

# The Effectiveness of Parent-Child Observation in Parent-Mediated Programmes for Children with Developmental Disabilities and Externalizing Disorders: A Systematic Review and Meta-Analysis

## Abstract

This systematic review evaluated the treatment effects of communication-focused parent-mediated interventions (CF-PMT), a form of intervention that involves therapists observing parent-child interactions and giving feedback to parents on how they can practice positive parenting strategies to prevent or reduce externalizing behaviours in children with developmental disabilities. A literature search was conducted on three electronic databases. To be included in the review, studies had to: evaluate CF-PMT where therapists give feedback after observing parent-child interactions; examine changes in externalizing behaviours amongst children with any forms of developmental disability; and adopt a randomised controlled trial study design. Fifteen studies met eligible criteria for the literature review, of those, 13 studies had available data on changes in the primary (child externalizing behaviours) and secondary outcomes (parental stress, child linguistic abilities and child social responsiveness). We found significant treatment effects for CF-PMT in reducing child externalizing behaviours ( $d = -0.60$ ) but not for any of the secondary outcomes. A sensitivity analysis showed a small but significant treatment effect for parental stress ( $d = -0.18$ ). Considerable bias was observed due to the lack of available information reported by studies on aspects measured by the Mixed Methods Appraisal Tool. Overall, we found evidence to support the benefits of complex interventions which incorporate direct parent-child observations and feedback to improve behavioural outcomes amongst children with developmental disabilities.

## Introduction

### Developmental disabilities and externalizing behaviours

Developmental disabilities refer to a group of conditions that involve impairments in physical, learning, behavioural or language areas (Centers for Disease Control and Prevention, 2022). This includes but is not limited to conditions such as autism spectrum disorder (ASD) and intellectual disabilities. Previous population studies and meta-analyses suggest estimated prevalence rates of 1% for ASD (Zeidan et al., 2022) and 3% for intellectual disabilities (Olusanya et al., 2020).

Whilst the aetiology and presentation of each developmental disability vary, children in this population are often at increased risk for exhibiting externalizing behaviours (also called challenging or disruptive behaviours) (Hastings, 2002). These are behaviours that may put the individual or those around them in harm, including interpersonal physical or verbal aggression and self-injurious behaviours (Emerson et al., 2011). Prevalence rates of externalizing behaviours amongst children with intellectual disabilities range between 51.3% - 80.3% (Decker et al., 2012; Lundqvist, 2013).

Externalizing behaviours significantly impact the individual, their families and the wider community. On an individual level, externalising behaviours that persist into adulthood are likely to reduce educational and vocational opportunities as well as increasing the use of restrictive practices including the administration of long term psychotropic medications (Einfeld et al., 2006). On a familial level, externalizing behaviours are consistently associated with higher levels of parental stress compared with parents of neurotypical children (Findler et al., 2016). In summary, the costs of externalizing behaviours in children with developmental disabilities are too detrimental to be left untreated.

## Importance of parenting

Positive parenting refers to parenting styles that include consistently caring for, communicating and providing for the needs of a child to promote a healthy parent-child relationship (Seay et al., 2014). Parental sensitivity, an aspect of positive parenting, refers to the ability to identify and interpret a child's cues and signals, and subsequently respond to those needs promptly and appropriately (Ainsworth et al., 1974), has been shown to impact child development. Clinical characteristics of developmental disabilities, such as impairments in verbal and non-verbal communication and differences in processing information (Mazefsky et al., 2013), may make it difficult for parents to understand and respond to their child's attachment needs. This increases the likelihood for children to exhibit externalizing behaviours in stressful or overstimulating situations. Indeed, higher levels of parental sensitivity have been shown to correlate with enhanced emotional regulation, cognitive development and social responsiveness (i.e., quality of communication skills) amongst children with ASD developmental disabilities (Warren & Brady, 2007; Crowell et al., 2019). Enhanced emotional regulation in children leads to better behavioural management, and subsequently, lower levels of externalizing behaviours (Öztürk Samur, 2015). Evidence have also shown increased social responsiveness – the quality of communication skills – amongst children that receive positive and supportive parenting.

