



Room to Improve: Predictors of Attendance and Outcomes Within Mindfulness-Enhanced Behavioral Parent Training

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Abstract

Objectives Parents across a broad sociodemographic spectrum struggle with their children’s difficult behaviors and need effective and engaging interventions. We developed a mindfulness-enhanced behavioral parent training group program (MeBPT) aiming to be more inclusive and enable positive outcomes. This study investigated whether MeBPT can meet diverse needs across child, parent, family, and program-delivery factors, and explored whether improvements in parent-rated child behavior are predicted by changes in mindful parenting, parenting approach, or both.

Method Participants were 338 parents of 3- to 12-year-old children presenting with externalizing problems to a university clinic in regional Australia. Factors that significantly correlated with improvements in parent and child outcomes or attendance were included in regression analyses.

Results Improved parent-rated child behavior was predicted by change in mindful parenting ($p=0.019$) but not parenting approach ($p=0.305$). Attendance was high across all factors, and particularly for older parents. Improvements in parent well-being, approach, mindfulness, and child behavior were similarly large for families across child and family characteristics. Low-income families exhibited less improvement in parental well-being ($p=0.012$), although demonstrated similar improvements in child behavior, parenting approach, and mindful parenting. Families with more severe problems at baseline showed largest gains ($p<0.002$). Parental self-awareness and acceptance were important change agents.

Conclusions MeBPT appears effective across various sociodemographic backgrounds and is particularly beneficial for families presenting with more severe behavioral problems. Controlled research with ethnically diverse families is needed to confirm the benefits of MeBPT and to allow examination of mediators and moderators.

Keywords Parenting · Child behavior · Mindfulness · Predictors · Attendance · Outcomes

Early child behavioral problems such as tantrums and non-cooperation often persist into adulthood and are associated with negative longer-term outcomes including mental health problems (Reef et al., 2011), unemployment (Fergusson, 2005), and criminal activity (Farrington, 2007). Parents struggling with their child’s difficult behaviors therefore need access to

effective and engaging interventions that can mitigate these trajectories. Fortunately, there are well-proven behavioral parent training programs (BPTs) that have demonstrated moderate to large effect size improvements in child behavior and parenting approach (Buchanan-Pascall et al., 2018; Hua & Leijten 2022; Kaminski & Claussen, 2017). BPT helps parents to adjust contingencies around their child such that desirable behaviors are encouraged through positive attention, rewards, routines, and clear instructions, and undesirable behaviors are discouraged through limits, planned-ignoring, and consequences. Small upstream adjustments to parenting approach from BPT can lead to multiple downstream benefits for the child, family, and wider community (Conduct Problems Prevention Research Group, 2015). However, approximately 50% of parents drop-out of existing behavioral programs, often due to difficulties in regulating their own emotions and behavior or restrictive factors associated with social disadvantage (Chacko et al., 2016; Maliken &

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Katz, 2013). Furthermore, outcomes from BPT interventions have plateaued over the past 50 years (Buchanan-Pascall et al., 2018). There appears to be room for improvement.

Within this context, mindful parenting programs (MPPs) emerged over the past few decades, thus far producing small to moderate intervention effects (Bögels & Restifo, 2013; Burgdorf et al., 2019; Donovan et al., 2022b). Mindful parenting involves bringing intentional, accepting, and present-moment awareness to parent–child interactions, thereby helping parents to respond more sensitively, and to step back from fuelling coercive parent–child interactions theorized to underlie child behavioral problems (Kabat-Zinn & Kabat-Zinn, 1997; Patterson, 1982). Research exploring relative benefits of MPP versus BPT has identified differential effects of the interventions based on child and family factors. For example, mindfulness seems best suited where children present with life-long neurodevelopmental conditions such as autism spectrum disorder, while behavioral approaches appear preferable where children display disruptive behaviors underpinned by coercive parent–child cycles (Anand et al., 2023; Ferraioli & Harris, 2013). Understandably, many authors have suggested combining BPT and mindfulness (MeBPT) to derive benefits present within each approach (e.g., Emerson et al., 2021; Maliken & Katz, 2013; Singh et al., 2021). Some parents may benefit from clearer instructions and more consistent consequences, while others may benefit from improved emotion regulation and greater present-moment awareness of themselves and their child. Integrated MeBPT programs have thus far produced mixed effects on child externalizing behavior outcomes: some studies have shown very large effects (e.g., Gershby et al., 2017), and others have found no change in child behavior (e.g., Lengua et al., 2021). Given variability in MeBPT outcomes, it is important to understand whether MeBPT can meet the needs of parents across a range of sociodemographic factors, and whether changes in child behavior are driven by improvements in parenting approach or mindful parenting or both.

