

# Methodological Moderators in Prevalence Studies on Child Maltreatment: Review of a Series of Meta-Analyses

Insight into the effects of methodological characteristics on reported child maltreatment prevalence rates can facilitate the interpretation of results of previous studies and improve the design of future prevalence studies. We reviewed findings from four previous meta-analyses (Stoltenborgh *et al.*, 2011, 2012, 2013a, 2013b) on methodological moderators in self-report prevalence studies on child sexual ( $k=323$ ,  $N=410,951$ ), physical ( $k=157$ ,  $N=250,167$ ) and emotional abuse ( $k=42$ ,  $N=76,586$ ), and physical ( $k=13$ ,  $N=59,406$ ) and emotional neglect ( $k=16$ ,  $N=59,655$ ). We provide an overview of the moderating effects of participant characteristics (e.g. age), the sampling method and measurement characteristics (e.g. validation). No characteristic was without influence, but specific characteristics were significant moderators for certain types of abuse and not for others. This implies that the wide range of lifetime prevalence rates reported in the literature can partly be explained by methodological differences. Our best-evidence synthesis (sexual abuse:  $k=4$ ,  $N=52,749$ ; physical abuse:  $k=2$ ,  $N=40,341$ ; emotional abuse:  $k=6$ ,  $N=4029$ ; emotional neglect:  $k=3$ ,  $N=3226$ ) suggests that depending on the methodological characteristic under consideration a certain prevalence rate can be an over- or underestimation of the actual prevalence. Taking methodological characteristics' influence into consideration and choosing a sound methodology can help to get as close as possible to the actual child maltreatment prevalence. Copyright © 2016 John Wiley & Sons, Ltd.

## KEY PRACTITIONER MESSAGES:

- The methodological quality of studies affects the reported lifetime prevalence rates of child maltreatment, but the direction of this effect depends on the indicator of methodological quality.
- A higher response rate is related to a higher reported lifetime prevalence of child maltreatment for all maltreatment types except physical abuse.
- A sound study design and methodology can help researchers to get as close as possible to the actual lifetime prevalence of child maltreatment.

KEY WORDS: meta-analyses; child maltreatment; prevalence rates; moderators

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**‘The range of published prevalence rates is substantial’**

**‘Characteristics of the study samples and the procedures used to collect child maltreatment data may also affect the outcomes of prevalence studies’**

**‘Prevalence rates ... can be influenced by characteristics of the study participants other than continent and gender’**

## Introduction

The prevalence of various types of child maltreatment has been studied around the world. The range of published prevalence rates is, however, substantial; some studies report a lifetime prevalence of nearly zero per cent (e.g. Sibert *et al.*, 2002) while others show that almost 90 per cent of the population studied have been victims (e.g. Meston *et al.*, 1999). In a previous publication, we reported overall global prevalence rates for the different types of maltreatment (Stoltenborgh *et al.*, 2015). We showed that prevalence rates based on informant studies, in which reports of professionals were used, were much lower than those based on self-report studies, in which reports of victims themselves or their parents were used. In addition, prevalence rates were comparable across continents, except for sexual abuse which was reported more often in Australia and North America than in Asia and Europe for girls, and more often in Africa than in Asia, Europe and North America for boys. We also showed that there were no gender differences in the lifetime prevalence of different types of child maltreatment, again except for sexual abuse which was reported more often for girls than boys.

However, the large range of prevalence rates cannot be fully explained by these factors. Characteristics of the study samples and the procedures used to collect child maltreatment data may also affect the outcomes of prevalence studies and may partly explain the wide range of prevalence rates reported in previous studies. In the current review, we aim to clarify the role of such methodological characteristics by providing an overview of the moderator effects found in previous meta-analyses on the self-reported lifetime prevalence of child sexual abuse (Stoltenborgh *et al.*, 2011), physical abuse (Stoltenborgh *et al.*, 2013a), emotional abuse (Stoltenborgh *et al.*, 2012), and physical and emotional neglect (Stoltenborgh *et al.*, 2013b).

### *Participant Characteristics*

The prevalence rates reported in different studies can be influenced by characteristics of the study participants other than continent and gender, as previously reported (Stoltenborgh *et al.*, 2015). Prevalence rates can be higher for families under problematic economic circumstances, because economic hardship can cause stress which in turn increases the likelihood of child maltreatment (Stith *et al.*, 2009). Family stress can also be increased by a large family size (Euser *et al.*, 2010). In low-resource countries, both of these risk factors are more common, and prevalence rates in low-resource countries are therefore expected to be higher. Another participant characteristic reviewed is the type of respondent. Whether the sample consists of adults or children may make a difference to the prevalence rates. Recall bias is an important issue in retrospective reports on maltreatment experiences in their childhood by adult respondents, and this bias can lead to more false-negative reports (Hardt and Rutter, 2004) and may thus decrease the prevalence rate. On the other hand, prevalence rates can be increased by the fact that adults report about a longer period of time, covering the whole range of childhood when they report about childhood abuse experiences, whereas children are still in their childhood, and report

on a shorter period of time that is behind them. In addition, adults may be made aware by others of abuse that they do not remember themselves, whereas children may be considered too young to be exposed to such information from their past.

