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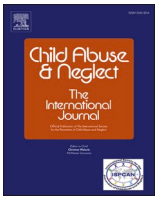

Maternal history of maltreatment and offspring's emotional and behavioral problems in adolescence: Do family factors contribute to the intergenerational risk transmission?

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ABSTRACT

Background: A history of childhood maltreatment often has a negative and long-lasting impact across different domains in life. A childhood maltreatment experience in parents may even affect the next generation. So far, the effects of family factors have been considered in the intergenerational transmission of adversity across the childhood years, but whether the effects remain until adolescence is less clear.

Objective: Using data from a large population-based study in the Netherlands, including both mother and child reports, we examined whether maternal childhood maltreatment history is associated with increased mental health problems in offspring and the role of family functioning and harsh parenting as a potential pathway.

Participants: 4912 adolescents (aged 13 years) and their mothers were recruited in the Generation R study.

Methods: Mothers reported childhood maltreatment experiences using the Childhood Trauma Questionnaire (CTQ), and adolescents reported on their mental health using the Youth Self Report (YSR). Structural equation modeling (SEM) was used to test the association of maternal childhood maltreatment on mental health problems in offspring and family functioning and harsh parenting as mechanisms to explain this association.

Results: Adolescents of mothers with a history of maltreatment had greater internalizing ($\beta = 0.07$, $p < .01$) and externalizing problems ($\beta = 0.08$, $p < .01$). Moreover, we found an indirect effect via family functioning over time and harsh parenting at ages 3 and 8 years which mediated this association.

Conclusion: We concluded an intergenerational effect of maternal childhood maltreatment on adolescents internalizing and externalizing problems. The findings might enable earlier

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intervention within the family context to mitigate the consequences of maternal childhood maltreatment.

1. Introduction

In the life of a person, a history of childhood maltreatment has several potential long-lasting consequences (Buss et al., 2017). Those who experienced adverse events in early life are at increased risk for negative outcomes in different domains across the lifespan (Cicchetti & Toth, 2005; Norman et al., 2012), such as negative adult relationships and poorer mental health (Caldwell, Shaver, Li, & Minzenberg, 2011). The consequence of experiencing adverse life events may even affect the next generation (Roberts et al., 2014). Evidence suggests associations between maternal history of maltreatment and child mental health outcomes during childhood and adolescence, namely externalizing problems (Pasalich, Cyr, Zheng, McMahon, & Spieker, 2016; Plant, Pawlby, Pariante, & Jones, 2018) as well as an increased risk of depression and internalizing problems among offspring (Su, D'Arcy, & Meng, 2022).

Prior research has identified some key mechanisms contributing to the intergenerational transmission of early life adversities to the next generation, but mainly focused on poor maternal mental health (Choi et al., 2019; Letourneau et al., 2019; Madigan, Wade, Plamondon, & Jenkins, 2015; Meller, Kuperman, McCullough, & Shaffer, 2016; Pereira, Ludmer, Gonzalez, & Atkinson, 2018). However, maternal mental health alone cannot explain this transmission; instead, it might be multidetermined by different risk factors (Belsky, 1993; Cicchetti & Valentino, 2015). For instance, mothers who were exposed to maltreatment are at a greater risk of experiencing difficulties in the parent-child interactions with their offspring (Ozcan, Boyacioglu, Enginkaya, Bilgin, & Tomruk, 2016; Pasalich et al., 2016; Savage, Tarabulsy, Pearson, Collin-Vezina, & Gagne, 2019), which increases the likelihood of a risky caregiver system (Dixon, Hamilton-Giachritsis, & Browne, 2005; Russotti, Warmingham, Handley, Rogosch, & Cicchetti, 2021). Consequently, a potential mechanism underlying this intergenerational transmission might be the family context, which could be affected through the maladaptive patterns experienced during childhood that repeat itself and are displayed in the current family (Adams, Handley, Manly, Cicchetti, & Toth, 2019; Belsky, 1984; St-Laurent, Dubois-Comtois, Milot, & Cantinotti, 2019). Although these findings have examined the family context as a potential mechanism, the persistence of an unhealthy family context across childhood and into adolescence has not been comprehensively examined to understand the cycle of maltreatment (Alink, Cyr, & Madigan, 2019; Madigan et al., 2019). Thus, based on an ecological framework, we explored how maternal childhood maltreatment might shape the offspring's environment and, as such, potentially be associated with the development of offspring, revealing a multifactorial process from which child psychopathology emerges (Belsky, 1980; Cicchetti & Toth, 2016). Therefore, the current study focuses on two specific potential mechanisms within the family context, namely family functioning, which relates to both healthy and unhealthy interactions and relationships (e.g. quality of communication, level of conflict and cohesion) within families (Byles, Byrne, Boyle, & Offord, 1988). Additionally, we included harsh parenting, which is defined as coercive strategies of parents directed towards children using psychical or verbal violence (Chang, Schwartz, Dodge, & McBride-Chang, 2003). These mechanisms were selected as they are risk factors for offspring psychopathology and because a mother's history of child maltreatment might affect family relations and parenting. The following section will give an overview of harsh parenting and poor family functioning as potential risk mechanisms explaining the intergenerational transmission of adversity.

1.1. Parenting

Previous studies highlighted that a maternal history of maltreatment negatively affected parenting skills (Greene, Haisley, Wallace, & Ford, 2020; Martinez-Torteya et al., 2014; Moehler, Biringen, & Poustka, 2007; Plant, Jones, Pariante, & Pawlby, 2017; Savage et al., 2019). For instance, a mother's history of sexual and physical abuse was associated with less confidence and higher control in the parental role (DiLillo, 2001), less parental competence (Banyard, Williams, & Siegel, 2003), and less maternal emotional availability towards offspring (Kluczniok et al., 2016). Likewise, evidence suggests that mothers with a history of neglect and emotional abuse are more likely to respond in a negative way to their children (Wright, Laurent, & Ablow, 2017), by exerting high psychological control towards the child (Zalewski, Cyranowski, Cheng, & Swartz, 2013), showing low reactivity to infant crying (Reijman et al., 2014), or exhibiting signs of hostility during interactions (Bailey, DeOliveira, Wolfe, Evans, & Hartwick, 2012). Moreover, parents exposed to physical abuse are at risk of using the same strategies with their children (Simons, Johnson, & Conger, 1994). Indeed, in the same cohort as the current study is embedded in, a history of maternal childhood maltreatment was associated with behavioral problems in early childhood up to age 6 via maternal hostility and maternal harsh discipline (Rijlaarsdam et al., 2014). Hence, harsh parenting could be a key mechanism that explains the intergenerational risk transmission of maternal childhood maltreatment and child emotional and behavioral problems.

