



## UvA-DARE (Digital Academic Repository)

### Risk factors for child neglect: A meta-analytic review

Mulder, T.M.; Kuiper, K.C.; van der Put, C.E.; Stams, G.-J.J.M.; Assink, M.

**DOI**

[10.1016/j.chiabu.2018.01.006](https://doi.org/10.1016/j.chiabu.2018.01.006)

**Publication date**

2018

**Document Version**

Final published version

**Published in**

Child Abuse & Neglect

[Link to publication](#)

**Citation for published version (APA):**

Mulder, T. M., Kuiper, K. C., van der Put, C. E., Stams, G.-J.J.M., & Assink, M. (2018). Risk factors for child neglect: A meta-analytic review. *Child Abuse & Neglect*, 77, 198-210. <https://doi.org/10.1016/j.chiabu.2018.01.006>

**General rights**

It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

**Disclaimer/Complaints regulations**

If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: <https://uba.uva.nl/en/contact>, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.



Contents lists available at ScienceDirect

# Child Abuse & Neglect

journal homepage: [www.elsevier.com/locate/chiabuneg](http://www.elsevier.com/locate/chiabuneg)

## Research article

# Risk factors for child neglect: A meta-analytic review

Tim M. Mulder<sup>a</sup>, Kimberly C. Kuiper<sup>b</sup>, Claudia E. van der Put<sup>a</sup>, Geert-Jan J.M. Stams<sup>a</sup>,  
Mark Assink<sup>a,\*</sup>

<sup>a</sup> Research Institute of Child Development and Education, University of Amsterdam, The Netherlands

<sup>b</sup> Department of Education and Child Studies, Leiden University, The Netherlands



## ARTICLE INFO

### Keywords:

Child neglect  
Risk factors  
Meta-analysis  
Child abuse  
Child maltreatment

## ABSTRACT

Knowledge of risk factors and their effects is vital for successfully preventing and reducing child neglect. This study provides a meta-analytic update of research on risk factors for child neglect. A total of 315 effect sizes were extracted from 36 primary studies and classified into 24 risk domains. Effects of 15 risk domains were significant and ranged from small ( $r = .110$ ) to large ( $r = .372$ ) in magnitude. Most risks were found at the parental level, such as having a history of antisocial behavior/criminal offending ( $r = .372$ ); having a history of mental/psychiatric problems ( $r = .259$ ); having mental/physical problems ( $r = .207$ ); and experiences of abuse in own childhood ( $r = .182$ ). The effect of mother-related risk factors was not significantly different from the effect of father-related risk factors. It is concluded that child neglect is determined by multiple risk domains and that especially parent-related risk factors are important in preventing and reducing child neglect. Implications of the results for clinical practice are discussed.

## 1. Introduction

Child neglect has a relatively high prevalence rate, compared to other types of child maltreatment, such as physical and sexual abuse (Sedlak et al., 2010; Stoltenborgh, Bakermans-Kranenburg, Alink, & Van IJzendoorn, 2015). The impact of child neglect on the health and development of children is at least as negative as the impact of other types of child maltreatment (Norman et al., 2012), not to mention the high societal, medical, and personal costs associated with victimization of child neglect (Florence, Brown, Fang, & Thompson, 2013; Gilbert et al., 2009). Paradoxically, however, child neglect has received the least scientific and public attention compared to other forms of child maltreatment (Gilbert et al., 2009), which has been dubbed by researchers as the “neglect of neglect” (McSherry, 2007; Stoltenborgh, Bakermans-Kranenburg, & Van IJzendoorn, 2013).

Given the serious consequences of child neglect, scientific knowledge as well as clinical awareness of risk factors for child neglect is essential. From a scientific perspective, insight in risk factors and their effects may shed more light on the etiology of child neglect, whereas from a clinical perspective, risk and care needs assessment procedures may be improved. In this way, the proper care needs of high-risk children and their families can be better targeted to prevent (the recurrence of) child neglect. Although a variety of risk factors for child neglect were examined in the scientific literature, different populations, methods, and study designs were used in primary studies. This limits the possibility to be conclusive on not only the factors that can be designated as risk factors, but also on the strength of the effect of these risk factors. To overcome this problem, systematic and meta-analytical integrations of results of primary studies on the effects of risk factors are needed to estimate an “overall” (or mean) effect of risk factors as well as variables that may moderate these overall effects. The aim of the current study was to perform such a meta-analytic review.

\* Corresponding author at: Research Institute of Child Development and Education, University of Amsterdam, P.O. Box 15780, 1001 NG, Amsterdam, The Netherlands.

E-mail address: [M.Assink@UvA.nl](mailto:M.Assink@UvA.nl) (M. Assink).

<https://doi.org/10.1016/j.chiabu.2018.01.006>

Received 19 July 2017; Received in revised form 18 December 2017; Accepted 7 January 2018

0145-2134/© 2018 Elsevier Ltd. All rights reserved.

Child neglect is a heterogeneous construct covering rather dissimilar negative child experiences, such as poor quality of supervision, inadequate or insufficient availability of food, lack of school attendance, and lack of required medical attention. In general, neglect refers to the omission of caretaking behavior that is necessary for a child's healthy development, whereas other forms of abuse most often have to do with harmful acts that are committed against a child (Mennen, Kim, Sang, & Trickett, 2010). However, two major issues contribute to difficulties in defining and operationalizing neglect (Dubowitz et al., 2005). First, it is debated by scholars whether neglect should only include actual harm or also potential harm. Second, there is an ongoing discussion on whether neglect should be seen as not meeting a child's basic needs from the child's perspective, or whether neglect should be seen as parental omissions in care. Moreover, legal definitions of neglect vary by jurisdiction and between countries (Mennen, Kim, Sang, & Trickett, 2010). Throughout the years, multiple types and subtypes of child neglect have been proposed by different researchers. Examples of neglect categories are physical neglect, emotional neglect, medical neglect, mental health neglect, and educational neglect (Erickson & Egeland, 2002); cognitive neglect (Slack, Holl, Altenbernd, McDaniel, & Stevens, 2003); psychological and environmental neglect (Dubowitz, Pitts, & Black, 2004); lack of supervision (Kaufman Kantor et al., 2004); and denial of professional care and treatment (Knutson, DeGarmo, & Reid, 2004). Although consequences of child neglect can be very serious (Norman et al., 2012), there is limited societal agreement on whether parental omissions in care are valid reasons for child welfare services to intrude in the life of a child and its family (Mennen, Kim, Sang, & Trickett, 2010).

Several theoretical models have been developed to explain child neglect, and in general, child neglect is perceived as the result of a complex interplay of risk factors present in children and their rearing environment. For instance, in the theoretical model of Belsky (1980), which was based on the ecological perspective on development of Bronfenbrenner (1979, 2000), risk factors can be present at four different levels: (1) the ontogenetic development of parents, which refers to the phenomena that negative parental experiences from the past are brought into their parenting behavior; (2) characteristics of the child and the family (i.e., the microsystem); (3) characteristics of the living environment (i.e., the exosystem); and (4) the attitude of society on children and child maltreatment (i.e., the macrosystem). In this model, the occurrence of child maltreatment (including neglect) is explained by a disbalance between risk and protective factors. A second theoretical model is the transactional model of Cicchetti and Rizley (1981), in which the reciprocal interactions between a child, the caregiver(s), and their environment play a central role. This model does not only stress the importance of risk factors of which the presence can fluctuate over time, but also the importance of protective factors, which can decrease the risk for child neglect. A last theoretical model is the one of Wolfe (1991), who stated that child maltreatment is an escalating process, located at the maladaptive end of a continuum of parenting behaviors. Put differently, this model implies that inadequate parenting behavior is the most important risk factor for child neglect. In sum, each of the described theoretical models assumes that the accumulation of - and interactions between - multiple protective and risk factors either increases or decreases the likelihood of victimization of child neglect rather than the presence of a single factor (see also Cicchetti & Carlson, 1989). Focusing on the accumulation of and interaction between different risk factors is therefore more promising for understanding the etiology of child neglect (MacKenzie, Kotch, & Lee, 2011).

Knowledge on risk factors is not only important for improving insight in the etiology of child neglect, but also for improving clinical practice aimed at preventing (the recurrence of) neglect. A theoretical model often applied in forensic (youth) care and in which risk factors play a central role is the *Risk-Need-Responsivity* model (RNR model; first formulated by Andrews, Bonta, & Hoge, 1990). The RNR model is widely used in penal law as a method for assessing and treating criminal offenders with the aim to reduce recidivism (Andrews, Bonta, & Wormith, 2011; Ward, Melser, & Yates, 2007). The model has three core principles: 1) the 'risk' principle stating that an intervention's intensity should match an offender's risk for recidivism; 2) the 'needs' principle stating that dynamic (i.e., changeable) risk factors associated with recidivism should be targeted in an intervention; and 3) the 'responsivity' principle stating that an intervention should be matched to characteristics of the offender, so that its potential positive impact is maximized (Andrews & Bonta, 2010). Although the RNR-model was specifically designed for preventing recidivism of criminal offenders, it may be very promising to apply the RNR principles in child welfare services. After all, child neglect, just like criminal recidivism, can be explained by the balance between multiple risk and protective factors present in the child and different ecological systems surrounding the child. To successfully bring the risk and needs principles into clinical practice, it is important that valid and reliable risk and needs assessment instruments are available in which only variables are assessed that have empirically been found to be risk factors for child neglect. This underlines the importance of meta-analytic research on the effects of risk factors for child neglect.

