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Attachment, behavior problems and interventions

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This paper puts forward an explanation for the frequent co-occurrence of attachment and behavior problems in children and the implications of this for interventions; presents preliminary evidence that some behaviorally based parenting programs reduce child behavior problems through two separate, but mutually reinforcing, processes—improved attachment relationships and increased parental use of behavior management techniques; and suggests next steps for the field to improve outcomes for those children who, without interventions that addresses both relationship building and behavior management, are at risk of significant long-term difficulties.

KEYWORDS

childhood, attachment, behavior problems, parenting programs, behavioral analysis

1. Introduction

Significant attachment disorders/difficulties are frequently established early in children's lives (1) and behavioral challenges also emerge when children are quite young. Both have poor outcomes and, over time, often co-occur (2–6). This paper presents a brief behavioral analysis of attachment and reviews evidence that behavioral parenting programs, that include relationship building, conceptualized within a behavioral framework, improve child-parent attachment relationships whilst independently reducing child behavior problems.

2. Attachment

Children's very early experience of the care, provided by their primary carers, impacts their developing brain function in terms of their ability to regulate both physiology and behavior (1). Experience-dependent brain maturation contributes to an understanding of attachment supporting Bowlby's (7) view that attachment has a biological function that mediates processes in children's emotions, social cognition and behavior with studies demonstrating how children make the best use of the care that is offered and demonstrating relative deficits in effortful control or self-regulation among children with disorganized attachments (8–10).

Maternal attachment style, associated with internalizing and externalizing behavior in children, carries intergenerational risks associated with adverse maternal childhood experiences and current mental health problems (11). Caregiver sensitivity ensures secure infant attachment (12–14) with early caregiver sensitivity in low-income mothers of children aged 1 year predicting their self-regulation at ages 2 and 3 (15, 16). Furthermore these early attachment relationships patterns become increasingly hard to change over time.

Maternal depression significantly reduces maternal responsiveness, contributing to impaired bonding, early mother–baby interaction difficulties and long-term effects for

children (17, 18) and there are risks particularly for children who are removed from their biological parent (1).

Attachment-based studies show both levels of cortisol that differ from those of securely attached children and effective changes in brain function and attachment behaviors following attachment based intervention [e.g., (1), in a their study with fostered toddlers]. However, much of this work focuses on children's very early years and seldom evaluates impacts on co-occurring behavioral problems. However, a recent meta-analysis of Video-feedback Intervention to Promote Positive Parenting and Sensitive Discipline, combining parental sensitive responsiveness and sensitive limit setting, (VIPP-SD) (19) showed substantial effects on parenting behavior and attitudes and child attachment security but no significant effects on child externalizing behavior. Furthermore despite "an extensive literature linking maternal sensitivity, attachment and child outcomes at present the evidence base for directly affecting attachment via maternal sensitivity is equivocal" (20).

3. Behavior problems

Early child behavior problems represent the largest referral category to child mental health services (21), have lifelong effects (2) and are extremely costly (21, 22). Longer term problems include poor health, school failure, delinquency, drug use, adult offending and violence towards partners and children (23, 24).

Significant child behavior problems are associated with insensitive parenting (25, 26) through a downward spiral in which both parents and children behave aversively (27). Problematic parent behaviors include harsh parenting, physical punishment, lax supervision and inconsistent discipline (24, 28).

Behaviorally based parenting programs reduce child behavior problems and increase positive parenting skills both short (29–33) and longer term (34, 35). Many studies also report significant improvements in maternal depression (36). However program content is varied and, despite their impact on child internalizing and externalizing behavior problems, effect sizes often remain small (37). It is clear from the development strong criteria for assessing the content, process and access to programs (the Blueprints for Violence Prevention criteria) that many programs achieve limited results due to lack of fidelity.

4. Attachment and behavior problems

Untreated early attachment difficulties are linked to subsequent hostility, hyperactivity, aggression, oppositional defiant disorder (38) and longer-term mental health problems and delinquency (39–42). Insecure attachment at age one predicts child aggression at age seven, and maternal criticism towards children at age four predicts more severe child aggression (43). Over 80% of pre-school children with behavior problems are insecurely attached to their parents (44) and teachers rate children with attachment problems as also having behavior problems poor school attendance and academic underachievement (45, 46).

The association between attachment and behavior problems is particularly relevant for looked after children (47) who have often been maltreated (48), have, by definition, had disrupted attachments and have three times the general rate of conduct disorders (49) with problems frequently established before entering care (50, 51). These problems present significant risk of placement breakdown (52) and are the major challenge for fostering services (53, 54).

Maternal depression predicts attachment and behavior difficulties (55) with 50% of mothers of children with significant behavioral problems clinically depressed (33, 36, 56). Depressed mothers have lower rates of praise, fail to monitor children and spend less time playing with them (57–59). They have insensitivity to the cues of others (60, 61), poor observation skills (62, 63) and poor problem-solving (64, 65). They focus on deviant behavior and cannot describe behavior in detail (66–68) differentiating between parents of referred and non-referred children with behavioral challenges (69) and describing many aspects of parenting attachment difficulties.

Attachment relationship problems generally precede the emergence of behavior problems. However there are a number of possible explanations for the emergence of both problems: (1) Behavior problems can arise from parental insensitivity to children's cues causing children to escalate attention seeking problematic behavior; (2) Lack of positive attention can prompt children to seek alternative tangible, reinforcers such as foods or risky high adrenaline activities; (3) Some early child features, prematurity, disability, sleep/feeding difficulties, persistent crying, increase the risk of attachment problems because parents' caring behavior is not reinforced, increasing risks for child protection issues and behavior problems (70, 71); (4) Attachment and behavior problems may have independent causes, e.g., socioeconomic disadvantage (SED). However, SED is mediated through parenting behavior (27), impacting on children when parenting is compromised rather than independently causal. Furthermore the association between crime and structural factors is mediated by parental discipline, supervision, and attachment (72), so largely impacted by intervening family processes (73).