1.2. Family functioning

In line with the ecological framework of childhood maltreatment (Belsky, 1980), an interplay at different levels of the child's environment is relevant to consider. The evidence, as mentioned earlier, suggests that maternal childhood maltreatment negatively influences the caregiving context through parenting and maternal mental health problems. However, it may also influence the family environment more broadly, for example, via higher levels of stress (Ammerman et al., 2013; Yoon et al., 2019), which in turn potentially negatively influences the caregiving context and, thus emotional and behavioral problems might arise in the next

generation (Bosquet Enlow, Englund, & Egeland, 2018). This cascade of risk factors might put a strain on families and negatively affect the family's functioning, by presenting high levels of conflict, disorganization and poor communication quality among and between the family members (Alderfer et al., 2007). According to a recent study, poor family functioning from pregnancy onwards predicts child problem behavior up to preadolescence (5 and 9 years) (Xerxa et al., 2020). Therefore, it seems that the maladaptive pathways of poor family functioning appear early in the child's life and tend to be stable over time, highlighting the chronic strains that may compromise healthy child development.

1.3. The current study

Altogether, these studies provided evidence regarding the impact of maternal childhood maltreatment on offspring behavioral problems and how family environment can negatively affect child development. Nevertheless, some key gaps remain that prevent us from better understanding the consequences of maternal childhood maltreatment for the next generation. First, studies on the intergenerational effects focused on the association of maternal history of maltreatment with child problems in early and middle childhood. As a result, it is not clear whether the reported associations also extend or emerge in adolescence. Although behavioral problems may track from childhood into adolescence, some individuals only start developing problems in adolescence (Blok et al., 2021). Thus, adolescence seems to be a key phase for the onset of certain psychopathologies, such as mood, eating and personality disorders (Sroufe, Egeland, Carlson, & Collins, 2009). Besides, previous studies relied on maternal reports of both maltreatment history and child behavior, ignoring the possibility of reporter bias. However, from previous studies, we know that mothers with elevated depressive symptoms often tend to overestimate child behavioral problems (Bodeker et al., 2019; Krain & Kendall, 2000; Richters, 1992; Ringoot et al., 2015; Xerxa et al., 2021). Therefore, it is crucial to include multiple informants of child behavior, including the children themselves. Finally, many mechanistic studies focused on the pathway of maternal mental health as mediator of the association between maternal history of maltreatment and offspring problems, but the broader role of the family functioning has remained less explored: up to date, the effects of poor family functioning across childhood have not been considered in the intergenerational transmission of adversity.

In this study, we examine the relation between maternal history of maltreatment and offspring internalizing and externalizing problems in adolescence. In particular, if family risk factors, such as poor family functioning and harsh parenting, mediate this association. For this, we will use data from a large population-based study, using both mother and child self-reports, to avoid potential reporter bias. In line with previous research, we hypothesize that poor family functioning and harsh parenting explain part of the association between maternal childhood maltreatment and offspring's emotional and behavioral problems.

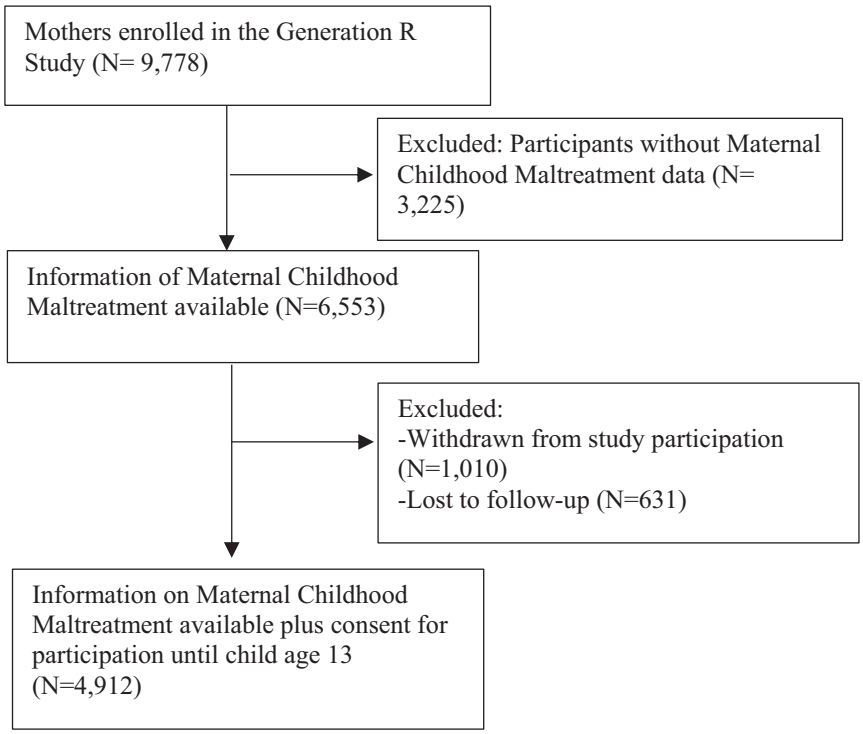

Fig. 1. Flowchart of sample selection.