To the best of our knowledge, Stith et al., 2009 were the first to meta-analytically examine the effect of risk factors for different forms of child maltreatment. As for child neglect, they showed that risk factors involving the parent-child relationship and parental perceptions of the child (e.g., perceiving the child as problematic) were the two strongest predictors of child neglect. Relatively strong effects were also found for low social competence of children, high levels of parental stress, high levels of parental anger, and low parental self-esteem. Although it was the first and rather comprehensive meta-analytic study on risk factors for child maltreatment (including neglect), the study had several important limitations. A first shortcoming is that no moderator analyses were performed, implying that possible moderating effects of risk factor, study or sample characteristics were not revealed. For example, the type of neglect could be a moderating factor, since it cannot just be assumed that effects of risk factors are equal for different forms of child neglect. A second potential moderator could be the source that is used in primary research to identify neglect victimization, which is often either official records (mostly retrieved from CPS [Child Protection Services]) or self-reports on experiences of victimization. Given that prevalences of child neglect derived from official records are consistently lower than those derived from self-reports (Euser, Van IJzendoorn, Prinzie, & Bakermans-Kranenburg, 2010; Hussey et al., Hussey, Chang, & Kotch, 2006), official records may underestimate true prevalence rates and therefore, effects of risk factors in studies in which CPS data are used may be different from effects found in studies using self-reported data.

A second limitation is that [Stith et al. \(2009\)](#) averaged effects of risk factors in cases where multiple effect sizes were reported in primary studies. This not only leads to loss of information and thus less adequate estimates of effects of risk factors, but also to less statistical power in analyses, since not all relevant effect sizes are part of the dataset (see also [Assink et al., 2015](#); [Assink & Wibbelink, 2016](#)). Furthermore, reservations can be put forward regarding the completeness of the data derived from the included primary studies. This is due to the search being conducted in only a single literature database combined with the fact that it was not examined whether the study results were influenced by forms of bias, such as publication or selection bias ([Rosenberg, 2005](#)). Finally, [Stith et al. \(2009\)](#) only included studies published until the year 2002, which calls for an update of their meta-analysis in which results of recent primary research is also included.

In sum, the aim of the present study was to meta-analytically examine effects of risk factors for victimization of child neglect. A second aim was to examine several variables as potential moderators of the effects of risk factors. The present study is relevant from both a scientific and clinical perspective, as updated knowledge on (effects) of risk factors for victimization of child neglect may improve our understanding of the etiology of child neglect and clinical practice in terms of risk and needs assessment of children and their families.

## 2. Methods

### 2.1. Inclusion criteria

Several inclusion criteria were formulated for the selection of primary studies. First, studies that were published between January 1<sup>st</sup>, 1990 and April 30<sup>th</sup>, 2016 were included. Studies performed prior to 1990 were excluded, primarily because earlier attitudes on and definitions of types of child maltreatment differ substantially from contemporary notions of types of child maltreatment ([Gelles, 1980](#); [Goode, 1971](#)). In addition, early research on child maltreatment was, in general, conducted with less methodological rigor than more recent studies. For example, in studies conducted in the USA, there often is no consistent information available on substantiated cases of child maltreatment prior to 1990 (see, for instance, [Bittler & Zavodny, 2002](#); [Paxson & Waldfogel, 2002](#)). Second, studies had to examine (victimization of) child neglect. As for the specificity of neglect, both studies examining child neglect that was not further specified as well as studies examining one or more specific types of child neglect were included. Studies were not excluded based on the (sub)type of neglect examined, implying that the broadest possible range of neglect types was included. Third, studies had to report at least one bivariate (zero-order) association between child neglect and a variable preceding the episode(s) of neglect (i.e., the potential risk factor). If such associations were not reported, studies had to provide sufficient statistical information to calculate at least one bivariate association. Fourth, the sample used in studies had to comprise children or adolescents younger than 18 years of age. Fifth, the design of studies had to include a group of participants who were victims of child neglect as well as a “control” (comparison) group of participants who were not victims of child neglect. This implies that a control group consisted of participants who were not exposed to *any* form of child abuse and neglect, or that a control group consisted of participants who were not victims of child neglect, but may have been exposed to any other form of child abuse (such as physical and/or sexual abuse). Further, matching these groups using variables such as gender, age, or ethnicity, was not allowed, since matching aims to reduce the effect of these (potential) risk factors to zero, thereby impeding estimating a ‘true’ effect of these factors. Finally, studies had to be written in either English or Dutch.

### 2.2. Search strategy

We searched for studies using a four-step method. First, an electronic search was employed in the databases PsychINFO, ERIC, Sociological Abstracts, Science Direct, and Google Scholar. In this search, the following keywords were used in varying combinations to retrieve relevant articles, book chapters, dissertations, and reports: neglect, maltreatment, victim\*, child\*, youth, adolescen\*, juvenile\*, risk, risk factor\*, predictor\*, association, etiology, correlate\*, and antecedent\*. The asterisk (\*) used in these keywords implies a ‘joker’ sign. Second, all articles cited in the meta-analysis of [Stith et al. \(2009\)](#) were manually searched and assessed against the inclusion criteria set out for this review (see previous section). Third, studies were searched by screening reference lists of studies and review articles found in the first two steps of this search procedure (e.g., [Connell-Carrick, 2003](#); [Thornberry, Knight, & Lovegrove, 2012](#)). Finally, we attempted to retrieve additional published and unpublished studies (and datasets) by contacting several authors of relevant articles.

Determining eligibility of each primary study was performed by the first two authors by examining titles and abstracts. If necessary, full article texts were read to clarify any doubts about inclusion. After initial screening, the search strategy yielded 437 studies. After thoroughly assessing these studies, a total of 36 studies using 34 independent samples met the inclusion criteria and were therefore included in the present review. In Appendix A, an overview of the included studies and their characteristics can be found (which are marked with an asterisk in the reference list). A flow chart of the search procedure is presented in Appendix B.

### 2.3. Coding of studies

Based on guidelines proposed by [Lipsey and Wilson \(2001\)](#), a coding form was developed for coding risk factor, study, and sample characteristics, as well as data needed to calculate the effect sizes (see Appendix C). In order to extract risk factors from primary studies, we included all variables of which an association with child neglect was described, provided that all inclusion criteria were met. If a study labeled a variable representative of a particular risk domain as a protective factor (e.g., mother had *no* history of

alcohol abuse or dependency), we recoded the variable (changing the direction of the effect) in order to be able to include this variable as a risk factor in our review. We subsequently calculated the corresponding effect size using statistical information derived from the reported statistics. Regarding risk factor characteristics, the main variable of interest was the risk domain into which each (potential) risk factor for child neglect, as examined in primary studies, could be classified. A risk domain consists of (more or less) similar risk factors that can be classified into one category based on conceptual similarity. By coding this variable, we were able to estimate an overall (mean) effect for each risk domain for child neglect. To classify risk factors into risk domains, a classification scheme was developed consisting of 23 mutually exclusive risk domains and one rest category, resulting in a total of 24 risk domains. In creating these domains, we were as exhaustive as possible and we did not restrict to only child-related risk factors or to risk factors related to a single ecological system surrounding the child. The minimum number of risk factors for creating a separate risk domain was set to four. Appendix D shows an overview of all risk domains with examples of classified risk factors in each domain. Further, the type of each factor (static or dynamic) and the type of parent (father- or mother-figure for parent-related risk factors) were coded.

The following study characteristics were coded: publication year, study design (retrospective / prospective), country in which the study was conducted (US / Canada / Europe / Australia / Other), and the type of neglect examined (emotional / physical / educational / unspecified). As for the latter, we decided to test the potential moderating effect of neglect type using only those types of neglect that were most described in literature in order to preserve statistical power. These types were: (a) physical neglect, referring to the failure of parents to meet children's physical needs, for instance, by providing inadequate nutrition or not seeing a doctor when a child has medical care needs; (b) emotional neglect, referring to the failure of parents to meet children's emotional needs, for instance, by not showing affection to the child; and (c) educational neglect, referring to a parental failure in providing the care and supervision that is necessary to secure a child's education, for instance, by allowing a child to be chronically absent from school (Stoltenborgh et al., 2013). As many studies examined an unspecified form of child neglect, we added a fourth category "unspecified".

Several sample characteristics were also coded: percentage of males, percentage of non-Caucasians, and the method that was used for assessing child neglect. The following variables were only coded for descriptive purposes and were not tested as potential moderators: sample size of neglected group, sample size of non-neglected (control) group, total sample size, date of coding, name of coder, title of study, and authors of study.