Longitudinal studies conducted in children with intellectual disabilities have shown that experiencing quality parenting at age 3 can significantly predict better cognitive development and emotional regulation at age 10, suggesting the sustained benefits of quality parenting on children's development (Hauser-Cram et al., 2001). However, mothers of children with ASD tend to exhibit lower levels of maternal sensitivity, lower tolerance to frustration, and high levels of maternal intrusiveness compared to mothers of neurotypical children (Magrelli et

al., 2013; Dollberg et al., 2010; Feldman et al., 2011). Similarly, some parents of children with Down Syndrome have been reported to adopt a permissive parenting style, where the parents are nurturing but reluctant to impose limits and boundaries and are more tolerant of a range of externalizing behaviours, which may further reinforce externalizing behaviours (Phillips et al., 2017). These trends can be explained by the Hastings (2002) model, where child externalizing behaviours lead to an increase in parental stress, and parents under stress adopt parenting behaviours that unintentionally reinforce the negative behaviours (Azad et al., 2013). The reciprocal relationship between these factors suggests that to reduce child externalizing behaviours and parental stress, early parent-mediated interventions that promote positive parenting strategies should be implemented to improve child and parental outcomes. Evidence also found that children who experience positive parenting tend to have better linguistic outcomes, such as having larger vocabularies and stronger expressive and receptive language skills (Smith et al., 2000). Positive parenting strategies such as promoting parent-child interactions and creating a supportive environment can facilitate language development by encouraging more verbal exchanges and providing children with a rich language input (Zhang et al., 2019).

Communication-focused parent-mediated training (CF-PMT) is a program that involves therapists observing parent-child interactions, either in real-time or using video feedback technologies, and giving direct feedback to parents as the active ingredient to improve interactions with their children. Real-time observations allow for immediate feedback and intervention, and programmes that utilise video-recording technology offer the advantage of capturing and reviewing implicit signals between parent-child interactions in a controlled environment that may otherwise be missed in real-time (Juffer et al., 2017). Both methods allow parents to gain personalised insights on how to resolve externalizing behaviours in

specific situations and apply positive parenting strategies to their children. There is evidence to suggest that video-feedback interventions adapted specifically for children with developmental disabilities can improve parent-child relationships and child developmental outcomes, such as communication and vocalization behaviours amongst children with hearing impairments (Damen et al., 2011; Provenzi et al., 2020). However, there has not been a systematic review to specifically examine the treatment outcomes of parent-child observation and feedback interventions, both in real-time and using video feedback technologies. Considering the continuous and detrimental effects of childhood externalising behaviours into adulthood, including associations with poorer linguistic abilities (Peterson & LeBeau, 2020) and social responsiveness (Hus et al., 2012), we aim to gain insights on evidence-based interventions that utilise parent-child observations and feedback to improve parental outcomes and socioemotional outcomes for children with developmental disabilities.

### Review aims

Our objectives were to conduct a systematic review and meta-analysis to investigate whether direct parent-child observations and personalized feedback, as the active ingredient of interventions, are effective in reducing externalizing behaviours in children with developmental disabilities. Parental stress and other child developmental outcomes including linguistic abilities and social responsiveness will also be examined as secondary outcomes.

Data for the review is derived from randomised controlled trials.

## Methods

### Eligibility criteria

The inclusion criteria for papers selected for this review were as follows:

- The study incorporates a randomised controlled trial (RCT), or a quasi-RCT study design.
- The intervention of interest involves the therapist observing parent-child interactions and giving direct feedback on solutions for externalizing behaviours or strategies to promote positive parenting.
- Participants are children below the age of 18 with diagnoses of any type and severity of developmental disabilities defined by the International Classification of Diseases (ICD) or the Diagnostic and Statistical Manual (DSM) (including intellectual and neurodevelopmental disabilities) or other valid psychometric assessment, and their caregivers.
- The study measures changes in externalizing behaviours pre and post-intervention using a validated scale or questionnaire.

Papers were excluded in the review if:

- The study does not incorporate an RCT or quasi-RCT study design.
- The intervention of interest has no mention of clinicians observing and providing direct feedback on parent-child interactions.
- Children do not have a diagnosis of intellectual or developmental disabilities.
- Only includes adults or reports data on children and young people over the age of 18.
- Externalizing behaviours are not one of the outcome measures.

