total variance in parent-to-offspring communication was explained by differences between offspring, i.e., the correlation between fathers' and mothers' communication style with the same child is 0.10. Finally, 1% of the variance in parent-to-offspring communication pertains to differences between extended families, indicating that the correlation in parent-to-offspring communication between two parents within the same extended family is low. In a next step, covariates were included (Model 2). Of the covariates only gender of the offspring was significant ($t = 2.28$, $p = .023$), indicating that parents communicated more positively with daughters than with sons. The F -test indicated that Model 2 fitted the data better than Model 1 ($F(1, 8431) = 5.12$, $p = .024$). Abuse and neglect were included in the next step (Model 3). This model revealed that abuse was significantly negatively associated with parent-to-offspring communication ($t = -3.97$, $p < .001$), meaning that parents who perpetrated higher levels of abuse towards their offspring communicated more negatively with their offspring. Neglect was not associated with parent-to-offspring communication ($t = 0.02$, $p = .99$), suggesting no associations between parents' observed communication style and their neglectful behavior. In Model 4, family cohesion was included to examine associations between parents' communication and abuse when the level of family cohesion is held constant. This model showed that the association between abuse and parent-to-offspring communication remained significant ($t = -3.88$, $p < .001$) when family cohesion was controlled for, indicating that this association is independent of family cohesion. In addition, the F -test indicated improvement of model fit compared to Model 3 ($F(1, 2005) = 5.14$, $p = .023$).

Table 5.1. Parameter estimates of the mixed models on parent-to-offspring communication

		Model 1	Model 2	Model 3	Model 4
Fixed effects		Coef (se)	Coef (se)	Coef (se)	Coef (se)
Intercept		5.47 (0.09)**	5.27 (0.12)**	5.28 (0.12)**	5.31 (0.12)**
Gender O			0.34 (0.15)*	0.32 (0.14)*	0.27 (0.14)
Abuse				-0.38 (0.10)**	-0.37 (0.10)**
Neglect				0.00 (0.09)	-0.01 (0.09)
Cohesion					0.17 (0.08)*
Variance components					
Parent level	Intercept	0.77	0.73	0.66	0.66
Offspring level	Intercept	0.17	0.17	0.15	0.11
Family level	Intercept	0.02	0.03	0.03	0.04

Note. Gender: 0 = male, 1 = female. O = Offspring. Interactions between maltreatment and gender and age were not significant ($p > .19$) and model fit did not improve, thus Model 4 was accepted as the final model. * $p < .05$, ** $p < .01$.

Offspring-to-parent communication

Results of the mixed linear model on offspring-to-parent communication are presented in Table 5.2. The unconditional means model (Model 1) revealed that the proportion of explained variance (ICC) was 0.35 at the offspring level, and 0.08 at the parent level, and 0.02 at the family level. Covariates were included in Model 2. Only discussion of a problem was significantly associated with offspring-to-parent communication ($t = -2.93$, $p = .003$). Model 2 fitted the data significantly better than Model 1 ($F(1, 9031) = 8.21$, $p = .004$). Model 3 revealed that abuse ($t = -3.45$, $p = .001$) but not neglect ($t = -1.10$, $p = .27$) was significantly associated with offspring-to-parent communication, indicating that offspring with higher levels of experienced abuse communicated more negatively towards their parents. The F -test indicated improvement of model fit compared to Model 2 ($F(2, 22425) = 7.85$, $p < .001$). Inclusion of family cohesion in Model 4 showed that the association between abuse and offspring-to-parent communication remained significant ($t = -3.28$, $p = .001$) when family cohesion was held constant. In addition, the F -test indicated improvement of model fit compared to Model 3 ($F(1, 4209) = 26.81$, $p < .001$).

Table 5.2. Parameter estimates of the mixed models on offspring-to-parent communication

		Model 1	Model 2	Model 3	Model 4
Fixed effects		Coef (se)	Coef (se)	Coef (se)	Coef (se)
Intercept		6.13 (0.11)**	6.90 (0.29)**	6.88 (0.28)**	6.66 (0.27)**
Problem			-0.86 (0.29)**	0.83 (0.29)**	-0.58 (0.28)*
Abuse				-0.39 (0.11)**	-0.35 (0.11)**
Neglect				-0.12 (0.11)	-0.17 (0.10)
Cohesion					0.41 (0.08)**
Variance components					
Parent level	Intercept	0.16	0.06	0.04	0.03
Offspring level	Intercept	0.88	0.82	0.73	0.48
Family level	Intercept	0.05	0.07	0.06	0.02

Note. Gender: 0 = male, 1 = female. Interactions between maltreatment and gender and age were not significant ($p > .30$) and model fit did not improve, thus Model 4 was accepted as the final model. * $p < .05$, ** $p < .01$.