Most published parenting research investigating predictors of improvements in child behavior has focused on BPT studies, with an increasing number of MPP/MeBPT papers emerging. More severe difficulties in child or parent baseline measures have generally predicted greater improvements following BPT, often attributed to greater motivation to change and room for improvement (e.g., Leijten et al., 2018; Lundahl et al., 2006; Menting et al., 2013). Early meta-analyses of BPT programs found outcome effect sizes are smaller for low-income parents, for one-parent families, for parents with lower education or occupational status, and for mothers experiencing depression (Lundahl et al., 2006; Reyno & McGrath, 2006). A recent narrative analysis of predictors and moderators of child behavior improvements derived from BPT randomized controlled trials published between 2004 and 2019 found that social disadvantage, parent education, ethnicity, and marital satisfaction did not predict improvements in child behavior in any of the 21 studies

included (Dedousis-Wallace et al., 2021). There were mixed findings for parent age, parental stress, parental depression, and critical parenting style; some studies included in the review found greater improvements, some smaller, and others found no impact on outcome. Nearly half of the studies under review utilized the Incredible Years program (IY; Webster-Stratton & Reid, 2018), which emphasizes collaboration and invites parents to adapt strategies based on their own personal values and cultural norms: an approach that may appeal to families experiencing social disadvantage (Dedousis-Wallace et al., 2021; Leijten et al., 2018).

Within mindful parenting, a pre-post study based on the 8-week Mindful Parenting program (MP; Bögels & Restifo, 2013) found that improvements in child behavior were predicted by changes in parental over-reactivity, but not mindful parenting or parenting stress (Emerson et al., 2021). Another MP study found changes in mindful parenting, but not general mindfulness, predicted improved child behavior (Meppelink et al., 2016). An earlier integrated mindfulness and BPT program with parents of adolescents found changes in mindful parenting mediated pre- to post-intervention improvements in the parent–child relationship and discipline consistency (Coatsworth et al., 2010). A more recent integrated 6-week program with socially disadvantaged families explored a range of predictors of improvements in child and parent outcomes, including single parent status, parent education, parent age, ethnic/racial minority status, baseline outcome measures, and parenting change scores (Lengua et al., 2021). The authors found that none of the listed sociodemographic factors was associated with improved child behavior and parenting, although they identified a range of predictors associated with change scores. For example, increased parental scaffolding and responsiveness predicted reductions in child behavior problems. The researchers acknowledged that the relatively small sample ($n = 50$) may have accounted for non-significant findings and recommended a larger sample.

Taken together, these studies suggest that mindfulness has a role to play in parenting interventions, both as a program component and as a mechanism of change. However, it remains unclear whether MeBPT can produce similar improvements across diverse sociodemographic characteristics, and whether these improvements are related to changes in parenting approach, mindful parenting, or both. The current paper addresses these issues by examining predictors of outcome and attendance using a decade of data from an 8-week MeBPT group program for parents of children aged 3 to 12 years presenting with behavioral problems. The large sample size of our study allowed for the inclusion of a wide range of predictors. We hypothesized that (1) attendance and improvements in parent-rated child behavior, parent well-being, parenting approach, and mindful parenting would be similar across a range of child, parent, family, and program-delivery characteristics; (2) more severe problems at baseline would predict larger improvements

across all outcome measures; and (3) improved child behavior would be predicted by improvements in parenting approach and mindful parenting but not improved parent well-being.

Method

Participants

Participants were 338 parents who had attended an 8-week mindfulness enhanced behavioral parenting group program

between 2009 and 2019 at a university psychology clinic in regional Australia (see Table 1 for sociodemographic details). Parents had contacted the clinic for support in parenting a child with externalizing behavior problems, with over 90% self-referred to the clinic. Parents needed to meet the following criteria: (1) parent of a child aged 3 to 12 years presenting with externalizing behaviors, (2) contact with their child/ren at least 1 day per week, (3) absence of untreated severe parental mental health difficulties, (4) capacity to attend each week, and (5) ability to communicate in English.

Table 1 Demographic characteristics for parents who attended CCK groups between 2009 and 2019

Demographic characteristic	Specifier/s	Total sample (<i>n</i> = 338)
Child sex	Male (%)	236 (70.4%)
Child age	Mean (<i>SD</i>)	7.10 (2.20)
Child medication	On medication (%)	68 (25.3%)
Medication reason	Behavior/hyperactivity	37 (52.1%)
	Medical	23 (32.4%)
	Emotional/other	11 (15.5%)
Problems started	Birth	36 (16.1%)
	< 2 years old	83 (37.1%)
	3–5 years old	55 (24.6%)
	5 +	50 (22.3%)
Past professionals involved ^a	Mean (<i>SD</i>)	2.7 (1.5)
Parent role ^b	Mothers (%)	223 (66.0%)
Parent age	Mean (<i>SD</i>)	39.0 (6.9)
Parent nationality ^c	Australian	238 (82.6%)
	Australian + other	43 (14.9%)
	Other	7 (2.4%)
Education level	School	23 (14.9%)
	Certificate/diploma	104 (45.6%)
	Undergraduate	49 (21.5%)
	Post-graduate	41 (18%)
Employment status	Not employed	52 (24.5%)
	Part-time	83 (39.2%)
	Full-time	77 (36.3%)
Concession card	Yes	75 (26%)
	No	213 (74%)
Marital status	Married/defacto	240 (85.1%)
	Separated/divorced	22 (7.8%)
	Other	20 (7.1%)
Family type	Couple	249 (88.6%)
	One parent	32 (11.4%)
Family income ^d	Low	41 (14.7%)
	Middle/high	237 (85.3%)
Family size	Children, mean (<i>SD</i>)	2.3 (0.8)
Sessions attend ^e	Mean of 8 sessions (<i>SD</i>) ^e	6.7 (1.6)
Attend status	Mothers attend in couple	101 (29.3%)
	Fathers attend in couple	90 (26.6%)
	Mothers attend alone	121 (36.4%)
	Fathers attend alone	26 (7.7%)