### [Search strategy](#)

A systematic literature search was conducted in June 2022 on Medline (Ovid), PsychInfo and EMBASE. An extensive list of key terms and their variations were devised and searched in collaboration with expert librarians and unlimited truncations were used on the respective

electronic databases to expand the search results (see Appendix 1). Due to time constraints and limited resources, a limit on English-only studies was placed on all searches. This was supplemented by a manual search on Google Scholar and through the reference sections of relevant articles from the database searches. Citations of articles that resulted from the respective searches were then downloaded into the software EndNote and deduplicated. The first author screened the titles and abstracts to identify articles that could potentially meet the inclusion criteria and excluded irrelevant papers. The full texts of the remaining articles were then retrieved and screened for inclusion (Figure 1). Ten percent of papers were randomly selected and reviewed at both stages by an independent screener and the process was aided by a third rater. In the case of disagreement, the first author and second rater would meet and discuss any discrepancies. High inter-rater reliability ( $\alpha = 0.75$ ) was observed.

insert Figure 1

#### Data extraction

Data from included studies were extracted using the Cochrane Data Collection form for intervention reviews – RCTs only (Cochrane Collaboration, 2021). The first author extracted data from each included paper containing study title, author, year of publication, study setting, study design, sample size, sample characteristics including mean age and standard deviation in years, child diagnosis, the intervention programme name and measurements used to assess externalizing behaviours. Individual results were also tabulated, incorporating statistical indices, such as p-values and odds ratio, and conclusions drawn by study authors. Key information from respective studies was then collated onto one Data Extraction Table in Excel software.

## Data synthesis

Following the PRISMA checklist for reporting literature reviews, a descriptive synthesis of studies that met inclusion criteria was conducted to provide a summary of study characteristics, i.e. setting, the total number of families included, and the presence of different developmental disorders. Two studies that met inclusion criteria for the literature review did not have available statistical data on post-intervention child externalizing behaviours scores (Greathouse, 2021; Quetsch, 2019), therefore they were not included in the meta-analysis. Findings of these studies are presented in a narrative synthesis.

## Primary and secondary outcome measures

As the primary outcome, the current review focused on the differences in child externalizing behaviours between those that received CF-PMT and those that did not. All outcome measures reported in the included studies were collated and common themes related to parenting and child developmental outcomes were extracted as secondary outcomes, they are: parental stress, child's linguistic abilities and child's social responsiveness. These outcomes were chosen to examine whether CF-PMT improves other parental and child developmental outcomes.

## Data analysis

To analyse the overall change in primary and secondary outcomes of the included studies, random effects models were used to calculate standardised mean differences (SMD) of the post-intervention scores between the intervention and control groups on the Review Manager 5.4.1 software (Higgins et al., 2022). SMD was used to account for the different scales used to measure each of the outcomes. Studies were categorised into three domains based on the similarity in theoretical orientation between each intervention: attachment-based



interventions (n = 8); cognitive and behavioural-based interventions (n = 4); family systems theory-based interventions (n = 1). Subgroup analyses were conducted with studies in the attachment-based and cognitive and behavioural-based interventions. Group analysis on family systems-based intervention could not be performed as only 1 study reported an intervention underpinned by this theoretical premise. Sensitivity analyses were also conducted where analyses were repeated after excluding studies with significant risk of bias (RoB).

### Risk of bias assessment

The methodological quality of studies included in the review was assessed using the Mixed Methods Appraisal Tool (MMAT) in 5 aspects: performance of randomisation, group differences at baseline, completeness of outcome data, blinding of outcome assessors and participants' adherence rates (Hong et al., 2018). There are no specified cut-off values for acceptable complete outcome data and participants' adherence rates in the official guidelines of the MMAT, therefore the current research team agreed to use 80% as standardised measurements of acceptable complete outcome data and participant adherence rates across all included studies (Thomas et al., 2004). Following the guidelines of the criteria, the main author reviewed the methods and results section of each included study and rated each aspect in 1 of 3 response categories – 'Yes', 'No,' and 'Can't tell' based on the available information reported in each study, therefore results of the RoB assessments are presented in table format. The risk of publication bias of the primary outcome was assessed through the examination of funnel plots and Egger's test for funnel plot asymmetry (Higgins et al., 2022) using the SPSS 28 statistical software.

