CAMBRIDGE
UNIVERSITY PRESS

Regular Article

The effect of relationship-based interventions for maltreated children and adolescents: a systematic review and meta-analysis

Hans Bugge Bergsund[1,4] (iD), Filip Drozd[1], Kåre S. Olafsen[2], Karianne Hammerstrøm Nilsen[3], Siv Linnerud[5], John Kjøbli[2] and Heidi Jacobsen[1]

[1]Section for Infants and Young Children, Regional Center for Child and Adolescent Mental Health, Eastern and Southern Norway (RBUP), Oslo, Norway, [2]Section for Prevention and Treatment Research, Regional Center for Child and Adolescent Mental Health, Eastern and Southern Norway (RBUP), Oslo, Norway, [3]Regional Center for Child and Adolescent Mental Health, Eastern and Southern Norway (RBUP), Oslo, Norway, [4]Department of Psychology, University of Oslo, Oslo, Norway and [5]Oslo Metropolitan University, Oslo, Norway

Abstract

Child maltreatment is characterized by a harmful relational environment which can have negative cascading consequences for the child's development. Relationship-based interventions may improve maltreated children's functioning by addressing key aspects of the parent-child relationship at various stages of development. The objective of the current study was to perform a systematic review on relationship-based interventions for maltreated children and a meta-analysis on the impact of these interventions on observed parent-child relational behavior. Data collection consisted of a comprehensive literature search in six databases and contacting experts in the field and hand searching relevant publications. In total, 5,802 abstracts were screened, of which 81 relevant publications were identified, representing 4,526 participants. The meta-analysis found large improvements in observed parent interactive behavior ($g = 0.888$), smaller improvements in child attachment ($g = 0.403$) and child interactive behavior ($g = 0.274$). The effect on parent interactive behavior was larger in interventions addressing middle childhood. Risk of bias assessments showed that a large number of studies suffer from poor reporting, which limits the conclusions of the findings. Future research should examine parent-child relationship behavior across multiple developmental stages, as well as the impact of developmentally appropriate intervention elements on maltreated children.

Keywords: child maltreatment; relationship-based interventions; systematic review; meta-analysis

(Received 9 November 2020; revised 27 August 2021; accepted 29 August 2021; First Published online 15 November 2021)

Introduction

Child maltreatment has been defined as acts of commission or omission which lead to harm, the potential for harm or threat of harm to a child (Leeb et al., 2008) and is associated with a range of negative consequences, both physical, mental, social and behavioral in nature (Carr, Duff, & Craddock, 2018). One of the difficulties of treating victims of abuse or neglect is that the perpetrators are often the ones closest to the child. More than 90% of maltreated children are victimized by one or both of their parents (U.S. Department of Health & Human Services, 2019). This harmful relational environment is often characterized by unpredictability, inconsistency and a lack of parental sensitivity (Cerezo, D'Ocon, & Dolz, 1996), which can have important consequences for the child's development.

Certain elements of interaction, like behavioral synchrony, sensitivity, and responsivity, have positive cascading consequences for various developmental domains, like self-regulation, social competence, and compliance (Davis, Bilms, & Suveg, 2017; Kim, Boldt, & Kochanska, 2015; Schueler & Prinz, 2013), as well as for the formation of secure attachment relationships (De Wolff & Van Ijzendoorn, 1997; Lucassen et al., 2011). Longitudinal studies suggest that these core relational qualities are influential throughout childhood. For instance, parental sensitivity for very young children has been found to predict social development over long periods of time (Jaffari-Bimmel et al., 2006), parent–child cooperation may improve moral reasoning for school-age children (Hinnant et al., 2013) and parental warmth can help improve adolescents' emotional regulation (Eisenberg et al., 2005). On the other hand, a parent–child relationship characterized by maltreatment can influence the emergence and maintenance of adjustment difficulties (Morton & Browne, 1998), with earlier exposure to maltreatment being associated with worse outcomes (Kaplow & Widom 2007). Maltreatment is often linked to disorganized attachment (Cyr, Euser et al., 2010; Moran et al., 2008), which, in turn, is linked to a wide range of detrimental outcomes (van IJzendoorn et al., 1999). Hence, interventions that aim to improve the relationship between caregivers and children at various stages of development could have a significant impact on child functioning.

According to the organizational perspective on development (Doyle & Cicchetti, 2017), development is viewed as hierarchically organized with several stage-salient tasks at different stages. It is

assumed that successful resolution of an early task increases the likelihood of successful achievement of subsequent tasks, and that failure to resolve a task may lead to deficits in future development. From this perspective, maltreatment interventions should not only seek to decrease future incidents of maltreatment, but also to enhance components of the parent–child relationship that will facilitate the resolution of these stage-salient tasks among maltreated children (Valentino, 2017). For instance, the formation of a secure attachment relationship is one of the first major issues faced by very young children, and interventions that help parents provide sensitive, responsive care will increase the likelihood that the child resolves this task (Dozier et al., 2002). Later, during middle childhood, the capacity for behavioral control becomes a salient developmental task (e.g. sitting for long periods of time in the classroom). Relationship-based interventions may address parenting practices associated with improvements in child behavior during this period, like emotion coaching (Cunningham, Kliewer, & Garner, 2009) and warmth and support (Eisenberg et al., 2005). When children reach adolescence, a major task is to achieve independence from their caregivers and to develop more intimate relationships with peers (Sroufe, 2013). Relationship-based interventions for adolescents may facilitate healthy functioning by parenting in ways that support this stage-salient task, like supporting autonomy through low psychological control (Oudekerk et al., 2015) and providing emotional support (Boudreault-Bouchard et al., 2013). Intervention during this period is particularly important, as it may be critical in preventing further strengthening of maladaptive interpersonal patterns resulting from childhood maltreatment (Toth et al., 2014).

Relationship-based interventions target ongoing, daily interactions between children and caregivers (Chaffin et al., 2004; Dozier et al., 2006; Lieberman, Van Horn, & Ippen, 2005). By drawing on information about actual moment-to-moment processes and targeting specific aspects of parenting practices that are aimed at optimizing parenting competence, relationship-based interventions are able to enhance maltreated children's mental and motor development (Dubois-Comtois et al., 2017), reduce externalizing and internalizing behavior (Mersky et al., 2016), reduce mental health symptoms of post-traumatic stress disorder (PTSD) and depression (Ghosh Ippen et al., 2011) and promote attachment security, both short term (Moss et al., 2011) and long term (Zajac, Raby, & Dozier, 2019). The effect of relationship-based interventions has been examined in systematic reviews and meta-analyses, often with the conclusion that they are effective in improving attachment security and reducing rates of disorganized attachment (Letourneau et al., 2015; Mountain, Cahill, & Thorpe, 2017) and that relationship-based program components (e.g. positive interactions and emotional communication) when used in parent training programs in general, tend to be associated with a larger effect (Kaminski et al., 2008). However, despite the evidence for the effect of these interventions, few systematic reviews or meta-analyses have looked specifically at their impact on victims of child maltreatment. Several systematic reviews have been conducted on interventions for child maltreatment in general (Mikton & Butchart, 2009). Many of these focus on the *prevention* of child maltreatment (Altafim & Linhares, 2016; Chen & Chan, 2016; Euser et al., 2015) or on *reducing the recurrence* of maltreatment (Gubbels, van der Put, & Assink, 2019; van der Put et al., 2018). Few systematic reviews, however, summarize and explore interventions that deal with the *consequences* of maltreatment, such as problem behavior, mental health, social functioning or quality

of life. One exception is a meta-analysis by Skowron and Reinemann (2005) which examined the effect of psychological interventions on various outcomes of maltreatment like child cognitive processes, behavior, mental health and parent–child interaction. This study found that, at posttest, 71% of children in the intervention groups functioned better than children in the control conditions. Another, more recent review by Macdonald and colleagues (2016) identified 198 studies that assessed the effect of various psychosocial interventions for maltreated children. Interestingly, this included relationship-based interventions, which were found to improve rates of secure attachment and reduce disorganized behavior.

Many of the above-mentioned studies rely on self-report data which may be poorly suited to provide accurate information about the parent–child relationship. Children may lack the appropriate vocabulary to describe their experiences accurately and parents may not be aware of how they interact with their child or how to label the quality of their interaction (Funamoto & Rinaldi, 2015). Observational measures, on the other hand, may be less influenced by informants' communication skills and tendency to respond in socially desirable ways (Lotzin et al., 2015) and tend to be particularly sensitive to change in parent and child behavior following an intervention (Aspland & Gardner, 2003). Several observational measures of parent–child interaction have been found to have sound psychometric properties for a wide range of age groups. These include, among others, the Parent–Child Interaction System (Funamoto & Rinaldi, 2015) for ages ranging from preschool to adolescence; the Emotional Availability Scale (Biringen, et al., 2014) from infancy to early adolescence; and Coding Interactive Behavior (Feldman, 2010) from infancy to adolescence. Additionally, for attachment behavior, there is Ainsworth's Strange Situation Procedure for infants and toddlers (Solomon & George, 2016) and the observer Attachment Q-Sort (Cadman, Diamond, & Fearon, 2018) for toddlers and preschoolers.

Moderating variables

The research literature outlined above suggests that psychosocial interventions for child maltreatment may be effective in improving the lives of victims of maltreatment, as well as preventing future maltreatment outcomes. Nevertheless, their effects are not always similar in direction or magnitude, which means that there might be several factors that affect their impact. Previous meta-analyses on parenting interventions have found child age to be a moderator of treatment effect, some finding that early intervention is more effective (e.g. Chen & Chan, 2016) and others finding that intervening at a later stage is more effective (e.g. Bakermans-Kranenburg, Van Ijzendoorn, & Juffer, 2005; Euser et al., 2015). Moreover, given the assumption of hierarchical organization of development (Valentino, 2017), it seems likely that interventions that promote the resolution of stage-salient developmental tasks would be more suited to enhance the positive developmental trajectories of maltreated children.

In some reviews, study characteristics like sample size and design, have been found to moderate the relationship between intervention exposure and outcome, with smaller sample sizes (Chen & Chan, 2016; Euser et al., 2015; Gubbels et al., 2019) and quasi-experimental design (Gubbels et al., 2019; van der Put et al., 2018) producing larger effect sizes. Moreover, intervention characteristics like number of intervention sessions (Bakermans-Kranenburg, Van IJzendoorn, & Juffer, 2003; Chen & Chan, 2016; Euser et al., 2015), duration in weeks (Euser et al., 2015;

Skowron & Reinemann, 2005; van der Put et al., 2018), and personal contact (Bakermans-Kranenburg et al., 2003) have turned out to be significant moderators.

Aims

Despite the existence of reviews on the effect of interventions for child maltreatment, to the authors' knowledge, only one systematic review has looked specifically at relationship-based programs (Macdonald et al., 2016) and no meta-analysis in the field has looked specifically at the impact on observed parent–child behavior (e.g. as opposed to self-report data). The literature search in Macdonald and colleagues' (2016) review was carried out in 2014, which suggests the need for an updated search and review. Furthermore, few meta-analyses in the field have yet to utilize a multilevel approach to meta-analysis (Assink & Wibbelink, 2016). This method can help increase statistical power substantially by accounting for dependency between effect sizes, an issue that is much harder to overcome in traditional univariate meta-analyses. Hence, the overall objective for this study was to systematically review effect studies on relationship-based interventions for maltreated children. The four main aims were to 1) perform an overall narrative review of all included studies and interventions; 2) assess the risk of bias in these studies and discuss how potential biases could affect interpretation of the outcomes; 3) conduct a quantitative synthesis (i.e. meta-analysis) on the impact of relationship-based interventions on the observed relationship behavior of parents and children; and, 4) given a substantial amount of heterogeneity in the estimated effects, test for the impact of the following moderators: intervention dosage, duration, child age, child presence, as well as sample size and study design. All in all, the review will contribute to the field of child maltreatment and relationship-based interventions by providing recommendations for future program development and research.

Method

Protocol and registration

The review was performed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis statement (Moher et al., 2009). The protocol was registered with PROSPERO (ID CRD42018110194).

Eligibility criteria

Participants

The populations of interest were infants, children and adolescents who had experienced maltreatment. This included children with high likelihood of maltreatment, such as children in foster care. In cases where there was uncertainty regarding maltreatment status, authors were contacted in order to obtain the full details. Studies were eligible if children were between 0 and 17 years and 11 months, as well as young people up to the age of 24 years and 11 months, given that maltreatment had occurred within the age of 0–17 and 11 months. Maltreatment is defined as any act of commission (abuse) or omission (neglect) which leads to harm, the potential for harm or threat of harm to a child. This includes physical abuse, emotional/psychological abuse, sexual abuse and neglect (Leeb et al., 2008).

Interventions

Interventions of interest were relationship-based interventions, meaning interventions that seek to improve the relationship between children and their parents, often through improving participants' interactional competence with the aim of promoting secure child attachment or other related outcomes (Macdonald et al., 2016). This includes interventions aimed at the caregiver, the child or the parent–child dyad. All forms of parental relationships were considered relevant, meaning that both biological parents, foster parents and adoptive parents were included. However, interventions aimed at other relationships (e.g. peers, siblings), without including parents or caregivers were considered ineligible. The core elements of these interventions represent foundational qualities in the parent–child relationship, which involve the key role played by caregiver responsivity – displayed as sensitivity, emotional communication, turn taking, and warmth (Dishion & Stormshak, 2007; Sroufe, 2005). In accordance with a hierarchical integrative and organizational view on development, these attributes are important early in the child's life and continue to have impact on social adaptation through development (Doyle & Cicchetti, 2017; Stack et al., 2012). The fact that these qualities are central across a variety of different programs for a wide age range underlines the importance of having relational interventions available throughout the child's development.