Hill et al. (74) identify two necessary parenting behaviors, discipline and safety and attachment security, associated with positive child outcomes. The effective response to challenging behaviors may be to ignore or to restrain a child, even if this increases the child's distress. For an attachment need, the response would be to offer comfort.

"if family members interpret the attachment related distress of a child as a disciplinary issue, they may respond in a way that increases the distress. In the same way, the introduction of attachment concerns into a disciplinary process may lead to ineffective responses" (74).

This is supported by Juffer et al. (75) whose meta-analysis targeting sensitive parenting found that attachment and discipline were both associated with fewer child behavior problems.

5. A behavioral analysis of attachment

Parental sensitivity can be understood in terms of principles of reinforcement. The “Learning Theory of Attachment” (76) describes how classical and operant conditioning processes explain attachment behavior. It assumes that the attachment behavior system in babies is innate, initially occurring during distress and the adult caring response reduces the stress. Bosmans et al. (76) describe ways in which physiological processes are triggered by caring adult responses:

First, research shows that support decreases cortisol levels (UCRneg_decrease; e.g. [77]) which translates into a sense of relief (78). Second, support is supposed to increase oxytocin (UCRpos; e.g. [79]) translating into a sense of felt security and comfort (80). This has been described as a secure attachment state e.g. [81] or as state trust (82, 83). Finally, oxytocin in turn activates the reward system and the secretion of dopamine (UCRpos) which motivates future affiliative behavior (84) and which plays a role in the conditioning process itself (85) (76).

Infants support seeking behavior comes under the control of reinforcement through parents/caregivers removing discomfort and providing comfort through gentle touch, etc. These sensitive parental responses establish parent-child relationships (95, 96). The best predictors of secure infant attachment were explicit (contingent) behaviors that function as reinforcement, rather than implicit (non-contingent) parenting behaviors and interventions targeting them were more effective in changing caregiver sensitivity (79).

Further evidence for the “Learning Theory of Attachment” (76) comes from experimental trials (80) and clinical work showing the development of secure attachment in children adopted after severe deprivation (81) or the disruption of secure attachments following severe life events (82).

6. Intervention

The frequent co-occurrence of behavior and attachment problems requires interventions that reduce both. In the past some attachment therapists/theorists did not accept the contribution of learning theory (7) or argued that behavioral challenges stemmed from **underlying** attachment causes and that behavioral parenting programs addressed symptoms not causes (83). Furthermore, despite strong evidence that behavioral programs reduce behavioral problems, some argued that non-violent discipline strategies such as time out, were inappropriate (54). Others suggest that behavioral programs worked with less damaged populations but were ineffective in addressing severe attachment difficulties (84).

The effectiveness of attachment-based interventions, in addressing behavioral, or co-occurring attachment and behavioral problems, is unclear (85). However, a Bakermans-Kranenburg

et al. (95) meta-analysis of 88 sensitivity and attachment interventions, showed that “*interventions with a clear focus and a modest number of sessions are preferable.... Interventions with an exclusively behavioral focus on maternal sensitivity appear to be most effective not only in enhancing maternal sensitivity but also in promoting children’s attachment security*” (pp. 212).

Establishing the parent as a positive reinforcer is an “essential part” of interventions for parents of children with significant behavior and attachment problems, and behavioral programs that include relationship building are more effective (96). This is particularly the case for interventions targeting children with severe behavioral problems (97) where the parent-child relationship has broken down. The most effective, strongly evidence-based, parenting programs for child behavior problems have Blueprint for Violence Prevention status (98), include Helping the Non-compliant Child (99), Parent Child Interaction Therapy (100) and the Incredible Years (101). All are based on the Hanf (102) two-stage model to address severe child behavioral challenges. Previous psychodynamic therapy did not involve parents and lacked evidence (103).

Hanf started with unconditional relationship building conceptualized as establishing/re-establishing the parent as a reinforcer by association with activities that the child found reinforcing. By pairing a behavior that is reinforcing (play) with a less frequently occurring behavior (positive parental attention) the latter acquires reinforcing properties (104). For example, children learn to like eating olives or other novel experiences through exposure, in the presence of someone who is reinforcing to them and reinforces their engagement in these activities.

Hanf strengthened parent-child relationships before introducing discipline strategies, subsequently enabling the parent to reinforce appropriate behavior and set limits that the child accepted. Hanf had specific criteria for rates of attending and praising child behavior before moving to the second stage. Once established this child-led component continued throughout the intervention. The second stage introduced contingent praise and rewards for desirable behavior, consistency, positive instruction giving, setting clear limits, extinction of undesirable behaviors through ignoring and, where necessary, time out and consequences.

Hanf directly coached and reinforced parents, modelling and prompting desired parenting behavior. This is also how the most effective behaviorally based parenting programs are delivered (105) with parents learning skills through discussion, realistic goal setting and actual or role-play practice.

Many randomized controlled trials (RCTs) and systematic reviews present quantitative & qualitative evidence for Hanf derived programs (29) especially for children aged 2–9 years (96). However, relatively little evidence reports their impact on attachment relationships. Even a recent study comparing behavioral and attachment-based program impact on children’s externalizing problems used no attachment-based measures (106).

Three studies have reported impact of Hanf derived programs on both child behavior and attachment related behaviors. O’Connor et al. (83) analyzed observational data involving three

parent-child interaction tasks, from an RCT of the Incredible Years parenting intervention (107) to test whether it independently, promoted attachment-based parenting. Many studies collapse observational ratings across different tasks (108). However, O'Connor et al. (83) coded three tasks, free play, structured challenge and tidy-up, separately for attachment and parenting behaviors. Two attachment measures, sensitive responding and mutuality, were coded (109). Parental behavior management skills were coded using the Parent Behavior Coding Scheme (110, 111). Changes in child-centered parenting were robust and partly distinct from improvements in attachment-based sensitive responding and varied across tasks.