All included primary studies were randomly assigned to the first and second author of the present review, who subsequently coded all studies. During the coding process, there was weekly contact between the coders to improve reliability. For every issue the two coders could not agree upon, consultation was provided by the other authors. The interrater agreement was assessed using a random selection of 6 of the 36 coded studies (16.7% of the total number of studies). High percentages of agreement (at least 85% agreement) between coders were found for the following variables: average age of the sample (86.8%), type of study design (93.5%), sample size of the neglected group (95.2%), and sample size of the control group (95.2%). Initially, the percentual agreement on the classification of risk factors into risk domains was lower than expected (60.3%), and therefore, each risk factor was thoroughly discussed until 100% agreement was reached on the classification of all risk factors into one of the risk domains. Perfect agreement (100%) was reached for type of risk factor, type of neglect, the gender distribution in study samples, country in which the study was conducted, the percentage of non-Caucasians in the sample, and type of parent associated with parent-related risk factors (i.e., father (-figure) or mother (-figure)). The intraclass correlation for hand-calculated effect sizes was  $r = .920$ .

#### 2.4. Calculation of effect sizes

To quantify the effect of a (potential) risk factor for child neglect, the Pearson product-moment correlation coefficient ( $r$ ) was calculated for each association between child neglect and a variable preceding the child neglect episode(s) that could be extracted from the primary studies (see also the third inclusion criterion in the Methods section). Pearson's product moment correlation coefficient ( $r$ ) was chosen as the effect size for several reasons. First,  $r$  is a common metric used for describing the effect of risk factors for a specific negative outcome. Second, correlations are readily interpretable in terms of practical importance (Field, 2005; Rosenthal & DiMatteo, 2001; Rosenthal, 1991). Last, correlations can be easily computed from chi-square,  $t$ ,  $F$ , and  $d$  values (Hunter & Schmidt, 2004), which proved helpful since there were differences in statistics that were reported in primary studies (e.g., correlations, means, standard deviations, proportions, and odds-ratios). Study-specific data were transformed to correlation coefficients using methods and formulas proposed by Ferguson (1966); Lipsey and Wilson (2001), and Rosenthal (1994). Effect sizes were not calculated using results of multivariate analyses (e.g., adjusted means or adjusted odds-ratios), but only on the basis of bivariate results. We chose for this approach, since different scholars rarely use the same set of covariates. This means that combining and comparing differentially adjusted effect sizes would limit the ability to properly estimate a true overall effect of risk factors.

In the present study, effect sizes of  $r > .100$  were interpreted as small,  $r > .243$  as medium, and  $r > .371$  as large (Rice & Harris, 2005). As for the direction of effect sizes, it was essential that the direction of each effect (either positive or negative) matched the statistical data as reported in a primary study. This means that a positive sign was assigned to an effect size in case higher scores or prevalences on a putative risk factor - such as a high level of family chaos - were associated with more (occurrences of) child neglect. In contrast, a negative sign was assigned to an effect size in case higher scores or prevalences on a putative risk factor were associated with less (occurrences of) child neglect.

When the correlation coefficient has been chosen as effect size, multiple scholars advise to transform correlations into normally distributed Fisher's  $z$ -values prior to conducting the statistical analyses in meta-analytic research. Correlations are not normally distributed, and this may negatively affect results of analyses (see for example Cooper, 2010; Lipsey & Wilson, 2001). Therefore, all correlation coefficients were transformed to Fisher's  $z$ -scores prior to conducting the analyses. After the analyses, Fisher's  $z$ -scores were transformed back to correlations in order to enhance the interpretability of the results.

**Table 1**  
Results for the Overall Mean Effect Sizes of the 24 Risk Domains.

Domain of risk factors	# Studies	# ES	Fisher's z (SE)	95% CI	Sig. mean z (p)	Mean r	% Var. at level 1	Level 2 variance	% Var. at level 2	Level 3 variance	% Var. at level 3
Family level											
Parents not married	5	6	.293 (.099)	0.040, 0.546	.031*	.285	.65	.000	.00	.046	99.35
Physical violence in the home environment	6	8	.200 (.048)	0.087, 0.313	.004**	.197	4.43	.016*	95.57	.000	.00
Large family size (2 or more children)	17	18	.188 (.040)	0.105, 0.272	<.001***	.186	.36	.021***	99.64	.000	.00
Low family SES	19	28	.168 (.052)	0.062, 0.275	.003**	.166	.18	.041***	69.48	.018	30.34
Child is not living with two biological parents	14	17	.121 (.030)	0.057, 0.184	<.001***	.120	3.39	.008***	85.64	.001	10.97
Problematic family behavior and cognitions	8	27	.110 (.038)	0.032, 0.188	.007**	.110	15.80	.002**	16.16	.008**	68.03
Low social support/low social network	10	20	.037 (.036)	-0.038, 0.112	.313	.037	13.52	.000	.00	.011***	86.48
Parental level											
Parental history of antisocial behavior/criminal offending	2	4	.391 (.070)	0.168, 0.615	.011*	.372	1.98	.001***	13.38	.006	84.63
Parental history of mental/psychiatric problems	4	13	.265 (.067)	0.118, 0.411	.002**	.259	.53	.035***	87.13	.005	12.35
Prenatal problems	2	5	.249 (.134)	-0.122, 0.620	.136	.244	.03	.003***	7.86	.034*	92.11
Low parental education	19	21	.233 (.041)	0.147, 0.318	<.001***	.229	1.09	.019***	67.09	.009	31.83
Parental mental/physical problems	6	22	.210 (.071)	0.063, 0.357	.007**	.207	1.62	.017***	46.31	.020*	52.07
Parental history of abuse	7	21	.184 (.036)	0.108, 0.259	<.001***	.182	3.81	.024***	96.19	.000	.00
Parental age factors	15	18	.141 (.036)	0.065, 0.217	.001**	.140	2.51	.000	.00	.014*	97.49
Parental unemployment	6	7	.137 (.070)	-0.034, 0.307	.097+	.136	7.71	.000	.00	.025	92.29
Parental substance (ab)use	4	5	.128 (.091)	-0.125, 0.381	.234	.127	1.59	.004	10.94	.029	87.47
Parental adverse childhood experiences	5	11	.127 (.060)	-0.008, 0.262	.062+	.126	14.97	.032**	85.03	.000	.00
Adverse parental cognitions regarding pregnancy	4	5	.021 (.036)	-0.080, 0.122	.594	.021	4.65	.005***	95.35	.000	.00
Child level											
Child being non-Caucasian	6	13	.219 (.070)	0.067, 0.372	.009**	.216	.34	.006***	25.46	.019+	74.20
Perinatal problems	5	8	.187 (.039)	0.095, 0.279	.002**	.185	11.85	.003	37.28	.004	50.87
Child's mental/physical/behavioral problems	8	12	.173 (.044)	0.077, 0.270	.002**	.171	9.80	.002	14.31	.010*	75.89
Child being female	9	10	.002 (.032)	-0.071, 0.075	.954	.002	4.18	.002	37.41	.003	58.41
Child being younger <sup>a</sup>	8	8	-.045 (.085)	-0.247, 0.157	.618	-.045	9.03	.023	45.49	.023	45.49
Other	5	7	.129 (.062)	-0.023, 0.281	.084+	.128	.81	.000	1.33	.018*	97.86

Note. # Studies = number of studies; ES = number of effect sizes; SE = standard error; CI = confidence interval for Fisher's z; sig = level of significance; mean sig. z. = mean effect size z (Fisher's z), r = mean effect size (Pearson's correlation); % var = percentage of variance; Level 2-variance = variance between effect sizes within studies; Level 3-variance = variance between studies.

+ p < .10; \* p < .05; \*\* p < .01; \*\*\* p < .001.

<sup>a</sup> This domain refers to (the effect of) children being younger in the neglect group than in the non-neglect group.

To prevent a disproportionate influence of extreme values (outliers) on the estimated parameters in the statistical analyses, potential outliers were examined in each risk domain by identification of  $z$ -values larger than 3.29 or smaller than -3.29 (Tabachnik & Fidell, 2013). In total, one risk factor classified in the risk domain “Low family SES” with a  $z$ -value larger than 3.29, was identified as an outlier and therefore substituted by a new coefficient equaling the highest possible  $z$ -value that fell within the normal range.

## 2.5. Statistical analyses

The included primary studies in the current review were regarded as a random sample from a larger population of studies, and therefore a random-effect-approach was applied in the statistical analyses (see for example Van den Noortgate & Onghena, 2003; Raudenbusch, 2009). Most included studies reported on multiple risk factors that could all be classified into one of the formulated risk domains. This meant that in many cases, multiple effect sizes could be extracted from one primary study (see Table 1 for the number of extracted effect sizes per study). It is assumed that effect sizes extracted from the same study are more similar than effect sizes extracted from different studies, since the former are based on the same participants, instruments, and/or conditions in which the study was performed (see, for instance, Houben, Van den Noortgate, & Kuppens, 2015). Because independence of effect sizes is an important prerequisite in traditional approaches to meta-analysis, we used an approach in which the (possible) dependence of effect sizes can be modeled. Therefore, we chose to combine effect sizes in multilevel meta-analytic models (see also Assink & Wibbelink, 2016).

