How Do Mothers' Parental Attributions Affect Child Outcomes from a Positive Parenting Intervention? A Mediation Study

Vilas Sawrikar1,2 · David J. Hawes2 · Caroline Moul2 · Mark R. Dadds2

Published online: 15 November 2019 © The Author(s) 2019

Abstract

Problematic parental attributions refer to negative causal explanations for child problem behaviour and are known to predict parenting intervention outcomes. This study examines alternative accounts of how mothers’ problematic parental attributions, operationalised as negative pre-treatment and change resistant parental attributions during treatment, may affect child behaviour outcomes from a parenting intervention program. Putative mediators included parental feelings about the child and use of harsh discipline. Participants were 163 families with children aged from 3 to 16 referred to specialist clinics for the treatment of conduct problems. Measures were collected as part of pre-treatment, post-treatment, and 3-month follow-up assessments. Mothers’ pre-treatment and change resistant parental attributions were associated with smaller improvements in parental feelings at the end of treatment which in turn were associated with greater use of harsh discipline. Greater use of harsh discipline was associated with greater conduct problems overall. Smaller improvements in parental feelings mediated the effects of pre-treatment and change resistant parental attributions on outcomes in mothers’ use of harsh discipline and mediated the effects of change resistant parental attributions on outcomes in child conduct problems. Smaller improvements in parental feelings about the child may act as a mechanism that explains the impact of problematic parental attributions on treatment outcomes.

Keywords Parent training · Parental attributions · Optimising outcomes · Parenting · Parent–child relationships
sessions are arguably basic necessities for maintaining 
retaining parents and having them attend regular treatment 
involvement in treatment [24]. This is problematic since 
mental health should be on the child and parents need to have little 
attitudes may mean that parents expect that the focus of treat-
ment models hypothesise that parents 
cognitive models for proposing how parental attributions 
problematic parental attributions for explaining child 
problems [33]. Further, difficulties in down regulating 
emotions predict poorer outcomes for children with con-
duct problems [33]. Further, difficulties in down regulating 
emotional over-involvement towards the patient contribute 
to negative family-patient relationships that increase the risk 
for poor treatment outcomes [26, 27]. Patients' perceived by relatives to be undesirable but under the control of the patient are most likely to be targets of criticism which is expected to result in maladaptive attempts to change the patients' behaviour [28]. This study expands on these models to examine whether mothers' problematic parental attributions are a risk marker of enduring negative parent–child relationships that lead to ongoing use of harsh discipline and thus poor child behaviour outcomes.

Problematic parental attributions are known to impact the affective quality of the parent–child relationship which may decrease the family’s propensity to benefit from participating in BPT. Previous research shows that mothers’ internal and stable parental attributions for problem behaviours elicit negative parental feelings and expressed emotions towards the child [29–32], and that mothers’ negative expressed emotions predict poorer outcomes for children with conduct problems [33]. Further, difficulties in down regulating negative parental feelings are known to perpetuate coercive and harsh parenting behaviours [34, 35]. No research has attempted to translate the study of attribution-relational-
parenting processes within BPT; however, it may be critical given that a predictor of parent training success is improvements in parent–child relationships and decreased use of harsh parenting [36, 37]. The current study provides the first mediational test that individual differences in improvements in parental feelings and harsh discipline mediate the effects of problematic parental attributions on child behaviour outcomes.

In summary, the primary aim of the mediation analyses was to test alternative accounts of how mothers’ parental attributions affect child behaviour outcomes in BPT by examining putative mechanisms conferring the risk of mothers’ problematic parental attributions during and after treatment. The current study uses data collected from a single group treatment study used to evaluate whether problematic
parental attributions, measured at pre-treatment and as pre- 
to post-treatment changes in parental attributions, uniquely 
predict child outcomes [8]. As noted in Sawrikar et al. [8], 
changes in parent and child outcomes in this study are attrib- 
utable to both treatment effects and other concurrent changes 
in child and family functioning occurring during the treat- 
ment period which is consistent with anticipated outcomes 
of BPT [38, 39].

Figure 1 outlines the serial mediation model used to test 
the main hypotheses. First, to examine the possible presence 
of mediation it was hypothesised that (i) problematic paren- 
tal attributions were associated with smaller improvements 
in negative parental feelings at the end of treatment (path 
a), (ii) smaller improvements in negative parental feelings 
were associated with greater use of harsh discipline (path b), 
and (iii) greater use of harsh discipline was associated with 
worse child behaviour outcomes (path c). Second, it was 
hypothesised that individual differences in improvements in 
negative parental feelings mediated the association between 
problematic parental attributions and mothers’ use of harsh 
discipline (indirect path a × b) and child behaviour outcomes 
(indirect path a × d). Finally, it was hypothesised that the 
association between problematic parental attributions and 
child behaviour outcomes was mediated by individual dif- 
fferences in improvements in negative parental feelings and 
mothers’ use of harsh discipline (indirect path a × b × c).