Comparisons

All types of control conditions were included (e.g. treatment as usual (TAU), waitlist and active controls), given the paper had a relevant study design (see below).

Outcomes

According to the Cochrane Handbook Guidelines (O'Connor, Green, Higgins, 2011), outcomes do not tend to be used as criteria for including studies. Consequently, the present review included all studies, irrespective of their outcomes, as long as the other criteria were met. However, due to the focus of this review, only observed behavioral outcomes related to the parent–child relationship were included in the meta-analysis stage.

Study designs

Any controlled study was considered eligible, including randomized controlled trials (RCTs), quasi-randomized trials, quasi-experimental trials and controlled observational studies. The rigid requirements of an RCT can make research on maltreated children challenging, which means that other, less invasive designs might be more suitable in certain cases (e.g. controlled observational studies in situations where active group assignment would not be feasible). Hence, non- or quasi-RCTs were included to cover as much of the literature on the effect of relationship-based interventions as possible.

Exclusion criteria

Studies that did not examine the effect of interventions (e.g. descriptive studies, qualitative studies, acceptability and feasibility studies, economic evaluations, etc.) or did not contain empirical data (e.g. editorials, opinion papers, etc.) were excluded. Moreover, interventions whose primary aim were not to improve parent–child relationships, or were not mainly comprised of relationship components, were excluded. Examples include pharmacological studies, cognitive-behavioral therapies or psychodynamic interventions without a relationship component. Furthermore, interventions directed at the child or parent alone, which could lead to positive outcomes for the parent–child relationship, but were not aimed at the relationship per se, were excluded. No outcomes were excluded at the screening stage (see Outcomes above), but all non-observational or non-relational behavioral outcomes (e.g. self-report

of child depressive symptoms) were excluded from the meta-analysis.

Search strategy and data collection

A comprehensive search strategy was developed in collaboration between two of the authors (HBB and KTH) and a research librarian (SB) to identify all studies relevant to our research question. The search strategy by Macdonald et al. (2016) served as a point of departure for the development of the present strategy, with some modifications to widen the scope on maltreatment terms (e.g. adding "adop*" as a search term) and narrow the scope to relationship-based interventions (e.g. adding "relational*" and "interaction*"). The following databases were searched from their date of inception to the dates the search was conducted, November 15th and 16th in 2018, and included the following databases: (1) PsycINFO (OVID), (2) MEDLINE(R) (OVID), (3) Cochrane Library (Wiley), (4) Web of Science (Clarivate) and (5) PTSDpubs (ProQuest). Additionally, OpenGrey was searched manually, but no relevant publications were found. We included any grey literature (e.g. in PsycINFO) to minimize the presence of publication bias.

The search consisted of core terms describing: (1) relationship-based interventions, (2) maltreatment and (3) children; as well as synonyms for these terms. The search strings were adapted to each database as necessary, according to individual database descriptors and indexing. A simplified version of the search string for PsycINFO looked like this: **TOPIC:** (maltreat* OR abuse OR neglect* OR foster care OR child protective service*) AND **TOPIC:** (relationship* OR relational*) *adj10* (intervention* OR treatment* OR training*) AND **TOPIC**: (child* OR adolescen* OR infant*). See Supplementary Appendix 1 for the complete search strategies.

Other sources of data

The first author manually browsed through relevant systematic reviews and meta-analyses, as well as reference lists of included studies, for additional studies that were not identified in the literature search. Researchers, authors, and experts in the field were also contacted for advice on further studies that should be considered for this review.

Study selection

All references were imported into Covidence (www.covidence.org), an online program for systematic review management. All titles and abstracts were screened by two reviewers independently and disagreements were resolved through discussion until consensus was reached. Full-text publications of potentially relevant studies were obtained and reviewed in the same way in the second stage of the selection process. Subsequently, all publications were carefully examined to determine whether they belonged to the same study. Reviewers checked trial identification numbers, made cross-comparisons of sample sizes and contacted authors in order to avoid study duplication.

Despite the definition of a relationship-based intervention outlined in the criteria above, no general agreed-upon definition exists in the literature. Moreover, many papers are not explicit in their descriptions of the intervention they assess. Therefore, to avoid losing potentially relevant interventions, all studies that included some form of relationship-based focus were initially included. This meant that some interventions which were not primarily relationship-based were also included during the first two stages of the review process. For this reason, three experienced reviewers (HBB,

FD, and HJ) examined the descriptions of each included intervention independently. If the paper's description of the intervention was insufficient, attempts were made to find the original publication in which the intervention was outlined. The reviewers then decided on whether the intervention was eligible for inclusion, based on whether the aim of the intervention was primarily to improve the parent–child relationship and whether a major part of the intervention content consisted of relationship-related constructs (e.g. responsiveness, cooperation, etc.). Disagreements between reviewers were resolved through discussion.

Data extraction

A data extraction form was developed by the first author. The form was piloted on eight randomly selected studies and adapted, based on the feedback from reviewers who piloted the form, before it was utilized on the review data. The following data was extracted from each study: author, publication year, country, study design, characteristics of the participants (i.e. type of maltreatment, age, gender), intervention information (i.e. name, staff, setting, number of sessions, duration), sample size, outcome measure, informant, means, standard deviations, and effect sizes. In cases where data were missing or insufficiently reported, authors were contacted for further information.

Risk of bias

The Cochrane Handbook's Risk of Bias Tool was used to assess risk of bias in the included studies (Higgins, Altman, & Sterne, 2011). Bias is a systematic error that may lead to misleading conclusions; that is, lead to an over- or underestimation of a true intervention effect. The seven items covered in this tool are 1) random sequence generation, 2) allocation concealment, 3) blinding of participants and personnel, 4) blinding of outcome assessment, 5) incomplete outcome data, 6) selective reporting and 7) other sources of bias. Each item was rated as either "low", "high" or "unclear risk". The assessment was completed independently by two reviewers and disagreements were resolved through discussion, in accordance with the Cochrane guidelines (Higgins et al., 2011).

Additionally, risk of bias due to non-reporting (Page, Higgins, & Sterne, 2019) was addressed through the inclusion of gray literature in the review. The presence of unpublished literature was considered for its overall impact on the study selection, as well as how it affected the subsequent meta-analyses.

Statistical analysis

Data on observed parent–child relationship behavior were pooled using a random-effects model. Many studies reported findings on multiple measures within the same domain, generating more than one effect size per study. In order to include all effect sizes without violating the assumption of independency between effect size, a multilevel approach was adopted, utilizing a Restricted Maximum Likelihood estimation method in the *metafor* package in R (Assink & Wibbelink, 2016; Viechtbauer, 2010). When studies contained more than one intervention arm (e.g. a three-armed RCT), outcome data from the two treatment arms were averaged, based on the recommendations of the Cochrane Handbook (Higgins, Li, & Deeks, 2019). When more than one comparator arm existed per study, the active comparator was preferred over the passive (e.g. active control intervention over waitlist). In a few cases, relevant measures existed, but with insufficient data to calculate their effect size (e.g. no standard deviation). In all
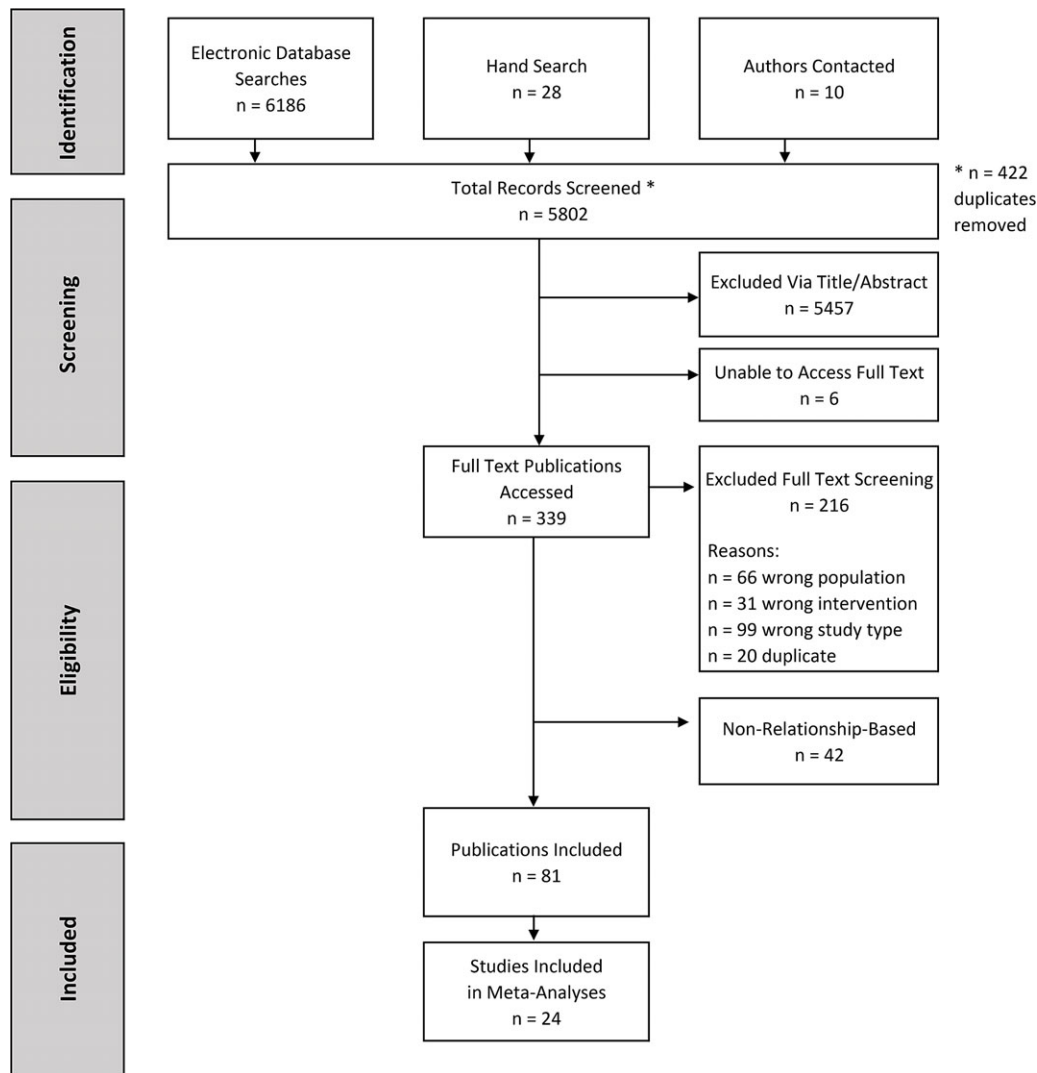
Figure 1. Flowchart for the inclusion of articles.

these cases, authors were contacted and asked to provide the missing data.

All continuous effect estimates for observed parent and child behavior were calculated using Hedges' *g*, a measure of effect size similar to Cohen's *d*, but with a correction which makes it more precise when dealing with small sample sizes (Borenstein et al., 2009). When interpreting effect sizes, Cohen's benchmarks for 0.2 (small), 0.5 (medium), and 0.8 (large) were applied (Cohen, 1988). For analysis of categorical effect estimates, the *esc* package in R (Lüdecke, 2019) was used to convert estimates into Hedges'*g*.

Publication bias was not tested in the current paper. Most tests for examining publication bias, such as funnel plots, Egger's test and trim-and-fill, are based on the assumption of independent effect sizes. Since a multilevel approach was applied here, in which more than one effect size from each was utilized, this assumption would have been violated.

Heterogeneity

Subgroup analyses were carried out when the model demonstrated substantial heterogeneity. Cochran's Q-test was used to test for heterogeneity for models without moderators, whereas the Q_E-test was used when moderators were included. Hunter and Schmidt's (1990) '75% rule' was followed, in which heterogeneity is considered substantial if under 75% of the total variance can be attributed to sampling variance. Based on what has been found previously in the literature, the variables expected to moderate the effect estimate were intervention dosage (i.e. number of sessions), duration (i.e. number of weeks), child's presence in the intervention and the age of the children included in the intervention. Child age was both assessed continuously (i.e. mean age in months) and categorically in terms of what developmental stages were covered by each intervention (infant, toddler, preschool, middle childhood, and adolescence). Additionally, the included studies' sample size and design were also considered as potential moderators. Based on comments from reviewers, additional variables were included, namely intervention type, caregiver type (birth vs. non-birth parent), risk of bias, and publication type (dissertation vs. journal article).

Results

Study selection

The literature search retrieved 6,186 potentially relevant references (see Figure 1). Hand-search of reference lists, journals and contact with authors of the included studies rendered 38 references in total. After removing duplicates, 5,802 unique references remained.

A total of 5,457 references were excluded from the screening of titles and abstracts. After reviewing the remaining 339 full-text papers, 81 relevant publications were included (see Supplementary Table 1 in Appendix 2 for an overview of all publications and their respective studies). These publications represented 42 individual studies on different interventions (see Table 2) and are summarized in the subsections below. Twenty-four of these studies contained observational data on parent–child relationship and were included in the meta-analyses. Some of the studies in the present review did not contain sufficient information to be included in the meta-analyses, either due to lack of relevant outcome measures (e.g. only questionnaires and no observational measures used) or due to insufficient data available for a meta-analysis to be conducted (e.g. observational measures used, but no means were available). Of all the outcome measures that were collected, there were 27 studies (93.1%) that used parent measures, 13 that used child measures (44.8%) and three that used dyadic measures (10.3%).