### Results

## Description of studies

Fifteen records met the inclusion criteria for the review (Table 1). The majority of studies were conducted in the USA (n = 9), 2 studies in Ireland, and 1 study each in Hong Kong, Italy, and Japan. Sample sizes of the included studies ranged from 19 to 244, with a sum of 1029 families participating across all studies. Nine studies focused on children diagnosed with ASD, 5 studies on children with non-specified developmental disabilities, and one study each on children with intellectual disabilities (Bagner & Eyberg, 2007) and foetal alcohol syndrome (Petrenko et al., 2017). Three studies utilised video-recording technology to facilitate observations and feedback, remaining studies observed parent-child interaction and gave feedback in real-time. Children's age ranged from 2 to 8.84 years, and the percentage of male children ranged from 62.5% to 92.9%. Nine studies reported the ethnic and racial composition of the sample. One study conducted in Japan reported participants to be all Japanese (Furukawa et al., 2018), and another study reported participants to be largely Hispanic (60.7%) (Quetsch, 2019). The remaining 7 studies reported participants to be largely White, ranging from 51.9% to 91% of the sample.

insert Table 1

## Types of Intervention

Studies are grouped based on the theoretical basis of the intervention programme at focused, they are attachment-based interventions (n = 8), cognitive behavioural-based interventions (n = 4) and family system theory based intervention (n = 1). Results are presented in the following table.

Insert Table 2

## Meta-analysis of Treatment Effects

### Primary Outcomes – Externalizing Behaviours

13 studies were included in the meta-analysis for the primary outcome. Standardised mean differences (SMD) of post-intervention scores showed significantly lower externalizing behaviours in the intervention group when compared to the control group ( $n = 383$ ,  $d = -0.60$ , [95% CI -0.95, -0.25]) (Table 2).

### Subgroup analysis – Externalizing Behaviours according to Intervention type

Subgroup analyses revealed significantly lower levels of externalizing behaviours amongst groups that received attachment-based interventions ( $n = 168$ ,  $d = -0.87$ , [95% CI -1.56, -0.18],  $I^2 = 86\%$ ), and cognitive and behavioural-based interventions ( $n = 188$ ,  $d = -0.21$ , [95% CI -0.42, -0.00],  $I^2 = 0\%$ ) (Table 2). Subgroup analysis was not conducted on family systems-based interventions as only 1 study reported on an intervention underpinned by this theoretical premise.

insert Table 3

### Secondary Outcomes

Standardised mean differences in post-intervention scores between the intervention and control groups were calculated for secondary outcomes. Results showed no significant differences in parental stress ( $n = 375$ ,  $d = -0.10$ , [95% CI -0.26, 0.07],  $I^2 = 13\%$ ) (Table 3), child linguistic abilities – measured by children’s vocabulary ( $n = 98$ ,  $d = 0.14$ , [95% CI -0.14, 0.42],  $I^2 = 0\%$ ), or child social responsiveness ( $n = 25$ ,  $d = -0.21$ , [95% CI -0.77, 0.36],  $I^2 = 0\%$ ) (Table 3).

insert Table 4

#### Assessment of risk of bias

Overall, studies included in the review failed to report information on some aspects measured by the MMAT (Supplementary Material 1). Of the information that was available, 2 studies included in the review utilised methodology that may put the findings at higher risk of researcher bias (Quetsch, 2019) (i.e. outcome assessors were not blinded to group allocation) or selection bias (Salisbury et al., 2022) (i.e. no random allocation to groups).

See Supplementary Material 1

#### Publication bias

Egger's test of funnel plot asymmetry showed no significant results ( $t = -1.072$ ,  $p = .307$ ), indicating the primary outcome data in the funnel plot is symmetrical (Supplementary Material 2). Although this does not directly negate the possibility of publication bias in studies included in the current review, it suggests that it was unlikely to have taken place.

See Supplementary Material 2

#### Sensitivity analyses

Sensitivity analyses were conducted on the effects of individualised CF-PMT on child externalizing behaviours and parental stress with the Salisbury et al. study removed due to its high risk of selection bias. This showed an increase in effect size, from  $d = -0.60$  to  $d = -0.67$  of the primary outcome ( $n = 313$ ,  $d = -0.67$ , [95% CI -1.03, -0.32],  $I^2 = 74\%$ ). Non-

significant findings originally observed in the parental stress domain were rendered significant within this analysis, indicating lower levels of parental stress in the intervention group post-intervention ( $n = 305$ ,  $d = -0.18$ , [95% CI -0.35, -0.02],  $I^2 = 0\%$ ).

#### Narrative synthesis – Treatment Effects of CF-PMT

Two studies that met inclusion criteria did not have available statistical data on post-intervention child externalizing behaviours scores, therefore they were not included in the meta-analysis. Findings of these studies are presented in a narrative synthesis below.