#### *Sampling Method*

The type of sample, the method used to recruit the study sample, the response rate and the size of the sample are also potential moderators. College samples generally report lower prevalence rates, possibly because they form a group with better psychological health compared to random samples representing the general population (Goldman and Padayachi, 2000). In addition, the risk of response bias in college samples may be higher because respondents in these samples are likely to be more aware of the study's aims (Stoltenborgh *et al.*, 2011). Also, the risk of biased results is larger for convenience than randomised samples (Barel *et al.*, 2010). Regarding the response rate and the sample size, samples with a higher response rate and larger samples are a better representation of the population and provide more precise lifetime prevalence estimates (Stoltenborgh *et al.*, 2012).

#### *Measurement Characteristics*

The measurement sensitivity of an instrument depends on its validity, definition, type and the number of questions. If an instrument is validated, researchers can be confident that they are using an instrument that measures what it is supposed to measure. Prevalence rates based on validated instruments will thus be more reliable, but whether a non-validated instrument results in higher or lower prevalence rates cannot be predicted. Depending on the width of the definition of a certain maltreatment type that a study uses, there will be more or fewer childhood experiences that match this definition and that will be reported as maltreatment. Studies using a broader definition are expected to gather higher prevalence rates. The type of instrument used to measure maltreatment and the number of questions included in the instrument can also influence the reported lifetime prevalence of child maltreatment. Previous reviews and meta-analyses show contradicting results, with some finding that the prevalence rates are higher when interviews are used compared to self-report questionnaires and others not finding these differences (Goldman and Padayachi, 2000; Pereda *et al.*, 2009). When maltreatment is investigated by means of multiple questions, these questions are likely to be more sensitive than a single question. Using multiple questions can therefore result in higher prevalence rates.

#### *The Current Study*

The World Health Organization (WHO) (1999) provides definitions of the different types of child maltreatment in their *Report of the Consultation on Child Abuse Prevention*. *Sexual abuse* is defined as:

‘the involvement of a child in sexual activity that he or she does not fully comprehend, is unable to give informed consent to, or for which the child is not developmentally prepared and cannot give consent, or that violate the laws or social taboos of society.’ (p. 15)

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**‘Whether a non-validated instrument results in higher or lower prevalence rates cannot be predicted’**

**‘The actual definitions used in studies on child maltreatment sometimes vary from those provided by the WHO’**

**‘The overview is restricted to self-report studies because the number of informant studies is insufficient’**

**‘Each of the meta-analyses included a systematic search of electronic databases and specialised journals’**

*Physical abuse* is defined as:

‘that which results in actual or potential physical harm from an interaction or lack of an interaction, which is reasonably within the control of a parent or person in a position of responsibility, power or trust.’ (p. 15)

*Emotional abuse* is defined as:

‘the failure to provide a developmentally appropriate, supportive environment, including the availability of a primary attachment figure, so that the child can develop a stable and full range of emotional and social competencies commensurate with her or his personal potentials and in the context of the society in which the child dwells.’ (p. 15)

*Neglect* is defined as:

‘the failure to provide for the development of the child in all spheres: health, education, emotional development, nutrition, shelter, and safe living conditions, in the context of resources reasonably available to the family or caretakers and causes or has a high probability of causing harm to the child's health or physical, mental, spiritual, moral or social development.’ (p. 15)

The actual definitions used in studies on child maltreatment sometimes vary from those provided by the WHO.

For each of these types of maltreatment, the current paper provides a meta-analytic overview of the potential moderating effects in self-report prevalence studies of the participant characteristics economic development, the type of respondent (adult or child), the characteristics of the sampling method (sampling procedure, type of sample, response rate and sample size) and the measurement characteristics validation of the instrument, the definition of abuse, the type of instrument and the number of questions. In addition, the influence of the overall methodological quality based on the sampling procedure, response rate, sample size and validation of the instrument is analysed in a best-evidence synthesis. The overview is restricted to self-report studies because the number of informant studies is insufficient (see Stoltenborgh *et al.*, 2015). Insight into the moderating effects of methodological characteristics facilitates the interpretation of results of previous prevalence studies and the design of future prevalence studies.

## Method

### *Meta-Analyses*

The methods used for the literature search and meta-analytical computation of effect sizes included in our review are described in detail in a previous review paper regarding the lifetime prevalence of child maltreatment (Stoltenborgh *et al.*, 2015). In short, to find relevant studies reporting on the prevalence rates of the particular type of maltreatment under study, each of the meta-analyses included a systematic search of the electronic databases PubMed, Online Contents, Picarta, ERIC, PsychInfo and Web of Science, the specialised journals *Child Abuse & Neglect* and *Child Maltreatment*, and the references of collected papers, dissertations and book chapters. Studies were included:

(a) if they were published between January 1980 and January 2008; (b) if the prevalence of the type of maltreatment under study was reported in terms of proportions at the child level (not at the family level); (c) if victims were under the age of 18 years; (d) if samples were non-clinical; and (e) if sufficient data were provided to determine the prevalence as well as the sample size.