Study characteristics

Characteristics of the included studies, including maltreatment category, age of the included children and their gender, are presented in Table 1. Most studies were conducted in the U.S. ($N = 29$, 69.0%), while the others were conducted in the Netherlands, the U.K., Italy, Australia, Denmark, Canada, and Israel. Nineteen studies (45.2%) were conducted on children whose maltreatment status was confirmed (e.g. through Child Protective Service (CPS) case records or court documents). However, remaining studies ($N = 23$, 54.8%) were conducted on populations in which maltreatment was less certain, such as adopted children; children in foster care; or children whose maltreatment status was alleged, but not confirmed (e.g. parents with an open case for maltreatment in the CPS). Caregivers in the different studies included birth parents ($N = 22$, 52.4%); non-birth parents, like foster caregivers or adoptive parents ($N = 17$, 40.5%); and some studies that combined these groups ($N = 3$, 7.1%). The mean age of children at baseline ranged from 6 to 136 months between studies, with an overall mean of 54 months (i.e. 4.5 years). The lowest age reported in a study was 0 months and the highest was 194 months (i.e. 16.2 years). The distribution of gender ranged from 26% to 79% girls, with an average of 48%.

Research design

The majority of studies were RCTs ($N = 35$, 83.3%; see Table 1), while a few were non-randomized trials ($N = 3$, 7.1%), quasi-randomized trials ($N = 2$, 4.8%) and controlled observational trials ($N = 2$, 4.8%). There were various control conditions, with TAU ($N = 16$, 36.4%) and active control conditions ($N = 16$, 36.4%) being the most common, followed by waitlist controls ($N = 11$, 25.0%) and not reported ($N = 1$, 2.3%). Sample sizes ranged from 12 to 497 participants, with an average of 107.8 ($SD = 99.9$) per study.

Intervention characteristics

There were 20 different interventions in total, of which 8 were tested in multiple studies (i.e. Parent–Child Interaction Therapy (PCIT), Attachment and Biobehavioral Catch-up (ABC), Video-Feedback Intervention to Promote Positive Parenting (VIPP), Filial Therapy (FT), Child–Parent Psychotherapy (CPP), Promoting First Relationships (PFR), Trust-Based Relational Intervention (TBRI) and Child Parent Relationship Therapy (CPRT)). The ages covered ranged from infancy to teenage years, with preschool age

being the most common (covered by 16 interventions) and adolescence being the least common (covered by three interventions). Most interventions were home based ($N = 17$, 40.5%), although many were also conducted in service agencies ($N = 16$, 38.1%, e.g. mental health service, child welfare office, etc.). Multiple locations in Table 2 include interventions that were not consistently implemented in the same setting (e.g. some participants received the intervention at a community clinic, at church and others at home). The length of each intervention varied a great deal, with Pre-VIPP being the shortest at about 3 hours (i.e. 1 hour over 3 sessions), followed by Reminiscing and Emotion Training and Family Intervention for Improving Occupational Performance at about 4 hours (i.e. 1 hour over 4 sessions and 0.5 hours over 8 sessions, respectively). The most comprehensive interventions were CPP and Dyadic Developmental Psychotherapy (DDP) (i.e. CPP about 32 one hour-long sessions and DDP 23 two hour-long sessions). The average length of a session was 1.9 hours ($SD = 1.7$) and the average number of sessions per intervention was 11.3 ($SD = 7.3$). Overall, interventions lasted on average 14.4 weeks ($SD = 13.0$), ranging from 0.6 to 50.6 weeks.

Risk of Bias

Figure 2 provides a summary of the risk of bias domains on all included studies. Overall, less than 50% of studies adequately reported allocation concealment ($N = 3$, 9.5%), blinding of participants and personnel ($N = 7$, 16.7%), and generation of randomization sequence ($N = 7$, 16.7%). Blinding of outcome assessments was divided into two categories: observational measures and questionnaires. These were generally characterized by low risk of bias, with a few exceptions. Some studies did not utilize observational measures and, hence, are displayed as 'Not applicable'. Selective outcome reporting and incomplete outcome data was often difficult to evaluate due to poor reporting of relevant information (e.g. protocol registration number not reported), but the majority were determined to be low risk of bias in this domain. Overall, the study pool was somewhere between unclear to low risk of bias, though with some high risk of bias in all domains (except from blinding of outcome assessors for observational measures).

Figure 3 displays the assessments for the studies that were used in the meta-analyses and Figure 4 displays the assessments for the remaining studies in the review that were not in the meta-analyses. There were some differences between these two groups, most notably in the sense that there was a larger proportion of high and unclear risk of bias in the studies that were not in the meta-analysis, more specifically in terms of unclear risk of bias for sequence generation ($N = 14$, 73.7% compared to $N = 9$, 39.1%), high risk of bias for blinding of participants and personnel ($N = 5$, 26.3% compared to $N = 2$, 8.7%), and unclear risk of bias for incomplete outcome data ($N = 8$, 42.1% compared to $N = 4$, 17.4%).

Out of the 81 included publications, 65 were journal articles (80.2%), 15 were dissertations (18.5%) and one was a book chapter (1.2%). Nine of the dissertations contained relevant data for the meta-analyses, of which seven were included in the analysis of observed parent behavior at posttest and two for the analysis of observed child behavior at posttest. All other data used in the meta-analyses were drawn from journal articles.

Meta-analysis

Data on observed parent–child relationship behavior were divided into three categories: parent interactive behavior, child attachment, and child interactive behavior. Data on parent interactive behavior were available from 21 studies at posttest, generating 57 effect sizes,

Table 1. Included studies, interventions, design characteristics and population data

First Author[a]	Year	N	Intervention	Control Group	Design	Country	Maltreatment Category	% Girls	Child Age[d]	Mean Age (Years)	Caregiver
Abrahamse	2016	45	PCIT	Active	RCT	The Netherlands	Maltreatment[b]	42	32–102 (68)	5.7	Birth
Barone	2018	84	VIPP-FC/A	Active	RCT	Italy	Adoption	47	17–75 (43)	3.6	Non-birth
Becker-Weidman	2006	64	DDP	TAU	COT	USA	Maltreatment[b]	41	64–194 (126)	10.5	Non-birth
Bernard	2012	260	ABC	Active	RCT	USA	CPS	42	2–21 (10)	NA	Birth
Carnes-Holt	2010	72	CPRT	Waitlist	RCT	USA	Adoption	NA	24–120 (68)	5.7	Non-birth
Casonato	2017	12	VIPP-SD	Active	RCT	Italy	Maltreatment[b]	67	10–36 (20)	1.7	Birth
Chaffin	2004	110	PCIT + PCIT-E	TAU	RCT	USA	Maltreatment[b]	NA	48–144 (NA)	NA	Birth
Chaffin	2009	153	PCIT	Active	RCT	USA	Maltreatment[c]	NA	30–144 (NA)	NA	Birth
Cicchetti	2006	102	CPP	TAU + Active	RCT	USA	Maltreatment[b]	56	NA–NA (13)	1.1	
Cohen	2004	229	CCT	Active	RCT	USA	Maltreatment[b]	79	96–179 (129)	10.8	Combined
Costas	1999	31	FT	Waitlist	QRCT	USA	Maltreatment[b]	68	48–120 (NA)	NA	Combined
Danko	2014	28	CDI + PCIT	Waitlist	RCT	USA	Foster care	26	25–68 (43)	3.6	Non-birth
Dozier	2006	96	ABC	Active	RCT	USA	Foster care	48	1–22 (10)	NA	Non-birth
Foley	2010	49	PCIT-G	TAU	NRCT	USA	Maltreatment[b]	34	12–144 (77)	6.4	Birth
Haight	2005	20	ESC	Not reported	RCT	USA	Maltreatment[c]	45	24–72 (36)	3.0	Birth
Jacobsen	2014	19	DMT	TAU	RCT	Denmark	Maltreatment[b]	57	60–144 (91)	7.6	Birth
Juffer	1997	60	Pre-VIPP	TAU	QRCT	The Netherlands	Adoption	51	5–12 (NA)	NA	Non-birth
Juffer	2005	100	Pre-VIPP	TAU	RCT	The Netherlands	Adoption	49	6–9 (NA)	NA	Non-birth
Lieberman	2005	75	CPP	Active	RCT	USA	Maltreatment[c]	44	36–72 (48)	4.0	Birth
Lind	2017	121	ABC-T	Active	RCT	USA	Foster care	49	24–36 (NA)	NA	Non-birth
Mersky	2015	155	PCIT-B + PCIT-EX	Waitlist	RCT	USA	Maltreatment[b]	56	24–84 (55)	4.6	Non-birth
Messer	2018	31	CARE	TAU	RCT	USA	Foster care	42	NA–NA (80)	6.7	Non-birth
Minnis	2001	182	CWC	TAU	RCT	UK	Maltreatment[c]	43	NA–NA (136)	11.3	Non-birth
Moss	2011	79	AVI	TAU	RCT	Canada	Maltreatment[b]	49	1–30 (18)	1.5	Birth
Opiola	2016	50	CPRT	TAU	RCT	USA	Maltreatment[c]	49	24–108 (NA)	NA	Non-birth
Oxford	2016	247	PFR	Active	RCT	USA	Maltreatment[c]	46	10–24 (28)	2.3	Birth
Paradis	2013	497	BHC (CPP)	TAU	RCT	USA	Maltreatment[b]	48	1–26 (6)	NA	Birth
Purvis	2015	287	TBRI	Waitlist	RCT	USA	Maltreatment[c]	38	60–144 (95)	7.9	Non-birth
Razuri	2016	304	TBRI	Waitlist	RCT	USA	Maltreatment[c]	50	60–144 (NA)	NA	Non-birth
Smith	2003	21	FT	TAU + Active	COT	USA	Maltreatment[b]	53	48–120 (75)	6.3	Birth
Smith	2015	115	DART	Active	NRCT	UK	Maltreatment[c]	NA	NA–NA (NA)	NA	Birth
Spieker	2012	211	PFR	Active	RCT	USA	Maltreatment[b]	54	10–25 (17)	1.4	Combined
Sprang	2009	58	ABC	Waitlist	RCT	USA	Maltreatment[b]	NA	NA–NA (42)	3.5	Non-birth
Stevens	2011	15	CDI (PCIT)	Waitlist	RCT	USA	Foster care	50	24–90 (62)	5.1	Non-birth
Terao	1999	34	PCIT	TAU	RCT	USA	Maltreatment[b]	35	24–84 (59)	4.9	Birth
Thomas	2011	78	PCIT-TV	Waitlist	RCT	Australia	Combined	29	27–98 (60)	5.0	Birth
Thomas	2012	152	PCIT	Waitlist	RCT	Australia	Combined	30	NA–NA (55)	4.6	Birth
Toth	2002	64	PPP (CPP)	TAU	RCT	USA	Maltreatment[b]	44	NA–NA (48)	4.0	Birth
Valentino	2013	44	RET	Waitlist	RCT	USA	Maltreatment[b]	55	36–72 (59)	4.9	Birth

(Continued)

Table 1. (*Continued*)

First Author[a]	Year	*N*	Intervention	Control Group	Design	Country	Maltreatment Category	% Girls	Child Age[d]	Mean Age (Years)	Caregiver
Van Andel	2016	123	FFI	TAU	RCT	The Netherlands	Maltreatment[b]	49	NA–NA (19)	1.6	Non-birth
Waldman-Levi	2015	37	FI-OP	Active	NRCT	Israel	Maltreatment[c]	62	13–71 (32)	2.7	Birth
Walker	2002	12	FT	Active	RCT	USA	Maltreatment[c]	NA	0–60 (NA)	NA	Birth

Abbreviations: N = Sample size, NA = Not Applicable/Not Reported, ABC = Attachment and Biobehavioral Catch-up, ABC-T = ABC-Toddlers, AVI = Attachment Video-Feedback Intervention, BHC = Building Healthy Children, CARE = Child Adult Relationship Enhancement, CCT = Child-Centered Therapy, CDI = Child Directed Interaction Training, CPP = Child-Parent Psychotherapy, CPRT = Child Parent Relationship Therapy, CPS = Child Protective Services, CWC = Communicating With Children, DART = Domestic Abuse Recovering Together, DDP = Dyadic Developmental Psychotherapy, DMT = Dyadic Music Therapy, ESC = Emotion Support and Coaching, FFI = Foster Family Intervention, FI-OP = Family Intervention for Improving Occupational Performance, FT = Filial Therapy, PCIT = Parent–Child Interaction Therapy, PCIT-B = Brief-PCIT, PCIT-E = Enhanced-PCIT, PCIT-EX = Extended-PCIT, PCIT-G = Group-PCIT, PCIT-TV = Time Variable-PCIT, PFR = Promoting First Relationships, PPP = Preschooler–Parent Psychotherapy, RET = Reminiscing and Emotion Training, TBRI = Trust-Based Relational Intervention, Pre-VIPP = Video-Feedback Intervention to Promote Positive Parenting, VIPP-FC/A = VIPP-Foster Care/Adoption, VIPP-SD = VIPP-Sensitive Discipline, TAU = Treatment-as-Usual, RCT = Randomized Controlled Trial, COT = Controlled Observational Trial, NRCT = Non-Randomized Controlled Trial, QRCT = Quasi-Randomized Controlled Trial.
[a]First publication's lead author and publication year used as label for each study. See Supplementary Table 1 for all publications.
[b]Confirmed.
[c]Alleged.
[d]Age reported in months. Minimum age – Maximum age (Mean age).

and from 4 studies at follow-up, generating 8 effect sizes. Child data consisted of child attachment (e.g. secure, disorganized) and child interactive behavior (e.g. involvement, engagement). Data on child attachment were available from 8 studies at posttest generating 11 effect sizes, and from 3 studies at follow-up generating 4 effect sizes. Data on observed child interactive behavior were available from 8 studies at posttest, generating 12 effect sizes, and from 3 studies at follow-up generating 5 effect sizes.