**Method**

**Participants and Procedures**

Data were collected from $N = 169$ families who completed 
parent training for child conduct problems at one of two 
Child Behaviour Research Clinic (CBRC) sites in Syd- 
ney, Australia. The two CBRC sites provide clinic-based 
BPT treatments to families throughout New South Wales, 
the most populous state of Australia. Families were eligi- le to participate if the referred child was aged from 3 to 
16 years and had a primary presenting problem consistent 
with a diagnosis of Oppositional Defiant Disorder (ODD) 
or Conduct Disorder (CD). Children demonstrating sub- 
diagnostic levels of ODD or CD were also included, while 
children with co-occurring Attention-deficit Hyperactivity 
Disorder (ADHD), Anxiety Disorder, and/or Depressive 
Disorder were eligible for participation. Children with 
an intellectual disability or an Autism Spectrum Disor- 
der (ASD) diagnosis were excluded from participation. 
Pre-treatment diagnostic status was determined by the 
Diagnostic Interview Schedule for Children, Adolescent, 
and Parents [40], a semi-structured diagnostic interview 
administered to both parents by the treating clinician. 
Post-treatment and 3-month follow-up diagnostic assess- 
ments were independently completed by a psychologist 
unfamiliar with the case. Parents also completed a bat- 
tery of questionnaires at each of the different assessments. 
Demographic information was collected at pre-treatment, 
while measures of parental attributions, negative paren- 
tal feelings, and use of harsh discipline were collected at 
the pre-treatment, post-treatment, and 3-month follow-up 
assessments. Parents provided informed consent prior to 
research participation and data were collected in accord- 
ance with ethical guidelines provided by the Human 
Research Ethics Committee.

Sample characteristics of participants used in the cur- 
rent study are summarised in Table 1. Figures relate to 
the $N = 163$ families where the mother had completed 
pre-treatment assessment questionnaires. In general, 
the referred child was male and from intact families 
where parents were either married or in a de facto living 
arrangement. Prior to treatment, children were rated 
to have conduct problems consistent with a diagnosis of 
either ODD or CD using DSM-IV criteria [41]. Children 
were generally young with 93.9% of children aged 10 years 
or younger. The clinical profile of participants indicated 
that the most common child psychopathology was comor- 
bid conduct problems and ADHD (51.5%), conduct prob- 
lems only (24.5%), comorbid conduct problems, ADHD, 
and mood disorder (13.5%), and comorbid conduct prob-
lems and mood disorder (10.4%). Families receiving BPT 
at site 2 were from a lower socio-economic background.
and children had greater ratings of ADHD severity to those receiving BPT at site 1.

**Parenting Intervention**

All families received the Integrated Family Intervention for Child Conduct Problems [42], a manualised social-learning based parenting intervention shown to be effective in reducing child externalising problems [43–50]. Families participated as part of a randomised control trial evaluating the efficacy of the parenting program in web-based versions that included videoconferencing with a practitioner compared to standard face–face BPT sessions. Details of the programs are provided in [50], with results indicating that the program is equally efficacious in face–face and web-based versions [see also 48, 49]. Clinical psychologists with a minimum of at least 1-year Masters Level training with specialist placements in behavioural parent management training administered the treatment.

**Measures**

**Demographic Information**

Psychosocial demographic information was collected as part of the pre-treatment questionnaire battery. Socio-economic status was determined by the Socio-Economic Indexes for Areas (SEIFA) that ranks residential areas according to relative socio-economic advantage and disadvantage [51]. Marital status was recoded into single parent status where families were deemed to be single parent if parents reported to be separated, divorced, or single.

**Diagnostic Interview Schedule for Children, Adolescents, and Parents (DISCAP)**

The DISCAP [40] is a semi-structured diagnostic interview administered to parents based on the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition [41]. The DISCAP provides diagnosis and rating of clinical severity. Severity ratings are scored on a 6-point scale with ratings reflecting non-clinical [1, 2], sub-diagnostic [3], and diagnostic [4–6] severity. Rater agreements (Kappa) on diagnostic category for primary and secondary diagnoses were .73 and .71 respectively. Agreement of severity levels (correlations) for primary diagnoses were: ODD/CD = .74, ADHD = .81, and Anxiety-depression = .48.

**Parent Attribution Measure (PAM)**

Child-causal attributions were measured using the Parent Attribution Measure (PAM), a 12-item self-report measure designed to assess negative causal explanations for child problem behaviour along dimensions of Intentionality, Permanence, and Disposition [18]. Respondents are asked to rate their agreement to statements on a 3-point Likert scale that ranged from 1 (‘not at all true’) to 3 (‘certainly true’). Positively worded items are reverse scored and all items are summed to represent a Total Scale measure of negative attributions for problem behaviours. The internal consistency for the Total Scale in the current study was good (α = .80). Individual difference scores reflecting pre- to post-treatment changes in parental attributions was used to measure change resistant parental attributions [8].