In these models, three different sources of variance are modeled: variance between studies (level 3), variance between effect sizes extracted from the same primary study (level 2), and sample variance of the retrieved effect sizes (level 1) (Cheung, 2014; Hox, 2002; Van den Noortgate, López-López, Martín-Martínez, & Sánchez-Meca, 2013; Van den Noortgate, López-López, Marin-Martínez, & Sánchez-Meca, 2014). The multilevel models allow for the calculation of an average (or overall) effect size and, if significant variance on level 2 and/or level 3 is present, to examine whether study, sample, and/or risk factor descriptors can explain this variance by including the descriptors in the models as covariates. In each model, the sample variance of effect sizes (level 1) was not estimated, but treated as known. The formula of Cheung (2014, p. 2015) was used to calculate the parameter value of this type of variance. In building the meta-analytic models in the statistical environment R (version 3.3.0, R Core Team, 2015), we used the syntax as described by Assink and Wibbelink (2016) to apply the multilevel approach to meta-analysis as described by Cheung (2014) and Van den Noortgate et al., 2013, Van den Noortgate et al., 2014). The model coefficients were tested two-sided using the Knapp-Hartung-correction (Knapp & Hartung, 2003), meaning that a  $t$ -distribution was used for testing individual coefficients, and an  $F$ -distribution was used for the omnibus-test of all coefficients in the model (excluding the intercept). To determine the significance of the variances at levels 2 and 3, two one-sided log-likelihood-ratio-tests were performed, in which the deviance of the full model was compared with the deviance of the model without one of the two variance-parameters. In estimating the parameters in the model, the restricted maximum likelihood-method was used.

Since we regarded each domain of risk factors as qualitatively different from other risk domains, we decided to estimate the (overall) effect of each risk domain in separate intercept-only models, that is, we performed a meta-analysis for each of the 24 risk domains. In this perspective, we follow the procedure of Assink et al. (2015), who examined the effect of multiple risk domains for persistent delinquent behavior. As for the moderator analyses, we decided to examine a selective number of potential moderating variables using the full dataset instead of testing potential moderators in each risk domain. After classifying each risk factor into one of the risk domains, we learned that a substantial number of risk domains was based on ten or less effect sizes. If we would test potential moderators within these risk domains, the statistical power for detecting moderating effects in the multilevel models would be severely limited by the small number of effect sizes (level 2) and studies (level 3), despite significant variation in effect sizes that may be present at level 2 and 3 of the models. Prior to the moderator analyses, dummy variables were created for each category of all discrete variables, and all continuous variables were centered around their mean. All meta-analyses were performed in R using the function “rma.mv” from the metafor package of Viechtbauer (2010).

Finally, to examine the extent to which the results were affected by different sources of bias (such as publication bias), the nonparametric and funnel-plot based trim-and-fill analysis as described by Duval and Tweedie (2000a, 2000b) and Duval (2005) was performed. We ran this analysis within each risk domain using the metafor package (Viechtbauer, 2010) in the R environment. In all analyses, a 5% significant level was used.

## 3. Results

### 3.1. Descriptives

In the present review, a total of  $K = 36$  primary studies were included. Most studies were conducted in the USA ( $k = 33$ ), and single studies were conducted in South Korea ( $k = 1$ ), Vietnam ( $k = 1$ ), and the Netherlands ( $k = 1$ ). The total sample size ( $N$ ) was 729,840 children, of which  $n = 19,851$  were victims of neglect, and  $n = 706,936$  were not a victim of neglect. The victimization status could not be determined for  $n = 3053$  children due to insufficient data. The sample size of the included studies (assessed at the start of each study) ranged from  $n = 23$  to  $n = 495,368$ , and the mean age of the children at start of the studies was 4.42 years ( $SD = 5.20$ ). As for the study design, most primary studies ( $k = 27$ ) were retrospective and  $k = 9$  studies were prospective. The mean number of effect sizes extracted from each primary study was 7.86 ( $SD = 6.23$ ). In total, 315 effect sizes were extracted from all primary studies. It should be noted that none of the included primary studies reported on risk factors associated with educational neglect.

**Table 2**  
Results for Categorical and Continuous Moderators (Bivariate Models).

Moderator variables	# Studies	# ES	Intercept (95% CI) / mean Z (95% CI)	Mean <i>r</i>	$\beta$ (95% CI)	<i>F</i> (df1, df2) <sup>a</sup>	<i>p</i> <sup>b</sup>	Level 2 variance	Level 3 variance
Study design									
Retrospective (RC)	26	186	0.129 (0.071; 0.187)	.128		<i>F</i> (1, 313) = 0.556	.456	.056***	.010***
Prospective	10	129	0.167 (0.086; 0.248)	.165	0.038 (−0.062; 0.137)				
Type of risk factor									
Static (RC)	31	204	0.160 (0.107; 0.213)	.159		<i>F</i> (1, 313) = 2.693	.102	.056***	.011***
Dynamic	23	111	0.106 (0.041; 0.171)	.106	−0.054 (−.119; 0.011)				
Type of parent									
Father (-figure) (RC)	5	21	0.121 (0.031; 0.210)	.120		<i>F</i> (1, 110) = 3.157	.078 <sup>+</sup>	.015***	.008***
Mother (-figure)	18	91	0.196 (0.138; 0.254)	.194	0.076 (−0.009; 0.160) <sup>+</sup>				
Type of neglect									
Unspecified (RC)	28	256	0.159 (0.106; 0.211)	.158		<i>F</i> (2, 312) = 0.997	.370	.056***	.010***
Physical	6	50	0.087 (−0.018; 0.191)	.087	−0.072 (−0.189; 0.045)				
Emotional	2	9	0.043 (−0.157; 0.242)	.043	−0.116 (−0.322; 0.091)				
Type of assessment									
CPS-records (RC)	25	182	0.120 (0.062; 0.177)	.119		<i>F</i> (2, 312) = 1.538	.216	.056***	.009***
Self-report	10	109	0.164 (0.083; 0.246)	.163	0.045 (−0.055; 0.144)				
Combined	1	24	0.302 (0.090; 0.514)	.293	0.182 (−0.038; 0.402)				
Continuous variables									
Percentage of males	17	173	0.131 (0.048; 0.214)	–	−0.004 (−0.013; 0.004)	<i>F</i> (1, 171) = 0.957	.329	.085***	.017***
Percentage of non-Caucasians	19	141	0.138 (0.053; 0.222)	–	−0.002 (−0.005; 0.001)	<i>F</i> (1, 139) = 1.499	.223	.110***	.014
Publication year	36	315	0.142 (0.094; 0.191)	–	0.000 (−0.005; 0.006)	<i>F</i> (1, 313) = 0.025	.876	.056***	.011***

Note. # studies = number of studies; # ES = number of effect sizes; mean *r* = mean effect size (*r*); CI = confidence interval;  $\beta$  = estimated regression coefficient; Level 2 variance = residual variance between effect sizes extracted from the same study; Level 3 variance = residual variance between studies; RC = reference category; CPS = child protection services.

<sup>+</sup> *p* < .10; \* *p* < .05; \*\* *p* < .01; \*\*\* *p* < .001.

<sup>a</sup> Omnibus test of all regression coefficients in the model.

<sup>b</sup> *p*-value of the omnibus test.

### 3.2. Overall effects of the risk domains

An overview of the overall effect of each of the 24 domains of risk factors is presented in Table 1. Each overall effect represents the effect of a risk domain for child neglect (relative to “control” children who were not neglected, but may have been maltreated otherwise, for instance in the form of physical and/or sexual abuse). The overall effect of 15 risk domains was significant, and ranged from small (*r* = .110 for the domain of problematic family behavior and cognitions) to large (*r* = .372 for the domain of parental history of antisocial behavior or criminal offending) in magnitude. The overall effect of three domains was trend-significant, and the overall effect of six domains was not significant, indicating that these effects did not significantly deviate from zero (i.e., no effect).

### 3.3. Heterogeneity and moderator effects

The results of the likelihood-ratio tests revealed significant variance between effect sizes extracted from the same study (i.e., level 2 variance) in 14 risk domains, and significant variance between studies (i.e., level 3 variance) in seven risk domains (see Table 1). There was no significant level 2 or level 3 variance in six risk domains. Disregarding the separate risk domains and considering all effect sizes in one dataset (see Methods section), the log-likelihood ratio tests revealed (trend)significant variance on both level 2 (*p* = 0.056) and level 3 (*p* = 0.010) of the multilevel meta-analytic model. Therefore, we proceeded with testing variables as potential moderators using the full dataset (Table 2).

None of the variables tested in the moderator analyses yielded a significant effect. Type of parent (associated with parental risk factors) showed a trend effect (*p* < .100), implying that mother-related risk factors may show larger effects (*r* = .194) than father-related risk factors (*r* = .120). It should be noted that the country in which a study was conducted could not be tested as a moderating variable, as there was insufficient variance in countries.