^aPast professionals included private psychologist (*n* = 163), general practitioner (*n* = 161), pediatrician (*n* = 116), school counselor (*n* = 109), psychiatrist (*n* = 39), and other (*n* = 35); ^bParent role includes biological, step, foster, and grandparents; ^cOther nationality included European 10.4%, Asian 2.8%, and American 2.4%; ^dDefined by Australian Bureau of Statistics (2021), middle/high combined due to bracket changes over 10 years; ^eSessions attend includes catch-ups

Parents who attended the program mostly identified as female (66%), aged from 22 to 77 years ($M=39.0$ years, $SD=6.9$), mostly of high school/diploma level of education (60.5%), working either part-time (39.2%) or full-time (36.3%), married/defacto (85.1%), living in a couple (88.6%), of middle or above income (85.3%), and identifying as Australian (82.6%), and 26% received government support for unemployment, disability, carer, or aged pension (concession card holders). Children were mostly identified as boys (70.4%), aged 3 to 12 years ($M=7.1$ years, $SD=2.2$), problem-onset largely prior to school age (77.7%), 25.3% on medication, and average of 2.7 professionals previously consulted regarding child behavioral problems ($SD=1.5$). Baseline measures found that 77.8% of children were classified as above the clinical cut-off for behavioral problems and 74.2% of parents were classified as above the clinical cut-off for parenting problems. There were 223 mothers (211 biological, 1 step, 6 foster, 5 grand) and 115 fathers (106 biological, 6 step, 1 foster, 2 grand). One hundred and forty-seven parents attended individually (139 biological parents, four grandparents, two stepfathers, two foster mothers), and 191 attended as parent-teams (mostly spouses, one three-parent-team that included a grandmother).

From the total sample, 219 parents (70.9% mothers) had completed both pre- and post-intervention measures and were included in the analysis of predictors of change following treatment. The partial sample under investigation here was similar to the full sample across most sociodemographic factors and outcome measures (see Supplementary Tables S1 and S2). Parents who completed measures at one versus both timepoints were similar in terms of child age, sex, problem-onset, medication use, parent age, education, employment, marital status, one-parent family status, frequency of child problem behaviors, parenting approach, parental well-being, and mindful parenting. The partial sample differed only in terms of higher proportion of mothers, less concession card holders, less low-income parents, lower session attendance, and higher intensity of child problems. Overall, there was sufficient generalizability to conduct regression analyses on the partial sample without needing to replace missing data for whole measures. Mothers and fathers were included in the same analyses due to insufficient numbers of fathers to run separate regression analyses. Mothers and fathers also showed similar baseline severity across most outcome measures and demonstrated similar improvements across all outcome measures. Further details regarding the sample are described in Donovan et al. (2022a).

Intervention

Confident Carers Cooperative Kids (CCCK) is a manualized 8-week mindfulness-enhanced behavioral parenting program delivered in group format using didactic delivery, group discussion, live/video demonstration, mindfulness/experiential exercises, in-session practice, and out-of-session homework

tasks. To improve program fidelity, parents were given an 80-page workbook that included all key materials, images, exercises, and between-session tasks. Therapists likewise used a 60-page manual that overviewed all program components including verbatim instructions to guide group exercises and discussions. The CCCK program represents a Third Wave integration of behavioral skill components, mindfulness and acceptance and commitment therapy (ACT) components, and psychoeducation regarding neurobiology of attachment (Donovan et al., 2023; see Table 2 for details). CCCK shares an underlying philosophy of collaboration and strengthening parent–child relationships with the IY program, and the behavioral skill components were adapted from IY (Webster-Stratton & Reid, 2018). CCCK foundational principles are covered in Sessions 1 and 2 that establish a frame from which parents can deliver behavioral skills presented in subsequent sessions, with brief mindfulness exercises included in each session. The program has been revised over the past 15 years based on parent and facilitator feedback, with increased integration and parsimony of key concepts, metaphors, and images, and 50% increase in mindfulness components after 2014. Preliminary research has established that CCCK is associated with significant pre- to post-intervention improvements in parenting approach, mindful parenting, parent well-being, and child behavior, with large effect sizes (Donovan et al., 2022a, 2023).