**Harsh Discipline**

The Corporal Punishment subscale from the Alabama Parenting Questionnaire [APQ; 52] was used to measure parental use of harsh discipline. Mothers responded to three items assessing the use of corporal punishment (e.g., “You spank your child with your hand when he/she has done something wrong”) in which items were rated on a 5-point frequency scale 1 (‘never’) to 5 (‘always’). The internal consistency was moderate for the Corporal Punishment scale (α = .65).

**Parental Feelings Questionnaire (PFQ)**

A seven-item version of the PFQ [53] assessed parental feelings about the child. The shortened PFQ consists of three
positive items (e.g., “I feel happy about my relationship with my child”) and four negative items (e.g., “I feel frustrated by my child”), in which parents responded on a 5-point Likert scale (‘definitely true’ to ‘definitely not true’). Positive items were reversed scored and summed with negative items to create a total score for negative feelings. The short version of the PFQ was previously used to study parental affect with good reliability [54]. The internal consistency for this measure in the current study was good ($\alpha_{\text{mothers}} = .73$).

**Data Analytic Plan**

Mediation analyses were conducted using path analysis in MPlus (version 8) with full information maximum likelihood (FIML) estimation. Models were judged to be appropriate if it met pre-specified goodness-of-fit criteria determined by a multiple-index strategy [55] that included the model Chi square ($p$ value > .05), comparative fit index (CFI; .95), and the root mean square error of approximation (RMSEA; .05). Path analytic models varied in when parental attributions (PAM Total Scale) and child behaviours outcomes (DISCAP ratings of conduct problems) were assessed: [1] mothers’ pre-treatment parental attributions on post-treatment outcomes, [2] mothers’ pre-treatment parental attributions on 3-month follow-up outcomes, and [3] pre-to post-treatment changes in mothers’ parental attributions on 3-month follow-up outcomes (i.e., measuring the association between change resistant parental attributions and outcomes).

Post-treatment ratings of negative parental feelings (PFQ score) and ratings of harsh discipline (APQ Corporal Punishment scale) at the time of assessing child behaviour outcomes were entered as mediators in serial mediation models (Fig. 1). Consistent with recent recommendations for testing mediation [56], individual components of the indirect effect pathway (‘direct effects’) were first tested for significance to examine the presence of mediating effects. The significance of mediating effects was subsequently assessed by bootstrapping with bias corrected confidence intervals for the indirect effect (10,000 resamples; Hayes 2009). A single-group design was first used to maximise analytic power, which was supported by findings that the intervention was equally efficacious across delivery modes and treatment sites [48–50]. Invariance testing using multigroup analyses examined replicability across treatment sites (group 1: site 1; group 2: site 2) and delivery modes (group 1: face-to-face; group 2: telehealth). Invariance was determined using the Satorra-Bentler Scaled Chi square Difference Test [57] whereby a model which constrained direct effects to be equal across groups was compared with a model which allowed direct effects to be freely estimated among groups. Indirect effects were also tested for equivalence across groups as evidence of invariance in indirect parameter estimates [58]. Significance testing was at $\alpha = .05$ level.

Covariates were chosen to control for individual differences in baseline measures that could influence study outcomes. Pre-treatment scores on severity of conduct problems, severity of ADHD, negative parental feelings, mothers’ use of harsh discipline, child age, and number of sessions were added as covariate regression paths where child behaviour outcomes was the dependent variable to control for their potential influence on how parental attributions affect BPT outcomes [13, 59]. Number of sessions also controlled for differences in treatment duration which may influence the amount of change in parental attributions and parental feelings important to predicting treatment outcomes. Pre-treatment scores on parental feelings and harsh discipline were added as covariate regression paths where putative mediators were the dependent variables. Finally, models analysing the effects of changes in parental attributions included pre-treatment scores to control for pre-treatment differences on the predictor variable. Covariates were modelled to correlate with each other.

Missing data were associated with non-participation in follow-up assessments. The proportion of missing data was 6.10% for post-treatment ratings of conduct problems, 10.40% for 3-month follow-up ratings for conduct problems, 10.40% for post-treatment ratings of negative parental feelings, harsh discipline, and change in parental attributions, and 18.40% for 3-month follow-up ratings for use of harsh discipline. Missing data were missing completely at random [Little MCAR Test: $\chi^2 (122, N = 163) = 131.06, p > .05$].