“there was not strong evidence of coordinated change between the child-centered and Sensitive Responding parenting measures:(a) correlation between change scores was modest; (b) there was not significant evidence of mediation for Sensitive Responding; and (c) whereas changes in child-centered behaviors were most evident in the free play and LEGO challenge interaction tasks, changes in Sensitive Responding were strongest in the tidy-up task. That implies that the social learning theory-based intervention produced additional and not merely overlapping changes in attachment-related caregiving” (83).

A trial of the Infant Behavior Program (IBP) (112), a version of Parent-Child Interaction Therapy (100) evaluated attachment-based caregiving behaviors by coding videotaped infant-led play (113). Behaviorally based parenting skills correlated moderately with attachment-based caregiving behaviors, with direct effects on warmth and sensitivity, mediated by post-intervention increases in parenting skills. They concluded that the behavioral skills had a broader impact on attachment-based caregiving.

Further evidence of impact on attachment relationships comes from an RCT by Fisher and Kim (114) of the Multidimensional Treatment Foster Care Program for Preschoolers (MTFC-P) (115) a pre-school version of Multidimensional Treatment Foster Care Program (MDTF) (116). They demonstrated significant positive impact on the attachment-related behavior of maltreated fostered pre-school children toward caregivers over a 12-month period following a new placement.

Meta-analyses support the importance of relationship building in behavioral parenting programs with relationship building and behavior management each associated with stronger program effects (117). However, because these components are often integrated (96) it was difficult to interpret findings when the presence (versus absence) of the other component was not taken into account. However, a meta-analysis of 156 behavioral parenting RCTs (97) tested the effects of programs that integrated relationship building and behavior management versus those that only taught behavior management. The programs included universal, preventive, targeted and treatment populations. Combined behavioral management and relationship building was not superior overall but was superior in treatment trials and inferior in preventive trials. Parents accessing behavior management advice in universal non-clinical settings addressing

normal behavioral challenges generally do not have the compromised attachment relationships typical of the coercive relationships between parents and children with clinical levels of problems (26). This makes sense since it is in settings, where children have significant behavioral problems, that attachment relationships are most likely to be compromised and need addressing.

Using the same RCTs, Leijten et al. (118) coded each study for 26 intervention techniques. Three core techniques showed stronger effects overall in reducing disruptive behavior, positive reinforcement, praise as a specific operationalization of positive reinforcement, and natural/logical consequences. However, they were all associated with stronger effects in treatment samples. Similar effects to those from the earlier meta-analysis (97) were found for four additional techniques: relationship building as a general technique, parent-child play as operationalization of relationship building, active listening, and parental self-management, which would contribute to enabling parents to meaningfully reinforce other behaviors. All four showed stronger effects in treatment samples and weaker or no effects in prevention trials (118).

7. Conclusion

Attachment relationships for young children are significantly affected by the parenting that they experience and the impacted brain cortisol patterns can become harder to change over time (1). Attachment based interventions have often failed to focus on, or measure, their impact on the behavioral challenges and behaviorally based interventions, that have been shown to impact attachment relationships, have so far failed to explore changes in the underlying brain function and cortisol levels that are impacted by poor early parenting.

The formation of attachment can be understood as a behavioral process (76) that, for children with significant behavioral problems requires relationship building to be addressed as part of the program. This can independently improve attachment relationships and reduce behavioral problems. The contribution of behavioral interventions in addressing both behavioral and attachment challenges is relatively under-researched and could benefit the many children with either/both difficulties.

This paper reports on the frequent co-occurrence of child attachment and behavioral problems and presents a “Learning Theory of Attachment” (76) and theoretical reasons why Hanf derived programs, that include relationship building reduce both attachment and behavioral problems. Until recently, there was limited evidence to demonstrate this, however, Blizzard et al. (113) and O'Connor et al. (83) both showed improvements in attachment related parenting behaviors that were partly independent of behavioral parenting skills and Fisher and Kim (114) showed the impact of a behaviorally based program on the attachment relationships of looked after children. The two Leijten et al. papers (97, 118), showed that relationship building components added significantly to intervention outcomes for child behavior problem treatment

samples. The strongest evidence-based behavioral interventions, that include behaviorally based relationship building, alongside other learning theory principles, stem from the work of Hanf (96, 103). Future research must explore the unique contribution that behaviorally based programs make to improving attachment relationships, including their impact on brain function in relation to regulatory processes, alongside increasing parental use of behavioral parenting techniques and reducing child behavioral problems.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary Material, further inquiries can be directed to the corresponding author.

Ethics statement

Ethical review and approval was not required for this study in accordance with the local legislation and institutional requirements.