Dyadic affective dissimilarity

Results of the mixed linear model on dyadic affective dissimilarity are presented in Table 5.3. An unconditional means model revealed that the variance of the extended family level was zero, and, therefore, was omitted from the model. The proportion of explained variance (ICC) was 0.13 at the offspring level, and 0.10 at the parent level. Inclusion of covariates in Model 2 revealed that only gender of the parent was significantly associated with dyadic affective dissimilarity ($t = 3.23$, $p = .001$), such that parents communicated more positively than offspring in case the parent was the mother. The fit of Model 2 proved

to be significantly better than the fit of Model 1 ($F(1,7662) = 9.91, p = .002$). Model 3 showed that abuse ($t = -2.10, p = .035$), but not neglect ($t = 1.90, p = .057$), was significantly negatively associated with dyadic affective dissimilarity. The F -test indicated improvement of model fit compared to Model 2 ($F(2, 9061) = 3.12, p = .04$). A scatterplot (see Figure S5.1 of the Supplementary material) revealed that parents who perpetrated no or low levels of abuse communicated more positively than their offspring, but the difference decreased with increasing levels of abuse. Model 4 showed that the association between abuse and dyadic affective dissimilarity remained significant ($t = -2.35, p = .019$) when family cohesion was held constant. In addition, the F -test indicated improvement of model fit compared to Model 3 ($F(1, 7327) = 11.21, p = .001$). Finally, this model revealed a significant positive association between neglect and dyadic affective dissimilarity. A scatterplot (see Figure S5.2 of the Supplementary material) revealed that offspring of parents who perpetrated higher levels of neglect communicated more negatively than their parents, but the difference decreased with decreasing levels of neglect.

Table 5.3. Parameter estimates of the mixed models on dyadic affective dissimilarity

		Model 1	Model 2	Model 3	Model 4
Fixed effects		Coef (se)	Coef (se)	Coef (se)	Coef (se)
Intercept		0.46 (0.08)**	0.22 (0.11)	0.18 (0.11)	0.18 (0.10)
Gender P			0.45 (0.14)**	0.51 (0.14)**	0.52 (0.14)**
Abuse				-0.20 (0.09)*	-0.22 (0.09)*
Neglect				0.17 (0.09)	0.19 (0.07)*
Cohesion					-0.21 (0.06)**
Variance components					
Parent level	Intercept	0.16	0.12	0.13	0.09
Offspring level	Intercept	0.21	0.27	0.27	0.23

Note. P = Parent. Gender: 0 = male, 1 = female. Interactions between maltreatment and gender and age were not significant ($p > .18$) and model fit did not improve, thus Model 4 was accepted as the final model. * $p < .05$, ** $p < .01$.

Family cohesion

Results of the stepwise multilevel linear regression analysis on family cohesion are presented in Table 5.4. The unconditional means model (Model 1) revealed that the proportion of explained variance (ICC) was 0.36 at the extended family level, indicating that 36% of the total variance in family cohesion pertains to differences between extended families, i.e., the correlation between two nuclear families from the same extended family is 0.36. Covariates were included in Model 2. Age of parents, gender of parents and offspring, SES of parents and offspring and family size were significantly associated with family cohesion ($t_{\text{range}} = 2.32 - 4.47$), indicating that family cohesion was higher in families with a higher mean family age, in families where a father participated in the task, families with

more female children, parents with a higher SES and offspring with a lower SES. The *F*-test indicated that Model 2 fitted the data better than Model 1 ($F(6, 6671) = 9.13, p < .001$). Model 3, with inclusion of abuse and neglect, showed no significant associations between family cohesion and abuse ($t = -0.67, p = .500$) and neglect ($t = 0.81, p = .417$), and no improvement of model fit compared to Model 2 ($F(2, 46015) = 0.49, p = 0.612$). Thus, the level of abuse and neglect that occurred within the nuclear family was not associated with observed family cohesion.