Observed parent data

Parent interactive behavior. The overall effect size of relationship-based interventions on observed parent behavior at immediate post-intervention was large ($g = 0.888$, 95% CI [0.545, 1.230], $p < .001$). Behaviors included parental sensitivity, structuring of child behavior, supportive and positive attention, as well as lack of negative behaviors like hostility and intrusiveness. See Table 3 for an overview of all effect sizes. There was significant heterogeneity between effect sizes within ($Q(56) = 286.29$, $p < .001$) and between studies ($p < .001$). The distribution of variances across the three different levels was 9.7% for sampling variability (Level 1), 19.2% within-study variability (Level 2) and 71.2% between-study variability (Level 3). The percentage of sampling variability is clearly below 75% of the total variance (according to the '75% rule', see above), which indicates that there is more variance between effect sizes than what can be expected by chance. This further suggests that there is room for within- and between-study characteristics that may impact on the overall effect.

For follow-up studies, the overall effect size was small and non-significant ($g = 0.214$, 95% CI [−0.218, 0.647], $p = .280$) with significant heterogeneity between effect sizes ($Q(7) = 17.135$, $p = .017$) and nonsignificant between studies ($p = .122$). See Supplementary Table 4 for all follow-up effect sizes. The average follow-up length for the included studies was 12.8 months ($SD = 11.60$ months).

Moderator analyses. Four continuous and twelve categorical variables were examined as potential moderators of the relationship between intervention exposure and observed parent interactive behavior. Study sample size, intervention dosage, duration, and age of the child were the continuous variables, whereas study design, child's presence in the intervention, intervention type (e.g.

ABC, PCIT, VIPP, etc.), caregiver type and publication type were among the categorical variables. In addition, the three risk of bias domains that contained the most inadequate reporting were added: sequence generation, allocation concealment and blinding of participants and personnel (see Figure 1). Four categorical variables were also added to examine the role of different developmental stages: infant (0–1 years), toddler (1–3 years), preschool (3–6 years), and middle childhood (6–12 years). There were no interventions that targeted adolescence (12–18 years) in this data set, hence, it was not considered as a moderator.

The Omnibus-test (see Table 4) showed that few of the potential moderators were significantly related to parent behavior, including sample size ($F(1,55) = 3.042$, $p = .087$), intervention dosage ($F(1,55) = 0.194$, $p = .661$) or duration ($F(1,48) = 0.676$, $p = .415$). Child age, however, was a significant moderator ($F(1,48) = 5.15$, $p = .028$), with a positive regression coefficient of 0.014 (95% CI [0.002, 0.027], $p = .028$), indicating that higher child age was associated with a larger effect on parent behavior. Analyses were also carried out on categorical variables, showing that neither study design ($F(1,55) = 0.582$, $p = .562$), intervention type ($F(10,46) = 1.819$, $p = .084$) nor caregiver type ($F(2,54) = 1.102$, $p = .339$) significantly moderated the overall effect. Moreover, none of the risk of bias domains were significant moderators: sequence generation ($F(2,54) = 0.196$, $p = 0.823$), allocation concealment ($F(2,54) = 0.404$, $p = .670$), and blinding of participants and personnel ($F(2,54) = 0.611$, $p = .547$). Furthermore, three of the categorical variables reflecting child age in developmental stages were nonsignificant: infant ($F(1,55) = 3.536$, $p = .065$), toddler ($F(1,55) = 0.092$, $p = .762$), and preschool ($F(1,55) = 2.422$, $p = .125$). However, middle childhood was a significant moderator ($F(1,55) = 13.668$, $p < .001$), with a positive regression coefficient of 1.006 (95% CI [0.460, 1.551], $p < .001$), suggesting that interventions that addressed middle childhood were associated with a higher level of effect on parent behavior. The child's presence in the intervention also significantly moderated the overall effect ($F(1,55) = 12.262$, $p < .001$), with a regression coefficient of −1.548 (95% CI [−2.433, −0.662], $p < .001$), indicating that the child's presence in the intervention was associated with a reduced effect on parent behavior. Finally, publication type was also a significant moderator ($F(1,55) = 18.074$, $p < .001$), with a positive regression coefficient of 1.145 (95% CI [1.684, 0.605], $p < .001$).

Table 2. Characteristics of the interventions in the included studies

| Intervention | First Author | Year | Setting | Mean Intervention Dosage[a] | | | Staff |
				Sessions	Hours	Duration[b]	
ABC	Bernard	2012	Home	10	1	10	Trained parent coaches
ABC	Dozier	2006	Home	10	1	10	Trained parent coaches
ABC	Sprang	2009	Home	10	NA	10	Mental health professionals with >5 years' experience
ABC-T	Lind	2017	Home	10	1	10	Trained parent coaches
AVI	Moss	2011	Home	8	1.5	8	Interveners with varied academic qualifications
BHC	Paradis	2013	Home	NA	NA	NA	Master's prepared social worker
CARE	Messer	2018	Service Agency	2	3	4.3	NA
CCT	Cohen	2004	Service Agency	10.75	1.5	12	Therapists with diverse professional training
CDI (PCIT)	Stevens	2011	Service Agency	8	1	4	Graduate student trainers who met PCIT standards
CDI + PCIT	Danko	2014	Home	12	1	12.5	Therapists with at least one year of PCIT training
CPP	Lieberman	2005	Service Agency	32.09	1	50	Clinicians with a PhD/master's degree in clinical psychology
CPP	Stronach	2011	Home	21.56	NA	46.4	Master's level therapists
CPRT	Carnes-Holt	2010	Multiple Locations	10	2	10	Therapists with play therapy experience
CPRT	Opiola	2016	Multiple Locations	10	2	10	Facilitators with advanced doctoral level education
CWC	Minnis	2001	NA	3	6	2	Experienced social worker/trainer
DART	Smith	2015	Service Agency	10	NA	10	NA
DDP	Becker-Weidman	2006	Service Agency	23	2	47.39	A therapist
DMT	Jacobsen	2014	Residential Facility	10	NA	10	Trained music therapists
ESC	Haight	2005	Service Agency	NA	NA	NA	One psychiatrist and one PhD candidate
FFI	Van Andel	2016	Home	6	1.5	13	Trained foster care workers
FI-OP	Waldman-Levi	2015	Residential Facility	8	0.5	6.25	Trained therapists with >10 years professional experience
FT	Costas	1999	Multiple Locations	10	2	10	NA
FT	Smith	2003	Residential Facility	12	1.5	2.5	A doctoral candidate with a course in filial therapy
FT	Walker	2002	Service Agency	8	1.5	8	A researcher with PhD/mental health background
PCIT	Abrahamse	2016	Service Agency	22	1	22	Clinicians with a master's degree in mental health
PCIT	Chaffin	2009	Service Agency	10.1	NA	10.1	Master's level therapists trained by study staff
PCIT	Terao	1999	Service Agency	14	NA	14	NA
PCIT	Thomas	2012	NA	14	NA	NA	Master's and doctoral level psychologists trained in PCIT
PCIT + PCIT-E	Chaffin	2004	Service Agency + Home	23	NA	26.09	Combination of trainees, experienced trainees and experts
PCIT-B + PCIT-EX	Mersky	2015	Service Agency	2	7	8	Graduate students trained in PCIT
PCIT-G	Foley	2010	Service Agency	8.1	2	12	Undergraduate and graduate students with PCIT training
PCIT-TV	Thomas	2011	NA	16.95	NA	24.3	Psychologists, some with and some without PCIT training
PFR	Oxford	2016	Home	10	1	10	Providers with master's level education and PFR training
PFR	Spieker	2012	Home	10	NA	10	Master's level mental health providers
PPP (CPP)	Toth	2002	Service Agency	32.39	1	50.57	Master's level therapists with training in the intervention
Pre-VIPP	Juffer	1997	Home	3	NA	17.39	Researchers with master's degree in child and family studies
Pre-VIPP	Juffer	2005	Home	3	1	17.39	Researchers with master's degree in child and family studies
RET	Valentino	2013	Home	4	1	4	Bachelor's level home-visitors
TBRI	Purvis	2015	Service Agency	4	6	0.57	Trainers with 2-year TBRI experience
TBRI	Razuri	2016	Online	18	NA	4	NA

(Continued)

Table 2. (*Continued*)

Intervention	First Author	Year	Setting	Mean Intervention Dosage[a]			Staff
				Sessions	Hours	**Duration**[b]	
VIPP-FC/A	Barone	2018	Home	7	NA	7	Interveners trained according to VIPP guidelines
VIPP-SD	Casonato	2017	Home	6	1.5	16	Interveners with master'/PhD level education

Abbreviations: NA = Not Applicable/Not Reported, ABC = Attachment and Biobehavioral Catch-up, ABC-T = ABC-Toddlers, AVI = Attachment Video-Feedback Intervention, BHC = Building Healthy Children, CARE = Child Adult Relationship Enhancement, CCT = Child-Centered Therapy, CDI = Child Directed Interaction Training, CPP = Child–Parent Psychotherapy, CPRT = Child Parent Relationship Therapy, CPS = Child Protective Services, CWC = Communicating With Children, DART = Domestic Abuse Recovering Together, DDP = Dyadic Developmental Psychotherapy, DMT = Dyadic Music Therapy, ESC = Emotion Support and Coaching, FFI = Foster Family Intervention, FI-OP = Family Intervention for Improving Occupational Performance, FT = Filial Therapy, PCIT = Parent–Child Interaction Therapy, PCIT-B = Brief-PCIT, PCIT-E = Enhanced-PCIT, PCIT-EX = Extended-PCIT, PCIT-G = Group-PCIT, PCIT-TV = Time Variable-PCIT, PFR = Promoting First Relationships, PPP = Preschooler–Parent Psychotherapy, RET = Reminiscing and Emotion Training, TBRI = Trust-Based Relational Intervention, Pre-VIPP = Video-Feedback Intervention to Promote Positive Parenting, VIPP-FC/A = VIPP-Foster Care/Adoption, VIPP-SD = VIPP-Sensitive Discipline.
[a]Target dosage used where mean number was unavailable.
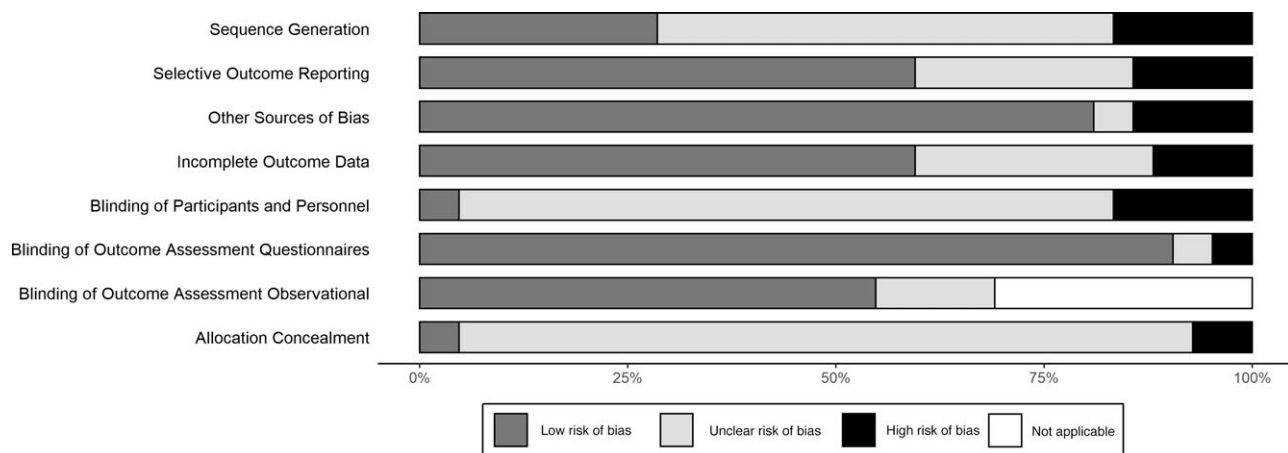[b]Duration reported in weeks.

Figure 2. Risk of bias in all included studies.

In other words, in cases where the data were published in a journal article, the effect tended to be lower than when published in a dissertation.

A revised analysis of the overall effect was carried out in a multiple moderator model, with the four moderator variables that were found to be significant in the previous step (i.e. child age (continuous), child presence, middle childhood, and publication type) added to the model (see Table 5). This was done to examine the unique contribution of the moderators to the prediction of effect size. In this model, heterogeneity was particularly explained by publication type and middle childhood.

Observed child data
Attachment. The overall effect size of relationship-based interventions on child attachment at posttest was small, but approaching medium ($g = 0.403$, 95% CI [0.141, 0.665], $p = .006$; see Table 6). This indicates that children's attachment had improved among the children who received relationship-based interventions (e.g. lower rates of disorganized attachment, higher rates of secure attachment). The test for heterogeneity did not reveal a significant difference between effect sizes ($Q(10) = 16.595$, $p = .084$) and no significant difference between studies ($p = .215$).