References

- Dozier M, Peloso E, Lewis E, Laurenceau JP, Levine S. Effects of an attachment-based intervention on the cortisol production of infants and toddlers in foster care. *Dev Psychopathol.* (2008) 20:845–59. doi: 10.1017/S0954579408000400
- Colman I, Murray J, Abbott RA, Maughan B, Kuh D, Croudace TJ, et al. Outcomes of conduct problems in adolescence: 40 year follow-up of national cohort. *Brit Med J.* (2009) 338–42. doi: 10.1136/bmj.a2981
- Erskine HE, Norman RE, Ferrari AJ, Chan GC, Copeland WE, Whiteford HA, et al. Long-term outcomes of attention-deficit/hyperactivity disorder and conduct disorder: a systematic review and meta-analysis. *J Am Acad Child Adolesc Psychiatry.* (2016) 55:841–50. doi: 10.1016/j.jaac.2016.06.016
- Fearon RP, Bakermans-Kranenburg MJ, Van IJzendoorn MH, Lapsley AM, Roisman GI. The significance of insecure attachment and disorganization in the development of children's externalizing behavior: a meta-analytic study. *Child Dev.* (2010) 81:435–56. doi: 10.1111/j.1467-8624.2009.01405.x
- Hoeve M, Stams GJJ, Van der Put CE, Dubas JS, Van der Laan PH, Gerris JR. A meta-analysis of attachment to parents and delinquency. *J Abnorm Child Psychol.* (2012) 40:771–85. doi: 10.1007/s10802-011-9608-1
- Wertz J, Agnew-Blais J, Caspi A, Danese A, Fisher HL, Goldman-Mellor S, et al. From childhood conduct problems to poor functioning at age 18 years: examining explanations in a longitudinal cohort study. *J Am Acad Child Adolesc Psychiatry.* (2018) 57:54–60. doi: 10.1016/j.jaac.2017.09.437
- Bowlby J. Comment on paper by dr gewirtz. In: Foss BM, editors. *Determinants of infant behaviour.* London: Methuen (1961). p. 301–4.
- Pallini S, Chirumbolo A, Morelli M, Baiocco R, Laghi F, Eisenberg N. The relation of attachment security status to effortful self-regulation: a meta-analysis. *Psychol Bull.* (2018) 144:501–31. doi: 10.1037/bul0000134
- Schore AN. Attachment and the regulation of the right brain. *Attach Human Dev.* (2000) 2:23–47. doi: 10.1080/146167300361309
- Schore JR, Schore AN. Modern attachment theory: the central role of affect regulation in development and treatment. *Clin Soc Work J.* (2008) 36:9–20. doi: 10.1007/s10615-007-0111-7
- Cooke JE, Racine N, Plamondon A, Tough S, Madigan S. Maternal adverse childhood experiences, attachment style, and mental health: pathways of transmission to child behavior problems. *Child Abuse Neglect.* (2019) 93:27–37. doi: 10.1016/j.chiabu.2019.04.011
- Fonagy P, Steele H, Steele M. Maternal representations of attachment during pregnancy predict the organisation of infant-mother attachment at one year of age. *Child Dev.* (1991) 62:891–905. doi: 10.1111/j.1467-8624.1991.tb01578.x

Author contributions

JH produced the first draft of the manuscript. All other authors contributed equally to developing the line of argument and the editing to produce the final manuscript. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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- Grossman K, Fremmer-Bombik E, Rudolph J, Grossman KE. Maternal attachment representations as related to patterns of infant-mother attachment and maternal care during the first year. In: Hinde RA, Stevenson-Hinde B, editors. *Relationships within families.* Oxford: Oxford University Press (1988). p. 241–60.
- Steele H, Steele M, Fonagy P. Associations among attachment classifications of mothers, fathers and their infants. *Child Dev.* (1996) 67:541–55. doi: 10.1111/j.1467-8624.1996.tb01750.x
- Ispa JM, Su-Russell C, Palermo F, Carlo G. The interplay of maternal sensitivity and toddler engagement of mother in predicting self-regulation. *Dev Psychol.* (2017) 53:425–35. doi: 10.1037/dev0000267
- O'Connor TG, Woolgar M, Humayun S, Briskman JA, Scott S. Early caregiving predicts attachment representations in adolescence: findings from two longitudinal studies. *J Child Psychol Psychiatry.* (2019) 60:944–52. doi: 10.1111/jcpp.12936
- Moehler E, Brunner R, Wiebel A, Reck C, Resch F. Maternal depressive symptoms in the postnatal period are associated with long-term impairment of mother-child bonding. *Arch Womens Ment Health.* (2006) 9:273–8. doi: 10.1007/s00737-006-0149-5
- Murray L, Fiori-Cowley A, Hooper R, Cooper P. The impact of postnatal depression and associated adversity on early mother-infant interactions and later infant outcome. *Child Dev.* (1996) 67:2512–26. doi: 10.1111/j.1467-8624.1996.tb01871.x
- van IJzendoorn MH, Schuengel C, Qiang W, Bakermans-Kranenburg MJ. Improving parenting, child attachment, and externalizing behaviors: meta-analysis of the first 25 randomized controlled trials on the effects of video-feedback intervention to promote positive parenting and sensitive discipline. *Dev Psychopathol.* (2023) 35:241–56. doi: 10.1017/S0954579421001462
- Deans CL. Maternal sensitivity, its relationship with child outcomes, and interventions that address it: a systematic literature review. *Early Child Dev Care.* (2020) 190:252–75. doi: 10.1080/03004430.2018.1465415
- National Collaborating Centre for Mental Health. *Antisocial behavior and conduct disorders in children and young people: The NICE guideline on recognition, intervention, and management [No. 158].* Leicester, UK: RCPsych Publications (2013).
- Bonin EM, Stevens M, Beecham J, Byford S, Parsonage M. Costs and longer-term savings of parenting programs for the prevention of persistent conduct disorder: a modelling study. *BMC Public Health.* (2011) 11:803. doi: 10.1186/1471-2458-11-803
- Farrington D, Welsh BC. *Saving children from a life of crime: Early risk factors and effective interventions.* New York: Oxford University Press (2007).