In the previous meta-analyses, the Comprehensive Meta-Analysis program (Borenstein *et al.*, 2005) was used to compute overall prevalence rates based on logit event rates. In total, 323 independent samples reporting on the self-reported lifetime prevalence of child sexual abuse ( $N=410,951$ ), 157 on physical abuse ( $N=250,167$ ), 42 on emotional abuse ( $N=76,586$ ), 13 on physical neglect ( $N=59,406$ ) and 16 independent samples reporting on the lifetime prevalence of child emotional neglect ( $N=59,655$ ) were meta-analysed in our previous studies (Stoltenborgh *et al.*, 2011, 2012, 2013a, 2013b). Random effects models were used for significance tests. We prefer to use random effects models, because, unlike fixed models, random models allow for random differences between studies that are not associated with sampling error and thus point to different study populations (Borenstein *et al.*, 2010).

Interrater agreement between the coders for moderators and outcome variables was assessed in all of the previous meta-analyses. For all types of abuse, interrater agreement was satisfactory (mean kappas for categorical variables 0.74–0.89, mean agreement 86–93%; mean intra-class correlations for continuous variables 0.92–0.95).

Potential differences in combined effect sizes between specific subsets of studies based on methodological characteristics were tested in moderator analyses with random effects models (Borenstein *et al.*, 2007).  $Q$ -statistics and their  $p$ -values were used to determine whether effect sizes varied as a function of the methodological characteristics under study. Only subgroups that consisted of at least four studies were included in the moderator analyses (Bakermans-Kranenburg *et al.*, 2003). For those moderators that were tested in meta-regression analyses,  $z$ -statistics and their  $p$ -values were used to determine whether the moderation was significant. Because the confidence intervals of the overall prevalence rates of sexual abuse for boys and girls did not overlap (Stoltenborgh *et al.*, 2011), separate effect sizes for boys and girls were reported for this type of maltreatment.

#### *Participant Characteristics*

Participant characteristics were tested as potential moderators for all types of maltreatment (Stoltenborgh *et al.*, 2011, 2012, 2013a, 2013b). The economic development of the country that the sample originated from was coded as high resource or low resource according to the World Economic Outlook database (International Monetary Fund, 2010). In addition, we coded whether the respondent reporting about child maltreatment was a child (or adolescent) or an adult. In the case of sexual and physical abuse, an adult respondent could also be a parent.

#### *Sampling Method*

Characteristics of the sampling method were tested as moderators for all types of maltreatment (Stoltenborgh *et al.*, 2011, 2012, 2013a, 2013b). The type of sample was coded as cohort (e.g. group of respondents from the same birth

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**‘Participant characteristics were tested as potential moderators for all types of maltreatment’**

**‘The type of sample was coded as cohort, college, high school and population samples, or samples originating from a specific occupational group’**

**‘Measurement characteristics validation of the instrument, the definition of abuse, the type of instrument and the number of questions were tested as potential moderators’**

**‘A best-evidence synthesis was used to determine the prevalence rates for all types of abuse’**

year), college, high school and population samples (i.e. randomly drawn from the population as a whole), or samples originating from a specific occupational group. The sampling procedure was coded as convenience sampling or randomised sampling. In the meta-analyses on physical and emotional abuse, an additional category of modified randomised samples (e.g. stratified random sample or birth cohort) was coded. All of the studies on sexual abuse used modified randomised samples. Of the studies on physical neglect that were coded as (modified) randomised, three were modified randomised, whereas for emotional neglect one of the studies coded as (modified) randomised used a modified form of randomisation. The response rate and sample size were continuous variables included in meta-regression analyses for physical and emotional abuse. For sexual abuse and neglect, these variables were included in the analyses as categorical variables based on recoding of the continuous variables.

#### *Measurement Characteristics*

The measurement characteristics validation of the instrument, the definition of abuse, the type of instrument and the number of questions were tested as potential moderators for all types of maltreatment (Stoltenborgh *et al.*, 2011, 2012, 2013a, 2013b). Several aspects of the measurement instrument were coded. For many of the moderators, the limited number of studies on the lifetime prevalence of child physical and emotional neglect did not allow for a differentiation in more than two categories for this type of child maltreatment (see Table 1).

Whether or not the instrument was validated was coded on the basis of how this was reported in the prevalence study in which the instrument had been used. The definition of abuse was coded as being broader than the definition used in the Third National Incidence Study (NIS-3; Sedlak, 2001), according to this definition, or stricter than the definition. The NIS-3 definitions describe specific behaviours for each type of abuse. The type of instrument was coded as interview or questionnaire. For all maltreatment types except neglect, this coding was further differentiated into face-to-face interview, telephone interview, paper-and-pencil questionnaire or computerised questionnaire.

The number of questions included in the instrument was initially scored as a continuous variable. For physical and emotional abuse, the potential moderating effect of this variable was tested by means of meta-regression. For sexual abuse, the number of questions was recoded into three categories based on the 33<sup>rd</sup> and 67<sup>th</sup> percentile score (fewer than 3, 3–7, 8 or more) and for neglect into two categories (1 or 2, 3 or more).

#### *Best-Evidence Synthesis*

A best-evidence synthesis (Slavin, 1995) was used to determine the prevalence rates for all types of abuse based on a selected set of studies that used an optimal methodology as indicated by their sampling procedure, sample size, response rate and the use of a validated instrument. A priori criteria were set for these four indicators of methodological quality to determine which studies used a sound methodology. Studies were included as best evidence if (modified) random sampling was used, if the sample size was sufficient to find the mean prevalence rate with a confidence interval of five per cent, if the response rate was within the highest quartile and if a validated instrument was used.