2. Method

2.1. Design and study population

The present study was embedded in the Generation R study, a population-based cohort from fetal life onwards (Kooijman et al., 2016). The participants eligible for this study were pregnant women living in the study area in Rotterdam, the Netherlands, with an expected delivery date between April 2002 and January 2006. In total, 9778 mothers were enrolled (response rate: 61 %). The study was approved by the Medical Ethical Committee of the Erasmus University Medical Center, Rotterdam. For all participants, a written informed consent was obtained. The measures were collected at different times points. Maternal history of maltreatment was measured in the prenatal period (mean = 14.64 weeks of gestation, SD = 3.60) using a self-administered questionnaire. In total, 6553 mothers completed a questionnaire assessing past physical, emotional, and sexual maltreatment. Of these, 4912 mothers and offspring gave consent for participation until the age of 13 years (see Fig. 1). Those with incomplete questionnaires (mediators or outcome, $n = 1489$) were retained in the analyses, with missing data being handled with multiple imputation procedures (see statistical analysis section). For further clarification of the different time points of the study variables see supplementary material (Fig. S1).

Non-responding families at the 13 years assessment ($n = 3130$) had younger mothers at baseline (28.5 versus 31.3 years old, $t = 22.5$, $p < .001$), and the mothers were more often from non-Dutch origin (45.8 % versus 23.3 %, $x^2 = 362.836$, $p < .001$), and had a lower educational level (34.3 % versus 14 %, $x^2 = 360.016$, $p < .001$) and family income (34.4 % versus 15.3 %, $x^2 = 203.249$, $p < .001$) than families included in the analyses ($n = 4912$).

2.2. Measures

2.2.1. Maternal childhood maltreatment

The Childhood Trauma Questionnaire (CTQ) was used to assess mothers' history of childhood maltreatment. This retrospective self-report consisting of 34 items was filled out by mothers to measure the extent to which she experienced maltreatment before age 18. Mothers rated the items on a 5-point Likert scale from “never true” to “very often true”. We created a latent variable of childhood maltreatment, composed of the five subscales of the instrument, namely emotional abuse (5 items, $\alpha = 0.87$), physical abuse (5 items, $\alpha = 0.86$), sexual abuse (6 items, $\alpha = 0.82$), emotional neglect (10 items, $\alpha = 0.93$), and physical neglect (8 items, $\alpha = 0.58$). The CTQ instrument has demonstrated good test-retest reliability (Bernstein, Ahluvalia, Pogge, & Handelsman, 1997), and it is commonly used to measure maltreatment in retrospective studies as a sensitive and valid screening questionnaire (Bernstein et al., 2003).

2.2.2. Externalizing and internalizing problems

The Youth Self Report (YSR; Achenback & Rescorla, 2001), a prominent and widely used self-report measure for youth aged 11 to 18, was used to assess externalizing and internalizing problems (Achenback & Rescorla, 2001). The instrument consists of 119 items which are rated as 0 (not true), 1 (somewhat or sometimes true), or 2 (very true or often true). The Internalizing Problems score was based on the sum of the three subscales anxious/depressed, somatic complaints and withdrawn. The internal consistency (Cronbach's alpha) was 0.88. The Externalizing Problems score is the sum of the scales aggressive behavior and rule-breaking behavior, with an internal consistency (Cronbach's alpha) of 0.82. Besides, a good validity of the Dutch version of the YSR was confirmed (Verhulst et al., 1997). Besides the YSR, we included the parallel mother-reported Child Behavior Checklist (CBCL) as a sensitivity analysis. The CBCL version 6–18 years consists of 112 items, with a three-point Likert scale (0 = not true, 1 = somewhat true, 2 = very true). Again, in this sample we used the Internalizing and Externalizing Problems scale with a good internal consistency (Cronbach's alpha) of 0.87 and 0.88, for both scales respectively.

2.3. Potential mediators

2.3.1. Family functioning

Maternal reports on the Family Assessment Device (Byles et al., 1988; Epstein, Baldwin, & Bishop, 1983) were used to measure general family functioning as perceived by mothers. The general functioning subscale consists of 12 items on a 4-point Likert scale ranging from “strongly disagree” to “strongly agree”. Six items describe healthy functioning such as “In times of crisis, we can turn to each other for support” and the other half of the items describe unhealthy functioning, “There are a lot of unpleasant and painful feelings in our family”. An overall mean item score for family functioning was calculated after reverse-coding the items on healthy functioning. The sum was divided by twelve, resulting in a total score ranging from 1 to 4. Higher scores indicate poorer family functioning (Byles et al., 1988; Epstein et al., 1983). The FAD was measured at three-time points, prenatally and when the child was 5 and 9 years old. In this sample, the internal consistencies were 0.90 (during pregnancy), 0.89 (at 5 years), and 0.90 (at 9 years).

2.3.2. Harsh parenting

The disciplinary style of the mother was assessed using an adapted version of the Parent-Child Conflict Tactics Scale (CTS-PS; Straus et al., 1998). Mothers rated their use of discipline tactics during the past 2 weeks on a 6-point Likert scale rating from “never” to “five times or more”. This scale was measured when the child was 3 years old. In this adapted version, excluding the three items on physical punishment (e.g., hit the child with an object), since corporal punishment has been illegal in the Netherlands since 2007. Additionally, one item that was less age-appropriate (“Said you would kick the child out of the house”) was also removed. This leaves 10 items as a final version, which was analyzed by factor analysis in a previous study from this cohort (Jansen et al., 2012). A two-factor structure

was found, including six items in the first factor with factor loadings >0.50 that matched the construct and definition of harsh parenting, namely: "Shook my child", "Shouted or screamed angrily at my child", "Called my child names", "Threatened to give a slap, but still, I didn't do it", "Angrily pinched my child's arms", and "Called my child stupid, lazy, or something like that". The six items of the harsh parenting measure showed good model fit (Jansen et al., 2012). The internal consistency (Cronbach's alpha) of the two items in our study was 0.60.

At child age 8 years, we assessed harsh parenting with two items of the Alabama Parenting Questionnaire (APQ; Shelton, Frick, & Wootton, 1996). Mothers' reported on two items how often they utilized physical punishment on a 5-point scale ranging from "never" to "very often". The items asked about tendencies to spank or slap the child when he/she did something wrong. The internal consistency (Cronbach's alpha) of the two items in our study was 0.64.

Table 1
Descriptive characteristics of the study sample (N = 3422).