**Results**

**Preliminary Analysis**

Descriptive statistics and correlations among variables are summarised in Supplementary Table 1. Families generally received 7 treatment sessions and a one-way repeated measures ANOVA indicated that the average ratings of conduct problems at the post-treatment and 3-month follow-up assessments were significantly lower than pre-treatment levels, $F(2,280) = 114.85, p < .05, \eta^2 = .45$. Further, average ratings of mothers’ use of harsh discipline at the post-treatment and 3-month follow-up assessments were significantly lower than pre-treatment levels, $F(2,244) = 29.92, p < .05, \eta^2 = .20$. A repeated measures ANOVA testing the assumption parental attributions and feelings change during treatment indicated a main effect for time with average post-treatment scores lower than pre-treatment scores [parental attributions: $F(1,145) = 54.99, p < .05, \eta^2 = .28$; negative parental feelings: $F(1,145) = 68.94, p < .05, \eta^2 = .32$].

Fit indices indicated that the two structural models accounting for the association between pre-treatment parental attributions and child behaviour outcomes measured at
Mediation Analyses of How Mothers’ Parental Attributions Affect BPT Outcomes

Figure 2 summarises the results for testing the significance of direct effects. In models 1 and 2, pre-treatment negative parental attributions predicted greater negative parental feelings at the end of treatment (path a). In turn, greater post-treatment negative parental feelings were associated with higher ratings of harsh discipline at the post-treatment and 3-month follow-up assessments (path b). Further, higher ratings of harsh discipline at both the post-treatment and 3-month follow-up assessments were respectively associated with higher ratings of conduct problems (path c). In model 3, smaller pre-to post-treatment changes in parental attributions were associated with greater post-treatment negative parental feelings (path a) which in turn predicted higher ratings of harsh discipline at the 3-month follow-up assessment (path b). Higher ratings of harsh discipline at the 3-month follow-up assessment were subsequently associated with higher ratings of conduct problems at the same assessment time point (path c). Taken together, the results indicate the possible presence of mediation along the hypothesised pathways of the mediation model.

The results for testing indirect effects associated with the putative mediators are summarised in Fig. 1 and Table 2. In models 1 and 2, the indirect effects associated with the hypothesis that smaller improvements in parental feelings mediated the association between pre-treatment negative parental attributions and outcomes in mothers’ use of harsh discipline were significant for both the post-treatment and 3-month follow-up assessments (indirect path a×b). However, the indirect effects associated with the hypothesis that smaller improvements in parental feelings mediated the association between pre-treatment negative parental attributions and child behaviour outcomes were non-significant for both the post-treatment and 3-month follow-up assessments (indirect path a×d). Finally, the indirect effect associated with the hypothesis that the association between negative pre-treatment parental attributions and child behaviour outcomes was mediated by smaller improvements in negative parental feelings and harsh discipline were non-significant for both the post-treatment and 3-month follow-up assessments (indirect path a×b×c).

In model 3, the indirect effect associated with the hypothesis that smaller improvements in negative parental feelings mediated the association between change resistant parental attributions and 3-month follow-up outcomes in harsh discipline was significant (indirect path a×b). Further, the indirect effect associated with the hypothesis that smaller improvements in negative parental feelings mediated the association between change resistant parental attributions and 3-month follow-up child behaviour outcomes was significant (indirect path a×d). However, the indirect effect associated with the hypothesis that the association between change resistant parental attributions and child behaviour outcomes (3-month follow-up) was mediated by smaller improvements in negative parental feelings (post-treatment) and harsh discipline (3-month follow-up) was non-significant (indirect path a×b×c).

Results from invariance testing indicated equivalence in direct effects across treatment sites (model 1: Satorra–Bentler Scaled $\chi^2 (7) = 4.88$, $p = .67$, CFI = 1.00, RMSEA = .00). Model 3 accounted for 48.2% of variance in negative parental feelings at post-treatment, and 30.3% of variances in harsh discipline and 29.1% of variance in severity of conduct problems at 3-month follow-up.
Partial support for the mediation hypothesis was obtained with findings that smaller improvements in parental feelings mediated the association between mothers’ change resistant parental attributions and outcomes in use of harsh discipline and child conduct problems. Findings inconsistent with expectations were that putative mediators did not mediate the association between pre-treatment parental attributions and child behaviour outcomes and that smaller improvements in parental feelings and harsh discipline did not mediate the association between measures of problematic parental attributions and child behaviour outcomes in this study.
Overall, the results indicate that associations between problematic parental attributions, negative parental feelings about the child, and harsh discipline have the potential to influence child behaviour outcomes in BPT. Best to our knowledge this study represents the first examination of these relations within BPT for child conduct problems. The findings extend research showing that mothers’ problematic parental attributions are associated with negative parental feelings that affect the quality of parent–child relationships within the BPT context [29–32]. Our findings also replicate research showing quality of parent–child relationships predict child behaviour outcomes [33, 36]. Further, the results extend previous research examining how negative parental feelings are associated with parenting behaviours implicated in maintaining child conduct problems by showing that smaller improvements in mothers’ negative parental feelings at the end of treatment are also associated with greater post-treatment use of harsh discipline [34, 35]. The current study demonstrated these factors remain related even after participation in BPT.