24. Hoeve M, Dubas JS, Eichelsheim VI, van der Laan PH, Smeenk W, Gerris JRM. The relationship between parenting and delinquency: a meta-analysis. *J Abnorm Child Psychol.* (2009) 37:749–75. doi: 10.1007/s10802-009-9310-8
25. Patterson GR. *Living with children: New methods for parents and teachers.* Champaign, IL: Research Press (1976).
26. Patterson GR. *Coercive family process.* Eugene, OR: Castalia (1982).
27. Patterson GR, Yoerger KA. A developmental model for early- and late-onset delinquency. In: Reid JB, Patterson GR, Snyder JJ, editors. *Antisocial behavior in children and adolescents: A developmental analysis and model for intervention.* Washington DC: American Psychological Association (2002). p. 147–72.
28. Lunkenheimer E, Lichtwarck-Aschoff A, Hollenstein T, Kemp CJ, Granic I. Breaking down the coercive cycle: how parent and child risk factors influence real-time variability in parental responses to child misbehavior. *Parent Sci Pract.* (2016) 16:237–56. doi: 10.1080/15295192.2016.1184925
29. Furlong M, McGilloway S, Bywater T, Hutchings J, Smith SM, Donnelly M. Behavioral and cognitive-behavioral group-based parenting programs for early-onset conduct problems in children aged 3 to 12 years (cochrane review). *Cochrane Database Syst Rev.* (2012) 2:1–362. doi: 10.1002/14651858.CD008225.pub2
30. Gardner F, Hutchings J, Bywater T, Whitaker C. Who benefits and how does it work? Moderators and mediators of outcome in an effectiveness trial of a parenting intervention. *J Clin Child Adolesc Psychol.* (2010) 39:568–80. doi: 10.1080/15374416.2010.486315
31. Gardner F, Leijten P, Harris V, Mann J, Hutchings J, Beecham J, et al. Equity effects of parenting interventions for child conduct problems: a pan-European individual participant data meta-analysis. *Lancet Psychiatry.* (2019) 6:518–27. doi: 10.1016/S2215-0366(19)30162-2
32. Hutchings J, Gardner F. Support from the start: effective programs for three to eight year-olds. *J Child Serv.* (2012) 7:29–40. doi: 10.1108/17466661211213652
33. Hutchings J, Bywater T, Daley D, Gardner F, Whitaker CJ, Jones K, et al. Parenting intervention in sure start services for children at risk of developing conduct disorder: pragmatic randomised controlled trial. *Brit Med J.* (2007) 334:678–84. doi: 10.1136/bmj.39126.620799.55
34. Bywater T, Hutchings J, Daley D, Whitaker CJ, Yeo ST, Jones K, et al. Long-term effectiveness of a parenting intervention in sure start services in wales for children at risk of developing conduct disorder. *Brit J Psychiatry.* (2009) 195:318–24. doi: 10.1192/bjp.bp.108
35. van Aar J, Leijten P, de Castro BO, Overbeek G. Sustained, fade-out or sleeper effects? A systematic review and meta-analysis of parenting interventions for disruptive child behavior. *Clin Psychol Rev.* (2017) 51:153–63. doi: 10.1016/j.cpr.2016.11.006
36. Hutchings J, Bywater T, Williams ME, Lane E, Whitaker CJ. Improvements in maternal depression as a mediator of child behavior change. *Psychology.* (2012) 3:795–801. doi: 10.4236/psych.2012.329120
37. Bosmans G. Cognitive behaviour therapy for children and adolescents: can attachment theory contribute to its efficacy? *Clin Child Fam Psychol Rev.* (2016) 19:310–28. doi: 10.1007/s10567-016-0212-3
38. Greenberg M. Attachment and psychopathology in childhood. In: Cassidy J, Shaver PR, editors. *Handbook of attachment: Theory, research and clinical applications.* New York, NY: Guilford Press (1999). p. 469–96.
39. Allen JP, Porter MF, McFarland C, McElhane KB, Marsh P. The relation of attachment security to adolescents' paternal and peer relationships, depression, and externalizing behavior. *Child Dev.* (2007) 78:1222–39. doi: 10.1111/j.1467-8624.2007.01062.x
40. Scott S, Briskman J, Woolgar M, Humayun S, O'Connor TG. Attachment in adolescence: overlap with parenting and unique prediction of behavioral adjustment. *J Child Psychol Psychiatry.* (2011) 52:1052–62. doi: 10.1111/j.1469-7610.2011.02453.x
41. Van Ijzendoorn MHS, Bakermans-Kranenburg MJ. Disorganized attachment in early childhood: meta-analysis of precursors, concomitants, and sequelae. *Dev Psychopathol.* (1999) 1:225–49. doi: 10.1017/s0954579499002035
42. Vando J, Rhule-Louie DM, McMahon RJ, Spieker SJ. Examining the link between infant attachment and child conduct problems in grade 1. *J Child Fam Stud.* (2008) 17:615–28. doi: 10.1007/s10826-007-9173-y
43. Cyr M, Pasalich DS, McMahon RJ. The longitudinal link between parenting and child aggression: the moderating effect of attachment security. *Child Psychiatry Hum Dev.* (2014) 45:555–64. doi: 10.1007/s10578-013-0424-4
44. Speltz M, Greenberg M, DeKlyen M. Attachment in preschoolers with disruptive behavior: a comparison of clinic-referred and non-problem children. *Dev Psychopathol.* (1990) 2:31–46. doi: 10.1017/S0954579400000572
45. Futh A, O'Connor T, Matias C, Green J, Scott S. Attachment narratives and behavior and emotional symptoms in an ethnically diverse, at risk sample. *J Am Acad Child Adolesc Psychiatry.* (2008) 47:709–18. doi: 10.1097/CHI.0b013e31816bfff5