Procedure

Parents requesting assistance for a child aged 3 to 12 years with externalizing behavioral problems were offered CCCK during each of four school terms between 2009 and 2019. CCCK represents one of several parenting interventions offered by local child and family services to parents struggling with challenging child behaviors, and the main parenting intervention offered by the university clinic. Parents attended a pre-group meeting to determine suitability and identify risk factors that required alternative intervention. Parents who met suitability criteria completed baseline measures and then attended 2-hr group sessions for eight consecutive weeks, with four to 15 parents (average eight parents) and three facilitators in each group. Facilitators were post-graduate psychology students undertaking clinical psychology training who had attended a 2-day certification training with the CCCK developers and weekly clinical supervision with one of the authors (Mark Donovan), including demonstration and practice of key program components. Parents were invited to attend an individual 2-month follow-up meeting with group facilitators to review progress and discuss future needs. Pre- and post-intervention paper and pencil outcome measures were completed as part of routine care, and pre- to post-intervention changes were discussed with parents at the follow-up meeting. Parents who missed a group session

Table 2 CCCK weekly behavioral skills, mindfulness, and ACT^a components

Week	Title/goal for week	CCCk components		Homework/committed action ^a
		Behavioral skills	Mindfulness/ACT ^a /visual imagery and metaphor	
1	Understanding and preventing problem behaviors	Recognition of shared experiences, formulation of problem behaviors via coercive cycle, problem list	Bushfire metaphor formulation, power struggles (defusion), mind struggles (creative hopelessness, defusion)	Monitor child non-cooperation, complete bushfire worksheet, complete mind struggle worksheet, draw family
2	Becoming aware of your parenting values	Emotion coaching	Parenting compass (guided mindfulness, values-identification), doing what matters (choice point, committed action), wheel of noticing (observing self)	Notice parenting values, practice emotion coaching
3	Strengthening relationships	Attuned care-giving, balance between love and limits, play tips and traps	Mindful play, mindful describing, doing what matters	Monitor child cooperation, daily mindful play
4	Encouraging positive behaviors	Learned behavior, praise and rewards	Mindful eating/drinking, mindful praise, grounding exercise, “feeding tiger cub” (defusion), doing what matters	Monitor praise and child’s response, mindful play
5	Preventing misbehavior	Setting limits, household rules, clear instructions, planned ignoring	Mindfulness of breath, mindful limits, “drop the rope” (acceptance), doing what matters	Monitor clear instructions, avoid arguments, complete family agreement, mindful play
6	Managing misbehavior	Fight/flight/freeze, natural consequences, loss of privileges, time-out	Breathing space, mindful consequences, doing what matters	Monitor consequences, time-out plan, mindful play
7	Managing difficult situations	Behavior action plan, consolidation	Self-compassion break, mind struggle drawing (defusion), doing what matters	Complete behavior action plan for high-risk problem, mindful play
8	Being the parent	Behavior action plan, consolidation, relapse prevention	Sweet-spot guided mindfulness and drawing, doing what matters	

^aACT, acceptance and commitment therapy; reproduced with permission from Donovan et al. (2022a)

were contacted by telephone or email and offered an individual catch-up session. Paper and pencil follow-up measures were mailed to parents who missed the final session.

Ethical approval was gained from the University Human Research Ethics Committee for the research team to access de-identified archival CCK data from 2009 to 2019 (HREC 2020/010). The de-identified database included extracted sociodemographic information, session attendance, pre- and post-intervention measures, and anonymous parent satisfaction ratings and feedback. The research team were not directly involved in facilitating CCK groups or collecting data.

Measures

Child Behavior

The Eyberg Child Behavior Inventory (ECBI; Eyberg & PinCUS, 1999) provided a parent-reported measure of externalizing problems. Parents rated the intensity of 36 commonly reported child behavior problems on a scale from 1 (*never*) to 7 (*always*) (ECBI-I), as well as answering Yes/No to indicate their perception of problem status (ECBI-P). Total ECBI-I and ECBI-P scores are produced with recognized cut-offs of ECBI-I (> 131) and ECBI-P (> 15) that indicate clinical significance. ECBI-I and ECBI-P are widely used in parenting research and have demonstrated good internal consistency ($\alpha > 0.90$) and adequate external validity (Boggs et al., 1990; Colvin et al., 1999). Both subscales were used in the present study, with reliability coefficients $\alpha = 0.91$, $\omega = 0.90$ (ECBI-I) and $\alpha = 0.88$, $\omega = 0.87$ (ECBI-P).

Parental Well-Being

The Depression Anxiety Stress Scales 21 (DASS21; Lovibond & Lovibond, 1995) was used as a measure of parental emotional well-being. Parents rated each of 21 items on a 0 (*never*) to 3 (*nearly always*) scale, with 7 items for each of depression, anxiety, and stress. The DASS21 has established high levels of internal consistency for subscales ($\alpha = 0.82$ – 0.90) and total score ($\alpha = 0.93$), and adequate convergent and discriminant validity (Henry & Crawford, 2005; Lovibond & Lovibond, 1995). Categories of normal, mild, moderate, severe, and extremely severe are used to determine clinical severity. Here, we used moderate and above ranges to indicate clinically significant problems with parent well-being (Henry & Crawford, 2005). The DASS (total) was used for the present study, with clinical cut-off > 23, and reliability coefficient $\alpha = 0.94$ and $\omega = 0.94$.