### 3.4. Trim and fill analyses

The trim and fill analyses suggested that bias was present in 16 of the 24 risk domains, given the asymmetrical funnel plot distributions of these risk domains (which are available upon request). After the trim and fill analyses, the overall effects of these 16 domains were adjusted by imputing “missing” effect sizes and re-estimating an overall effect. Table 3 presents the 16 adjusted overall effects. Smaller effects were found for six risk domains, whereas for 10 domains larger effects were found. The trim and fill analyses showed that the distribution of effect sizes was symmetrical in the remaining 8 domains, implying that imputation of effect sizes was not necessary. Therefore, the overall effects of these 8 domains did not change.

**Table 3**  
Results for the Overall Mean Effect Sizes of the 24 Risk Domains after Trim and Fill Analyses.

Domain of risk factors	# Studies	# ES	Fisher's Z (SE)	95% CI	Sig. Mean Z (p)	Mean r
Family level						
Parents not married	–	–	–	–	–	–
Physical violence in the home environment	–	–	–	–	–	–
Large family size (> 2 children)	18	19	.203 (.041)	0.117; 0.290	<.001***	.200
Low family SES	23	33	.237 (.057)	0.122; 0.353	<.001***	.233
Child is not living with two biological parents	18	22	.176 (.036)	0.102; 0.251	<.001***	.174
Problematic family behavior and cognitions	–	–	–	–	–	–
Low social support/small social network	12	25	.007 (.036)	–0.067; 0.081	.847	.007
Parental level						
Parental history of antisocial behavior/criminal offending	3	5	.348 (.065)	0.167; 0.528	.065 <sup>+</sup>	.335
Parental history of mental/psychiatric problems	6	17	.165 (.078)	0.001; 0.329	.049 <sup>+</sup>	.164
Prenatal problems	3	6	.340 (.122)	0.027; 0.653	.039 <sup>+</sup>	.327
Low parental education	–	–	–	–	–	–
Parental mental/physical problems	9	27	.316 (.073)	0.167; 0.466	<.001***	.306
Parental history of abuse	–	–	–	–	–	–
Parental age factors	–	–	–	–	–	–
Parental unemployment	8	9	.194 (.066)	0.041; 0.347	.019 <sup>+</sup>	.192
Parental substance (ab)use	5	6	.167 (.081)	–0.041; 0.374	0.094 <sup>+</sup>	.165
Parental adverse childhood experiences	–	–	–	–	–	–
Adverse parental cognitions regarding pregnancy	5	6	.035 (.036)	–0.058; 0.129	.374	.035
Child level						
Child being non-Caucasian	7	14	.244 (.067)	0.100; 0.388	.003**	.239
Perinatal problems	8	11	.157 (.038)	0.072; 0.242	.002**	.156
Child's mental/physical/behavioral problems	13	17	.070 (.048)	–0.031; 0.172	.161	.070
Child being female	14	15	–.058 (.032)	–0.127; 0.012	.096 <sup>+</sup>	–.058
Child being younger	–	–	–	–	–	–
Other	6	8	.149 (.056)	0.017; 0.281	.032 <sup>+</sup>	.148

Note. # Studies = number of studies; # ES = number of effect sizes; Fisher's Z = mean effect size (Fisher's Z); SE = standard error; CI = confidence interval; Sig. = significance; r = Mean effect size (Pearson's correlation). Dashes indicate that the distribution of effect sizes in a risk domain was not asymmetrical and that no effect sizes were added to the risk domain.

<sup>+</sup>p < .10; \*p < .05; \*\*p < .01; \*\*\*p < .001.

#### 4. Discussion

Using a multilevel meta-analytic approach, we examined the effects of multiple domains of risk factors for child neglect. A total of 315 effect sizes of (potential) risk factors were retrieved from 36 primary studies, and clustered into 24 risk domains. The overall effect was significant for 15 risk domains, with magnitudes ranging from small ( $r = .110$  for the domain of problematic family behavior and cognitions) to medium ( $r = .372$  for the domain of parental history of antisocial behavior or criminal offending), according to Rice and Harris's criteria for interpreting effect sizes (2005). Overall, we found that multiple risk factors were involved in the occurrence of child neglect. These findings confirm that child neglect is more likely determined by multiple causes, than by one specific risk factor (see also the etiological theories of Belsky, 1980; 1993; Cicchetti & Rizley, 1981; Wolfe, 1991). Furthermore, we found that risk factors were present in most of the ecological contexts of a child, as described by Belsky (1980) and Bronfenbrenner (2000). However, we were unable to determine significant risks in the macrosystem, primarily because there was a lack of primary studies reporting on bivariate relations between potential risk factors in the macrosystem and child neglect. This may be explained by the fact that the majority of studies examined proximal rather than distal factors. After all, ecological theories attribute stronger effects to proximal factors, implying that proximal factors are more important to study than distal factors.

In general, this review reveals that the strongest predictors of child neglect can be found in parental characteristics, such as a history of antisocial/criminal offending, a history of mental/psychiatric problems, and a low educational level. These findings are in line with ecological models (e.g., Bronfenbrenner, 2000; Belsky, 1980), stating that a child's development is more affected by proximate than by distal social systems. Since parents or caretakers form the most proximal – and most important – social system influencing a child, it is not surprising that we found the strongest effects for parental and family related risk factors. Our results are also in line with previous studies showing that effects of risk factors present in the microsystem surrounding a child are in general stronger than effects of child-related risk factors (Cohen et al., Cohen, Brown, & Smailes, 2001; Sidebotham & Heron, 2006; Wu et al., 2004). We did find a relatively strong effect for ethnicity of the child, implying that non-Caucasian children have an increased risk for child neglect. However, in contrast to factors such as age and gender of the child, the child's ethnicity cannot be merely seen as a child factor, as it is informative on the (cultural) environment in which the child is growing up. Further, since most included studies originated from primarily Caucasian countries, the generalizability of this result is very limited.

We also found evidence for the intergenerational transmission of child neglect, since a parental history of child abuse seemed to be a significant risk domain. Although the effect of this risk domain was statistically small, it can be stated that children raised by parents who experienced abuse and/or neglect in their own childhood, are at risk for being a victim of child neglect. Evidence for intergenerational transmission of different types of child abuse is also presented in other review studies (see, for instance, the meta-

analytic review of [Assink et al., 2017](#) and the qualitative review of [Ertem, Leventhal, & Dobbs, 2000](#)). Unfortunately, most of the primary studies included in the current meta-analysis did not report on the type of abuse or neglect that parents had experienced, making it impossible to draw firm conclusions on type-specific transmission processes, such as described by [Kim \(2009\)](#).

Non-significant results were found for six domains, implying that – given our results – the following domains cannot be regarded as risk domains: a family experiencing low social support/having a small social network, the occurrence of prenatal problems, parental substance (ab)use, adverse parental cognitions regarding pregnancy, a child being female, and a child being younger. However, in interpreting the non-significant effects of these domains, two limitations should be kept in mind. First, some of the domains are based on a small number of effect sizes and studies, resulting in low statistical power and a relative unreliable estimate of the effect size. Second, heterogeneity was present in most domains, implying that variables were considered risk factors in some studies, but not in others. All in all, more primary studies examining the effects of these domains are needed to draw conclusions with more certainty.

The current results are generally in line with findings from [Stith et al. \(2009\)](#), who also found the strongest effects for parent- and family-related risk factors: current mental/psychiatric problems, having a history of mental/psychiatric problems, having a history of childhood abuse, age factors, being a single parent, low family SES, a large family size, and problematic family behavior. The current study adds to the results of [Stith et al. \(2009\)](#) in several ways. First, the present meta-analysis provides an updated overview of (effects of) risk factors for child neglect. Second, moderator analyses were performed to detect moderating effects of risk factor, study, and sample characteristics. Third, different and additional risk factors were examined in the current study, providing additional insight in risk factors for child neglect.

The trim and fill analyses revealed indications for missing data in 16 risk domains, implying that the true effect of these risk domains may differ from the estimated effects in the current study. However, the overall effects that we estimated after “correcting” for bias in the data, should not be regarded as true mean effects. Results from simulated meta-analyses showed that the trim and fill algorithm may inappropriately adjust for bias ([Peters, Sutton, Jones, Abrams, & Rushton, 2007](#); [Terrin, Schmid, Lau, & Olkin, 2003](#)). In addition, this algorithm was not specifically designed for data comprising dependent effect sizes in which heterogeneity is present. Consequently, estimated effects using data adjusted in accordance to results of trim-and-fill-analyses, should be interpreted with caution. The “corrected” overall effects of the 16 risk domains should only be interpreted as indications of (any source of) bias in the data and not as the true effects.

#### 4.1. Moderating effects

There were no moderating effects of the sample, research design, and risk factor characteristics that we examined as potential moderators, indicating that the overall effect of risk factors in general is at least to some extent robust. Nevertheless, this does not imply that effects of individual risk domains are robust, as potential moderating variables were not examined in each risk domain. We made this decision because a substantial number of risk domains was based on a low number of effect sizes and/or studies (ten or less), limiting the statistical power in the moderator analyses. It is thus important to determine the influence of variables such as gender, ethnicity, and type of neglect on the effects of individual risk domains or factors in future research.