For follow-up studies on child attachment, the overall effect size was small and nonsignificant ($g = 0.222$, 95% CI [−0.537, 0.982], $p = .420$) with significant heterogeneity between effect sizes

($Q(3) = 8.596$, $p = .035$) and nonsignificant between studies ($p = .275$). See Supplementary Table 5 for effect sizes on follow-up data.

Child interactive behavior. The overall effect size of relationship-based interventions on observed child interactive behavior at immediate posttest was small ($g = 0.274$, 95% CI [0.140, 0.408], $p < .001$). See Table 7 for an overview of all effect sizes. The test for heterogeneity revealed no significant difference between effect sizes within ($Q(15) = 15.06$, $p = .447$) or between studies ($p = 1.000$). The overall effect size on follow-up measures was small and nonsignificant ($g = 0.198$, 95% CI [−0.484, 0.879], $p = .466$) with significant heterogeneity between effect sizes ($Q(6) = 15.404$, $p = .017$) and no significant difference between studies ($p = 1.000$). See Supplementary Table 6 for effect sizes on follow-up data. The average follow-up length for the included studies was 5.33 months ($SD = 1.32$ months).

Discussion

The objective of this study was to systematically review effect studies on relationship-based interventions for maltreated children and to analyze their impact on observed outcomes in the parent–child relationship. We identified 35 RCTs and seven quasi- and non-randomized trials, with 4,526 participants in total. Twenty interventions were included, covering a wide age range from infancy to teenage years, with preschool age being

Figure 3. Risk of bias assessment for each study used in the meta-analysis.

Figure 4. Risk of bias assessment for each study not used in the meta-analysis.

the most common and adolescence being the least common. There was large variation in duration, with some only lasting a few hours to others lasting over 40 hours in total.

Risk of bias assessments suggest that, even though the proportion of studies characterized by high risk of bias was small, a great number of studies were associated with unclear risk of bias due to poor reporting. Lack of reporting in some domains could partly be explained by the fact that certain measures, like blinding of participants and personnel, are difficult to carry out with psychosocial

Table 3. Effect sizes per study, observed parent interactive behavior (posttest)

Study	First Author[a]	Year	Intervention	Instrument	ES [95% CI]
1)	*Dozier 2006*				
	Bick	2013	ABC	ORCE – Sensitivity	0.52 [−0.42, 1.45]
2)	*Bernard 2012*				
	Bernard	2013	ABC	ORCE – Sensitivity to distress	0.08 [−0.47, 0.62]
				ORCE – Synchrony/delight	0.88 [0.31, 1.45]
	Bernard	2015	ABC	ORCE – Delight	0.63 [0.09, 1.16]
				ORCE – Intrusiveness	0.72 [−1.26, −0.18]
				ORCE – Sensitivity	0.88 [0.33, 1.43]
3)	*Lind 2017*				
	Raby	2018	ABC-T	ORCE – Sensitivity	1.09 [0.64, 1.55]
4)	*Moss 2011*				
	Moss	2011	AVI	MBQS – Sensitivity	0.56 [0.07, 1.05]
5)	*Carnes-Holt 2010*				
	Carnes-Holt	2010	CPRT	MEACI – Total Empathy	1.68 [−2.28, −1.08]
6)	*Opiola 2016*				
	Opiola	2016	CPRT	MEACI – Total Empathy	2.87 [−3.68, −2.07]
7)	*Jacobsen 2014*				
	Jacobsen	2014	DMT	APC – Emotional Parental Response: Negative	0.53 [−0.41, 1.47]
				APC – Emotional Parental Response: Positive	0.74 [−0.21, 1.7]
8)	*Van Andel 2016*				
	Van Andel	2016	FFI	EAS – Emotional Availability Scales - Nonhostility	0.11 [−0.3, 0.53]
				EAS – Emotional Availability Scales - Nonintrusiveness	0.54 [0.12, 0.95]
				EAS – Emotional Availability Scales - Sensitivity	0.46 [0.05, 0.87]
				EAS – Emotional Availability Scales - Structuring	0.42 [0.01, 0.83]
9)	*Waldman-Levi 2015*				
	Waldman-Levi	2015	FI-OP	CIB – Limit Setting	0.22 [−0.43, 0.87]
				CIB – Sensitivity	0.21 [−0.44, 0.85]
10)	*Costas 1998*				
	Costas	1998	FT	MEACI – Total Empathy	2.28 [−3.28, −1.27]
11)	*Thomas 2012*				
	Thomas	2012	PCIT	DPICS-III – Commands	0.34 [−0.68, 0]
				DPICS-III – Description & Reflection	1.14 [0.78, 1.5]
				DPICS-III – Negative Talk	0.44 [−0.78, −0.1]
				DPICS-III – Praise	1.12 [0.76, 1.48]
				DPICS-III – Questions	1.47 [−1.85, −1.09]
				EAS (modified) – Sensitivity	0.68 [0.33, 1.02]
12)	*Abrahamse 2016*				
	Abrahamse	2016	PCIT	DPICS-IV – Demandingness	0.59 [−1.26, 0.07]
				DPICS-IV – Negative Leading	0.76 [−1.43, −0.1]
				DPICS-IV – Positive Following	0.72 [0.06, 1.39]
				DPICS-IV – Praise	0.94 [0.26, 1.63]
13)	*Stevens 2011*				
	N'zi	2012	PCIT-CDI	DPICS-IV – Positive Attention	8.4 [4.59, 12.22]
	N'zi	2016	PCIT-CDI	DPICS-IV – Negative Leading	2.34 [−3.74, −0.94]
				DPICS-IV – Positive Following	4.42 [2.38, 6.46]
	Stevens	2011	PCIT-CDI	DPICS-III – Do Skills	5.71 [2.85, 8.58]
				DPICS-III – Don't Skills	2.2 [−3.75, −0.64]

(Continued)

Table 3. (*Continued*)

Study	First Author[a]	Year	Intervention	Instrument	ES [95% CI]
14)	*Thomas 2011*				
	Thomas	2011	PCIT-TV	DPICS-III – Commands	0.61 [−1.07, −0.14]
				DPICS-III – Description & Reflection	1.58 [1.06, 2.1]
				DPICS-III – Praise	1.33 [0.83, 1.83]
				DPICS-III – Questions	2.18 [−2.75, −1.61]
				EAS (modified) – Sensitivity	0 [−0.45, 0.45]
15)	*Spieker 2012*				
	Spieker	2012	PFR	IPCI – Support	0.25 [−0.04, 0.54]
				NCATS – Sensitivity	0.31 [0.01, 0.6]
16)	*Oxford 2016*				
	Oxford	2016	PFR	NCATS – Sensitivity	0.12 [−0.14, 0.39]
17)	*Valentino 2013*				
	Valentino	2013	RET	MC – Cause/explanation of child's emotion	1.16 [0.48, 1.83]
18)	*Casonato 2017*				
	Casonato	2017	VIPP	DRS – Inflexibility	0.73 [−1.92, 0.46]
				DRS – Laxness	−0.11 [−1.04, 1.26]
				DRS – Physical interference	0 [−1.15, 1.15]
				DRS – Supportive presence	0.1 [−1.05, 1.25]
				MBQS – Sensitivity	0.46 [−0.7, 1.63]
19)	*Juffer 2005*				
	Juffer	2005	VIPP	SC – Cooperation	0.86 [0.45, 1.27]
				SC – Sensitivity	0.48 [0.08, 0.88]
20)	*Juffer 1997*				
	Juffer	1997	VIPP	SC – Cooperation	0.86 [0.33, 1.39]
				SC – Sensitivity	0.41 [−0.1, 0.92]
21)	*Barone 2018*				
	Barone	2018	VIPP-FCA	EAS – Nonhostility	−0.17 [−0.61, 0.27]
				EAS – Nonintrusiveness	0 [−0.44, 0.44]
				EAS – Positive Parenting	0.85 [0.39, 1.31]
				EAS – Sensitivity	0.03 [−0.41, 0.46]
				EAS – Structuring	0.14 [−0.3, 0.58]

Abbreviations: APC = Assessment of Parenting Competencies, CIB = Coding Interactive Behavior, DPICS = Dyadic Parent–Child Interaction Coding System, DRS = Discipline Rating Scales, EAS = Emotional Availability Scales, IPCI = Indicator of Parent–Child Interaction, MBQS = Maternal Behavior Q-Set, MC = Memory conversations, MEACI = Measurement of Empathy in Adult-Child Interaction, NCATS = Nursing Child Assessment Teaching Scale, ORCE = Observational Record of the Caregiving Environment, SC = Sensitivity and Cooperation.
[a]Original publication for the given study, followed by each publication from which effect sizes were drawn.

interventions (e.g. most intervention practitioners will have to be aware of the program they are implementing). However, this does not explain why some studies fail to report information on domains that are crucial to internal validity, such as the use of randomization procedure. Failure to report the randomization procedure means that selection bias cannot be ruled out, which further weakens the conclusion of the study. The studies that were included in the meta-analysis were to a lesser extent characterized by high and unclear risk of bias, which adds confidence to the findings below. However, the risk of bias in domains like sequence generation and selective outcome reporting was still considerable, suggesting that they should still be interpreted with caution. Furthermore, a substantial portion of the included publications consisted of gray literature. Data from gray literature tends to be characterized by smaller and less significant results, possibly due to nonsignificant results being harder to publish than significant results (Paez, 2017). Hence, the presence of these publications may help provide a more balanced view of the evidence, especially in terms of the effect estimates outlined below.

Meta-analyses were carried out on the subset of studies that contained observational data on parent–child interactive behavior and child attachment. It should be noted that none of these studies covered adolescence (i.e. >12 years). Hence, the following discussion is limited to infancy, toddlerhood, preschool and middle childhood. The analyses were carried out separately for parents and children, generating significant effects on observed behaviors in both groups. The effect on parent behavior, though large ($g = 0.888$), was characterized by substantial differences in effects

Table 4. Results of moderator analyses for parent interactive behavior (posttest)

Moderator variables	# Studies	# ES	Intercept/mean *g* (95% CI)[a]	*β*1 (95% CI)[b]	*F* (df1, df2)[c]	*p*[d]
Overall effect	21	57	0.888 [0.545, 1.230]***			
Continuous moderators						
Sample size	21	57	1.271 [0.716, 1.825]***	−0.005 [−0.011, 0.001]	3.042 (1,55)	.087
Dosage	21	57	0.728 [−0.092, 1.549]	0.017 [−0.061, 0.096]	0.194 (1,55)	.661
Duration	19	50	1.240 [0.300, 2.180]*	−0.029 [−0.101, 0.042]	0.676 (1,48)	.415
Child age (mean)	16	50	0.155 [−0.440, 0.751]	0.014 [0.002, 0.027]*	5.148 (1,48)	.028
Categorical moderators						
Design					0.582 (2,54)	.562
RCT	18	52	0.891 [0.508, 1.273]***			
Quasi-Randomized	2	3	1.300 [0.077, 2.522]*	0.409 [−0.872, 1.689]		
Controlled Observational	1	2	0.212 [−1.398, 1.822]	−0.679 [−2.334, 0.976]		
Child presence					12.262 (1,55)	<.001
Not present	3	3	2.244 [1.403, 3.084]***			
Present	18	54	0.696 [0.418, 0.974]***	−1.548 [−2.433, −0.662]***		
Intervention type					1.819 (10,46)	.084
ABC	3	7	0.753 [−0.046, 1.551]			
AVI	1	1	0.563 [−0.863, 1.998]	−0.190 [−1.824, 1.444]		
CPRT	2	2	2.237 [1.164, 3.310]***	1.484 [0.147, 2.822]*		
DMT	1	2	0.637 (−0.777, 2.052]	−0.116 [−1.740, 1.509]		
FFI	1	4	0.383 [−0.818, 1.584]	−0.370 [−1.812, 1.073]		
FI-OP	1	2	0.212 [−1.109, 1.534]	−0.541 [−2.085, 1.004]		
FT	1	1	2.276 [0.592, 3.961]**	1.524 [−0.340, 3.388]		
PCIT	4	20	1.349 [0.722, 1.976]***	0.596 [−0.419, 1.612]		
PFR	2	3	0.207 [−0.715, 1.129]	−0.545 [−1.765, 0.674]		
RET	1	1	1.155 [−0.347, 2.657]	0.402 [−1.298, 2.103]		
VIPP	4	14	0.415 [−0.214, 1.043]	−0.338 [−1.354, 0.678]		
Caregiver type					1.102 (2,54)	.339
Non-birth parent	9	22	1.166 [0.621, 1.711]***			
Birth parent	10	32	0.631 [0.133, 1.129]*	−0.535 [−1.273, 0.203]		
Both birth and non-birth	2	3	1.066 [−0.128, 2.259]	−0.100 [−1.412, 1.212]		
Publication Type					18.074 (1,55)	<.001
Journal article	17	47	0.643 [0.420, 0.866]***			
Dissertation	5	10	1.788 [1.277, 2.299]***	1.145 [0.605, 1.684]***		
Developmental stages						
Infant					3.536 (1,55)	.065
No	14	40	1.105 [0.701, 1.509]***			
Yes	7	17	0.465 [−0.086, 1.015]	−0.641 [−1.323, 0.042]		
Toddler					0.092 (1,55)	.762
No	5	8	0.992 [0.241, 1.743]*			
Yes	16	49	0.863 [0.463, 1.263]***	−0.129 [−0.980, 0.722]		
Preschool					2.422 (1,55)	.125
No	6	13	0.480 [−0.140, 1.100]			
Yes	15	44	1.053 [0.654, 1.452]***	0.573 [−0.165, 1.310]		
Middle childhood					13.668 (1,55)	<.001
No	13	32	0.483 [0.156, 0.811]**			
Yes	8	25	1.489 [1.053, 1.924]***	1.006 [0.460, 1.551]***		