Parenting Approach

The Parenting Scale (PS; Arnold et al., 1993) was used as a measure of parenting approach. Parents rated the likelihood

of using a specific discipline strategy along a 7-point Likert scale for 30 items covering three subscales of parenting approach: over-reactivity (10 items; authoritarian discipline, irritability), laxness (11 items; permissive discipline), and verbosity (7 items; over-wordy instructions or reliance on talking). The scale includes reverse-scored items. The scale has demonstrated good internal reliability ($\alpha = 0.84$), good test–retest reliability ($r = 0.81$ – 0.86), and good discriminant validity (Arnold et al., 1993; Rhoades & O’Leary, 2007). Clinically significant cut-off for the total score > 3.2 has been established (Arnold et al., 1993). The PS (total) was used for the present study with reliability coefficient $\alpha = 0.81$ and $\omega = 0.81$.

Mindful Parenting

The Interpersonal Mindfulness in Parenting Scale (IMP; Duncan, 2007) was used as a measure of mindful parenting. Parents rated themselves across six dimensions of mindful parenting: compassion for child (CC, 6 items), listening with full attention (LFA, 5 items), emotional awareness of child (EAC, 3 items), emotional awareness of self (EAS, 4 items), emotional non-reactivity in parenting (ENRP, 5 items), and non-judgmental acceptance of parent functioning (NJAPF, 6 items) (Burgdorf & Szabó, 2021). Higher scores signify increased mindful parenting, with no established clinical cut-offs and mean scores ranging from one to five in each of the subscales. The scale includes reversed-scored items, has demonstrated good internal consistency ($\alpha = 0.89$ for total), and has been validated within Australia for the revised version which uses 29 of the original 31 items (Burgdorf & Szabó, 2021; de Bruin et al., 2014). The reliability coefficient for IMP (total) was $\alpha = 0.88$ for the present study (ω unable to be calculated).

Attendance

Total session attendance was calculated by summing group sessions and individual catch-up sessions where group sessions had been missed. For parents with attendance data ($n = 287$), 30 parents attended one catch-up and six parents attended two catch-ups. Mean attendance was 6.7 sessions. Full attendance was shown by 39.7% of parents, 29.3% attended seven sessions, 17.1% attended six sessions, 5.2% attended five sessions, 1.4% attended four sessions, 3.5% attended three sessions, 2.1% attended two sessions, and 1.8% attended one session.

Predictors of Outcome and Attendance

Predictor variables from previous parenting intervention studies were selected, with the intention to capture a broad

range of predictors given the novel mindfulness-enhanced BPT intervention (Baker & Sanders, 2017). Variables were divided into those pertaining to the child, parent/family, program-delivery, and outcome measure change scores, with dichotomous categorical variables created where needed for the regression analyses.

Child Predictors

Age, sex (*male* = 1, *female* = 2), problem-onset age < 2 years (1) or older (2), on medication (1) or not (2), number of previous professionals, baseline ECBI-I score, and baseline ECBI-P score.

Parent/Family Predictors

Age, sex (*female* = 1, *male* = 2), education school/diploma (1) or university (2), living in two-parent (1) or one-parent family (2), family income classified by the Australian Bureau of Statistics (2021) as low (1) or middle and above (2), full-time/part-time employed (1) or not employed (2), concession card holder (1) or not (2), identify as Australian (1) or other (2), baseline DASS score, baseline PS score, and baseline IMP score.

Program-Delivery Predictors

Total sessions attended, attend status as parent-team (1) or alone (2), and program maturity (2009–2014 = 1, 2015–2019 = 2).

Change Score Predictors

Change scores were calculated for ECBI-I, ECBI-P, DASS, PS, and IMP by subtracting post-intervention from baseline scores. Positive change scores indicate improvements for ECBI-I/P, DASS, and PS, and negative change scores indicate improvements for IMP.

Clinically Significant Change Score Predictors

Clinically significant change was identified for parents who had shifted from clinical to non-clinical status on pre- to post-intervention measures of ECBI-I, ECBI-P, DASS, and PS (clinical range cut-off not available for IMP).

Data Analyses

Statistical analyses were conducted using SPSS version 28.0 (IBM Corp., 2021). Data were extracted from a 10-year archival database with incomplete data on most outcome measures for 0.2 to 5% of participants. Missing

values were confirmed to be random by Little's MCAR test ($\chi^2(54,165) = 44,099.7, p = 1.000$). Modal imputation was implemented on missing items for scales with at least 50% complete data. Participants with less than 50% complete data were omitted for that scale in the analyses.