46. Leschied AW, Chiodo D, Whitehead PC, Hurley D. The relationship between maternal depression and child outcomes in a child welfare sample: implications for treatment and policy. *Child Fam Soc Work.* (2005) 10:281–91. doi: 10.1111/j.1365-2206.2005.00365.x
47. Fisher PA, Skowron EA. Social-learning parenting intervention research in the era of translational neuroscience. *Curr Opin Psychol.* (2017) 15:168–73. doi: 10.1016/j.copsyc.2017.02.017
48. Levy TM, Orlans M. *Attachment, trauma, and healing: Understanding and treating attachment disorder in children and families.* Washington, DC: Child Welfare League of America Press (1998).
49. Meltzer H, Corbin T, Gatward R, Goodman R, Ford T. *The mental health of young people looked after by local authorities.* London: Office for National Statistics (2003).
50. Dimigen G, Del Priore C, Butler S, Evans S, Ferguson L, Swan M. Psychiatric disorder among children at time of entering local authority care: questionnaire survey. *Brit Med J.* (1999) 319:675. doi: 10.1136/bmj.319.7211.675
51. Whenan R, Oxlad M, Lushington K. Factors associated with foster carer well-being, satisfaction and intention to continue providing out-of-home care. *Child Youth Serv Rev.* (2009) 31:752–60. doi: 10.1016/j.childyouth.2009.02.001
52. Fisher PA, Stoolmiller M, Mannering AM, Takahashi A, Chamberlain P. Foster placement disruptions associated with problem behavior: mitigating a threshold effect. *J Consult Clin Psychol.* (2011) 79:481–7. doi: 10.1037/a0024313
53. Bywater T, Hutchings J, Linck P, Whitaker CJ, Daley D, Yeo ST, et al. Incredible years parent training support for foster carers in wales: a multi-centre feasibility study. *Child Care Health Dev.* (2010) 37:233–43. doi: 10.1111/j.1365-2214.2010.01155.x
54. Hutchings J, Bywater T. Delivering the incredible years parent program to foster carers in reflections from group leader supervision. *Adoption Fostering.* (2013) 37:28–42. doi: 10.1177/030857591347707
55. Gajos JM, Beaver KM. Maternal depression and risk for antisocial behavior in children. *Child Fam Soc Work.* (2017) 22:349–63. doi: 10.1111/cfs.12247
56. Munson JA, McMahon RJ, Spieker SJ. Structure and variability in the developmental trajectory of children's externalizing problems: impact of infant attachment, maternal depressive symptomatology, and child sex. *Dev Psychopathol.* (2001) 13:277–96. doi: 10.1017/S095457940100205X
57. Lovejoy MC, Graczyk PA, O'Hare E, Neuman G. Maternal depression and parenting behavior: a meta-analytic review. *Clin Psychol Rev.* (2000) 20:561–92. doi: 10.1016/S0272-7358(98)00100-7
58. Paulson JF, Dauber S, Leiferman JA. Individual and combined effects of postpartum depression in mothers and fathers on parenting behavior. *Pediatrics.* (2006) 118:659–68. doi: 10.1016/j.inbeh.2009.10.005
59. Webster-Stratton C, Herbert M. *Troubled families – problem children: Working with parents: A collaborative process.* West Sussex, UK: John Wiley & Sons (1994).
60. Ambady N, Gray HM. On being sad and mistaken: mood effects on the accuracy of thin-slice judgments. *J Pers Soc Psychol.* (2002) 83:947–61. doi: 10.1037/0022-3514.83.4.947
61. Cummings EM, Davies PT. Maternal depression and child development. *J Child Psychol Psychiatry.* (1994) 35:73–122. doi: 10.1111/j.1469-7610.1994.tb01133.x
62. Meunier LJ. *Maternal depressive symptoms and parenting behavior: child behavior as an activator of maternal responsiveness [Dissertation thesis].* Austin (TX): University of Texas (2007).
63. van Vreeswijk DF, de Wilde EJ. Autobiographical memory specificity, psychopathology, depressed mood and the use of the autobiographical memory test: a meta-analysis. *Behav Res Ther.* (2004) 42:731–43. doi: 10.1016/S0005-7967(03)00194-3
64. DeGarmo DS, Forgatch MS. Confidant support and maternal distress: predictors of parenting practices for divorced mothers. *Pers Relat.* (1997) 4:305–17. doi: 10.1111/j.1475-6811.1997.tb00148.x
65. Evans J, Williams JMG, O'Loughlin S, Howells K. Autobiographical memory and problem solving strategies of parasuicide patients. *Psychol Med.* (1992) 22:399–405. doi: 10.1017/S0033291700030348
66. McMahon RJ, Frick PJ. Evidence-based assessment of conduct problems in children and adolescents. *J Clin Child Adolesc.* (2005) 34:477–505. doi: 10.1207/s15374424jccp3403_6
67. Wahler RG, Dumas JE. Attentional problems in dysfunctional mother-child interactions: an interbehavioral model. *Psychol Bull.* (1989) 105:116–30. doi: 10.1037/0033-2909.105.1.116
68. Wahler RG, Sansbury LE. The monitoring skills of troubled mothers: their problems in defining child deviance. *J Abnorm Child Psychol.* (1990) 18:577–89. doi: 10.1007/BF00911109
69. Hutchings J, Smith M, Gilbert H. “The parent-child autobiographical memory test (PCAMT): identifying potential deficits in maternal observation style”, spotlight no. 43 (Cardiff: Wales Office for Research and Development) (2000).
70. Doidge JC, Higgins DJ, Delfabbro P, Segal L. Risk factors for child maltreatment in an Australian population-based birth cohort. *Child Abuse Neglect.* (2017) 64:47–60. doi: 10.1016/j.chiabu.2016.12.002
71. Maclean MJ, Sims S, Bower C, Leonard H, Stanley FJ, O'Donnell M. Maltreatment risk among children with disabilities. *Pediatrics.* (2017) 139:e20161817. doi: 10.1542/peds.2016-1817