Sample characteristics	N	Mean (SD)
Maternal childhood maltreatment scores		
Emotional abuse score	3405	6.97 (3.39)
Physical abuse score	3422	5.98 (2.40)
Sexual abuse score	3407	6.64 (2.19)
Emotional neglect score	3411	20.28 (8.40)
Physical neglect score	3422	9.01 (2.10)
Total maltreatment score	3422	48.86 (14.24)
Maternal childhood maltreatment categories[*]		
Emotional abuse, %	3405	7.60
Physical abuse, %	3422	5.50
Sexual abuse, %	3407	5.10
Emotional neglect, %	3411	14.40
Physical neglect, %	3422	2.00
Child age (in years)		
Child age at harsh parenting assessment (CTS-PS)	2612	3.05 (1.19)
Child age at harsh parenting assessment (APQ)	2786	8.16 (0.24)
Weeks' of gestation FAD pregnancy assessment	3148	14.65 (3.59)
Child age at FAD 5 years assessment	3148	5.99 (4.75)
Child age at FAD 9 years assessment	3073	9.68 (0.26)
Child age at YSR assessment	3422	13.60 (0.41)
Child age at CBCL assessment	3400	13.53 (0.37)
Mediators		
Harsh parenting score at 3 years	2558	2.07 (1.83)
Harsh parenting score at 8 years	2765	2.53 (0.93)
FAD score prenatal	3373	1.51 (0.46)
FAD score at 5 years	3090	1.49 (0.41)
FAD score at 9 years	2948	1.51 (0.44)
Outcome		
YSR total score	3411	31.41 (19.01)
YSR externalizing problems	3405	7.04 (5.35)
YSR internalizing problems	3415	8.87 (7.27)
CBCL total score	3354	18.00 (16.11)
CBCL externalizing problems	3349	4.10 (5.08)
CBCL internalizing problems	3355	5.53 (5.77)
Covariates		
GSI maternal psychopathology score	3353	0.24 (0.31)
Mother's age at intake	3422	31.34 (4.49)
Child gender, % boys	3422	48.00
Marital status, % married & cohabiting	3328	50.50
Ethnicity, % Dutch	2979	68.00
Maternal education	3352	
% high		56.80
% middle		28.94
% low		4.50
Family income	2979	
<€1200, %		11.10
€1200–€2000, %		23.30
>€2000, %		65.60

Note: FAD: Family Assessment Device; YSR: Youth Self Report; CBCL: Child Behavior Checklist; GSI: Global Severity Index; CTS: Conflict Tactics Scales.

[*] The cut-offs were based on the adapted 34-item version used before in the same study sample by Rijlaarsdam et al. (2014). Emotional abuse (score ≥ 13), physical abuse (score ≥ 10), sexual abuse (score ≥ 10), emotional neglect (score ≥ 30), and physical neglect (score ≥ 16).

Table 2
Correlations among the variables in the study.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Emotional abuse	1															
2. Physical abuse	0.67**	1														
3. Sexual abuse	0.48**	0.47**	1													
4. Emotional neglect	0.53**	0.39**	0.27**	1												
5. Physical neglect	0.44**	0.42**	0.40**	0.40**	1											
6. CTQ total	0.80**	0.70**	0.57**	0.88**	0.60**	1										
7. Maternal psychopathology (GSI)	0.23**	0.21**	0.23**	0.23**	0.19**	0.29**	1									
8. Harsh parenting 3 years	0.09**	0.10**	0.07**	0.08**	0.06**	0.11**	0.18**	1								
9. FAD pregnancy	0.21**	0.17**	0.16**	0.37**	0.18**	0.35**	0.36**	0.15**	1							
10. FAD 5 years	0.14**	0.11**	0.07**	0.25**	0.13**	0.23**	0.21**	0.12**	0.39**	1						
11. FAD 9 years	0.12**	0.10**	0.06**	0.25**	0.11**	0.22**	0.21**	0.14**	0.38**	0.53**	1					
12.Harsh parenting 8 years	0.05*	0.13**	0.08**	0.07**	0.07**	0.10**	0.13**	0.31**	0.14**	0.13**	0.14**	1				
13. YSR internalizing problems	0.10**	0.08**	0.11**	0.04*	0.05**	0.09**	0.13**	0.09**	0.07**	0.08**	0.11**	0.02	1			
14. YSR externalizing problems	0.11**	0.07**	0.08**	0.03	0.06**	0.08**	0.10**	0.16**	0.07**	0.08**	0.10**	0.12**	0.48**	1		
15. CBCL internalizing problems	0.17**	0.11**	0.15**	0.10**	0.09**	0.15**	0.22**	0.10**	0.14**	0.15**	0.21**	0.07**	0.53**	0.27**	1	
16. CBCL externalizing problems	0.15**	0.09**	0.09**	0.08**	0.09**	0.12**	0.14**	0.18**	0.14**	0.15**	0.19**	0.18**	0.26**	0.53**	0.52**	1

Note: CTQ: Childhood Trauma Questionnaire; GSI: Global Severity Index; FAD: Family Assessment Device; YSR: Youth Self Report; CBCL: Child Behavior Checklist.
* $p < .05$.
** $p < .01$.

2.3.3. Covariates

The potential confounders were selected based on previous studies that showed a relation between maternal childhood maltreatment and behavioral problem in adolescents. Sociodemographic information was obtained via self-report in questionnaires during pregnancy. Maternal ethnicity was classified into Dutch and non-Dutch origin: if one or both of a mothers' parents were born outside the Netherlands, she was classified as non-Dutch. Family income was defined as the total monthly net income of the mother's household. The income was classified into low (below social security level, ≤€1.200), middle (€1200–€2000) and high (above modal, ≥€2000). Maternal general psychopathology was self-reported in a questionnaire during pregnancy, using the Dutch version of the Brief Symptom Inventory (BSI). This is a 53-item self-report questionnaire in which mothers rated the extent to which each item described her feelings in the past week. The rating scale was 0 (not at all) to 4 (extremely). In this study we used the overall global severity index. The internal consistency was good ($\alpha = 0.96$). Finally, birth records were used to determine maternal age, child date of birth and gender.