Table 5.4. Parameter estimates of the multilevel linear regression models on family cohesion

		Model 1	Model 2	Model 3
Fixed effects		Coef (se)	Coef (se)	Coef (se)
Intercept		-0.07 (0.11)	-0.14 (0.11)	-0.13 (0.11)
Age P			0.02 (0.01)**	0.02 (0.01)**
Gender P			-0.79 (0.26)**	-0.75 (0.27)**
Gender O			0.76 (0.17)**	0.74 (0.17)**
HHSES P			0.41 (0.13)**	0.40 (0.13)**
HHSES O			-0.41 (0.18)*	-0.40 (0.18)*
Family size			-0.39 (0.09)**	-0.40 (0.09)**
Abuse				-0.08 (0.11)
Neglect				0.08 (0.10)
Variance components				
Nuclear family level	Intercept	1.00	0.81	0.81
Extended family level	Intercept	0.55	0.60	0.58

Note. P = Parent, O = Offspring. Gender: 0 = male, 1 = female. * $p < .05$, ** $p < .01$.

Bootstrap analyses

All results were replicated in all out of the five bootstrap analyses, except for the association between neglect and dyadic affective dissimilarity. Neglect was significantly associated with dyadic affective dissimilarity in four out of five bootstrap analyses.

Discussion

The aim of the present study was to investigate the associations between abuse and neglect, dyadic parent-offspring interactions and family cohesion in an extended family study. Parents who perpetrated higher levels of abuse towards their offspring interacted more negatively with their offspring, and offspring who experienced a higher level of abuse communicated more negatively with their parents. Furthermore, parent-offspring interactions were more dissimilar in dyads characterized by higher levels of neglect,

but not in dyads characterized by higher levels of abuse. In addition, findings showed similarity in parenting behavior across siblings and some similarity in parenting behavior displayed by two parents of the same offspring. Surprisingly, we found no association between family cohesion and maltreatment.

Our first hypothesis was partly confirmed. We found that parents and offspring communicated more negatively towards each other in dyads marked by higher levels of child abuse, but not in dyads marked by higher levels of child neglect. This finding is consistent with previous studies that observed more negative and less supportive behavior in abusive parents compared to non-maltreating parents (e.g., Lau et al., 2006; Wilson et al., 2008). The present results are also in line with findings that abused children emit more frequent aversive child behaviors than non-maltreated children during parent-offspring interactions (e.g., Cerezo & D'Ocon, 1999). It has been suggested that these behaviors might be reinforced because they attract the attention of abusive parents who tend to respond inconsistently to children's positive behaviors. Our findings suggest that child abuse might be part of an overall disrupted parent-offspring relationship, rather than limited to 'occasional' occurrences of abusive behavior. Such a disrupted parent-offspring relationship might be a mechanism that contributes to the negative consequences of child maltreatment. It is important to note that a considerable part of our sample consisted of parent-*adult* offspring dyads. No interactions between age and maltreatment were found which may suggest that the association between childhood maltreatment and parent-offspring interactions is not dependent on whether the maltreatment is still ongoing or has happened several years ago. This is particularly worrisome since the parent-offspring relationship not only provides the foundation for a healthy development (e.g., Eisenberg et al., 2001), but also continues to be of importance during adulthood (Van Wel, Linssen, & Abma, 2000).

Contrary to the handful of studies that observed parent-offspring interactions in neglectful parents (Wilson et al., 2008), we did not find an association between neglect and parent or offspring individual behavior. However, the majority of these studies observed differential parent behavior as a function of neglect in the form of less involvement. We did not examine the level of involvement, rather we examined the presence of negative and positive behavior. Moreover, the task as used in the current study "forced" participants to interact with each other. Finally, it should be noted that the majority of studies that included neglectful parents did not statistically control for other types of maltreatment, leaving open the possibility that co-occurring experiences of abuse accounted for the associations between neglect and parent-offspring interactions.

Contrary to our expectations, results showed more dyadic affective similarity in parent-offspring dyads of which the parents perpetrated higher levels of abuse. Parents who perpetrated low levels of abuse interacted more positively than their offspring, but the difference between parental and offspring affective behavior decreased with increasing levels of abuse. One possible explanation for this finding is that non-maltreating parents

are better able to handle the negative behavior of their offspring and maintain a positive stance as a means to keep the interaction positive, whereas abusive parents are more reactive to changes in the mood that offspring display. Indeed, research has shown that abusive parents are hyperreactive to the misbehavior of their children during laboratory experiments and become more annoyed than non-maltreating parents and neglectful parents (Bousha & Twentyman, 1984). In addition, it has been reported that abusive parents tend to feel that they have no control over stressful interactions with their children (Bugental & Happaney, 2004).