We did find a trend-significant moderating effect of the gender of parents. The results showed that the effect of mother-related risk factors may be slightly larger than the effect of father-related risk factors, implying that the former may be stronger related to child neglect than the latter. This may be explained by the fact that mothers are emotionally and/or physically more involved with their children than fathers, particularly in single parent families in which children more often live with their mother. On the other hand, this difference in effect may decrease over time, since the division of child rearing roles between fathers and mothers is becoming more equally divided and increasingly less traditional (i.e., primarily mothers are responsible for child rearing and primarily fathers provide financial and material support; [Parker & Wang, 2013](#)). As mothers are still the primary focus of study in current scientific research on parenting ([Davison et al., 2016](#); [Phares, 1992](#); [Phares, Fields, Kamboukos, & Lopez, 2005](#); [Schumacher, Slep, & Heyman, 2001](#)), more research should be conducted on both the role of fathers in child neglect victimization and the effect of father-related risk factors. After all, fathers and mothers are both responsible for raising their children in a safe environment.

#### 4.2. Implications for clinical practice

Our findings have three main clinical implications. First, instruments designed for assessing risk and needs of children and adolescents regarding child neglect must contain items on risk factors at the child level (e.g., a child’s mental / physical / behavioral problems), the parental level (e.g., a history of antisocial/criminal offending; current and previous manifestations of mental/psychiatric problems), and the family level (e.g., physical violence in the home environment; low family SES). Since most significant effects were found for parental and family related risk factors, these type of factors should primarily be assessed in instruments for risk and needs assessment. This is underlined by formal reviews of cases in which children died due to ignorance of the meaning of parent and family related risk factors. In these cases, clinical professionals tended to overvalue child related factors and to undervalue parent related risks, with tragic consequences as a result (for UK, see [Trench & Griffiths, 2014](#); for the Netherlands, see: [Inspectie Jeugdzorg Health and Youth Care Inspectorate \(2016\)](#)).

Second, (preventive) interventions aimed at reducing the risk for child victimization of neglect should especially focus on the dynamic risk factors with the strongest effects, such as mental/psychiatric problems of parents, mental/physical/behavioral problems of a child, and physical violence in the home environment of a child. Obviously, other established care needs of children and families should also be addressed to reduce the risk for child neglect. Only by properly addressing risk factors in risk and needs assessment on

the one hand, and in (preventive) intervention strategies on the other, the risk and need principle of [Andrews and Bonta \(2010\)](#) can be effectively implemented in clinical practice.

Third, given the relatively large effects of several static risk factors, such as a parental history of antisocial/criminal behavior and a parental history of mental/psychiatric problems, we argue that it is important to keep track of client information in case management. This implies not only that client information should be properly documented over time, but also that it must be possible for (youth) care organizations (including child protection services) to share client information, since this will ultimately serve the care needs of children and their families. This purpose should be weighted against legal issues on the exchange of client information between (youth) care organizations. A final clinical implication is that both father- and mother related risk factors deserve attention in assessment and intervention strategies, as we did not find evidence for a difference in effect between mother and father related risk factors.

#### 4.3. Limitations of the study

The current study has several limitations. First, and as shown by the flow chart (Appendix B), the number of scientific studies specifically examining child neglect is scarce. Due to methodological issues, many of the studies that initially seemed suitable for inclusion in the current review did not meet all inclusion criteria. A relatively large number of studies could not be included, because bivariate data were not reported nor available upon request, making it impossible to calculate an effect size for the factors examined in the studies. Moreover, in a substantial number of studies, variables were examined as risk factors for child maltreatment in general and not as risk factors for specifically child neglect. These studies were also not eligible for inclusion. Consequently, the numbers of studies and effect sizes on which risk domains were based are rather low, and negatively affecting the power in the statistical analyses and the validity of our results. In addition, the results of the trim-and-fill analyses imply that bias may be present in 14 of the 25 examined risk domains. In sum, the estimated effects of risk domains and the results of the moderator analyses should be interpreted with caution.

A second issue involves the type of child neglect on which primary studies report. Although physical and sexual child abuse are generally regarded as different forms of child maltreatment and, as a consequence, studies are directed on either of these maltreatment forms, this has not been the case for different forms of child neglect ([Stoltenborgh et al., 2013](#)). The majority of risk factors reported on in the included primary studies was related to an unspecified type of neglect, meaning that associations between risk factors and specific types of neglect (such as physical neglect, emotional neglect, and educational neglect) were not described. Therefore, we could not examine differences in effects of risk domains for the different forms of child neglect.

A third limitation is related to the nature of the control groups used in primary studies. Ideally, (overall) effects of potential risk factors for child neglect are estimated based on primary research in which (levels of) risk factors are compared between a group of neglected children and a group of children who have not been exposed to child neglect *nor* any form of child abuse (such as physical and/or sexual abuse). In this way, the effects of risk factors are relative to true control participants, which is required for obtaining the best possible estimates of risk factor effects. However, the number of studies in which a neglected group is compared to a strict non-maltreated control group is rather small. Moreover, it is difficult to completely rule out episodes of child abuse and neglect in control participants, as the problem of underreporting is more or less present in all methods that are available for assessing episodes of child abuse and neglect (e.g., [Fergusson, Horwood, & Woodward, 2000](#); [Finkelhor, 2008](#)), of which different types often co-occur (e.g., [Arata, Langhinrichsen-Rohling, Bowers, & O'Farrill-Swails, 2005](#)). Therefore, we decided to also include studies comparing a neglected group to a non-neglected group (that could have been abused otherwise), which is a decision that should be kept in mind when interpreting our results.

#### 4.4. Recommendations for future research

Based on the lack of studies with high methodological standards, we call for increased awareness amongst researchers studying risk factors for child neglect to employ methodologically strong designs. Researchers should report on bivariate associations between variables examined as risk factors and child neglect (either or not in combination with multivariate results), and a control group should be part of the study design so that associations can be properly assessed. A further recommendation is that more research be directed on risk factors for child neglect in general, and on risk factors for the different forms of neglect specifically. In literature on child abuse, far more scientific attention is given to physical and sexual abuse, even though the consequences of neglect can be at least as devastating as the consequences of other forms of maltreatment ([Hildyard & Wolfe, 2002](#)). Research on risk factors for child neglect can strengthen efforts to prevent child neglect and its serious consequences. A third recommendation is to study effects of risk domains in various populations. Although we did not find a moderating effect for the percentage of non-Caucasians on the effect of risk factors, we cannot assume that effects of individual risk domains are the same across individuals with different ethnic backgrounds. Between ethnic groups, different factors may be present contributing to the risk for child neglect, and there may also be differences in the strength of risk factors. Studies on risk factors for child neglect are primarily performed in Western countries, and we should therefore be aware of potential ethnic bias. The similar accounts for the gender of children. We did not find a moderating effect of the percentage males in samples, but differences in (effects of) risk domains for child neglect may exist between male and female children. These issues should be further explored in future research.

## 5. Conclusion

The present review contributes to the literature on risk factors for child neglect by examining the effect of multiple risk domains. The largest effects were found for parent related risks, such as having a history of antisocial behavior/criminal offending, having a history of mental/psychiatric problems, having mental or physical problems, and having a low educational level. Mental, physical, and/or behavioral problems of children were also found to increase the risk for child neglect. Overall, the results confirm that risk factors for child neglect may be present in different ecological contexts and that the etiology of child neglect is multi-causally determined. In current clinical practice, much attention is paid to determining child related factors, but the results of this review imply that more attention should be given to parent related factors, since the latter are relatively large in number and effect than the former. From our review, we can infer that future methodologically rigorous research on risk factors for child neglect is needed, as child neglect is still the least studied of all the forms of child abuse.

## Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.chiabu.2018.01.006>.