2.4. Statistical analysis

Missing values on the outcome (Youth Self Report), covariates and mediators were imputed using multiple imputations, which were generated from a Markov Chain Monte Carlo (MCMC) simulation in Mplus version 8.6 (Muthén & Muthén, 1998). For that, Mplus runs 100 MCMC iterations and then stores the generated missing data values. The process is repeated until the 50 imputed data sets created have been stored (Asparouhov & Muthén, 2010). All variables were included in the imputation model and were imputed except for maternal history of childhood maltreatment, for which we selected participants with available data only. Although data was not completely missing at random, we relied on multiple imputation methods to partially restore lost power due to missingness and because the use of auxiliary variables in the imputation model can reduce the impact of data not missing at random (Pedersen et al., 2017; Woods et al., 2021).

Sample characteristics and bivariate correlations between maternal history of childhood maltreatment and emotional and behavioral problems in adolescents were examined using the Statistical Package for the Social Sciences (SPSS) Version 20.0 (Corp, 2013). As a second step, a confirmatory factor analysis (CFA) was conducted to evaluate the measurement model of maternal childhood maltreatment, including the five types of maltreatment as indicators. Then, we ran a structural equation modeling (SEM) to test the extent to which maternal history of childhood maltreatment was associated with offspring self-reported internalizing and externalizing problems at the age of 13 years. Besides, to examine whether harsh parenting and family functioning mediated the effect of maternal childhood maltreatment on internalizing and externalizing problems, we evaluated the specific indirect effects, total indirect effects, and total effects using the model indirect option in Mplus. The significance of the parameter estimates was tested with a bootstrap approach through bias corrected estimator (Bollen & Stine, 1992; Shrout & Bolger, 2002).

The CFA and SEM analyses were estimated using full information maximum likelihood (FIML) estimation with robust standard errors to account for non-normality in our data (Enders & Bandalos, 2001). Model fit was evaluated with the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Root-Mean-Square Error of Approximation (RMSEA). Good model fit was achieved if the TLI and CFI were ≥0.90 and RMSEA ≤ 0.08 (Hu & Bentler, 1999; Marsh, Wen, & Hau, 2004). The CFA and SEM analyses were estimated using MLR estimator in conjunction with full information maximum likelihood (FIML), with robust standard errors to account for non-normality and missing values in our data (Enders & Bandalos, 2001).

In all the analyses, the covariates were included in the models as predictors of all endogenous variables in the model. The analyses were conducted in Mplus (Muthén & Muthén, 1998). As a sensitivity analysis, we repeated the SEM analysis by using the mother-reported (CBCL) scales as outcome variables instead of the Youth Self Report scales. In a second sensitivity analysis, we repeated the SEM analysis within the sample with full data available (without multiple imputations).

3. Results

The non-imputed characteristics of the sample are shown in Table 1. In this sample, half of the children were boys (48 %), and about 86 % of the families had a relatively high family income (≥ 2000 euros net/month) and 84.7 % high maternal education. Besides, 76.5 % of the mothers were from western origin. Information about imputed sample is display in Table S1 (see supplementary tables). Although all the variables were used continuously in the analyses, for descriptive purposes, the prevalence of moderate to severe maltreatment of each type of maltreatment is also presented in Table 1 (cut-offs based on Rijlaarsdam et al., 2014).

Correlations among the variables in the study are presented in Table 2. The maternal childhood maltreatment types were positively correlated with each other (e.g. Emotional and Physical abuse, $r = 0.67$). Maternal childhood maltreatment was positively correlated with internalizing and externalizing problems at 13 years and with harsh parenting, and poor family functioning over time (e.g. family functioning at pregnancy, $r = 0.35$) Moreover, all assessments of poor family functioning were positively related with more internalizing and externalizing problems at 13 years. Finally, harsh parenting at 3 years was correlated positively with internalizing and externalizing problems at 13 years, and harsh parenting at 9 years was related to internalizing problems at 13 years.

3.1. Measurement model

As a first step, we tested the measurement model for the latent maltreatment variable. The results from the Confirmatory Factor Analysis (CFA) showed a good fit of the model (CFI = 0.98; TLI = 0.93; RMSEA = 0.06). Moreover, the factor loadings of the latent variable showed statistically significant estimates, namely: emotional abuse (0.86), physical abuse (0.77), sexual abuse (0.59),