Greathouse (2021) examined child behavioural outcomes between families that received PCIT and with those who did not. The author reported a significantly steeper decrease in problem behaviours amongst children of families that attended PCIT compared to the control group. Quetsch (2019) investigated treatment effects between receiving PCIT with monetary incentives and PCIT alone on child behavioural outcomes and treatment retention amongst children with mental health difficulties (30% of participants were diagnosed with ASD) and their families. Results showed no significant group differences in child externalizing behaviours, parental stress, or attendance between groups. However, within-group analyses revealed a significant decrease in child externalizing behaviours and parental stress before and after receiving intervention in both groups. Another study worth mentioning is the Salisbury et al. study, where the authors compared treatment effects between parent-mediated interventions with (intervention) and without (control) video-coaching sessions. They found no significant differences in child externalizing behaviours and parental stress between intervention and control groups, but within-group analyses indicated that both groups experienced significant improvements in both child behavioural and parental outcomes.

## Discussion

The current systematic review and meta-analysis investigated the effectiveness of CF-PMT, a form of therapy that involves parent-child observations and feedback, in improving child behavioural outcomes. The meta-analysis found a significant moderate effect ( $d = -0.60$ ) of CF-PMT in reducing externalizing behaviours amongst children with developmental disabilities. These findings complement the conclusions made by Provenzi et al. in their literature review, where video-feedback interventions were consistently found to improve behavioural outcomes amongst children with neurodevelopmental disabilities. Through observing and providing feedback on parent-child interactions, therapists can support parents to improve the relationship with their child (Bakermans-Kranenburg et al., 2003).

Subgroup analyses showed a significant decrease in child externalizing behaviours for both attachment-based and cognitive and behavioural-based interventions, however, effect size for attachment-based interventions was larger ( $d = -0.81$ ). According to the attachment theory, child's socioemotional development is strongly influenced by the quality of early relationship and attachment with primary caregivers (Bowlby, 1982). However, children with developmental disabilities often face difficulties in this area as they may display atypical behaviours including repetitive patterns or limited interest in interacting with their parents (American Psychiatric Association, 2013) – commonly observed amongst children with ASD. Similarly, children with developmental disabilities tend to rely on non-verbal cues or alternative modes of communication to express their attachment-related needs to caregivers (Aydin, 2023). Indeed, children with intellectual disabilities are more likely to form insecure or disorganised attachment types, which leads to a range of adverse outcomes including higher rate of externalising behaviours (Madigan et al., 2016; Hamadi & Fletcher, 2021). Understanding these unique expressions of attachment then becomes crucial for caregivers in order to ensure healthy socioemotional development amongst these children. Tailored

strategies given during parent-child observation and feedback, specifically in increasing parental understanding of children's attachment needs and communication techniques can promote healthy development and reduce externalising behaviours amongst children. This explains why attachment-based interventions that focus on improving parent-child relationship may be more efficacious in achieving reduction of externalising behaviours. This is not to say, however, that cognitive behavioural-based interventions are not effective. Specifically, emphasis placed on emotional coaching – techniques that highlight the impact of children's thoughts and attitude on their emotions and feelings (Gottman et al., 1996) – amongst these interventions can also lead to increased parental warmth and improved emotional regulation amongst children. Thus, children are less likely to exhibit externalizing behaviours as a result of negative emotions (Eisenberg et al., 1998; Reuben et al., 2016). A survey found that children with ASD whose parents used emotional coaching techniques such as respecting and talking about a situation that affects their child's emotions, exhibited significantly lower levels of externalizing behaviours (Wilson et al., 2013). Considering significant results were observed amongst both attachment-based and cognitive behavioural-based interventions, we conclude that both theoretically driven interventions appear effective in reducing externalising behaviours for this population.

The current review did not find any effects of CF-PMT on any of the secondary outcomes, parental stress, child linguistic abilities and child social responsiveness. However, after removing the Salisbury et al. study, small but significant effects were observed for lower levels of parental stress in the intervention groups. This is supported by existing studies, where researchers have found that parental stress is directly related to externalizing behaviours, more so than any other child-related factors such as the severity of child disability (Neece et al., 2012). A reduction in parental stress may be a by-product of the

reduction in externalizing behaviour. Alternatively, the parent-mediated intervention itself may have a direct effect in reducing parental stress amongst families of children with disabilities (Tellegen et al., 2013). Either way, CF-PMT likely has additional benefits on child and parent outcomes beyond the reductions of externalizing behaviours.