## References

- Andrews, D. A., & Bonta, J. (Eds.). (2010). *The psychology of criminal conduct* (5<sup>th</sup> ed.). New Providence, NJ: Matthew Bender & Company, Inc., LexisNexis Group.
- Andrews, D. A., Bonta, J., & Hoge, R. D. (1990). Classification for effective rehabilitation: rediscovering psychology. *Criminal Justice and Behavior*, *17*, 19–52. <http://dx.doi.org/10.1177/0093854890017001004>.
- Andrews, D. A., Bonta, J., & Wormith, J. S. (2011). The risk-need-responsivity (RNR) model: does adding the good lives model contribute to effective crime prevention? *Criminal Justice and Behavior*, *38*(7), 735–755. <http://dx.doi.org/10.1177/0093854811406356>.
- Arata, C. M., Langhinrichsen-Rohling, J., Bowers, D., & O'Farrill-Swails, L. (2005). Single versus multi-type maltreatment: an examination of the long-term effects of child abuse. *Journal of Aggression, Maltreatment & Trauma*, *11*(4), 29–52. [http://dx.doi.org/10.1300/J146v11n04\\_02](http://dx.doi.org/10.1300/J146v11n04_02).
- Assink, M., Spruit, A., Schuts, M., Lindauer, R., Van der Put, C. E., & Stams, G. J. J. M. (2017). The intergenerational transmission of child maltreatment: A three-level meta-analysis. *Manuscript submitted for publication*.
- Assink, M., Van der Put, C. E., Hoeve, M., De Vries, S. L. A., Stams, G. J. J. M., & Oort, F. J. (2015). Risk factors for persistent delinquent behavior: A meta-analytic review. *Clinical Psychology Review*, *42*, 47–61. <http://dx.doi.org/10.1016/j.cpr.2015.08.002>.
- Assink, M., & Wibbelink, C. J. M. (2016). Fitting three-level meta-analytic models in R: A step-by-step tutorial. *The Quantitative Methods for Psychology*, *12*(3), 154–174. <http://dx.doi.org/10.20982/tqmp.12.3.p154>.
- Belsky, J. (1980). Child maltreatment: an ecological integration. *American Psychologist*, *35*(4), 320–335. <http://dx.doi.org/10.1037/0003-066X.35.4.320>.
- Belsky, J. (1993). Etiology of child maltreatment: A developmental ecological analysis. *Psychological Bulletin*, *114*(3), 413–434. <http://dx.doi.org/10.1037/0033-2909.114.3.413>.
- Bittler, M., & Zavodny, M. (2002). Child abuse and abortion availability. *The American Economic Review*, *92*(2), 363–367. <http://dx.doi.org/10.1257/000282802320191624>.
- Bronfenbrenner, U. (1979). *The ecology of human development*. Cambridge, MA: Harvard University Press.
- Bronfenbrenner, U. (2000). Ecological theory. In A. Kazdin (Ed.), *Encyclopedia of psychology*. Washington, DC: American Psychological Association and Oxford University Press.
- Cheung, M. W. L. (2014). Modeling dependent effect sizes with three-level meta-analyses: A structural equation modeling approach. *Psychological Methods*, *19*(2), 211–229. <http://dx.doi.org/10.1037/a0032968>.
- Cicchetti, D., & Carlson, V. (Eds.). (1989). *Child maltreatment: theory and research on the causes and consequences of child abuse and neglect*. Cambridge, UK: Cambridge University Press.
- Cicchetti, D., & Rizley, R. (1981). Developmental perspectives on the etiology, intergenerational transmission, and sequelae of child maltreatment. *New Directions for Child and Adolescent Development*, *11*, 31–55. <http://dx.doi.org/10.1002/cd.23219811104>.
- Cohen, P., Brown, J., & Smailes, E. (2001). Child abuse and neglect and the development of mental disorders in the general population. *Development and Psychopathology*, *13*(4), 981–999.
- Connell-Carrick, K. (2003). A critical review of the empirical literature: identifying correlates of child neglect. *Child and Adolescent Social Work Journal*, *20*(5), 389–425. <http://dx.doi.org/10.1023/A:1026099913845>.
- Cooper, H. (2010). *Research synthesis and meta-analysis*. Thousand Oaks, CA: Sage Publications, Inc.
- Davison, K. K., Gicevic, S., Aftosmes-Tobio, S., Ganter, C., Simon, C. L., Newlan, S., ... Manganello, J. A. (2016). Fathers' representation in observational studies on parenting and childhood obesity: A systematic review and content analysis. *American Journal of Public Health*, *106*(11), e14–e21. <http://dx.doi.org/10.1177/1077559504269191>.
- Dubowitz, H., Pitts, S. C., & Black, M. (2004). Measurement of three major subtypes of child neglect. *Child Maltreatment*, *9*(4), 344–356. <http://dx.doi.org/10.1177/1077559504269191>.
- Dubowitz, H., Pitts, S. C., Litrownik, A. J., Cox, C. E., Runyan, D., & Black, M. M. (2005). Defining child neglect based on child protective services data. *Child Abuse & Neglect*, *29*, 493–511. <http://dx.doi.org/10.1016/j.chiabu.2003.09.024>.
- Duval, S. J., & Tweedie, R. L. (2000a). Trim and fill: A simple funnel-plot-based method of testing and adjusting for publication bias in meta-analysis. *Biometrics*, *56*(2), 455–463.
- Duval, S. J., & Tweedie, R. L. (2000b). A nonparametric "trim and fill" method of accounting for publication bias in meta-analysis. *Journal of the American Statistical Association*, *95*(449), 89–98.
- Duval, S. J. (2005). The trim and fill method. In H. R. Rothstein, A. J. Sutton, & M. Borenstein (Eds.), *Publication bias in meta-analysis: prevention, assessment, and adjustments* (pp. 127–144). Chichester, England: Wiley.
- Erickson, M. F., & Egeland, B. (2002). Child neglect. In J. E. B. Myers, L. Berliner, J. Briere, C. T. Hendriz, C. Jenny, & T. A. Reid (Eds.), *The APSAC handbook on child maltreatment*. Thousand Oaks, CA: Sage Publications.
- Ertem, I. O., Leventhal, J. M., & Dobbs, S. (2000). Intergenerational continuity of child abuse: how good is the evidence? *The Lancet*, *356*, 814–819. [http://dx.doi.org/10.1016/S0140-6736\(00\)02656-8](http://dx.doi.org/10.1016/S0140-6736(00)02656-8).
- Euser, E. M., Van IJzendoorn, M. H., Prinzie, P., & Bakermans-Kranenburg, M. J. (2010). Prevalence of child maltreatment in the Netherlands. *Child Maltreatment*, *15*(1), 5–17. <http://dx.doi.org/10.1177/1077559509345904>.
- Ferguson, G. A. (1966). *Statistical analysis in psychology & education*. p. 244 New York, NY: McGraw-Hill.
- Fergusson, D. M., Horwood, L. J., & Woodward, L. J. (2000). The stability of child abuse reports: A longitudinal study of the reporting behaviour of young adults. *Psychological Medicine*, *30*, 529–544.