(Continued)

Table 4. (Continued)

Moderator variables	# Studies	# ES	Intercept/mean g (95% CI)[a]	β1 (95% CI)[b]	F (df1, df2)[c]	p[d]
Risk of bias domains						
Sequence Generation					0.196 (2,54)	.823
Unclear	9	27	0.772 [0.218, 1.327]**			
Low	9	25	1.018 [0.457, 1.579]***	0.246 [−0.543, 1.034]		
High	3	5	0.908 [−0.094, 1.910]	0.136 [−1.009, 1.281]		
Allocation Concealment					0.404 (2,54)	.670
Unclear	18	49	0.958 [0.565, 1.351]***			
Low	1	4	0.754 [−0.810, 2.318]	−0.204 [−1.816, 1.408]		
High	2	4	0.425 [−0.723, 1.574]	−0.533 [−1.746, 0.681]		
Blinding of Participants and Personnel					0.611 (2,54)	.547
Unclear	19	51	0.950 [0.581, 1.320]***			
Low	1	1	0.518 [−1.351, 2.388]	−0.432 [−2.338, 1.473]		
High	1	5	0.166 [−1.319, 1.651]	−0.784 [−2.315, 0.746]		

Abbreviations: # Studies = Number of studies, # ES = Number of effect sizes, ABC = Attachment and Biobehavioral Catch-up, AVI = Attachment Video-Feedback Intervention, CI = Confidence interval, CPRT = Child Parent Relationship Therapy, df = degrees of freedom, DMT = Dyadic Music Therapy, FFI = Foster Family Intervention, FI-OP = Family Intervention for Improving Occupational Performance, FT = Filial Therapy, PCIT = Parent–Child Interaction Therapy, PFR = Promoting First Relationships, RET = Reminiscing and Emotion Training, VIPP = Video-Feedback Intervention to Promote Positive Parenting.
[a]Mean g mean effect size (Hedges' g).
[b]Estimated regression coefficient.
[c]Omnibus test of all regression coefficients in the model.
[d]p value of the omnibus test.
*p < .05; **p < .01; ***p < .001.

Table 5. Results of the multiple moderator variable model on parent interactive behavior (posttest)

Moderator variables	β (SE)[a]	95% CI	t-statistic	p
Intercept	1.016 (0.563)	−0.118, 2.151	1.804	0.078
Child age (mean)	−0.001 (0.006)	−0.013, 0.012	−0.115	0.909
Child presence	0.229 (0.597)	−0.972, 1.431	0.384	0.703
Publication type (article)	−0.928 (0.299)	−1.530, −0.325	−3.100	0.003
Middle childhood	0.711 (0.274)	0.159, 1.264	2.593	0.013
F (df1, df2)[b]	8.494 (4, 45)			
% level 2 variance[c]	71.3***			
% level 3 variance[d]	<.001			

Abbreviations: CI = Confidence Interval, df = degrees of freedom, SE = standard error.
[a]Estimated regression coefficient.
[b]F-statistic for the omnibus test.
[c]Percentage of variance within studies.
[d]Percentage of variance between studies.
*p < .05; **p < .01; ***p < .001.

between studies. A similar finding was found in a recent study by Schoemaker and colleagues (2019), in which interventions for foster and adoptive caregivers found a large effect on sensitive parenting, which was also characterized by a high degree of heterogeneity. In the present study, these differences were partly explained by publication type, meaning that effects published in dissertations tended to be larger (g = 1.788) compared to effects published in journal articles (g = 0.643). This is an interesting contrast to the common finding that gray literature is characterized by small and nonsignificant results (Paez, 2017; see above). One explanation

may be that some of the dissertations referenced here have been submitted to universities that also provide training in the intervention and often employ the developers. This is in line with findings in other fields, in which publications where study authors who have some form of conflict of interest tend to report larger effect sizes (Bottema-Beutel et al., 2021).

Child age also explained differences in intervention effect, with studies that included older children yielded larger effect sizes. Similar results have been found in previous meta-analyses, where older age predicted higher effect sizes (Euser et al., 2015; Schoemaker et al., 2019). As Bakermans-Kranenburg and colleagues (2005) point out, it could be that early childhood is particularly demanding for caregivers and that as they become more settled in their roles as parents and the children are older, they also become more open to intervention. Another interpretation may be that it is easier for parents to improve their behaviors when children are older and thus more verbal. Parents whose children have a wider communicative repertoire may be more receptive to change because they feel they can respond more easily to their child's cues.

Despite being significant predictors when assessed alone, both child age and child presence were no longer significant when included in the multiple moderator model. This suggests that they do not make unique contributions to the prediction of the overall effect, over and above publication type and middle childhood. Middle childhood, however, may provide further insight into how the age of children influences the overall intervention effect. Based on the conceptualization of development as a series of reorganizations around stage-salient tasks, interventions that address tasks relevant for a given developmental stage would be assumed to be more effective (Doyle & Cicchetti, 2017). It is possible that the interventions that address middle childhood may be more adept at

Table 6. Effect sizes per study, child attachment (posttest)

Study	First Author[a]	Year	Intervention	Instrument	ES [95% CI]
1)	*Bernard 2012*				
	Bernard	2012	ABC	Ainsworth Strange Situation Procedure – Secure Attachment	0.42 [0.01, 0.82]
	Bernard	2012	ABC	Ainsworth Strange Situation Procedure – Disorganized Attachment	0.57 [0.16, 0.98]
2)	*Cicchetti 2006*				
	Cicchetti	2006	CPP	Ainsworth Strange Situation Procedure – Secure Attachment	0.14 [−0.49, 0.76]
	Cicchetti	2006	CPP	Ainsworth Strange Situation Procedure – Disorganized Attachment	0.31 [−0.33, 0.94]
3)	*Danko 2014*				
	Danko	2014	PCIT	AQS – Attachment Q-Set – Secure Score	0.22 [−0.52, 0.96]
4)	*Juffer 1997*				
	Juffer	1997	VIPP	Ainsworth Strange Situation Procedure – Secure Attachment	0.73 [−0.05, 1.52]
5)	*Juffer 2005*				
	Juffer	2005	VIPP	Ainsworth Strange Situation Procedure – Disorganized Attachment	0.82 [0.07, 1.56]
6)	*Moss 2011*				
	Moss	2011	AVI	Ainsworth Strange Situation Procedure – Secure Attachment	0.87 [0.29, 1.44]
	Moss	2011	AVI	Ainsworth Strange Situation Procedure – Disorganized Attachment	0.89 [0.30, 1.49]
7)	*Oxford 2016*				
	Oxford	2016	PFR	Toddler Attachment Sort-45 – Secure Base Behavior	0.03 [−0.23, 0.29]
8)	*Spieker 2012*				
	Spieker	2012	PFR	Toddler Attachment Sort-45 – Security	0.26 [−0.04, 0.56]

Abbreviations: ABC = Attachment and Biobehavioral Catch-up, AVI = Attachment Video-Feedback Intervention, CPP = Child–Parent Psychotherapy, PCIT = Parent–Child Interaction Therapy, PFR = Promoting First Relationships, VIPP = Video-Feedback Intervention to Promote Positive Parenting.
[a]Original publication for the given study, followed by each publication from which effect sizes were drawn.

addressing stage-salient tasks compared to the interventions that cover other developmental stages. However, since the present study is not designed to examine fine-grained characteristics like individual intervention elements, the features that characterize middle childhood interventions may only be explored on a descriptive level. What can be seen from the data on parent behavior is that the interventions addressing middle childhood (CPRT, Dyadic Music Therapy, FT, and PCIT) on the whole seem to have more of a behavioral/behavior management emphasis (e.g. focusing on limit setting, positive reinforcement, etc.). Interventions focusing on younger children (e.g. VIPP, PFR, etc.) tend to rely more on elements like internal representations and dealing with events in the parent's caregiving history. This corresponds with previous research on attachment interventions where programs with a behavioral focus turned out to be the most effective (Bakermans-Kranenburg et al., 2003). It should be noted, however, that behavioral elements are not unique to interventions on older children and that most interventions combine different types of elements in the same program (e.g. positive reinforcement in VIPP, ABC, etc.). Therefore, a more elaborate meta-analytic design that encompasses specific intervention elements and their relationship with developmental stages is needed to explore this issue further.

It may also be that differences in assessment of behaviors could have confounded the results on middle childhood. For instance, parent sensitivity is widely used among the studies on younger children in this meta-analysis but is rarely used with interventions for middle childhood. One possibility is that inconsistent assessment of sensitivity could explain why effects are not higher among studies in this age group. Even though sensitivity is believed to be an important predictor of attachment security, the strength of its association has often be found to be small (Verhage et al., 2016). Some researchers have argued that this may be due to great variability in definitions, contexts, measures, duration, and frequency of assessment (Lindhiem, Bernard, & Dozier, 2011). Additionally, the aforementioned study by Schoemaker and colleagues (2019) found great differences between effect sizes on parent sensitivity among interventions in foster care and adoption. Therefore, it seems plausible that sensitivity could have underperformed in the present study due to the same inconsistencies in measurement, making the effects in middle childhood appear larger than those among the younger age groups. Another option is that certain instruments in the meta-analysis are usable for a wide age range and others are primarily developed for a narrower age range. This could have impacted the findings in the sense that behavior changes in middle childhood may have been more easily assessed with instruments used in this period compared to earlier periods.

The overall effect of relationship-based interventions on child attachment was smaller than the effect on parent behavior ($g = 0.403$ vs. 0.888), but with substantially less heterogeneity, suggesting that there was little difference in outcome between studies. Put differently, maltreated children allocated to the treatment condition were consistently more likely to demonstrate a secure or organized attachment style compared to an insecure or disorganized attachment style. It is also interesting to note that the impact was similar on both secure and disorganized attachment, suggesting that relationship-based interventions may be impactful across attachment classifications. This finding is comparable to previous meta-analyses on finding that interventions with an attachment/sensitivity focus are able to improve attachment

Table 7. Effect sizes per study, observed child interactive behavior (posttest)

Study	First Author[a]	Year	Intervention	Instrument	ES [95% CI]
1)	*Bernard 2012*				
	Lind	2014	ABC	The Tool Task – Anger toward parent	0.35 [−0.72, 0.01]
2)	*Van Andel 2016*				
	Van Andel	2016	FFI	EAS – Child Involvement	0.15 [−0.27, 0.56]
	Van Andel	2016	FFI	EAS – Child Responsiveness	0.48 [0.07, 0.9]
3)	*Waldman-Levi 2015*				
	Waldman-Levi	2015	FI-OP	CIB – Involvement	0.48 [−0.18, 1.13]
4)	*Abrahamse 2016*				
	Abrahamse	2016	PCIT	DPICS-IV – % Non-Compliance	0.28 [−0.94, 0.37]
	Abrahamse	2016	PCIT	DPICS-IV – Inappropriate Behavior	0.18 [−0.83, 0.47]
5)	*Foley 2010*				
	Foley	2010	PCIT	DPICS-III – Child Compliance	0.65 [0.04, 1.27]
6)	*Spieker 2012*				
	Spieker	2012	PFR	IPCI – Engagement	0 [−0.29, 0.29]
7)	*Oxford 2016*				
	Oxford	2016	PFR	TAS45 – Child atypical, affective communication	0.25 [−0.51, 0.01]
8)	*Barone 2018*				
	Barone	2018	VIPP-FCA	EAS – Child Involvement	0.28 [−0.16, 0.72]
	Barone	2018	VIPP-FCA	EAS – Child Responsiveness	0.37 [−0.07, 0.81]
	Barone	2018	VIPP-FCA	EAS – Child Summary Score	0.41 [−0.03, 0.86]

Abbreviations: CIB = Coding Interactive Behavior, DPICS = Dyadic Parent–Child Interaction Coding System, EAS = Emotional Availability Scales, IPCI = Indicator of Parent–Child Interaction, SSP = Ainsworth Strange Situation Procedure, TAS45 = Toddler Attachment Sort-45, TT = The Tool Task.
[a]Original publication for the given study, followed by each publication from which effect sizes were drawn.

security and disorganization in young children (Bakermans-Kranenburg et al., 2003; Bakermans-Kranenburg et al., 2005) and among children exposed to maltreatment (Macdonald et al., 2016). Furthermore, the findings of Facompré, Bernard, and Waters (2018) suggest that interventions aimed at maltreatment samples may be more effective in reducing disorganization than those of non-maltreated samples. This is promising for professionals working with maltreated children, given the negative consequences associated with disorganized attachment, like reduced peer competence and greater risk of externalizing problems (Groh et al., 2017).

The present meta-analysis also found a small, but significant effect on observed child interactive behavior ($g = 0.274$). The observed behaviors included, among others, child involvement and engagement with parent and child compliance. Despite the use of a variety of different interventions and outcome measures, the effects were quite homogenous, which adds confidence to the idea that these programs are effective in improving parent–child relationships. These improvements can theoretically have positive consequences for the parent–child relationship, bringing about more positive responses from parents in reaction to their child's behavior. However, there is little research devoted to the child's contribution to the dyadic relationship, especially in the field of child maltreatment. On the other hand, child interactive behaviors have been found to be associated with various positive outcomes for the child, such as development of child empathy (Moreno, Klute, & Robinson, 2008), attachment security (Ziv et al., 2000) and reduction in internalizing and externalizing symptoms (Biringen et al., 2005). Interestingly, the findings on child

interactive behavior in the present study was substantially smaller than those on child attachment ($g = 0.274$ vs. 0.403). This may be due to the interactive behaviors reflecting a diverse set of behaviors (e.g. involvement, compliance), whereas most of the studies in the analysis of child attachment used Ainsworth's Strange Situation Procedure, hence there was a high degree of similarity in age and outcome assessment. These similarities may also help explain the difference in findings (e.g. a uniform group of young children may be affected differently than a group consisting of a more diverse age range).