With regards to mediation, smaller improvements in parental feelings about the child consistently mediated the association between problematic parental attributions and outcomes in use of harsh discipline. As previously noted, these findings expand on previous research showing problematic parental attributions promote negative parental attitudes and feelings about the child which in turn are associated with maladaptive parenting behaviours [33, 35, 60]. These results suggest that including a focus on parental attributions could enhance improvements in parenting for mothers demonstrating problematic parental attributions in treatment [14, 15]. Importantly, smaller improvements in

Table 2 Results from testing indirect effects via putative mediators using single-group design

| Model | Indirect path | Indirect Effect (S.E) | Lower 2.5% | Upper 2.5% | p-value |
|-------|---------------|-----------------------|------------|------------|---------|
| 1     | Path $a \times b$ | .02 (.01) | .01 | .05 | .02*  |
|       | Path $a \times d$ | .01 (.01) | .00 | .04 | .22    |
|       | Path $a \times b \times c$ | .01 (.00) | .00 | .02 | .10    |
| 2     | Path $a \times b$ | .02 (.01) | .01 | .05 | .05*  |
|       | Path $a \times d$ | .02 (.01) | .00 | .05 | .09    |
|       | Path $a \times b \times c$ | .01 (.00) | .00 | .02 | .10    |
| 3     | Path $a \times b$ | .05 (.02) | .02 | .10 | .01*  |
|       | Path $a \times d$ | .05 (.02) | .01 | .10 | .03*  |
|       | Path $a \times b \times c$ | .01 (.01) | .00 | .03 | .07    |

Model 1: predictor = pre-treatment parental attributions, outcome = post-treatment child conduct problems; mediators = post-treatment negative parental feelings and harsh discipline; Model 2: predictor = pre-treatment parental attributions, outcome = 3-month follow-up child conduct problems; mediators = post-treatment negative parental feelings and 3-month follow-up harsh discipline; Model 3: predictor = changes in parental attributions, outcome = 3-month follow-up child conduct problems; mediators = post-treatment negative parental feelings and 3-month follow-up harsh discipline; changes in parental attributions = post-minus pre-treatment parental attributions; paths defined in Fig. 1

*p-value < .05

Table 3 Results from invariance testing of indirect effects across treatment sites (site 1 versus site 2) and delivery modes (face–face versus telehealth)

| Model | Indirect effect path | Site 1 versus site 2 | Face–face versus telehealth |
|-------|---------------------|---------------------|---------------------------|
|       |                     | $b_1$–$b_2$ (SE)   | Lower 2.5% | Upper 2.5% | $p$-value | $b_1$–$b_2$ (SE)   | Lower 2.5% | Upper 2.5% | $p$-value |
| 1     | Path $a \times b$  | .00 (.02)           | −.04 | .02 | .80 | .01 (.02)           | −.03 | .04 | .78 |
|       | Path $a \times d$  | −.02 (.03)          | −.09 | .02 | .48 | .01 (.03)          | −.04 | .06 | .85 |
|       | Path $a \times b \times c$ | .00 (.01) | .01 | .98 | .01 (.01) | −.01 | .02 | .50 |
| 2     | Path $a \times b$  | −.01 (.02)          | −.07 | .03 | .68 | −.01 (.02)          | −.06 | .03 | .69 |
|       | Path $a \times d$  | −.03 (.03)          | −.11 | .02 | .31 | −.01 (.03)          | −.07 | .05 | .77 |
|       | Path $a \times b \times c$ | .00 (.01) | .01 | .85 | −.01 (.01) | −.03 | .00 | .35 |
| 3     | Path $a \times b$  | .02 (.04)           | −.05 | .09 | .53 | .00 (.04)           | −.08 | .07 | .97 |
|       | Path $a \times d$  | −.10 (.06)          | −.24 | .00 | .09 | −.04 (.05)          | −.15 | .05 | .43 |
|       | Path $a \times b \times c$ | .01 (.01) | .03 | .63 | −.01 (.02) | −.05 | .01 | .52 |

*p-value < .05
parental feelings about the child were found to mediate the association between change-resistant parental attributions and long-term child behaviours outcomes. These findings represent new findings in the literature and are significant because they clarify what role parental attributions may have in influencing BPT outcomes in the treatment of conduct problems. That is, the results suggest that a focus on problematic parental attribution could potentially optimise child behaviour outcomes by helping to address enduring negative emotional qualities of the parent–child relationship that places some families at risk for poor treatment outcomes.