- Field, A. (2005). *London, United Kingdom: Sage Publications Discovering statistics using SPSS (2<sup>nd</sup> ed.)*. .
- Finkelhor, D. (2008). *Childhood victimization: violence, crime and abuse in the lives of young people*. Oxford: Oxford University Press.
- Florence, C., Brown, D. S., Fang, X., & Thompson, H. F. (2013). Health care costs associated with child maltreatment: impact on medicaid. *Pediatrics*, 132(2), 312–318. <http://dx.doi.org/10.1542/peds.2012-2212>.
- Gelles, R. J. (1980). Violence in the family: A review of research in the seventies. *Journal of Marriage and the Family*, 873–885.
- Gilbert, R., Widom, C. S., Browne, K., Fergusson, D., Webb, E., & Janson, S. (2009). Burden and consequences of child maltreatment in high-income countries. *The Lancet*, 373(9657), 68–81. [http://dx.doi.org/10.1016/S0140-6736\(08\)61706-7](http://dx.doi.org/10.1016/S0140-6736(08)61706-7).
- Goode, W. J. (1971). Force and violence in the family. *Journal of Marriage and the Family*, 33, 624–636.
- Hildyard, K. L., & Wolfe, D. A. (2002). Child neglect: developmental issues and outcomes. *Child Abuse & Neglect*, 26(6–7), 679–695. [http://dx.doi.org/10.1016/S0145-2134\(02\)00341-1](http://dx.doi.org/10.1016/S0145-2134(02)00341-1).
- Houben, M., Van den Noortgate, W., & Kuppens, P. (2015). The relation between short-term emotion dynamics and psychological well-being: A meta-analysis. *Psychological Bulletin*, 141(4), 901–930. <http://dx.doi.org/10.1037/a0038822>.
- Hox, J. (2002). *Multilevel analysis: techniques and applications*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Hunter, J. E., & Schmidt, F. L. (2004). *Methods of meta-analysis: correcting error and bias in research findings (2nd ed.)*. Thousand Oaks, CA: Sage.
- Hussey, J. M., Chang, J. J., & Kotch, J. B. (2006). Child maltreatment in the United States: prevalence, risk factors, and adolescent health consequences. *Pediatrics*, 118(3), 933–942. <http://dx.doi.org/10.1542/peds.2005-2452>.
- Inspectie Jeugdzorg [Health and Youth Care Inspectorate], (2016). Casusonderzoek Drenthe: Onderzoek naar aanleiding van het overlijden van een kind [case review in the Dutch Province Drenthe: investigation as a result of the death of a child] Retrieved from the Health and Youth Care Inspectorate website: <https://www.inspectiejeugdzorg.nl/documenten/Casusonderzoek%20naar%20aanleiding%20van%20het%20overlijden%20van%20een%20kind%20in%20Drenthe.pdf>.
- Kaufman Kantor, G., Holt, M. K., Mebert, C., Straus, M. A., Drach, K. M., Ricci, L. R., MacAllum, C., & Brown, W. (2004). Development and psychometric properties of the child self-report multidimensional neglectful behavior scale (MNBS-CR). *Child Maltreatment*, 9(4), 409–429. <http://dx.doi.org/10.1177/1077559504269530>.
- Kim, J. (2009). Type-specific intergenerational transmission of neglectful and physically abusive parenting behaviors among young parents. *Children and Youth Services Review*, 31(7), 761–767. <http://dx.doi.org/10.1016/j.childyouth.2009.02.002>.
- Knapp, G., & Hartung, J. (2003). Improved tests for a random effects meta-regression with a single covariate. *Statistics in Medicine*, 22(17), 2693–2710. <http://dx.doi.org/10.1002/sim.1482>.
- Knutson, J. F., DeGarmo, D. S., & Reid, J. B. (2004). Social disadvantage and neglectful parenting as precursors to the development of antisocial and aggressive child behavior: testing a theoretical model. *Aggressive Behavior*, 30, 187–205. <http://dx.doi.org/10.1002/ab.20016>.
- Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis*. Thousand Oaks, CA: Sage.
- MacKenzie, M. J., Kotch, J. B., & Lee, L. (2011). Toward a cumulative ecological risk model for the etiology of child maltreatment. *Children and Youth Services Review*, 33(9), 1638–1647. <http://dx.doi.org/10.1016/j.childyouth.2011.04.018>.
- McSherry, D. (2007). Understanding and addressing the “neglect of neglect”: why are we making a mole-hill out of a mountain? *Child Abuse & Neglect*, 31(6), 607–614. <http://dx.doi.org/10.1016/j.chiabu.2006.08.011>.
- Mennen, F. E., Kim, K., Sang, J., & Trickett, P. K. (2010). Child neglect: definition and identification of youth's experiences in official reports of maltreatment. *Child Abuse & Neglect*, 34, 647–658. <http://dx.doi.org/10.1016/j.chiabu.2010.02.007>.
- Norman, R. E., Byambaa, M., De, R., Butchart, A., Scott, J., & Vos, T. (2012). The long-term health consequences of child physical abuse, emotional abuse, and neglect: A systematic review and meta-analysis. *PLOS Medicine*, 9(11), 1–31. <http://dx.doi.org/10.1371/journal.pmed.1001349>.
- Parker, K., & Wang, W. (2013). *Modern parenthood: roles of moms and dads converge as they balance work and family*. Pew Research Center: Washington, DC.
- Paxson, C., & Waldfogel, J. (2002). Work, welfare, and child maltreatment. *Journal of Labor Economics*, 20(3), 435–474. <http://dx.doi.org/10.1086/339609>.
- Peters, J. L., Sutton, A. J., Jones, D. R., Abrams, K. R., & Rushton, L. (2007). Performance of the trim and fill method in the presence of publication bias and between-study heterogeneity. *Statistics in Medicine*, 26(25), 4544–4562.
- Phares, V. (1992). Where's poppa? The relative lack of attention to the role of fathers in child and adolescent psychopathology. *Journal of American Psychology*, 47(5), 656–664.
- Phares, V., Fields, S., Kamboukos, D., & Lopez, E. (2005). Still looking for poppa. *Journal of American Psychology*, 60(7), 735–736.
- R Core Team (2015). *R: A language and environment for statistical computing*. Retrieved from Vienna, Austria: R Foundation for Statistical Computing. <http://www.R-project.org/>.
- Raudenbusch, S. W. (2009). Analyzing effect sizes: random-effects models. In H. Cooper, L. V. Hedges, & J. C. Valentine (Eds.). *The handbook of research synthesis and meta-analysis* (pp. 295–315). New York, NY: Russell Sage Foundation.
- Rice, M. E., & Harris, G. T. (2005). Comparing effect sizes in follow-up studies: ROC area, Cohen's d, and r. *Law and Human Behavior*, 29(5), 615–620. <http://dx.doi.org/10.1007/s10979-005-6832-7>.
- Rosenberg, M. S. (2005). The file-drawer problem revisited: A general weighted method for calculating fail-safe numbers in meta-analysis. *Evolution*, 59(2), 464–468. <http://dx.doi.org/10.1111/j.0014-3820.2005.tb01004.x>.
- Rosenthal, R. (1991). Effect sizes: Pearson's correlation, its display via the BESD, and alternative indices. *American Psychologist*, 46(10), 1086–1087.
- Rosenthal, R. (1994). Parametric measures of effect size. In H. Cooper, & L. V. Hedges (Eds.). *The handbook of research synthesis* New York, NY: Sage. p. 239.
- Rosenthal, R., & DiMatteo, M. R. (2001). Meta-analysis: recent developments in quantitative methods for literature reviews. *Annual Review of Psychology*, 52, 59–82.
- Schumacher, J. A., Slep, A. M. S., & Heyman, R. E. (2001). Risk factors for child neglect. *Aggression and Violent Behavior*, 6(2–3), 231–254. [http://dx.doi.org/10.1016/S1359-1789\(00\)00024-0](http://dx.doi.org/10.1016/S1359-1789(00)00024-0).
- Sedlak, A. J., Mettenburg, J., Basena, M., Petta, I., McPherson, K., Greene, A., ... Li, S. (2010). *Fourth national incidence study of child abuse and neglect (NIS-4): report to congress* Washington, DC: U.S. Department of Health and Human Services, Administration for Children and Families.
- Sidebotham, P., & Heron, J. (2006). Child maltreatment in the “children of the nineties”: A cohort study of risk factors. *Child Abuse and Neglect*, 30, 497–522. <http://dx.doi.org/10.1016/j.chiabu.2005.11.005>.
- Slack, K. S., Holl, J., Altenbernd, L., McDaniel, M., & Stevens, A. B. (2003). Improving the measurement of child neglect for survey research: issues and recommendations. *Child Maltreatment*, 8(2), 98–111. <http://dx.doi.org/10.1177/1077559502250827>.
- Stith, M. S., Liu, T. L., Davies, C., Boykin, E. L., Alder, M. C., Harris, J. F., ... Dees, J. E. M. E. G. (2009). Risk factors in child maltreatment: A meta-analytic review of the literature. *Aggression and Violent Behavior*, 14(1), 13–29. <http://dx.doi.org/10.1016/j.avb.2006.03.006>.
- Stoltenborgh, M., Bakermans-Kranenburg, M. J., & Van IJzendoorn, M. H. (2013). The neglect of child neglect: A meta-analytic review of the prevalence of neglect. *Social Psychiatry and Psychiatric Epidemiology*, 48(3), 345–355. <http://dx.doi.org/10.1007/s00127-012-0549-y>.
- Stoltenborgh, M., Bakermans-Kranenburg, M. J., Alink, L. R. A., & Van IJzendoorn, M. H. (2015). The prevalence of child maltreatment across the globe: review of a series of meta-analyses. *Child Abuse Review*, 24(1), 37–50. <http://dx.doi.org/10.1002/car.2353>.
- Tabachnik, B. G., & Fidell, L. S. (2013). *Using multivariate statistics (6th ed.)*. Boston, MA: Allynand Bacon.
- Terrin, N., Schmid, C. H., Lau, J., & Olkin, I. (2003). Adjusting for publication bias in the presence of heterogeneity. *Statistics in Medicine*, 22(13), 2113–2126.
- Thornberry, T. P., Knight, K. E., & Lovegrove, P. J. (2012). Does maltreatment beget maltreatment? A systematic review of the intergenerational literature. *Trauma, Violence and Abuse*, 13(3), 135–152. <http://dx.doi.org/10.1177/1524838012447697>.
- S. Trench, S. Griffiths, Serious case review report: family L OCT 2014 (2014) Retrieved from Norfolk Safeguarding Children Board website [http://www.norfolkscsb.org/wp-content/uploads/2015/03/Norfolk-SCR\\_Case-L\\_FINAL.pdf](http://www.norfolkscsb.org/wp-content/uploads/2015/03/Norfolk-SCR_Case-L_FINAL.pdf).
- Van den Noortgate, W., & Onghena, P. (2003). Multilevel meta-analysis: A comparison with traditional meta-analytical procedures. *Educational and Psychological Measurement*, 63(5), 765–790. <http://dx.doi.org/10.1177/0013164403251027>.
- Van den Noortgate, W., López-López, J. A., Marin-Martinez, F., & Sánchez-Meca, J. (2013). Three-level meta-analysis of dependent effect sizes. *Behavior Research*

- Methods*, 45(2), 576–594. <http://dx.doi.org/10.3758/s13428-012-0261-6>.
- Van den Noortgate, W., López-López, J. A., Marin-Martinez, F., & Sánchez-Meca, J. (2014). Meta-analysis of multiple outcomes: A multilevel approach. *Behavior Research Methods*, 47(4), 1274–1294. <http://dx.doi.org/10.3758/s13428-014-0527-2>.
- Viechtbauer, W. (2010). Conducting meta-analyses in R with the metafor package. *Journal of Statistical Software*, 36(3), 1–48.
- Ward, T., Melser, J., & Yates, P. M. (2007). Reconstructing the risk – need – responsivity model: A theoretical elaboration and evaluation. *Aggression and Violent Behavior*, 12(2), 208–228. <http://dx.doi.org/10.1016/j.avb.2006.07.001>.
- Wolfe, D. A. (1991). *Preventing physical and emotional abuse of children*. New York: Guilford Press.
- Wu, S. S., Ma, C. X., Carter, R. L., Ariet, M., Feaver, E. A., Resnick, M. B., ... Roth, J. (2004). Risk factors for infant maltreatment: A population-based study. *Child Abuse & Neglect*, 28(12), 1253–1264. <http://dx.doi.org/10.1016/j.chiabu.2004.07.005>.