Finally, the results on follow-up for both child and parent behavior were small and nonsignificant. Few studies examined the long-term effects of their interventions which may partly explain these findings. In other words, the reason for the small effects may be due to a lack of research, not necessarily due to a lack of sustained impact. Furthermore, many outcomes reported in the included publications were not assessed in this meta-analysis, because they were not observational measures of parent–child behavior. Some of these publications examined the long-term effects on outcomes that are known to be associated with parent–child relationship such as child problem behavior (Stronach et al., 2013), diurnal cortisol rhythm (Bernard, Hostinar, & Dozier, 2015) and cognitive flexibility (Lewis-Morrarty et al., 2012). Hence, there may be several other positive long-term effects of relationship-based interventions, beyond observational measures of the parent–child relationship.

Future research should address this issue by examining the long-term impact of relationship-based interventions on maltreated children. Considering how the quality of parent–child relationship at

various stages of development is crucial for healthy development (Hinnant et al., 2013; Jaffari-Bimmel et al., 2006; Oudekerk et al., 2015), it is important to understand whether improved relational quality can be sustained over time in dyads affected by maltreatment. This would entail assessing such behavior across multiple age levels, not just for a single point in time. Moreover, given the findings in this study on how child age and certain developmental stages are associated with larger effects, combined with previous findings on how focusing on specific intervention aspects may be particularly effective (e.g. Bakermans-Kranenburg et al., 2003), future studies should examine specific intervention elements and the extent to which they address developmental stages and their associated stage-salient tasks. Interventions that address these tasks may have the potential for larger impact than the interventions that fail to address them. There is currently an emergence of component-based research in multiple fields, like HIV treatment (Collins, Kugler, & Gwadz, 2016) and adult mental health (Murray et al., 2014). The tools applied in these fields could also be used to explore what constellations of relationship-based components would best serve sufferers of child maltreatment. This element-based approach would be beneficial for program developers who wish to know how to adapt their interventions for the best possible outcome and for clinicians who wish to know what configuration would best serve the needs of their clients.

Limitations

The main limitation of the present review is the use of term 'relationship-based intervention'. This term has no common definition that is widely accepted by all researchers in the field. Hence, there might be disagreements on whether the included programs are truly relationship-based and whether some of the excluded programs may be considered relationship-based. It should be pointed out, however, that a rigorous process of identifying and selecting appropriate interventions was employed to avoid a haphazard inclusion of interventions. This involved an open initial screening process in which all potentially relevant publications were included, followed by a thorough examination of all interventions by three different reviewers (see 'Study Selection' above for more details on the process and Supplementary Table 3 in Appendix 3 for publications excluded due to the intervention being categorized as non-relationship-based).

Despite this limitation, the current review and meta-analysis makes an important contribution to the field of child maltreatment interventions by using a multilevel meta-analysis, which reduces issues associated with dependencies between effect sizes and hence achieves more statistical power. Moreover, the findings presented here provides important information for both clinical practice and future research. First, the positive outcomes of relationship-based programs should be taken into account by clinicians and policy makers when considering interventions to aid maltreated children and their families. Seeing as the results are based on behavioral observations of both parents and children interacting together, their validity and real-world applicability may be more confidently assumed than similar results based on self-report data. Second, the finding that interventions aimed at middle childhood are particularly impactful may be of particular use to professionals working with school-age children who are victims of abuse or neglect. This finding also lays an important foundation for future research into the effects of intervention elements of relationship-based interventions.

Conclusion

Child maltreatment is, by its nature, characterized by a harmful relational environment, and children who are exposed to this environment are at risk for a range of negative sequelae. Relationship-based interventions can help these children and their caregivers improve their interactional competence and thus improve their relational environment, which may in turn have positive cascading consequences for the child's development. The results from the current meta-analysis demonstrate that relationship-based interventions are effective in improving parent–child interactive behavior and child attachment, as evidenced in data from behavioral observations. The effect on parenting behavior may be particularly high for parents with school-age children, though this may reflect aspects of the interventions and outcome measures. Studies on the developmental appropriateness of child maltreatment interventions, using instruments applicable for the relevant age group are thus needed to examine this further. The impact on children is smaller, both in terms of attachment and child interactive behavior, but more consistent in terms of the effect magnitude. The findings on long-term effects did not reveal any significant effects. However, very few studies examined the long-term effects of relational interventions on observed parent–child behavior, which should be explored in future studies. Finally, there were very few interventions targeting maltreated adolescents. The current review highlights the need for relationship-based interventions targeting this group.

References

Altafim, E. R. P., & Linhares, M. B. M. (2016). Universal violence and child maltreatment prevention programs for parents: A systematic review. *Psychosocial Intervention*, 25, 27–38. https://doi.org/10.1016/j.psi.2015.10.003

Aspland, H., & Gardner, F. (2003). Observational measures of parent-child interaction: An introductory review. *Child and Adolescent Mental Health*, 8, 136–143. https://doi.org/10.1111/1475-3588.00061

Assink, M., & Wibbelink, C. (2016). Fitting three-level meta-analytic models in R: A step-by-step tutorial. *The Quantitative Methods for Psychology*, 12, 154–174.

Bakermans-Kranenburg, M. J., Van IJzendoorn, M. H., & Juffer, F. (2005). Disorganized infant attachment and preventive interventions: A review and meta-analysis. *Infant Mental Health Journal*, 26, 191–216. https://doi.org/10.1002/imhj.200046

Bakermans-Kranenburg, M. J., Van IJzendoorn, M. H., & Juffer, F. (2003). Less is more: Meta-analyses of sensitivity and attachment interventions in early childhood. *Psychological Bulletin*, 129, 195–215. https://doi.org/10.1037/0033-2909.129.2.195

Balduzzi, S., Rücker, G., & Schwarzer, G. (2019). How to perform a meta-analysis with R: A practical tutorial. *Evidence-Based Mental Health*, 22, 153–160. https://doi.org/10.1136/ebmental-2019-300117

Bernard, K., Hostinar, C. E., & Dozier, M. (2015). Intervention effects on diurnal cortisol rhythms of Child Protective Services-referred infants in early childhood preschool follow-up results of a randomized clinical trial. *JAMA Pediatrics*, 169, 112–119. https://doi.org/10.1001/jamapediatrics.2014.2369

Biringen, Z., Derscheid, D., Vliegen, N., Closson, L., & Easterbrooks, M. A. (2014). Emotional availability (EA): Theoretical background, empirical research using the EA Scales, and clinical applications. *Developmental Review*, 34, 114–167. https://doi.org/10.1016/j.dr.2014.01.002

Biringen, Z., Skillern, S., Mone, J., & Pianta, R. (2005). Emotional availability is predictive of the emotional aspects of children's "school readiness". *Journal of Early Childhood and Infant Psychology*, 1, 81–98.

Bottema-Beutel, K., Crowley, S., Sandbank, M., & Woynaroski, T. G. (2021). Research Review: Conflicts of Interest (COIs) in autism early intervention research – A meta-analysis of COI influences on intervention effects. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 62, 5–15. https://doi.org/10.1111/jcpp.13249

Boudreault-Bouchard, A. M., Dion, J., Hains, J., Vandermeerschen, J., Laberge, L., & Perron, M. (2013). Impact of parental emotional support and coercive control on adolescents' self-esteem and psychological distress: Results of a four-year longitudinal study. *Journal of Adolescence*, 36, 695–704. https://doi.org/10.1016/j.adolescence.2013.05.002

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). Chapter 04 – Effect sizes based on means. *Introduction to Meta-Analysis*, 41–43. https://doi.org/10.1002/9780470743386.ch6

Cadman, T., Diamond, P. R., & Fearon, P. (2018). Reassessing the validity of the attachment Q-sort: An updated meta-analysis. *Infant and Child Development*, 27. https://doi.org/10.1002/icd.2034

Carr, A., Duff, H., & Craddock, F. (2018). A systematic review of reviews of the outcome of noninstitutional child maltreatment. *Trauma, Violence, & Abuse*. https://doi.org/10.1177/1524838018801334

Cerezo, M. A., D'Ocon, A., & Dolz, L. (1996). Mother-child interactive patterns in abusive families versus nonabuse families: An observational study. *Child Abuse & Neglect*, 20, 573–587.

Chaffin, M., Silovsky, J. F., Funderburk, B., Valle, L. A., Brestan, E. V., Balachova, T., . . . Bonner, B. L. (2004). Parent-child interaction therapy with physically abusive parents: Efficacy for reducing future abuse reports. *Journal of Consulting and Clinical Psychology*, 72, 500–510. https://doi.org/10.1037/0022-006X.72.3.500

Chen, M., & Chan, K. L. (2016). Effects of parenting programs on child maltreatment prevention: A meta-analysis. *Trauma, Violence, and Abuse*, 17, 88–104. https://doi.org/10.1177/1524838014566718

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Collins, L. M., Kugler, K. C., & Gwadz, M. V. (2016). Optimization of multicomponent behavioral and biobehavioral interventions for the prevention and treatment of HIV/AIDS. *AIDS and Behavior*, 20, 197–214. https://doi.org/10.1007/s10461-015-1145-4

Cunningham, J. N., Kliewer, W., & Garner, P. W. (2009). Emotion socialization, child emotion understanding and regulation, and adjustment in urban African American families: Differential associations across child gender. *Development and Psychopathology*, 21, 261–283. https://doi.org/10.1017/S0954579409000157

Cyr, C., Euser, E. M., Bakermans-Kranenburg, M. J., & Van IJzendoorn, M. H. (2010). Attachment security and disorganization in maltreating and high-risk families: A series of meta-analyses. *Development and Psychopathology*, 22, 87–108. https://doi.org/10.1017/S0954579409990289

Davis, M., Bilms, J., & Suveg, C. (2017). In Sync and in control: A meta-analysis of parent–child positive behavioral synchrony and youth self-regulation. *Family Process*, 56, 962–980. https://doi.org/10.1111/famp.12259

De Wolff, M. S., & Van IJzendoorn, M. H. (1997). Sensitivity and attachment: A meta-analysis on parental antecedents of infant attachment. *Child Development*. https://doi.org/10.1111/j.1467-8624.1997.tb04218.x

Dishion, T. J., & Stormshak, E. A. (2007). *Intervening in children's lives: An ecological, family-centered approach to mental health care*. American Psychological Association. https://doi.org/10.1037/11485-000

Dozier, M., Albus, K., Fisher, P. A., & Sepulveda, S. (2002). Interventions for foster parents: Implications for developmental theory. *Development and Psychopathology*, 14, 843–860. https://doi.org/10.1017/S0954579402004091

Dozier, M., Peloso, E., Lindhiem, O., Gordon, M. K., Manni, M., Sepulveda, S., . . . Levine, S. (2006). Developing evidence-based interventions for foster children: An example of a randomized clinical trial with infants and toddlers. *Journal of Social Issues*, 62, 767–785. https://doi.org/10.1111/j.1540-4560.2006.00486.x

Doyle, C., & Cicchetti, D. (2017). From the Cradle to the Grave: The effect of adverse caregiving environments on attachment and relationships throughout the lifespan. *Clinical Psychology: Science and Practice*, 24, 203–217. https://doi.org/10.1111/cpsp.12192

Dubois-Comtois, K., Cyr, C., Tarabulsy, G. M., St-Laurent, D., Bernier, A., & Moss, E. (2017). Testing the limits: Extending attachment-based intervention effects to infant cognitive outcome and parental stress. *Development and Psychopathology*, 29, 565–574. https://doi.org/10.1017/S0954579417000189

Eisenberg, N., Zhou, Q., Spinrad, T. L., Valiente, C., Fabes, R. A., & Liew, J. (2005). Relations among positive parenting, children's effortful control, and externalizing problems: A three-wave longitudinal study. *Child Development*, 76, 1055–1071. https://doi.org/10.1111/j.1467-8624.2005.00897.x

Euser, S., Alink, L. R., Stoltenborgh, M., Bakermans-Kranenburg, M. J., & Van IJzendoorn, M. H. (2015). A gloomy picture: A meta-analysis of randomized controlled trials reveals disappointing effectiveness of programs aiming at preventing child maltreatment. *BMC Public Health*, 15, 1–14. https://doi.org/10.1186/s12889-015-2387-9

Facompré, C. R., Bernard, K., & Waters, T. E. A. (2018). Effectiveness of interventions in preventing disorganized attachment: A meta-analysis. *Development and Psychopathology*, 30, 1–11. https://doi.org/10.1017/S0954579417000426

Feldman, R. (2010). The relational basis of adolescent adjustment: Trajectories of mother-child interactive behaviors from infancy to adolescence shape adolescents' adaptation. *Attachment and Human Development*, 12, 173–192. https://doi.org/10.1080/14616730903282472

Funamoto, A., & Rinaldi, C. M. (2015). Measuring parent-child mutuality: A review of current observational coding systems. *Infant Mental Health Journal*, 36, 3–11. https://doi.org/10.1002/imhj.21481

Ghosh Ippen, C., Harris, W. W., Van Horn, P., & Lieberman, A. F. (2011). Traumatic and stressful events in early childhood: Can treatment help those at highest risk? *Child Abuse and Neglect*, 35, 504–513. https://doi.org/10.1016/j.chiabu.2011.03.009