Our hypothesis regarding more dyadic affective dissimilarity was confirmed for neglect. Results showed that parents and offspring interacted in a more similar manner in dyads marked by low levels of neglect, whereas offspring communicated more negatively than parents in dyads marked by higher levels of childhood neglect. It might be the case that offspring who experienced higher levels of neglect have less positive feelings towards their parents, whereas neglectful parents are - unlike abusive parents - not more negative in their interactions. This finding, however, should be interpreted with caution since it was not always confirmed in our bootstrap analyses. Replication in future studies is warranted.

In accordance with previous studies, there was substantial similarity in parenting behavior across siblings (Browne et al., 2012; Jenkins et al., 2003), whereas correspondence between parenting behavior of two parents within the same nuclear family was modest. This may suggest that parenting behavior as measured in our study was more parent-driven than child-driven. Thus, parental behavior while discussing conflict may be better explained by factors such as parents' personality or parents' history of childhood adversities than by child-specific factors, such as child gender or child age. Interestingly, the modest similarity in parenting behavior of two parents with the same offspring could not be attributed to parental gender, whereas previous studies observed higher levels of sensitive and nonintrusive behavior in mothers than in fathers (e.g., Hallers-Haalboom et al., 2017). However, most studies have been conducted with infants and toddlers, whereas our study included offspring across a wide developmental range, which may explain the difference. Fathers with older children are more sensitive and nonintrusive than fathers with younger children (Bergmann et al., 2013), and differences between mothers and fathers may become smaller when children are older and the division of childcare becomes more equal (Yeung et al., 2001).

Surprisingly and in contrast with previous investigations (e.g., Howes et al., 2000) family cohesion was not associated with maltreatment. Thus, family cohesion might still be intact even though maltreatment takes place within parent-offspring dyads in the family. However, it is also possible that we failed to observe an association between maltreatment and family cohesion, because only the most cohesive families entered the laboratory together to participate in the tower building game. During data collection, we sometimes experienced difficulties to schedule all nuclear family members on the same

day suggesting some reluctance among some family members to enter the laboratory together. To date, no other observational studies have investigated the association between maltreatment and both family cohesion and dyadic parent-offspring interactions. Future studies should replicate our results before firm conclusions can be drawn.

Strengths & limitations

The current study is one of very few observational studies on childhood maltreatment and parent-offspring interactions that included both fathers and mothers and multiple offspring across a wide age range, enabling a better understanding of maltreatment and parent-offspring interactions in the context of the family. In addition, parent and child reports of maltreatment were combined to minimize the influence of individual reporter bias. Finally, our study differentiated between effects of abuse and neglect, whereas effects of neglect are often 'neglected' in previous studies.

One limitation of this study is the use of retrospective reports to measure maltreatment, which can be subject to greater measurement error and false negatives due to recall bias (Hardt & Rutter, 2004). However, we combined parent and child reports in the maltreatment scores reducing individual bias. A second limitation is the correlational design of the study, which precludes drawing inferences about the direction of our findings. Disturbed parent-offspring interactions may precede or follow child maltreatment. Alternatively, it may be a transactional process with maltreatment causing negative interactions and negative interactions escalating toward child maltreatment. Further, although examining parent-adult offspring relationships fills a gap in the literature, it is also a limitation to include offspring across a wide developmental range since the parent-offspring relationship changes across the lifespan (McGue, Elkins, Walden, & Iacono, 2005). Nevertheless, research also points to considerable stability in parent-offspring relationship quality (Belsky et al., 2001). Moreover, we found no interactions between age and maltreatment indicating that the associations between maltreatment and parent-offspring interactions are independent of offspring's age. Finally, our laboratory interactions may have not elicited interactions as they naturally occur in home environments. Future studies might consider using longer observation periods and home observations, which may elicit typical parenting and offspring behavior to a greater extent.

Conclusion

In sum, we found that parents and offspring displayed more aversive behavior in parent-offspring dyads characterized by higher levels of child abuse, but not in dyads characterized by higher levels of child neglect. Moreover, more dyadic affective dissimilarity was found in parent-offspring dyads characterized by higher levels of neglect, and less dyadic affective dissimilarity in dyads characterized by higher levels of abuse. This finding underscores the importance to distinguish between abuse and neglect in research and in

practice. Moreover, we found substantial similarity in parenting behavior across siblings and modest similarity in parenting behavior between parents residing in the same home, highlighting the importance of including both parents in research on maltreatment. Our results suggest that child maltreatment often accompanies a disrupted parent-offspring relationship, which may contribute to the detrimental consequences of child maltreatment. Interventions focused on parent-offspring interactions (i.e., Parent-child interaction therapy; Batzer et al., 2015) may be effective in establishing non-coercive and non-violent relationship patterns between parents and children, eventually reducing the negative consequences of child maltreatment.

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