Repeated measure ANOVAs were used to determine significant pre- to post-intervention changes, demonstrating large effect size improvements across all variables that have been reported elsewhere (Donovan et al., 2022a). For the current regression analyses, data were inspected to confirm absence of outliers, linear relationship between predictor and outcome, and absence of multicollinearity. No outliers were removed as they appeared to be genuine variations rather than errors. ECBI-I and ECBI-P were correlated at $r < 0.725$ which was regarded as acceptable, and so both were included in regression analyses as they captured different aspects of parents' perception of child problems (Parent et al., 2011). Variance inflation factor statistics were all within acceptable ranges ($VIF < 2$). Relationships were explored between change scores and criterion predictor variables, using Pearson's correlations for continuous variables, and chi-square or two-tailed independent *t*-tests for categorical and nominal variables. Only variables with significant relationships ($p < 0.05$) were entered into the hierarchical multiple regression analyses, using enter method. Separate hierarchical multiple regression analyses were completed for the six dependent variables: Δ ECBI-I, Δ ECBI-P, Δ DASS, Δ PS, Δ IMP, and attendance. Significant correlations were found between baseline and change scores for each outcome variable; hence, baseline pre-scores were added at Step 1 in the regression analyses to control for possible confounding effects (The Conduct Problems Prevention Research Group, 2002). Where relevant, child-related factors were entered at Step 2, parent/family-related at Step 3, program-related at Step 4, and change scores at Step 5. This hierarchy of steps allowed discernment of variance contributions from pre-score, child, parent/family, program, and change score predictors (Baker & Sanders, 2017; Reyno & McGrath, 2006). Secondary logistic regression analyses were used to determine predictors of clinically significant change. Relationships between predictors and clinically significant change were measured using two-tailed independent *t*-tests and chi-square for continuous and categorical variables, respectively, and only those where $p < 0.1$ were included within further analyses. These predictors were included in backwards stepwise logistic regression analyses to determine the best predictors for each outcome measure, using the standard stop-rule of $p < 0.1$ (Tabachnick & Fidell, 2014). Predictors from the best model were then included in further logistic regression analyses using enter method, to calculate valid *p*-values and odds ratios (Tabachnick & Fidell, 2014). A priori power analyses using G*Power for multiple

regression with 18 predictors indicated a minimum sample of $n = 149$ assuming small effect size with 80% power and 0.05 alpha probability level (Faul et al., 2007).

Results

Sociodemographic and Baseline Predictors of Improvement and Attendance

Means, standard deviations, percentages, and bivariate correlations between predictors included in regression analyses are presented in Table 3. From the five child and eight parent/family sociodemographic predictors, only child age, problem-onset, parent age, one-parent status, family income, and concession were significantly correlated with one of the criterion change score variables and were included in the regression analyses. Two program-delivery predictors (program maturity, attend as couple) were significantly correlated with a criterion variable and were included in the regression analyses. Baseline scores for all five outcome measures were significantly correlated with their respective criterion change score and were included. Table 4 displays statistical values from hierarchical multiple regression exploring predictors of change in outcome measures and attendance. Table 5 shows findings from logistic regression examining predictors of clinically significant change in relevant outcome variables.

In relation to the question of which pre-intervention characteristics predicted stronger outcomes, higher baseline scores predicted larger pre- to post-intervention change scores on each of the five outcome measures, accounting for approximately 14 to 20% of the variance (Table 4). Higher baseline parenting approach also predicted greater mindful parenting change scores although did not contribute significantly to the model. From the six sociodemographic factors in the regression analyses (child age, problem-onset, parent age, one-parent status, family income, concession), none predicted improvements in child behavior intensity/frequency, parenting approach, or mindful parenting. Only higher family income was found to predict greater improvements in parent well-being, accounting for 5.2% of the variance. Neither of the two program-delivery factors (attend as couple, program maturity) predicted improvements in child behavior intensity, parent well-being, parenting approach, or mindful parenting, and only program maturity predicted greater improvements in child behavior frequency, accounting for 5.6% of the variance. Session attendance was not significantly correlated with any change scores, and was predicted by only higher parent age, accounting for 1.8% of the variance.

Sociodemographic and Baseline Predictors of Clinically Significant Change

Secondary logistic regression analyses explored associations between predictors and clinically significant (CS) change, identified by pre- to post-intervention movement from the clinical to the non-clinical range (Table 5). Similar to our results for improvement, higher baseline scores predicted CS change for child behavior intensity/frequency, parent well-being, and parenting approach. CS change in child behavior intensity/frequency was also predicted by onset of child problems prior to age 2 years, child behavior frequency CS change by program maturity, and parent well-being CS change by higher family income and higher baseline mindful parenting.

Change Score Predictors of Improvement

Our final area of interest was to explore relationships between improvements across the five outcome measures to determine whether changes in parent-reported child behavior were predicted by improvements in parent approach, mindful parenting, and/or parent well-being. Change scores for each outcome measure were entered as the final step in the hierarchical regression analyses (Table 4). Larger change scores in mindful parenting predicted greater improvements in child behavior intensity, parent well-being, and parenting approach. Changes in child behavior intensity/frequency were mutually predicted by each other, and improvement in mindful parenting was predicted by changes in parent well-being and parenting approach.