Table 1. Overview of sample sizes and prevalence rates for each maltreatment type per moderator subgroup

	Sexual abuse			Physical abuse			Emotional abuse			Physical neglect			Emotional neglect					
	girls			boys			k	N	%	k	N	%	k	N	%	k	N	%
	k	N	%	k	N	%												
Total sample size	193	216 071	18.0	104	142 675	7.4	157	250 167	22.6	42	76 586	36.3	13	59 406	16.3	16	59 655	18.4
<i>Participant characteristics</i>																		
Economic development	174	196 830	18.3	91	138 398	6.8	140	180 805	23.2	32	69 414	34.0	13	59 406	16.3	13	58 072	17.2
– high resource	19	19 241	15.9	13	4277	14.0	17	13 860	18.5	10	7172	43.9	3			3	1583	28.5
– low resource																		
<i>Respondent<sup>a</sup></i>																		
– adult	156	124 449	18.4	78	99 769	8.6	111	122 134	24.6	30	67 590	31.9	11	57 376	22.7	13	57 681	14.4
– child	36	90 889	17.3	24	42 017	4.7	34	58 680	14.5	11	7996	43.2	2	2030	1.4	3	1974	46.8
– parent							12	13 851	34.2									
<i>Sampling method</i>																		
Type of sample <sup>b</sup>																		
– cohort	13	43 932	19.5	12	5590	8.6	17	24 334	17.9	6	4406	45.9						
– college	52	31 642	19.9	31	18 574	10.8	39	25 090	40.3	7	2149	72.4						
– high school	28	30 164	19.5	17	26 971	6.3	22	18 817	17.6	6	3106	40.6						
– occupational group	8	7691	20.8	4	43 208	5.7	10	18 038	12.5	1	41 482	15.4						
– population	69	81 985	16.0	28	36 026	4.2	56	91 248	20.2	18	15 392	23.6						
<i>Sampling procedure<sup>c</sup></i>																		
– convenience	106	60 308	19.1	53	76 953	10.3	87	70 843	25.8	25	60 035	40.3	6	42 712	37.9	9	52 397	14.6
– (modified) random	86	155 711	16.9	51	65 722	5.2	31	60 755	18.8	7	4967	52.9	7	16 694	6.5	7	7258	24.3
– random							36	59 584	20.2	10	11 584	19.0						
<i>Response rate<sup>d</sup></i>																		
– low	51	59 139	20.4	25	70 781	6.1			0.00			0.05	8	58 176	7.8	9	56 253	12.1
– moderate	48	65 601	14.9	32	50 039	5.0							5	1230	43.3	5	3059	43.8
– high	45	72 091	18.8	27	15 852	11.1												
<i>Sample size<sup>d</sup></i>																		
– small	54	9733	22.0	29	4760	12.0			0.00			0.00	7	2197	34.7	11	3946	16.5
– medium	51	34 215	19.8	39	13 804	7.2							6	57 209	5.7	5	55 709	22.9
– large	55	172 123	13.0	36	124 111	5.4												

Table 1. (Continued)

	girls			boys			Sexual abuse			Physical abuse			Emotional abuse			Physical neglect			Emotional neglect		
	k	N	%	k	N	%	k	N	%	k	N	%	k	N	%	k	N	%	k	N	%
Total sample size	193	216 071	18.0	104	142 675	7.4	157	250 167	22.6	42	76 586	36.3	13	59 406	16.3	16	59 655	18.4			
<i>Measurement characteristics</i>																					
<i>Instrument validated</i>																					
– yes	69	68 899	18.1	26	29 124	9.0	81	80 583	26.1	23	8392	42.2	7	2197	34.7	4	1257	14.2			
– no	112	142 622	17.6	72	110 655	6.6	71	112 163	20.0	18	67 837	28.7	6	57 209	5.7	12	58 398	20.0			
<i>Definition<sup>e</sup></i>																					
– broader than NIS-3	59	44 365	19.1	38	70 949	7.0	28	33 434	45.1	4	4417	34.6									
– stricter than NIS-3	61	82 403	15.1	38	51 320	6.9	101	135 244	22.7	33	77 066	40.1									
– according to NIS-3	47	71 117	21.2	17	11 906	10.7															
<i>Type of instrument<sup>f</sup></i>																					
– interview face-to-face	41	21 889	17.4	11	8645	6.5	30	31 230	16.7	5	3040	44.2	3	2208	4.6	4	4724	30.4			
– interview telephone	14	33 727	13.8	12	21 149	5.4	19	31 486	28.5	6	3741	28.9									
– questionnaire paper	127	139 125	19.7	71	98 008	8.2	89	104 267	25.1	23	62 540	40.1	8	56 231	23.2	9	53 764	21.3			
– questionnaire computer	5	10 082	9.7	6	12 252	4.5	8	24 110	16.7	4	5738	21.8									
<i>Number of questions<sup>g</sup></i>																					
– under 3	43	94 548	12.0	28	73 051	4.8															
– 3 to 7	49	60 761	19.9	28	33 808	10.4															
– 8 and over	47	26 807	22.5	21	14 425	7.9															
											Slope: 0.17										
												Slope: 0.10									

k = number of studies, N = number of respondents.  
a The category parent as respondent was only coded for physical abuse.  
b In the original publication on the prevalence of sexual abuse, the moderator analyses with type of sample were not reported.  
c The category modified random sampling was only coded for physical and emotional abuse.  
d Response rate and Sample size were coded in three categories for sexual abuse and two for neglect (low to moderate/high), and were continuous for other types.  
e Definition was coded in three categories for sexual abuse and two for other types of abuse (broader than NIS-3/NIS-3 or stricter). NIS-3 = Third National Incidence Study.  
f Type of instrument was coded in two categories for neglect (interview/questionnaire) and four for other types of abuse.  
g Number of questions was coded in three categories for sexual abuse and two for neglect (under 3/3 or more), and was continuous for other types. Differences in totals of k are due to the exclusion from the moderator analysis of studies with missing values or subgroups with k < 4.