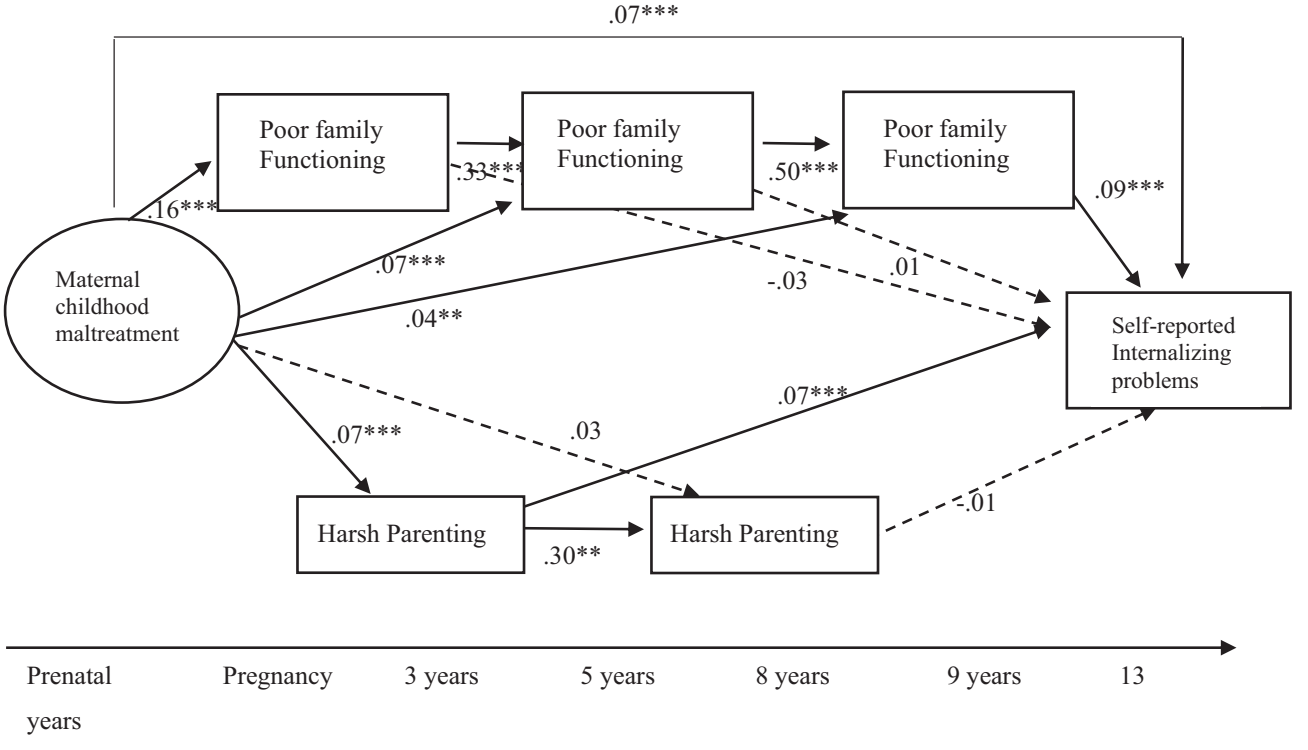

Fig. 2. Maternal childhood maltreatment, poor family functioning, harsh parenting and YSR internalizing problems at 13 years (child self-report).
Structural equation model of maternal childhood maltreatment with parenting variables and internalizing problems. Numeric values are standardized path regression coefficients. Covariates (sex, income, age, mother's psychopathology and ethnicity) are included, but to improve readability, paths for the covariates among the variables are not shown in the figure. The bold lines denote significant associations. The dotted lines denote non-significant associations. Model fit was acceptable (CFI = 0.96; TLI = 0.83; RMSEA = 0.06).

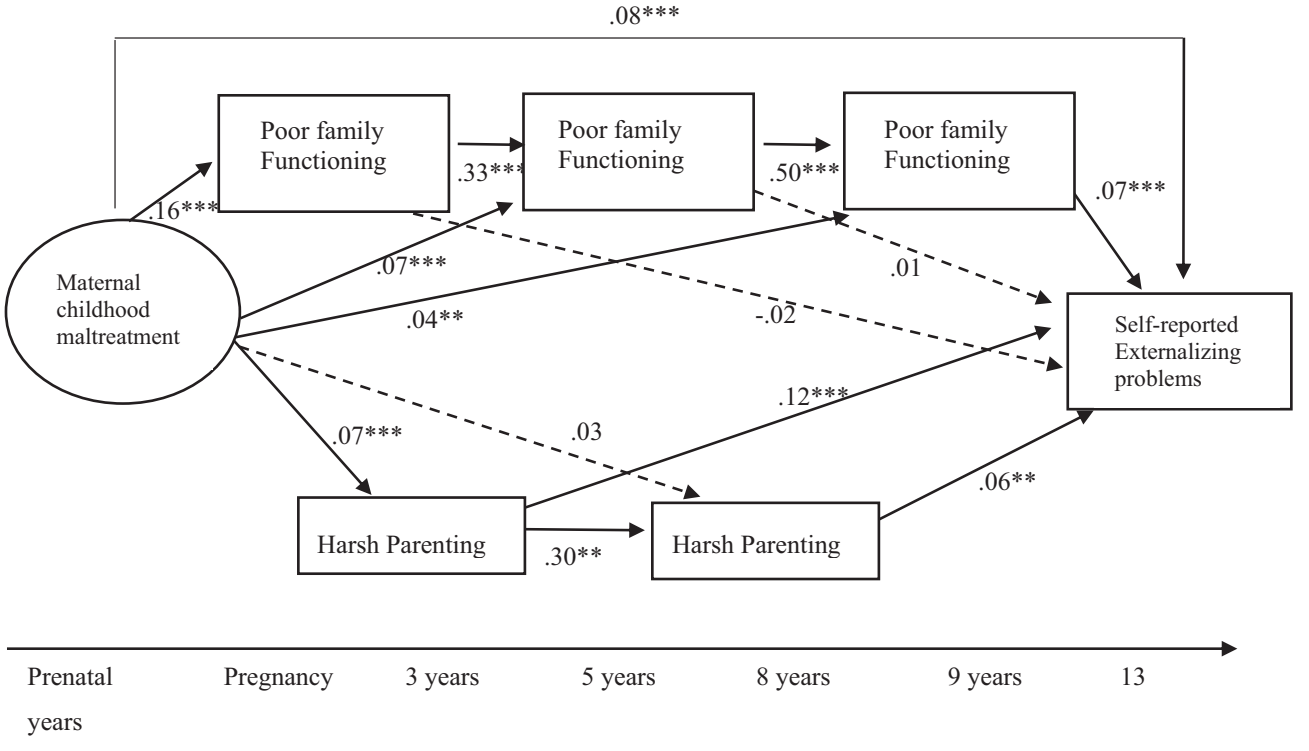

Fig. 3. Maternal childhood maltreatment, poor family functioning, harsh parenting and YSR externalizing problems at 13 years (child self-report).
Structural equation model of maternal childhood maltreatment with parenting variables and externalizing problems. Numeric values are standardized path regression coefficients. Covariates (sex, income, age, mother's psychopathology and ethnicity) are included, but to improve readability, paths for the covariates among the variables are not shown in the figure. The bold lines denote significant associations. The dotted lines denote non-significant associations. Model fit was acceptable (CFI = 0.91; TLI = 0.82; RMSEA = 0.06).

emotional neglect (0.52), and physical neglect (0.60). Therefore, the CFA indicated that the latent variable was acceptable to be included in the structural model.