72. Sampson RJ, Laub JH. Urban poverty and the family context of delinquency: a new look at structure and process in a classic study. *Child Dev.* (1994) 65:523–40. doi: 10.2307/1131400
73. Hutchings J, Bywater T, Davies C, Whitaker CJ. Do crime rates predict the outcome of parenting programs for parents of 'high risk' pre-school children? *Educ Child Psychol.* (2006) 23:15–24. doi: 10.53841/bpsecp.2006.23.2.15
74. Hill J, Fonagy P, Safier E, Sargent J. The ecology of attachment in the family. *Fam Process.* (2003) 42:205–21. doi: 10.1111/j.1545-5300.2003.42202.x
75. Juffer F, Bakermans-Kranenburg MJ, van IJzendoorn MH. Pairing attachment theory and social learning theory in video-feedback intervention to promote positive parenting. *Curr Opin Psychol.* (2017) 15:189–94. doi: 10.1016/j.copsyc.2017.03.012
76. Bosmans G, Bakermans-Kranenburg MJ, Vervliet B, Verhees MWTF, Van IJzendoorn MH. A learning theory of attachment: unraveling the black box of attachment. *Neurosci Biobehav Rev.* (2020) 113:287–98. doi: 10.1016/j.neubiorev.2020.03.014
77. Hostinar CE, Johnson AE, Gunnar MR. Parent support is less effective in buffering cortisol stress reactivity for adolescents compared to children. *Dev Sci.* (2015) 18:281–97. doi: 10.1111/desc.12195
78. McQuaid RJ, McInnis OA, Paric A, Al-Yawer F, Matheson K, Anisman H. Relations between plasma oxytocin and cortisol: the stress buffering role of social support. *Neurobiol Stress.* (2016) 3:52–60. doi: 10.1016/j.ynstr.2016.01.001
79. Feldman R, Bakermans-Kranenburg MJ. Oxytocin: a parenting hormone. *Curr Opin Psychol.* (2017) 15:13–8. doi: 10.1016/j.cop-syc.2017.02.011
80. Sroufe LA, Waters E. Attachment as an organizational construct. *Child Dev.* (1977) 48:1184–99. doi: 10.2307/1128475
81. Gillath O, Hart J, Noffle EE, Stockdale GD. Development and validation of a state adult attachment measure (SAAM). *J Res Pers.* (2009) 43:362–73. doi: 10.1016/j.jrp.2008.12.009
82. Bosmans G, Bowles D, Dewitte M, De Winter S, Braet C. An experimental evaluation of the state adult attachment measure: the influence of attachment primes on the content of state attachment representations. *J Exp Psychopathol.* (2014a) 5:134–50. doi: 10.5127/jep.033612
83. Bosmans G, Van de Walle M, Goossens L, Ceulemans E. (In)variability of attachment in middle childhood: secure base script evidence in diary data. *Behav Chang.* (2014b) 31:225–42. doi: 10.1017/bec.2014.18
84. Love TM. Oxytocin, motivation and the role of dopamine. *Pharmacol Biochem Behav.* (2014) 119:49–60. doi: 10.1016/j.pbb.2013.06.011
85. Schultz W. Updating dopamine reward signals. *Curr Opin Neurobiol.* (2013) 23:229–38. doi: 10.1016/j.conb.2012.11.012
86. Gewirtz JL. Identification, attachment, and their developmental sequencing in a conditioning frame. In: Gewirtz JL, Kurtines WM, editors. *Intersections with attachment.* Hillsdale, NJ: Erlbaum (1991). p. 247–55.
87. Gewirtz JL, Peláez Noguera M. B. F. Skinner's legacy to human infant behavior and development. *Am Psychol.* (1992) 47:1411–22. doi: 10.1037/0003-066X.47.11.1411
88. Dunst CJ, Kassow DZ. Caregiver sensitivity, contingent social responsiveness, and secure infant attachment. *J Early Intensive Behavior Intervention.* (2008) 5:40–56. doi: 10.1037/h0100409
89. Bosmans G, Waters TEA, De Winter S, Hermans D. Trust development as an expectancy-learning process: testing contingency effects. *PLoS One.* (2019) 14:e0225934. doi: 10.1371/journal.pone.0225934
90. Van IJzendoorn MH, Juffer F. The emanuel miller memorial lecture 2006: adoption as intervention. Meta-analytic evidence for massive catch-up and plasticity in physical, socio-emotional, and cognitive development. *J Child Psychol Psychiatry.* (2006) 47:1228–45. doi: 10.1111/j.1469-7610.2006.01675.x
91. Sroufe LA, Egeland B, Carlson EA, Collins WA. *The development of the person: The Minnesota study of risk and adaptation from birth to adulthood.* New York, NY: Guilford Publications (2005).
92. O'Connor TG, Matias C, Futh A, Tantam G, Scott S. Social learning theory parenting intervention promotes attachment-based caregiving in young children: randomized clinical trial. *J Clin Child Adolesc.* (2013) 42:358–70. doi: 10.1080/15374416.2012.723262
93. Green J, Goldwyn R. Annotation: attachment disorganisation and psychopathology: new findings in attachment research and their potential implications for developmental psychopathology in childhood. *J Child Psychol Psychiatry.* (2002) 43:835–46. doi: 10.1111/1469-7610.00102
94. Axford N, Bjornstad G, Matthews J, Heilmann S, Raja A, Koumounne OC, et al. The effectiveness of a therapeutic parenting program for children aged 6–11 years with behavioral or emotional difficulties: results from a randomized controlled trial. *Child Youth Serv Rev.* (2020) 117:105245. doi: 10.1016/j.childyouth.2020.105245
95. Bakermans-Kranenburg MJ, van IJzendoorn MH, Juffer F. Less is more: meta-analyses of sensitivity and attachment interventions in early childhood. *Psychol Bull.* (2003) 129:195–215. doi: 10.1037/0033-2909.129.2.195