For sexual and physical abuse, there were sufficient studies that met these criteria and could be included in best-evidence analyses. Unfortunately, there were too few studies with sound methodology based on all four characteristics of methodological quality for emotional abuse, and physical and emotional neglect. Therefore, we adapted our best-evidence criteria for these types of maltreatment and included studies in the analyses if at least three of the four indicators of methodological quality were present. This enabled us to conduct best-evidence analyses for emotional abuse and emotional neglect as well. However, even with this more lenient criterion there was only one study that could be considered best evidence for physical neglect and a best-evidence synthesis could thus not be conducted for this maltreatment type.

## Results

Significant moderator effects were found for all the methodological characteristics tested. Table 2 provides an overview of the methodological moderators for sexual, physical and emotional abuse, and physical and emotional neglect.

### *Moderation Effects of Participant Characteristics*

The economic development of the country was a significant moderator only for the lifetime prevalence of child sexual abuse as reported by boys, with boys from low-resource countries reporting more sexual abuse than boys from high-resource countries. The type of respondent was also a significant moderator for sexual abuse as reported by boys and for physical abuse. For both types of maltreatment, adult respondents reported higher prevalence rates than child respondents.

### *Moderation Effects of the Sampling Method*

The type of sample was a significant moderator for physical and emotional abuse, with studies using college samples reporting the highest prevalence rates. The sampling procedure was a significant moderator for sexual abuse as reported by boys, emotional abuse and physical neglect. In convenience samples, higher prevalence rates were reported than in (modified) randomised samples. Response rate was a significant moderator for all maltreatment types except physical abuse. Prevalence rates were higher in studies in which the response rate was higher. Sample size was a significant moderator for sexual abuse and physical neglect. Studies with smaller samples reported higher prevalence rates.

### *Moderation Effects of Measurement Characteristics*

The validation of the instrument was a significant moderator for physical neglect. Higher prevalence rates of physical neglect were reported when the instrument was validated. The definition of abuse was a significant moderator for sexual abuse as reported by girls and for physical abuse. Higher rates of abuse were reported when a broader definition was used than when a stricter definition was used. The type of instrument was a significant moderator for

**‘Significant moderator effects were found for all the methodological characteristics tested’**

**‘The type of sample was a significant moderator for physical and emotional abuse’**

**‘Higher prevalence rates of physical neglect were reported when the instrument was validated’**

**Table 2.** Overview of methodological moderators for all types of child maltreatment

	Direction of effect <sup>a</sup>	Sexual abuse		Physical abuse	Emotional abuse	Physical neglect	Emotional neglect
		girls	boys				
		$\bar{Q}$ / z	$\bar{Q}$ / z	$\bar{Q}$ / z	$\bar{Q}$ / z	$\bar{Q}$ / z	$\bar{Q}$ / z
<i>Participant characteristics</i>							
Economic development	Low resource > high	0.89	7.02**	0.84	0.98		
Respondent	Adult > child	0.30	6.84*	11.60**	1.56		
<i>Sampling method</i>							
Type of sample <sup>b</sup>	College > other	4.10	21.93**	27.57**	16.15**		
Sampling procedure	Convenience > random	1.93	12.31**	3.37	7.80*	22.55**	2.42
Response rate	Higher > lower	6.40*	10.09**	1.05	3.73**	61.18**	35.90**
Sample size	Smaller > larger	25.50**	12.35**	-0.56	-1.12	50.01**	0.79
<i>Measurement characteristics</i>							
Instrument validated	Yes > no	0.07	1.82	3.23	2.32	50.01**	0.67
Definition	Broader > stricter	8.72**	2.57	17.24**	0.13		
Type of instrument <sup>c</sup>		10.52*	3.75	5.66	2.38		
Number of questions	More > fewer	30.11**	5.95	7.73**	1.57	19.19**	10.94**
							2.10

\* $p < 0.05$   
 \*\* $p < 0.01$ .

Statistics presented are contrast  $\bar{Q}$ -statistics for categorical variables and z-statistics for continuous variables analysed with meta-regression; for categorical variables, subgroups with  $k < 4$  were excluded from contrasts. Shaded data indicate significant moderator effects; blank cells indicate that the influence of the moderator was not tested for a specific type of abuse.

<sup>a</sup>Same direction for all maltreatment types for which the moderator was significant.

<sup>b</sup>In the original publication on the prevalence of sexual abuse, the results of moderator analyses with the type of sample were not reported.