Despite these significant findings, certain results from the mediation analyses warrant specific discussion. In contrast to models examining change resistant parental attributions, significant mediating effects were not found for pre-treatment parental attributions on child behaviour outcomes despite significant direct effects suggesting the possible presence of mediation. Further, the standardised coefficients suggested a small to moderate effect for pre-treatment parental attributions on post-treatment negative parental feelings compared to a large effect when change-resistant parental attributions was the predictor variable [61]. This pattern of results may suggest that effects sizes related to mediation are greater at the end of treatment where mothers’ change resistant parental attributions represents a more proximal predictor of overall child behaviour outcomes [8, 13]. Further, outcomes in harsh discipline did not mediate the association between smaller improvements in parental feelings associated with change resistant parental attributions on child behaviour outcomes. It should be noted here that there was a trend toward statistical significance for the serial indirect effect (p value = .07) associated with this hypothesis; thus, outcomes in harsh discipline may still have an important role in explaining how problematic parental attributions and concurrent negative parental feelings influence child behaviour outcomes. Nonetheless, given that mediation was found for negative parental feelings at the end of treatment by contrast, the pattern of results makes a prima facie case that smaller improvements in negative parental feelings provides a better account of how problematic parental attributions affect BPT outcomes.

As such, the current results suggest that negative emotional aspects of the parent–child relationship may act as a mechanism conferring the risk of problematic parental attributions in BPT. The results extend previous research identifying problematic parental attributions as a risk factor for poor outcomes [8, 12, 17] by demonstrating that they predict smaller improvements in the emotional quality of parent–child relationships which in turn predict poorer treatment outcomes. We suggest that these results are best interpreted within models of reducing relapse in adults where negative attributions and expressed emotion are hypothesised to influence treatment outcomes [26]. These models recommend that standard interventions include a focus on family attributions to help remediate processes relating negative emotional aspects of family relationships to poor outcomes. Deciding when to focus on parental attributions in treatment remain unclear, particularly given mediation was observed for measures of change-resistant parental attributions and not for pre-treatment parental attributions. However, an ‘embedded’ approach to tailoring BPT is recommended to resolve this whereby parental attributions are assessed and monitored throughout treatment to determine if they are blocking treatment implementation [14]. Attribution theory then becomes part of a repertoire of tools for practitioners when problematic parental attributions limit improvements in parent–child relationships that help achieve positive child behaviour outcomes [7].

We note that the current study did not assess which clinical techniques to use while working with negative parental attributions. Previous researchers advocating for an embedded approach have suggested the use of classical cognitive restructuring/disputation techniques [7]. However, such techniques are yet to demonstrate efficacy in enhancing outcomes when used as a BPT module [22]. Alternatively, defusing or distancing the parent from maladaptive parental attributions as outlined within acceptance and commitment therapy and mindfulness-based interventions may be appropriate [62, 63]. Parental attributions may also not represent the primary focus of adjunctive components [64]. Rather, attention could be paid to directly improving the affective quality of parent–child relationships to minimise the impact of negative parental attributions on outcomes. A research agenda comparing techniques would help elucidate clinical approaches suitable for addressing parental attributions in BPT.

Other limitations of the current study present as possible directions for future research. We examined improvements in parental attributions and parent–child relationships as related outcomes consistent with research studying secondary outcomes of BPT [13, 38, 39]. However, changes in parental attributions and outcomes in parental feelings about the child were assessed at the same time; thus, the results do not tease out any putative directionality of influence. Mediation models also did not include variables evaluating how pre-treatment or treatment-related changes in child behaviours affect outcomes. We chose to model parent variables in BPT for parsimony based on an a priori theoretical model [26] and to maximise analytic power; thus, the results cannot rule out possible interactional effects between child and parent variables. It should be noted, however, that the model in the current study relates to a follow-up analysis that previously showed that problematic parental attributions uniquely predict child outcomes after controlling for changes in child behaviour during treatment [8]. Future research will ideally involve frequent assessments of parental attributions,
parenting, and child functioning within a longitudinal framework to reliably examine change processes within treatment. Finally, future use of observational measures like expressed emotion will help test the replicability of results when using alternative methods of assessment that minimise shared method variance. Observational methods are also useful in proposing specific behaviours as modifiable targets which could potentially limit the impact of problematic parental attributions on outcomes [65].

In sum, the current study represents the first attempt to study how parental attributions affect treatment outcomes in BPT using mediation analysis. The analyses revealed that a potential mechanism of how parental attributions affect outcomes includes negative parental feelings about the child. These findings bolster the general case that a focus on parental attributions has the potential to optimise parent training outcomes in the treatment of child conduct problems by facilitating improvements in parent–child relationships. The problem is that the field remains relatively silent on evidence-based clinical techniques to achieve this. In conclusion therefore we suggest that the field would benefit from practitioners and program developers thinking about how to build personalised interventions targeting parental attributions that can be manualised for clinical replication and research evaluation.