3.2. Structural model of maternal childhood maltreatment, family context, and adolescent-reported internalizing and externalizing problems

3.2.1. Direct effect

For both internalizing and externalizing problems, the model had an acceptable fit (CFI = 0.96; TLI = 0.83; RMSEA = 0.06 and CFI = 0.91; TLI = 0.82; RMSEA = 0.06, respectively). There was a significant positive association between maternal childhood maltreatment and internalizing and externalizing problems at age 13 years. Furthermore, higher levels of maternal childhood maltreatment directly predicted a higher level of poor family functioning in pregnancy at 5 years and at 9 years, as well as more harsh parenting at age 3. Besides, we found that higher levels of poor family functioning at 9 years and harsh parenting at 3 years predicted higher levels of both internalizing and externalizing problems at 13 years, respectively. Finally, harsh parenting at 8 years predicted higher levels of externalizing problems at 13 years (see Fig. 2 and Fig. 3, respectively). These associations were independent of maternal psychopathology, maternal age, ethnicity, and income.

3.2.2. Indirect effect

For the association between childhood maltreatment and internalizing problems, we found an indirect effect via harsh parenting at 3 years (bias corrected z = 0.005, $p = .02$) and through the path of poor family functioning over time, namely at pregnancy, 5 and 9 years (bias corrected z = 0.002, $p < .001$), the path from family functioning at 5 and 9 years (bias corrected z = 0.003, $p = .01$) as well as family functioning at 9 years (bias corrected z = 0.004, $p = .04$). For externalizing problems, we found an indirect effect of maternal childhood maltreatment via harsh parenting at 3 years (bias corrected z = 0.008, $p < .001$) as well as through the path of harsh parenting at 3 and 8 years (bias corrected z = 0.008, $p = .03$). Moreover, an indirect effect was found through the path of poor family functioning over time, namely at pregnancy, 5 and 9 years (bias corrected z = 0.002, $p < .001$) as well as the path from family functioning at 5 and 9 years (bias corrected z = 0.002, $p = .02$). Again, these associations were adjusted for maternal psychopathology, maternal age, ethnicity, and income.

3.2.3. Sensitivity analyses

In a sensitivity analysis, the models included mother reports (instead of youth self-reports) of offspring internalizing and externalizing problems. There was a significant positive association of maternal childhood maltreatment with internalizing ($\beta = 0.11$ $SE = 0.02$; $p < .01$) and externalizing problems ($\beta = 0.10$ $SE = 0.02$; $p < .01$) at age 13 years. Results were similar as the main analyses, for both direct and indirect effects, although associations were stronger with the mother reports as compared to the adolescent self-reports (see Supplementary Figs. S2 and S3). In the second sensitivity analysis, the models of youth self-reports of internalizing and externalizing problems were performed in the non-imputed data ($n = 3422$). Results were similar as for the imputed data, with similar effect sizes and significance levels for both direct and indirect effects (see Supplementary Figs. S4 and S5).

4. Discussion

This population-based study contributes to a better understanding of the intergenerational transmission of maternal childhood maltreatment on adolescents' internalizing and externalizing problems. We found that the association was partly explained by an enduring negative family context, involving harsh parenting and poor family functioning. Consistent with the ecological framework theory, maternal childhood maltreatment was associated with the family context and the harsh parenting practices that mothers used with their children, which in turn were associated with internalizing and externalizing problems in adolescence. Importantly, the findings were not attributable to sociodemographic characteristics or maternal psychopathology, as these variables were controlled for in the analyses.

4.1. Maternal childhood maltreatment and offspring internalizing and externalizing problems

Related to the first aim of this study and in line with our hypotheses, the results indicated that maternal history of maltreatment was directly associated with more internalizing and externalizing problems among offspring at age 13 years. This result confirmed a meta-analytic review of 12 studies that showed a small but significant ($r = 0.14$, $p < .05$) increased risk of psychopathology among offspring (prior to the age of 18) from mothers who experienced childhood maltreatment (Su et al., 2022) Furthermore, a recent study supports the existence of intergenerational influences of parental exposure to childhood trauma on childhood risk for psychopathology in offspring at 8 years (Uy et al., 2022). Similarly, previous work in our cohort showed that maternal childhood maltreatment was associated with emotional and behavioral problems in children up to 6 years (Rijlaarsdam et al., 2014). Our current results expand these findings by showing that this association extends into later stages of child development, suggesting that a maternal history of child maltreatment may have long-lasting consequences not only in the individual who experienced the maltreatment but also in the next generation, at least up to adolescence. Additionally, while previous studies have often relied on maternal reports of offspring problems only (Pasalich et al., 2016; Plant et al., 2018), we had information of different reporters, and the results based on the mother report of adolescents' psychopathology reflected larger effect sizes than the results for the youth self-report. This suggests that other studies using mother-reported psychopathology potentially reported inflated estimates.

4.2. The role of family and parenting mechanisms and developmental cascade

Our second aim involved obtaining insight into the indirect effects, hence the mechanisms connecting maternal childhood maltreatment and child outcomes. Results regarding harsh parenting suggest that the link between a mother's history of childhood maltreatment and parent-child interaction was already visible in early childhood, by showing that the mothers used more harsh strategies for discipline with their children as early as the age of 3. This is worrisome, as there is a thin line between harsh discipline strategies and physical and emotional abuse (Gershoff & Grogan-Kaylor, 2016), and there is a danger that the history of maltreatment will repeat itself (Simons, Whitbeck, Conger, & Wu, 1991), since parental experience of maltreatment creates a risk factor for maltreatment in the current family context (van IJzendoorn, Bakermans-Kranenburg, Coughlan, & Reijman, 2020). This result corroborated existing literature that identified harsh parenting as one of the transmission mechanisms from maternal childhood maltreatment to child outcomes (Rijlaarsdam et al., 2014; Scaramella, Neppl, Ontai, & Conger, 2008). However, we expected to find an association between harsh parenting at age 8 and internalizing problems. The absence of such an association could be explained by the fact that the assessment of harsh parenting at 8 years reflected corporal punishment. Previous studies have indicated that this type of punishment is more related to externalizing problems (Gromoske & Maguire-Jack, 2012; Ma, Han, Grogan-Kaylor, Delva, & Castillo, 2012; Mendez, Durtschi, Neppl, & Stith, 2016; Xing, Wang, & Wang, 2018), which is consistent with our results. In fact, evidence suggests that the externalizing behaviors that most prominently emerge as a consequence of corporal punishment are aggression and antisocial behaviors (Straus, Sugarman, & GilesSims, 1997). Based on the social learning theory, an explanation of the manifestation of these behaviors is that corporal punishment may provide the message to children that violence is an acceptable form of behavior (Graziano, 1994; Ma et al., 2012; Weiss, Dodge, Bates, & Pettit, 1992).