High attrition rates were consistently found in the trials included in the current review, which reflects a broader problem in paediatric therapy (Lyon et al., 2010). Attending therapy sessions may be particularly challenging for this population, due to additional caregiving demands and commitments such as other health appointments. This is concerning as it indicates a large number of families are not receiving the support and intervention they need, and points towards a need to explore the best mode and style of intervention delivery for this population. We found high heterogeneity in the pooling of studies for the primary outcome ( $I^2 = 78\%$ ). This may be due to the differences in sample characteristics and diagnosis as some studies focused only on children with ASD, and others on any developmental disabilities. Despite this, findings are broadly comparable as the outcome measures used in the included studies have been validated and largely measure similar constructs.

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### Strengths and Limitations

The present review represents a novel contribution by encompassing a meta-analysis of previously published studies evaluating the effectiveness of interventions incorporating what



may be considered active ingredients of parenting programmes to reduce externalising behaviours such as observations of parent-child interaction and feedback. Furthermore, studies were only included if they adopted an RCT design, considered to be the gold standard in efficacy research (Hariton & Locascio, 2018). Lastly, adherence to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) checklist ensured methodological rigor and transparency in both the methodology and reporting of results, facilitating study replication and strengthening the overall reliability of the findings.

However, there are some limitations to the current review. Though a previous meta-analysis on parent-mediated interventions has reported small, but significant effects of child communication-language abilities and socialisation amongst children with ASD (Nevill et al., 2018), this effect was not observed in the current review. This may be because only a small number of studies met the inclusion criteria for the current review, three and two studies respectively, measured each of these secondary outcomes. Small sample sizes are likely to reduce the power of the statistical analyses, thus rendering the findings inconclusive (Faber & Fonseca, 2014).

Post-intervention scores were used to calculate the differences in child and parental outcomes between the intervention and control groups. However, we acknowledge that comparing the mean change between pre- and post-intervention scores may have revealed more insightful findings, such as the degree of change in outcomes between the intervention and control group over time. Only two of 13 studies had available data on the mean change between pre- and post-intervention scores, therefore only post-intervention scores were used in the analysis.

There is a need for future research to consider the whether the number of individual sessions in the respective CF-PMT programmes affect treatment outcomes. It is logical to expect that

a higher number of sessions may lead to better treatment outcomes, as there is more opportunity for feedback and modifications to parenting behaviours. However, this effect was not examined as the number of individual sessions each CF-PMT provided were not specified in 9 out of 13 included studies.

Lastly, a limit to English-only studies was applied during the electronic database search. This increase the likelihood of bias and threatens the internal validity and limits the generalisability of findings to a very specific cultural background and socioeconomic demographic (Neimann et al., 2018). However, evidence suggest that excluding non-English studies from systematic reviews has minimal effect on overall conclusions (Nussbaumer-Streit et al., 2020; Dobrescu et al., 2021).

#### Implications for Practice and Future Research

The present study revealed significant reductions in externalizing behaviours amongst children with developmental disabilities subsequent to parents receiving Child-Focused Parent-Mediated Training (CF-PMT). Considering how children with developmental disabilities commonly encounter distinctive challenges concerning communication, and socioemotional development, tailored interventions that acknowledge and address these needs through promoting positive parenting can ensure parents receive appropriate guidance that supports their child's developmental profile. By directing attention to these specific areas, interventions can enhance the effectiveness of positive parenting strategies that are beneficial for children with developmental disabilities, specifically in reducing externalising behaviours. Moving forward, the findings from this review emphasize the necessity for broader implementation of personalized feedback parent-mediated interventions within routine care to improve treatment outcomes for children with developmental disabilities and their families. Furthermore, understanding the theoretical basis of these interventions (i.e.,

attachment-based, cognitive and behavioural-based) and the effectiveness of integrating these principles in interventions can guide practitioners and policymakers in developing evidence-based interventions that enhances treatment outcomes for children with developmental disabilities. Considering the long-lasting and detrimental effects of externalizing behaviours, further work to develop and test preventative interventions that teach parenting skills to parents of newly diagnosed children with development disabilities may also act to protect against the emergence of such behaviours.

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