Secondary Analyses

Secondary correlational and *t*-test analyses were conducted to better understand relationships between parenting approach (PS) and mindful parenting (IMP) subscales and mechanisms of change (Supplementary Table S1). There were no significant correlations between baseline PS or IMP subscales and change (Δ) in child behavior intensity/frequency. At baseline, PS-Over-reactivity was significantly correlated with five IMP subscales (all $p < 0.001$), including strongly correlated with Emotional Non-Reactivity in Parenting (ENRP, $r(236) = -0.554$) and Emotional Awareness of Self ($r(236) = -0.501$). PS-Laxness showed small significant correlations with four IMP subscales ($r(236) = -0.149$ to -0.214 , $p = 0.022$ to < 0.001) and PS-Verbosity was correlated with only the ENRP subscale ($r(236) = -0.172$, $p = 0.008$).

In terms of pre- to post-intervention changes within PS and IMP subscales, paired sample *t*-tests showed that Δ PS-Verbosity was larger than Δ PS-OR ($t(212) = 2.51$, $p = 0.013$, $d = 0.17$), and both were larger than Δ PS-Laxness

Table 3 Means, standard deviations, percentages, and bivariate correlations between predictors, outcome variables, and attendance

Variable	M/% (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
1. Child age	7.1 (2.2)	–																			
2. Prob. onset <2	53.2%	0.29 ***	–																		
3. Parent age	39.0 (6.9)	0.36 ***	0.20 **	–																	
4. One parent	11.4%	–0.02	0.03	0.00	–																
5. Concession	26%	–0.06	–0.08	0.09	0.44 ***	–															
6. Low income	14.7%	0.01	–0.05	0.09	–0.51 ***	0.50 ***	–														
7. Attendance	6.7 (1.6)	–0.03	0.04	0.18 **	–0.16 *	0.18 **	0.19 **	–													
8. Attend couple	55.9%	0.12 *	0.18 **	0.07	0.20 ***	–0.22 ***	–0.08	–0.15 *	–												
9. Prog. > 2014	54.7%	–0.02	0.09	0.08	0.10	0.03	0.02	0.09	–0.20 ***	–											
10. TI ECBLI ^a	153.9 (29.1)	–0.10	–0.10	–0.21 **	0.00	–0.08	–0.12	–0.13 *	0.01	0.04	–										
11. TI ECBLI ^b	18.7 (7.3)	–0.06	–0.02	–0.15 *	0.06	–0.15 *	–0.17 **	–0.12	0.12	–0.03	0.73 ***	–									
12. TI DASS ^c	13.1 (10.6)	–0.04	–0.04	–0.18 **	0.12	–0.10	–0.08	–0.11	0.07	–0.06	0.35 ***	0.33 ***	–								
13. TI PS ^d	3.5 (0.6)	0.01	–0.06	0.02	0.02	–0.04	0.00	–0.02	–0.09	–0.07	0.15 **	0.13 *	0.23 ***	–							
14. TI IIMP ^e	3.3 (0.4)	–0.06	0.04	–0.03	0.05	–0.06	–0.11	–0.04	0.03	0.01	–0.18 **	–0.10	–0.32 ***	–0.42 ***	–						
15. ΔECBLI	28.7 (23.3)	–0.08	–0.16 *	–0.07	–0.05	0.11	0.05	0.00	–0.05	0.11	0.37 ***	0.27 ***	–0.02	0.07	–0.03	–					
16. ΔECBLP	7.8 (6.7)	–0.16 *	–0.20 *	–0.20 *	0.02	0.02	–0.03	–0.05	0.01	0.16 *	0.26 ***	0.49 ***	–0.03	0.05	0.04	0.59 ***	–				
17. ΔDASS	3.0 (8.1)	–0.01	–0.05	0.06	–0.08	0.05	0.18 *	0.13	0.08	–0.15 *	0.04	0.09	0.45 ***	0.13	–0.12	0.19 **	0.15 *	–			
18. ΔPS	0.8 (0.7)	–0.08	–0.06	0.06	0.14	–0.04	0.00	–0.01	0.02	0.11	0.03	0.01	–0.06	0.44 ***	–0.03	0.30 ***	0.31 **	0.19 **	–		
19. ΔIMP	–0.3 (0.4)	–0.01	0.08	0.00	0.04	–0.11	–0.15 *	–0.00	–0.08	0.08	–0.08	–0.05	–0.03	–0.21 **	0.44 ***	–0.31 ***	–0.23 **	–0.33 **	–0.52 **	–	

***Correlation is significant at < 0.001 level (two-tailed). **Correlation is significant at < 0.01 level (two-tailed). *Correlation is significant at < 0.05 level (two-tailed)

^aECBLI, Eyberg Child Behavior Inventory – Intensity; ^bECBLI_P, Eyberg Child Behavior Inventory – Problem; ^cDASS, Depression Anxiety Stress Scale; ^dParenting Scale; ^eInterpersonal mindfulness in parenting; TI = baseline, Δ = change score (pre minus post)

Table 4 Hierarchical multiple regressions: predictors of change in outcome variables and attendance