<sup>c</sup>Direction of effect of the type of instrument for girls' sexual abuse: paper-and-pencil questionnaires > face-to-face or phone interviews > computer questionnaires. Direction of effect of the type of instrument for emotional neglect: interviews > questionnaires.

sexual abuse as reported by girls and emotional neglect. Prevalence rates of sexual abuse for girls were highest when paper-and-pencil questionnaires were used, lowest for computer questionnaires and intermediate with face-to-face or telephone interviews. For emotional neglect, higher prevalence rates were reported when interviews were used as compared to questionnaires. The number of questions was a significant moderator for sexual abuse as reported by girls, physical abuse and physical neglect. Higher prevalence rates were reported when the instrument included more questions.

### *Best-Evidence Synthesis*

Four studies on the lifetime prevalence of child sexual abuse and two on the lifetime prevalence of child physical abuse met our best-evidence criteria. Three of the studies on sexual abuse prevalence provided separate reports for female samples. Furthermore, six studies on the lifetime prevalence of child emotional abuse and three on the lifetime prevalence of child emotional neglect met our somewhat more lenient best-evidence criteria for these types of abuse. Characteristics of the studies included in our best-evidence synthesis are provided in Table 3. Results of this best-evidence synthesis are presented in Table 4. The best-evidence prevalence rates of 21.6 per cent for physical abuse and 34.0 per cent for emotional abuse were both within the confidence intervals around the point estimate for the total set of studies (Stoltenborgh *et al.*, 2012, 2013a). However, the best-evidence prevalence rates of 9.8 per cent for sexual abuse overall and 13.8 per cent for sexual abuse among females was below the lower limit of the confidence intervals of the total set of studies (Stoltenborgh *et al.*, 2011), and the best-evidence prevalence rate of 26.1 per cent for emotional neglect was higher than the upper limit of the confidence interval around the point estimate for the total set of studies (Stoltenborgh *et al.*, 2013b).

### **Discussion**

Our review of meta-analyses reveals that the prevalence rates of various types of child maltreatment found in different studies are affected by methodological characteristics. The effects of each of the moderators were specific for some types of maltreatment and not for others, and the moderators that affected the prevalence rates were different for each type of maltreatment. In Figure 1, an overview is given of the potential effect of choices made when setting up a study on the prevalence rate.

Higher prevalence rates of sexual abuse are reported by boys in low-resource countries, which are in line with the previous finding that prevalence rates were highest for boys in Africa (Stoltenborgh *et al.*, 2011). Economic hardship in low-resource countries can cause stress, which in turn increases the likelihood of maltreatment (Stith *et al.*, 2009). Also, poverty can increase the chance that children engage in commercial sex (Lalor, 2004). Adult male respondents reported higher sexual abuse rates than child male respondents, which might be explained by later disclosure of male victims of sexual abuse compared to that of female victims, probably because males find it more difficult to talk about these issues (O'Leary and Barber, 2008). The higher physical abuse rates

**'Four studies on the lifetime prevalence of child sexual abuse met our best-evidence criteria'**

**'Prevalence rates of various types of child maltreatment found in different studies are affected by methodological characteristics'**

**'Adult male respondents reported higher sexual abuse rates than child male respondents'**

Table 3. Characteristics of studies included in best-evidence synthesis

	Prevalence rate	Sample size <sup>a</sup>	Sampling procedure	Response rate <sup>b</sup>	Instrument validated
<i>Sexual abuse<sup>c</sup></i>					
Ackard and Neumark-Sztainer (2002)	12.5%	40 020	Random	97%	Yes
Akyuz et al. (2005)	2.5%	628	Modified	89%	Yes
Lodico et al. (1996)			Random	95%	Yes
– black female	23.4%	175			
– black male	9.8%	265			
– native American female	27.5%	229			
– native American male	8.3%	265			
– white female	15.1%	2582			
– white male	3.2%	2708			
Sachs-Eriessson et al. (2005)	6.7%	5877	Random	99%	Yes
<i>Physical abuse</i>					
Ackard and Neumark-Sztainer (2002)	13.1%	40 020	Random	97%	Yes
Madu (2001) (female sample only)	26.6%	321	Modified	99%	Yes
<i>Emotional abuse<sup>d</sup></i>					
Akyuz et al. (2005)	21.5%	628	Modified	89%	Yes
Khamis (2000)	16.4%	1000	Modified	99%	No
Madu (2001) (female sample only)	69.6%	321	Modified	99%	Yes
Madu (2003)	26.9%	722	Convenience	99%	Yes
Meston et al. (1999) (non-Asian female only)	70.0%	391	Convenience	100%	Yes
Scher et al. (2004)			Random	71%	Yes
– female	14.3%	618			
– male	9.6%	349			
<i>Emotional neglect<sup>d</sup></i>					
Fergusson and Horwood (1998)			Random	81%	No
– female	40.0%	515			
– male	40.0%	504			
Stephenson et al. (2006)	80.1%	1240	Random	89%	No
Scher et al. (2004)			Random	71%	Yes
– female	5.3%	618			
– male	4.9%	349			

<sup>a</sup> Based on power analyses, the minimal sample size was 160 for sexual abuse, 224 for physical abuse, 301 for emotional abuse, 210 for physical neglect and 231 for emotional neglect.

<sup>b</sup> The upper quartile of the response rate started at 89% for sexual abuse, 90% for physical abuse, 95% for emotional abuse, 89% for physical neglect and 81% for emotional neglect.