Groh, A. M., Fearon, R. M. P., van IJzendoorn, M. H., Bakermans-Kranenburg, M. J., & Roisman, G.I. (2017). Attachment in the early life course: Meta-analytic evidence for its role in socioemotional development. *Child Development Perspectives*, 11, 70–76. https://doi.org/10.1111/cdep.12213

Gubbels, J., van der Put, C. E., & Assink, M. (2019). The effectiveness of parent training programs for child maltreatment and their components: A meta-analysis. *International Journal of Environmental Research and Public Health*, 16, 2404. https://doi.org/10.3390/ijerph16132404

Higgins, J., Altman, D. G., & Sterne, J. A. C. (2011). Chapter 08: Assessing risk of bias in included studies. In *Cochrane handbook for systematic reviews of interventions* (pp. 1–73). https://doi.org/10.1001/jama.2013.109501.Conflict

Higgins, J. P., Li, T., & Deeks, J. J. (2019). Chapter 06: Choosing effect measures and computing estimates of effect. *Cochrane Handbook for Systematic Reviews of Interventions*, 143–176. https://doi.org/10.1002/9781119536604.ch6

Hinnant, J. B., Nelson, J. A., O'Brien, M., Keane, S. P., & Calkins, S. D. (2013). The interactive roles of parenting, emotion regulation and executive functioning in moral reasoning during middle childhood. *Cognition and Emotion*, 27, 1460–1468. https://doi.org/10.1080/02699931.2013.789792

Hunter, J. E., & Schmidt, F. L. (1990). *Methods of meta-analysis: Correcting error and bias in research findings*. Newbury Park, CA: SAGE Publications. https://doi.org/10.2307/2289738

Jaffari-Bimmel, N., Juffer, F., van IJzendoorn, M. H., Bakermans-Kranenburg, M. J., & Mooijaart, A. (2006). Social development from infancy to adolescence: Longitudinal and concurrent factors in an adoption sample. *Developmental Psychology*, 42, 1143–1153. https://doi.org/10.1037/0012-1649.42.6.1143

Kaminski, J. W., Valle, L. A., Filene, J. H., & Boyle, C. L. (2008). A meta-analytic review of components associated with parent training program effectiveness. *Journal of Abnormal Child Psychology*, 36, 567–589. https://doi.org/10.1007/s10802-007-9201-9

Kaplow, J. B., & Widom, C. S. (2007). Age of onset of child maltreatment predicts long-term mental health outcomes. *Journal of Abnormal Psychology*, 116, 176–187. https://doi.org/10.1037/0021-843X.116.1.176

Kim, S., Boldt, L. J., & Kochanska, G. (2015). From parent–child mutuality to security to socialization outcomes: Developmental cascade toward positive adaptation in preadolescence. *Attachment and Human Development*, 17, 472–491. https://doi.org/10.1080/14616734.2015.1072832

Leeb, R. T., Paulozzi, L. J., Cindi, M., Simon, T. R., & Arias, I. (2008). Child *maltreatment surveillance*: Uniform *definitions for public health and recommended data elements*. Retrieved from https://ncvc.dspacedirect.org/handle/20.500.11990/337

Letourneau, N., Tryphonopoulos, P., Giesbrecht, G., Dennis, C. L., Bhogal, S., & Watson, B. (2015). Narrative and meta-analytic review of interventions aiming to improve maternal-child attachment security. *Infant Mental Health Journal*, 36, 366–387. https://doi.org/10.1002/imhj.21525

Lewis-Morrarty, E., Dozier, M., Bernard, K., Terracciano, S. M., & Moore, S. V. (2012). Cognitive flexibility and theory of mind outcomes among foster children: Preschool follow-up results of a randomized clinical trial. *Journal of Adolescent Health*, 51(2 SUPPL.), S17–S22. https://doi.org/10.1016/j.jadohealth.2012.05.005

Lieberman, A. F., Van Horn, P., & Ippen, C. G. (2005). Toward evidence-based treatment: Child-parent psychotherapy with preschoolers exposed to marital violence. *Journal of the American Academy of Child and Adolescent Psychiatry*, 44, 1241–1248. https://doi.org/10.1097/01.chi.0000181047.59702.58

Lindhiem, O., Bernard, K., & Dozier, M. (2011). Maternal sensitivity: Within-person variability and the utility of multiple assessments. *Child Maltreatment*. https://doi.org/10.1177/1077559510387662

Lotzin, A., Lu, X., Kriston, L., Schiborr, J., Musal, T., Romer, G., & Ramsauer, B. (2015). Observational tools for measuring parent–infant interaction: A systematic review. *Clinical Child and Family Psychology Review*, 18. https://doi.org/10.1007/s10567-015-0180-z

Lucassen, N., Tharner, A., Bakermans-kranenburg, M. J., Volling, B. L., Verhulst, F. C., & Berg, M. P. L. Den. (2011). The association between paternal sensitivity and infant-father attachment security: A meta-analysis of three decades of research. *Journal of Family Psychology*, 25, 986–992. https://doi.org/10.1037/a0025855

Lüdecke, D. (2019). *esc: Effect size computation for meta analysis (Version 0.5.1)*. https://doi.org/10.5281/zenodo.1249218

Macdonald, G., Livingstone, N., Hanratty, J., McCartan, C., Cotmore, R., Cary, M., . . . Churchill, R. (2016). The effectiveness, acceptability and cost-effectiveness of psychosocial interventions for maltreated children and adolescents: An evidence synthesis. *Health Technology Assessment*, 20. https://doi.org/10.3310/hta20690

MacLeod, J., & Nelson, G. (2000). Programs for the promotion of family wellness and the prevention of child maltreatment: A meta-analytic review. *Child Abuse and Neglect*, 24, 1127–1149. https://doi.org/10.1016/S0145-2134(00)00178-2

Mersky, J. P., Topitzes, J., Grant-savela, S. D., Brondino, M. J., & Mcneil, C. B. (2016). Adapting parent-child interaction therapy to foster care: Outcomes from a randomized trial. *Research on Social Work Practice*, 26, 157–167. https://doi.org/10.1177/1049731514543023

Mikton, C., & Butchart, A. (2009). Child maltreatment prevention: A systematic review of reviews. *Bulletin of the World Health Organization*, 87, 353–361. https://doi.org/10.2471/BLT.08.057075

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine*, 6, e1000097. https://doi.org/10.1371/journal.pmed.1000097

Moran, G., Forbes, L., Evans, E., Tarabulsy, G. M., & Madigan, S. (2008). Both maternal sensitivity and atypical maternal behavior independently predict attachment security and disorganization in adolescent mother-infant relationships. *Infant Behavior and Development*, 31, 321–325. https://doi.org/10.1016/j.infbeh.2007.12.012

Moreno, A. J., Klute, M. M., & Robinson, J. L. (2008). Relational and individual resources as predictors of empathy in early childhood. *Social Development*, 17, 613–637. https://doi.org/10.1111/j.1467-9507.2007.00441.x

Morton, N., & Browne, K. D. (1998). Theory and observation of attachment and its relation to child maltreatment: A review. *Child Abuse and Neglect*, 22, 1093–1104. https://doi.org/10.1016/S0145-2134(98)00088-X

Moss, E., Dubois-Comtois, K., Cyr, C., Tarabulsy, G. M., St-Laurent, D., & Bernier, A. (2011). Efficacy of a home-visiting intervention aimed at improving maternal sensitivity, child attachment, and behavioral outcomes for maltreated children: A randomized control trial. *Development and Psychopathology*, 23, 195–210. https://doi.org/10.1017/S0954579410000738

Mountain, G., Cahill, J., & Thorpe, H. (2017). Sensitivity and attachment interventions in early childhood: A systematic review and meta-analysis. *Infant Behavior and Development*, 46, 14–32. https://doi.org/10.1016/j.infbeh.2016.10.006

Murray, L. K., Dorsey, S., Haroz, E., Lee, C., Alsiary, M. M., Haydary, A., . . . Bolton, P. (2014). A common elements treatment approach for adult mental health problems in low- and middle-income countries. *Cognitive and Behavioral Practice*, 21, 111–123. https://doi.org/10.1016/j.cbpra.2013.06.005

O'Connor, D., Green, S., Higgins, J. (2011). Chapter 05: Defining the review question and developing criteria for including studies. In *Cochrane handbook for systematic reviews of interventions* (pp. 1–11). http://handbook.cochrane.org/

Oudekerk, B. A., Allen, J. P., Hessel, E. T., & Molloy, L. E. (2015). The cascading development of autonomy and relatedness from adolescence to adulthood. *Child Development*, 86, 472–485. https://doi.org/10.1111/cdev.12313

Paez, A. (2017). Gray literature: An important resource in systematic reviews. *Journal of Evidence-Based Medicine*, 10, 233–240. https://doi.org/10.1111/jebm.12266

Page, M. J., Higgins, J. P., & Sterne, J. A. (2019). Chapter 13: Assessing risk of bias due to missing results in a synthesis. *Cochrane Handbook for Systematic Reviews of Interventions*, 349–374. https://doi.org/10.1002/9781119536604.ch13

Schoemaker, N. K., Wentholt, W. G. M., Goemans, A., Vermeer, H. J., Juffer, F., & Alink, L. R. A. (2019). A meta-analytic review of parenting interventions in foster care and adoption. *Development and Psychopathology*, 1–24. https://doi.org/10.1017/S0954579419000798

Schueler, C. M., & Prinz, R. J. (2013). The role of caregiver contingent responsiveness in promoting compliance in young children. *Child Psychiatry and Human Development*, 44, 370–381. https://doi.org/10.1007/s10578-012-0331-0

Skowron, E., & Reinemann, D. H. S. (2005). Effectiveness of psychological interventions for child maltreatment: A meta-analysis. *Psychotherapy*, 42, 52–71. https://doi.org/10.1037/0033-3204.42.1.52

Solomon, J., & George, C. (2016). The measurement of attachment security and related constructs in infancy and early childhood. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research and clinical applications* (pp. 366–396). New York: The Guilford Press.

Sroufe, L. A. (2005). Attachment and development: A prospective, longitudinal study from birth to adulthood. *Attachment and Human Development*, 7, 349–367. https://doi.org/10.1080/14616730500365928

Sroufe, L. A. (2013). The promise of developmental psychopathology: Past and present. *Development and Psychopathology*, 25(4 PART 2), 1215–1224. https://doi.org/10.1017/S0954579413000576

Stack, D. M., Serbin, L. A., Girouard, N., Enns, L. N., Bentley, V. M. N., Ledingham, J. E., & Schwartzman, A. E. (2012). The quality of the mother-child relationship in high-risk dyads: Application of the emotional availability scales in an intergenerational, longitudinal study. *Development and Psychopathology*, 24, 93–105. https://doi.org/10.1017/S095457941100068X

Stronach, E. P. (2011). Preventive interventions and sustained attachment security in maltreated children: A 12-month follow-up of a randomized controlled trial. University of Rochester. https://doi.org/10.1111/hir.12019

Stronach, E. P., Toth, S. L., Rogosch, F., & Cicchetti, D. (2013). Preventive interventions and sustained attachment security in maltreated children. *Development and Psychopathology*, 25(4 PART 1), 919–930. https://doi.org/10.1017/S0954579413000278

Toth, S. L., Gravener-Davis, J. A., Guild, D. J., & Cicchetti, D. (2014). Relational interventions for child maltreatment: Past, present, & future perspectives. *Development and Psychopathology*, 25, 1601–1617. https://doi.org/10.1017/S0954579413000795.Relational

U.S. Department of Health & Human Services, Administration for Children and Families, Administration on Children, Youth and Families, C. B. (2019). *Child maltreatment 2017*. https://www.acf.hhs.gov/cb/research-data-technology/statistics-research/child-maltreatment

Valentino, K. (2017). Relational interventions for maltreated children. *Child Development*, 88, 359–367. https://doi.org/10.1111/cdev.12735

van der Put, C. E., Assink, M., Gubbels, J., & Boekhout van Solinge, N. F. (2018). Identifying effective components of child maltreatment interventions: A meta-analysis. *Clinical Child and Family Psychology Review*, 21, 171–202. https://doi.org/10.1007/s10567-017-0250-5

van IJzendoorn, M. H., Schuengel, C., & Bakermans-Kranenburg, M. J. (1999). Disorganized attachment in early childhood: Meta-analysis of precursors, concomitants, and sequelae. *Development and Psychopathology*. https://doi.org/10.1017/s0954579499002035

Verhage, M. L., Schuengel, C., Madigan, S., Pasco Fearon, R. M., Oosterman, M., Cassibba, R., . . . Van IJzendoorn, M. H. (2016). Narrowing the transmission gap: A synthesis of three decades of research on intergenerational transmission of attachment. *Psychological Bulletin*, 142, 337–366. https://doi.org/10.1037/bul0000038

Viechtbauer, W. (2010). Conducting meta-analyses in R with the meta for Package. *Journal of Statistical Software*, 36, 1–48.

Zajac, L., Raby, K.L., & Dozier, M. (2019). Sustained effects on attachment quality in middle childhood: The attachment and biobehavioral catch-up intervention. *Journal of Child Psychology and Psychiatry*. https://doi.org/10.1111/jcpp.13146

Ziv, Y., Aviezer, O., Gini, M., Sagi, A., & Koren-Karie, N. (2000). Emotional availability in the mother-infant dyad as related to the quality of infant-mother attachment relationship. *Attachment and Human Development*, 2, 149–169. https://doi.org/10.1080/14616730050085536