Summary

Parental attributions are known to predict child outcomes from participation in parent training suggesting that best possible programs might include a focus on parental attributions to optimise outcomes. The current study examined how mothers’ problematic parental attributions affect child outcomes from a positive parenting program to better understand the role of parental attributions in BPT for conduct problems. It was hypothesised that smaller improvements in parental feelings about the child and ongoing use of harsh discipline mediates the effects of problematic parental attributions on child outcomes. The results suggested that a potential mechanism of how mothers’ parental attributions affect outcomes includes negative parental feelings about the child. The results support tailoring parenting interventions to focus on parental attributions to help remediate processes relating negative emotional aspects of parent–child relationships to poor treatment outcomes.

Funding This study was funded by NHMRC Project Grants 455372, 568667, 1041793 and 1041492 to the 3rd and 4th authors.

Compliance with Ethical Standards

Conflict of interest Vilas Sawrikar and Caroline Moul declare that they have no conflict of interest. David Hawes and Mark Dadds declare a conflict of interest arising from royalties associated with the treatment manual discussed in the current study.

Open Access This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made.

References

1. Eyberg SM, Nelson MM, Boggs SR (2008) Evidence-based psychosocial treatments for children and adolescents with disruptive behavior. J Clin Child Adolesc Psychol 37(1):215–237
2. Kaminski JW, Claussen AH (2017) Evidence base update for psychosocial treatments for disruptive behaviors in children. J Clin Child Adolesc Psychol 46(4):477–499
3. Brestan EV, Eyberg SM (1998) Effective psychosocial treatments of conduct-disordered children and adolescents: 29 years, 82 studies, and 5,272 kids. J Clin Child Psychol 27(2):180–189
4. Hood KK, Eyberg SM (2003) Outcomes of parent-child interaction therapy: mothers’ reports of maintenance three to six years after treatment. J Clin Child Adolesc Psychol 32(3):419–429
5. Ng MY, Weisz JR (2016) Annual research review: building a science of personalized intervention for youth mental health. J Child Psychol Psychiatry 57(3):216–236
6. Sanders MR, Bor W, Moraw ska A (2007) Maintenance of treatment gains: a comparison of enhanced, standard, and self-directed Triple P-Positive Parenting Program. J Abnorm Child Psychol 35(6):983–998
7. Scott S, Dadds MR (2009) Practitioner Review: when parent training doesn’t work: theory-driven clinical strategies. J Child Psychol Psychiatry 50(12):1441–1450
8. Sawrikar V, Hawes D, Moul C, Dadds M (2018) The role of parental attributions in predicting parenting intervention outcomes in the treatment of child conduct problems. Behav Res Ther 111:64–71
9. Bickett LR, Milich R, Brown RT (1996) Attributional styles of aggressive boys and their mothers. J Abnorm Child Psychol 24(4):457–472
10. Johnston C, Chen M, Ohan J (2006) Mothers’ attributions for behavior in nonproblem boys, boys with attention deficit hyperactivity disorder, and boys with attention deficit hyperactivity disorder and oppositional defiant behavior. J Clin Child Adolesc Psychol 35(1):60–71
11. MacBrayer EK, Milich R, Hundley M (2003) Attributional biases in aggressive children and their mothers. J Abnorm Psychol 112(4):698
12. Mattek RJ, Harris SE, Fox RA (2016) Predicting treatment success in child and parent therapy among families in poverty. J Genet Psychol 177(2):44–54
13. Hoza B, Johnston C, Pillow DR, Ascough JC (2006) Predicting treatment response for childhood attention-deficit/hyperactivity disorder: introduction of a heuristic model to guide research. Appl Prev Psychol 11(4):215–229
14. Sawrikar V, Dadds M (2018) What role for parental attributions in parenting interventions for child conduct problems?
of childhood: a follow-up study. J Child Psychol Psychiatry 36(5):833–846
34. Crandall A, Deater-Deckard K, Riley AW (2015) Maternal emotion and cognitive control capacities and parenting: a conceptual framework. Dev Rev 36:105–126
35. Wang Z, Deater-Deckard K, Bell MA (2016) The role of negative affect and physiological regulation in maternal attribution. Parenting 16(3):206–218
36. Booker JA, Capriola-Hall NN, Greene RW, Ollendick TH (2019) The parent–child relationship and posttreatment child outcomes across two treatments for oppositional defiant disorder. J Clin Child Adolesc Psychol. https://doi.org/10.1080/15374416.2018.1555761
37. Fossum S, Mørch W, Handegård BH, Drugli MB, Larsson BO (2009) Parent training for young Norwegian children with ODD and CD problems: predictors and mediators of treatment outcome. Scand J Psychol 50(2):173–181
38. Colalillo S, Johnston C (2016) Parenting cognition and affective outcomes following parent management training: a systematic review. Clin Child Fam Psychol Rev 19(3):216–235
39. Kazdin AE, Wassell G (2000) Therapeutic changes in children, parents, and families resulting from treatment of children with conduct problems. J Am Acad Child Adolesc Psychiatry 39(4):414–420
40. Holland D, Dadds MR (1997) The diagnostic interview schedule for children, adolescents, and parents. Griffith University, Brisbane
41. American Psychiatric Association (2000) Diagnostic and statistical manual of mental disorders, 4th edn. American Psychiatric Association, Washington, DC
42. Dadds MR, Hawes DJ (2006) Integrated family intervention for child conduct problems: a behaviour-attachment-systems intervention for parents. Australian Academic Press, Bowen Hills
43. Dadds MR, Cauchi AJ, Wimalaweera S, Hawes DJ, Brennan J (2012) Outcomes, moderators, and mediators of empathic-emotion recognition training for complex conduct problems in childhood. Psychiatry Res 199(3):201–207
44. Dadds MR, McHugh TA (1992) Social support and treatment outcome in behavioral family therapy for child conduct problems. J Consult Clin Psychol 60(2):252–259
45. Dadds MR, Schwartz S, Sanders MR (1987) Marital discord and treatment outcome in behavioral treatment of child conduct disorders. J Consult Clin Psychol 55(3):396–403
46. Hawes DJ, Dadds MR (2005) The treatment of conduct problems in children with callous-unemotional traits. J Consult Clin Psychol 73(4):737
47. Hawes DJ, Dadds MR, Brennan J, Rhodes T, Cauchi A (2013) Revisiting the treatment of conduct problems in children with callous-unemotional traits. Aust N Z J Psychiatry 47(7):646–653
48. Kirkman JLL, Hawes DJ, Dadds MR (2016) An open trial for an e-health treatment for child behavior disorders ii: outcomes and clinical implications. Evid Based Pract Child Adolesc Ment Health 1(4):213–229
49. Kirkman JLL, Hawes DJ, Dadds MR (2016) An open trial for an e-health treatment for child behavior disorders i: social acceptability, engagement, and therapeutic process. Evid Based Pract Child Adolesc Ment Health 1(4):196–212
50. Dadds MR, Thai C, Mendoza Diaz A, Broderick J, Moui C, Tully LA et al (2019) Therapist-assisted online treatment for child conduct problems in rural and urban families: two randomized controlled trials. J Consult Clin Psychol 87(8):706
51. Australian Bureau of Statistics (2013) Technical Paper: Socio-Economic Indexes for Areas—2011 (SEIFA). Aust Bur Stat
52. Frick PJ (1991) The Alabama Parenting Questionnaire (APQ). Unpublished rating scales: The University of Alabama