<sup>c</sup> The studies of Ackard and Neumark-Sztainer (2002) and Akyuz et al. (2005) and three female subsamples from the study of Lodico et al. (1996) were included in the best-evidence synthesis of sexual abuse among females.

<sup>d</sup> More lenient criteria for emotional abuse and neglect were used to enable a set of studies to be included in the best-evidence synthesis.

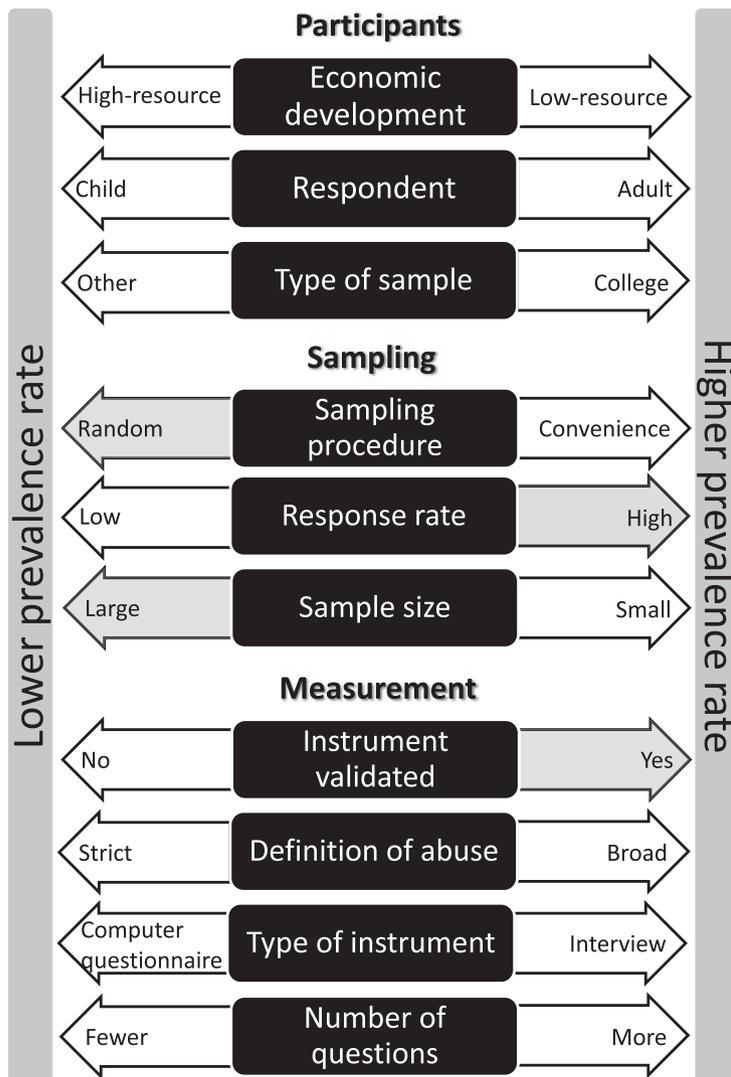
**Table 4.** Results of the best-evidence synthesis per type of maltreatment

	Best-evidence synthesis		Overall meta-analyses <sup>a</sup>	
	Best evidence based on <sup>b</sup>	Prevalence rate	Prevalence rate	95% CI <sup>c</sup>
Sexual abuse	4 criteria	9.8%	11.8%	10.0–13.8
Sexual abuse among females	4 criteria	13.8%	18.0%	16.4–19.7
Physical abuse	4 criteria	21.6%	17.7%	13.0–23.6
Emotional abuse	3 out of 4 criteria	34.0%	26.7%	14.4–44.2
Emotional neglect	3 out of 4 criteria	26.1%	18.4%	13.0–25.4

<sup>a</sup> Stoltenborgh *et al.* (2011, 2012, 2013a, 2013b).

<sup>b</sup> Best-evidence criteria: random sample, validated instrument, response rate in the upper quartile and large enough sample size based on power analysis.

<sup>c</sup> CI = Confidence interval.



*Note.* Arrows with a grey shade indicate a more optimal methodology

**Figure 1.** Overview of the effect of choices in study design on the prevalence rate.

**'The direction of moderating effects varied across the indicators of methodological quality'**

of adult respondents compared to those of children might be explained by the fact that adults report about a longer period of time.

The higher prevalence rates of boys' sexual abuse, and physical abuse and emotional abuse in studies with college samples as compared to other samples are contrary to our expectations. Our expectations were based on the expected psychological health of the sample and their insight into the goals of the study. However, it might not be these factors but rather their willingness for disclosure which makes them distinct from the other samples and results in higher prevalence rates. The topic of their studies might also affect students' reports. However, many of the studies that used college samples did not report about the type of programme that the students were enrolled in, so the effect of this variable could not be tested.