96. Kaehler LA, Jacobs M, Jones DA. Distilling common history and practice elements to inform dissemination: hanf-model BPT programs as an example. *Clin Child Fam Psychol.* (2016) 19:236–58. doi: 10.1007/s10567-016-0210-5
97. Leijten P, Melendez-Torres GJ, Gardner F, Van Aar J, Schulz S, Overbeek G. Are relationship enhancement and behavior management "the golden couple" for disruptive child behavior? Two meta-analyses. *Child Dev.* (2018) 89:1970–82. doi: 10.1111/cdev.13051
98. Mihalic S, Fagan AA, Irwin K, Ballard D. *Blueprints for violence prevention.* Boulder, CO: Centre for Study and Prevention of Violence, University of Colorado (2002).
99. Forehand RL, McMahon RJ. *Helping the noncompliant child: A clinician's guide to parent training.* New York: Guilford Press (1981).
100. Eyberg SM, Nelson MM, Boggs SR. Evidence-based psychosocial treatments for children and adolescents with disruptive behavior. *J Clin Child Adolesc.* (2008) 37:215–37. doi: 10.1080/15374410701820117
101. Webster-Stratton C, Mihalic S, Fagan A, Arnold D, Taylor T, Tingley C. *The incredible years parent teacher and child training series: Blueprints for violence prevention, book 11.* Boulder, CO: Blueprints for Violence Prevention Series, Center for the Study and Prevention of Violence, Institute of Behavioral Science, University of Colorado (2001).
102. Hanf C. *Modifying problem behaviors in mother-child interaction: Standardized laboratory situations.* Olympia, WA: Paper presented at the Association of Behavior Therapies (1968).
103. Reitman D, McMahon RJ. Constance "connie" hanf (1917–2002): the mentor and the model. *Cogn Behav Pract.* (2013) 20:106–16. doi: 10.1016/j.cbpra.2012.02.005
104. Mikulas WL. *Behavior modification: An overview.* New York: Harper & Row (1972).
105. Hutchings J, Gardner F, Lane E. Making evidence based interventions work in clinical settings: common and specific therapy factors and implementation fidelity. In: Sutton C, Utting D, Farrington D, editors. *Support from the start: working with young children and their families to reduce the risks of crime and antisocial behavior [research report 524].* London: Department for Education and Skills (2004).
106. Högström J, Olofsson V, Özdemir M, Enebrink P, Stattin H. Two-year findings from a national effectiveness trial: effectiveness of behavioral and non-behavioral parenting programs. *J Abnorm Child Psychol.* (2017) 45:527–42. doi: 10.1007/s10802-016-0178-0
107. Scott S, O'Connor TG, Futh A, Matias C, Price J, Doolan M. Impact of a parenting program in a high-risk, multiethnic community: the PALS trial. *J Child Psychol Psychiatry.* (2010) 51:1331–41. doi: 10.1111/j.1469-7610.2010.02302.x
108. Wakschlag LS, Briggs-Gowan MJ, Hill C, Danis B, Leventhal BL, Keenan K, et al. Observational assessment of preschool disruptive behavior, part II: validity of the disruptive behavior diagnostic observation schedule (DB-DOS). *J Am Acad Child Adolesc Psychiatry.* (2008) 47:632–41. doi: 10.1097/CHI.0b013e31816c5c10
109. Matias C, Scott S, O'Connor TG. *Coding of attachment related parenting.* London, UK: Institute of Psychiatry (2006).
110. Aspland H, Gardner F. Observational measures of parent-child interaction: an introductory review. *Child Adolesc Ment Health.* (2003) 8:136–42. doi: 10.1111/1475-3588.00061
111. Scott S, Sylva K, Doolan M, Price J, Jacobs B, Crook C, et al. Randomised controlled trial of parent groups for child antisocial behavior targeting multiple risk factors: the SPOKES project. *J Child Psychol Psychiatry.* (2010) 51:48–57. doi: 10.1111/j.1469-7610.2009.02127.x
112. Bagner DM, Cox S, Hungerford GM, Garcia D, Barroso NE, Hernandez J, et al. Behavioral parent training in infancy: a window of opportunity for high-risk families. *J Abnorm Child Psychol.* (2016) 44:901–12. doi: 10.1007/s10802-015-0089-5
113. Blizzard AM, Barroso NE, Ramos FG, Graziano PA, Bagner DM. Behavioral parent training in infancy: what about the parent-infant relationship? *J Clin Child Adolesc.* (2018) 47:5341–53. doi: 10.1080/15374416.2017.1310045
114. Fisher PA, Kim HK. Intervention effects on foster pre-schoolers' attachment-related behaviors from a randomized trial. *Prev Sci.* (2007) 8:161–70. doi: 10.1007/s11211-007-0066-5
115. Fisher PA, Ellis BH, Chamberlain P. Early intervention foster care: a model for preventing risk in young children who have been maltreated. *Child Serv Soc Pol Res Pract.* (1999) 2:159–82. doi: 10.1207/s15326918cs0203_3
116. Chamberlain P. The oregon multidimensional treatment foster care model: features, outcomes, and progress in dissemination. *Cogn Behav Pract.* (2003) 10:303–12. doi: 10.1016/S1077-7229(03)80048-2
117. Kaminski JW, Valle LA, Filene JH, Boyle CL. A meta-analytic review of components associated with parent training program effectiveness. *J Abnorm Child Psychol.* (2008) 36:567–89. doi: 10.1007/s10802-007-9201-9
118. Leijten P, Gardner F, Melendez-Torres GJ, van Aar J, Hutchings J, Schulz S, et al. Meta-analyses: key parenting program components for disruptive child behavior. *J Am Acad Child Adolesc Psychiatry.* (2019) 58:180–90. doi: 10.1016/j.jaac.2018.07.900