Additionally, an alternative explanation of the absence of this association is that in the Netherlands, corporal punishment of children has been illegal since 2007. Thus, the low rates of corporal punishment might in part be due to socially desirable answering trends, which makes other constructs (e.g., poor family functioning) more relevant to assess instead of corporal punishment in the context of the Netherlands. Finally, the non-significant results regarding harsh parenting at 8 years and later internalizing symptoms might also be due to a limited operationalization of the concept. The 8 years measure of harsh parenting was based on only two items – reflecting physical punishment rather than the broader concept of harsh parenting – which might have reduced the variance.

Findings related to family functioning showed an indirect effect of maternal childhood maltreatment on offspring outcomes via family functioning. The associations with family functioning were visible from pregnancy until the child reached the age of 9 years. This suggests that, at least in some women, maternal childhood maltreatment may have an enduring, negative effect on a mother's family environment starting even before the next generation is born. Poor family functioning is characterized by the incapacity of family members to support each other, less communication with each other, difficulties in expressing emotions to each other, and the presence of unpleasant feelings related to the social relations within a family. These patters tended to be stable over time, as shown in our models. Possibly, the increasing stability of poor family functioning patterns described above could amplify the negative relationship between the family members making the cycle of negative interactions more persistent (Paschall, Barnett, Mastergeorge, & Mortensen, 2017). Likewise, it is possible that exposure to childhood maltreatment in mothers could, in the long term, affect the relational outcomes with their partners, which in turn may also affect the family context for their children (Adams et al., 2019; Nguyen, Karney, & Bradbury, 2017). However, our results showed effect sizes small in magnitude, suggesting this mechanism only plays a little role for women in general, or plays a larger role for some women only. Apparently, the family patterns of mothers' own childhood do not necessarily repeat themselves in the current family, meaning that through the family environment, there is also substantial disruption of the intergenerational cycle of violence at play.

Given that our results demonstrated that poor family functioning and harsh parenting were related with maternal childhood maltreatment and offspring outcomes, it is important to consider that multiple pathways within the family context could explain future consequences on child development, as they separately but also collectively determined later functioning. This finding is consistent with a study reporting that a co-occurrence of harsh parenting with a context of disregard, inconsistency and uninvolvement might be a better predictor of the risk for childhood psychopathology rather than the consideration of isolated experiences (Simons et al., 1994). This is in line with the evidence that individual behavior and development are impacted by the entire history of cumulative experiences (Sroufe et al., 2009).

Moreover, our findings might best be explained by a developmental cascade perspective, with past experiences shaping future experiences and behavior and eventually spilling over to the next generation. Thus, from this perspective, the consequences of a history of childhood maltreatment can progressively accumulate over time via multiple pathways (Masten & Cicchetti, 2010). In this way, our findings support the notion that cumulative risk begets subsequent maladaptation, in which childhood maltreatment generates maladaptive pathways which limit the capacity to follow typical developmental trajectories (Cicchetti, 1993; Russotti et al., 2021; Sroufe, 2013).

4.3. Strengths and limitations

There are several strengths of this study, including the multi-informant and prospective design that allowed the identification of contextual family risk factors at different time points. However, some limitations are important to note as well. First, the history of maternal childhood maltreatment was measured retrospectively via adult self-reporting of childhood abuse and neglect, which is prone to recall and measurement error, particularly given the long recall period from mid-adulthood back to childhood. Second, according to our non-response analyses, the included participants show selection towards a relatively high socioeconomic status. Thus, the generalizability and the interpretation of the results must be done with caution. Third, the lack of information on fathers' own

childhood maltreatment experiences makes it challenging to identify the role of fathers in the family context and the child's emotional development. Likewise, we do not have information about exposure to maltreatment in offspring, which may impact the results of this study and would also provide a more comprehensive picture of the intergenerational transmission of adversity. Fourth, due to the small effect sizes of the associations found in this study, the practical significance is perhaps limited and needs to be cautiously considered. Finally, other variables than the ones included in this study are likely also involved in the intergenerational transmission of adversity. For instance, besides environmental processes, the association of maternal childhood maltreatment with offspring internalizing and externalizing problems may be partly due to shared genes.

4.4. Implications

Our findings suggest that mothers who experienced childhood maltreatment may face small, yet long-term risks that could affect their and their offspring's wellbeing. The results of the current study may inform interventions and social policies to mitigate the effects of maternal childhood maltreatment on child psychopathology and positively influence household dynamics. Particularly, the association of maternal childhood maltreatment with family functioning during pregnancy shows the importance of identification of mothers-to-be with a history of child maltreatment. The perinatal period provides opportunities for interventions targeting the consequences of maternal history of maltreatment and providing families with tools to implement positive parenting in their future families (Russotti et al., 2021). Indeed, previous studies showed that interventions in mothers who experienced child maltreatment helped to mitigate the risk for maltreatment through the reduction of harsh parenting (Julian et al., 2021). In this way, a promising mechanism to interrupt the intergenerational cycle of adversities is to simultaneously bolster a mother's positive parenting style as well, as to strengthen family interactions towards a healthy and supportive family environment for both the mother and her child (van IJzendoorn et al., 2020).

5. Conclusion

The present study revealed a comprehensive overview of family context mechanisms involved in the intergenerational transmission of maternal childhood maltreatment on child outcomes. Thus, the findings demonstrate the potential long lasting consequences of child maltreatment not only in the person itself but rather, increasing the risk of maladaptive patters on the family environment of the children and their families. However, we did not explain the full path from maternal childhood maltreatment on child outcomes, and therefore encourage scholars to investigate other potential risk pathways as well as protective factors that may buffer against the negative consequences of childhood maltreatment across generations.

Declaration of competing interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data availability

Data will be made available on request.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.chiabu.2023.106228.

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