The direction of moderating effects varied across the indicators of methodological quality. The moderating effects of sampling procedure and sample size both indicate that studies which are methodologically more sound (randomised samples and larger sample size) yield lower prevalence rates. By contrast, we found opposite effects for two other indicators of methodological quality, a high response rate and validation of the instrument. A high response rate indicates a more reliable reflection of the population, and validated instruments are expected to extract more reliable estimates of prevalence rates. Higher response rates were related to higher prevalence rates for all maltreatment types except physical abuse. This might be explained by a higher chance of including maltreatment victims when more effort is put into recruiting potential respondents who are more difficult to reach. The validation of the instrument was a significant moderator for physical neglect, with higher prevalence rates reported on validated instruments. This implies that the actual prevalence rate of physical neglect is higher than studies using non-validated instruments indicate. Results regarding the effect of methodological quality do not all point in the same direction, as can also be seen in Figure 1. Whether the rates found can be expected to be an over- or underestimation of the actual lifetime prevalence depends on the specific indicator of methodological quality. The results of our best-evidence synthesis, in which methodological quality was determined based on four indicators simultaneously, do not give a clear indication of the direction of the effect of methodological quality on prevalence rates either. For those types of maltreatment for which the prevalence rates found in best-evidence synthesis were outside the confidence intervals of the overall meta-analyses, a lower lifetime prevalence of child sexual abuse overall and among females and a higher prevalence of child emotional neglect were found with best-evidence studies.

**'The definition of abuse influenced the prevalence rates of girls' but not boys' sexual abuse'**

The definition of abuse influenced the prevalence rates of girls' but not boys' sexual abuse. It might be that the types of sexual abuse that boys are more likely to become a victim are included in the narrower definition as well, whereas girls can be victims of a broader range of sexually abusive behaviours. This idea is also in line with the finding that girls report higher prevalence rates when more questions are used, whereas for boys the number of questions did not make a difference. The abuse definition also moderated the prevalence rates of physical abuse, but not emotional abuse. It is possible that verbal abuse, which was the indicator in most of the narrow definitions for emotional abuse, always occurs and other less common forms of emotional abuse co-occur with verbal abuse. The finding that the number of questions was not a significant

moderator for emotional abuse further supports this idea. Lower prevalence rates of girls' sexual abuse were found when computerised questionnaires were used compared to interviews or paper-and-pencil questionnaires, and for emotional neglect when questionnaires were used compared to interviews. Girls may be less likely to report abuse experiences when the instrument format feels more anonymous. Still, these findings are somewhat puzzling and not in line with the absence of differences based on instrument types found in a previous study on the use of different assessment modes in research on child sexual and physical abuse (DiLillo *et al.*, 2006). Despite the absence of differences in prevalence rates, this previous study did find differences in preferences. Computerised questionnaires were the most preferred format and participants who disclosed their abusive experiences in an interview indicated that they would have preferred another format. Future research is necessary to look into differences in the preferences of instrument types for different maltreatment categories and their effect on prevalence rates.

An important limitation of this review is the lack of power to look into the combined effects of methodological characteristics, for example, large samples from high-resource countries or randomised samples with a high response rate. However, in our best-evidence synthesis, we simultaneously took into account at least three indicators of methodological quality. By doing so, we provide an indication of the combined effect of at least some of the moderators that we tested.

Although previous research has shown that comorbidity of different types of maltreatment is common (e.g. Euser *et al.*, 2013), only very few studies included in the previous meta-analyses studied the lifetime prevalence of all types of child maltreatment simultaneously (Stoltenborgh *et al.*, 2015). Overlap in prevalence rates can therefore not be distinguished in our current overview, which is a limitation of this review. The topic of comorbidity deserves more attention in future prevalence studies. In addition, participants' understanding of the definition used in the measurement instrument is an aspect that is hardly ever measured. Future studies should pay attention to this aspect to ensure valid measurement of abuse prevalence rates.

Three of the moderator variables – sample size, response rate and number of questions – were tested as continuous variables in meta-regression analyses for physical and emotional abuse and tested as categorical variables for sexual abuse and neglect. Because of these analytical differences the moderator effects of these variables are less easy to compare between types of abuse. Still, the significant effects of these moderator variables all point in the same direction, independent of whether categorical or continuous variables were used.

### *Future Directions*

The overview of moderator effects found in various meta-analyses on the lifetime prevalence of child maltreatment shows that the wide range of prevalence rates reported in previous studies can partly be explained by differences in study characteristics. Most of these characteristics are under the control of researchers and findings regarding their effects on study outcomes can therefore provide improvement points for the design of future studies. The most reliable reports of the lifetime prevalence of child maltreatment can be collected in a study with a sound methodology, i.e. a study

**‘Girls may be less likely to report abuse experiences when the instrument format feels more anonymous’**

**‘In our best-evidence synthesis, we simultaneously took into account at least three indicators of methodological quality’**

**‘Comorbidity deserves more attention in future prevalence studies’**

**‘The wide range of prevalence rates reported in previous studies can partly be explained by differences in study characteristics’**

**'Knowing which factors influence the results of prevalence studies can help us to get as close to the actual lifetime prevalence as possible'**

with a large randomised sample in which a validated instrument is used and of which the response rate indicates that it provides a true reflection of the population. To enable comparisons of the lifetime prevalence of child maltreatment around the world, the use of the same definition operationalised in a specific and validated way is advisable.

### Conclusion

The prevalence rates of child maltreatment are affected by methodological study characteristics. These features should be optimised in designs for future studies on the lifetime prevalence of child maltreatment. In addition, these moderators should be kept in mind in the interpretation of results of prevalence studies. The true lifetime prevalence of child maltreatment is hard to estimate, and perhaps impossible to measure, but knowing which factors influence the results of prevalence studies can help us to get as close to the actual lifetime prevalence as possible.

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