 Springer
53. Deater-Deckard K, O’Connor TG (2000) Parent–child mutuality in early childhood: two behavioral genetic studies. Dev Psychol 36(5):561–570
54. Oliver BR, Trzaskowski M, Plomin R (2014) Genetics of parenting: the power of the dark side. Dev Psychol 50(4):1233–1240
55. Yang Y (2018) Structural equation modelling. In: Brough P (ed) Advanced research methods for applied psychology: design, analysis and reporting. Routledge, London, pp 258–270
56. Yzerbyt V, Muller D, Batailler C, Judd CM (2018) New recommendations for testing indirect effects in mediational models: the need to report and test component paths. J Pers Soc Psychol 115(6):929
57. Satorra A, Bentler PM (2010) Ensuring positiveness of the scaled difference Chi square test statistic. Psychometrika 75(2):243–248
58. Ryu E, Cheong J (2017) Comparing indirect effects in different groups in single-group and multi-group structural equation models. Front Psychol 8:747
59. Dix TH (1993) Attributing dispositions to children: an interactional analysis of attribution in socialization. Personal Soc Psychol Bull. 19(5):633–643
60. Bolton C, Calam R, Barrowclough C, Peters S, Roberts J, Wearden A et al (2003) Expressed emotion, attributions and depression in mothers of children with problem behaviour. J Child Psychol Psychiatry 44(2):242–254
61. Cohen J (1988) Statistical power analysis for the behavioral sciences. Erlbaum, Hillsdale
62. David OA (2014) The rational positive parenting program for child externalizing behavior: mechanisms of change analysis. J Evid Based Psychother 14(1):21–38
63. Gershy N, Meehan KB, Omer H, Papouchis N, Sapir IS (2017) Randomized clinical trial of mindfulness skills augmentation in parent training. Child Youth Care Forum 46(6):783–803
64. Gavića OA, Joyce MR, David D (2011) Cognitive behavioral parent programs for the treatment of child disruptive behavior. J Cogn Psychother 25(4):240–256
65. Foster CJE, Garber J, Durlak JA (2008) Current and past maternal depression, maternal interaction behaviors, and children’s externalizing and internalizing symptoms. J Abnorm Child Psychol 36(4):527–537

Publisher’s Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.