Variables	β	p	ΔR^2 ^f	ΔF
Child Beh. Intensity Change (ECBI-I ^a)				
Step 1: Pre-score	0.199**	0.002	0.164	$F(1,130) = 25.52***$
Step 2: Onset <2y	-0.056	0.349	0.021	$F(1,129) = 3.39$
Step 3: ECBI-P Change	0.545	< 0.001	0.390	$F(4,125) = 28.78***$
PS Change	0.074	0.305		
DASS Change	0.058	0.363		
IMP Change	-0.176	0.019		
Child Beh. Problem Change (ECBI-P ^b)				
Step 1: Pre-score	0.258***	< 0.001	0.203	$F(1,127) = 32.31***$
Step 2: Child age	-0.100	0.152	0.053	$F(2,125) = 4.46*$
Onset <2y	-0.069	0.301		
Step 3: Parent age	-0.048	0.495	0.001	$F(1,124) = 0.11$
Step 4: Program maturity	0.169**	0.007	0.056	$F(1,123) = 10.11**$
Step 5: ECBI-I Change	0.532***	< 0.001	0.268	$F(4,119) = 19.02***$
PS Change	0.088	0.231		
DASS Change	0.042	0.527		
IMP Change	-0.053	0.490		
Parent Wellbeing Change (DASS ^c)				
Step 1: Pre-score	0.375 ***	< 0.001	0.140	$F(1,154) = 25.01***$
Step 2: Family income	0.173*	0.012	0.052	$F(1,153) = 9.76**$
Step 3: Program maturity	-0.088	0.200	0.008	$F(1,152) = 1.43$
Step 4: ECBI-I Change	0.091	0.297	0.159	$F(4,157) = 9.17***$
ECBI-P Change	0.080	0.351		
PS Change	0.137	0.093		
IMP Change	-0.230**	0.006		
Parenting Approach Change (PS ^d)				
Step 1: Pre-score	0.383 ***	< 0.001	0.209	$F(1,160) = 42.16***$
Step 2: ECBI-I Change	0.055	0.483	0.246	$F(4,156) = 17.61***$
ECBI-P Change	0.139	0.067		
DASS Change	0.027	0.686		
IMP Change	-0.410***	< 0.001		
Mindful Parenting Change (IMP ^e)				
Step 1: Pre-score	0.521***	< 0.001	0.206	$F(1,154) = 39.97***$
Step 2: PS-total pre-score	0.350***	< 0.001	0.001	$F(1,153) = 0.12$
Step 3: Family income	-0.079	0.148	0.025	$F(1,152) = 4.95*$
Step 4: ECBI-I Change	-0.085	0.210	0.375	$F(4,128) = 35.23***$
ECBI-P Change	0.021	0.757		
DASS Change	-0.150*	0.010		
PS Change	-0.610***	< 0.001		
Attendance (Sessions)				
Step 1: ECBI-I at baseline	-0.083	0.237	0.021	$F(1,210) = 4.49*$
Step 2: Parent age	0.140*	0.044	0.018	$F(1,209) = 3.86*$
Step 3: Concession	0.098	0.223	0.036	$F(3,206) = 2.65*$
Family Income	0.076	0.362		
One-parent Family	-0.035	0.665		
Step 4: Attend as couple	-0.092	0.187	0.008	$F(1,205) = 1.75$

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed); Change scores for outcome variables calculated by Pre minus Post; ^a ECBI-I = Eyberg Child Behavior Inventory – Intensity, ^b ECBI-P = Eyberg Child Behavior Inventory – Problem; ^c DASS = Depression Anxiety Stress Scale; ^d Parenting Scale; ^e Interpersonal Mindfulness in Parenting; ^f Effect size small $R^2 = 0.01$, medium $R^2 = 0.09$, large $R^2 = 0.25$ (Cohen, 1988)

Table 5 Logistic regression (enter): predictors of clinically significant change in outcome variables

Variables	<i>n</i>	Odds Ratio	CI (95%)	<i>p</i> value
Child Beh. Intensity CS Change (ECBI-I ^a)				
Pre-score	128	1.05	1.03 – 1.08	< 0.001***
Onset < 2y	128	2.72	1.17 – 6.32	0.020**
Concession	128	0.44	0.17 – 1.11	0.083
Child Beh. Problem CS Change (ECBI-P ^b)				
Pre-score	106	1.15	1.02 – 1.30	0.019*
ECBI-I pre-score	106	1.03	0.99 – 1.05	0.059
Onset < 2y	106	5.28	1.74 – 15.97	0.003**
Program maturity	106	0.15	0.05 – 0.44	< 0.001***
Parent Wellbeing CS Change (DASS ^c)				
Pre-score	46	1.24	1.04 – 1.48	0.018*
Family income	46	0.04	0.00 – 0.68	0.026*
Pre-IMP	46	0.06	0.00 – 0.85	0.038*
Parenting Approach CS Change (PS-Total ^d)				
Pre DASS	147	1.06	1.02 – 1.10	0.004**
Parent role	147	2.14	2.14	0.053

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed); ^a Clinical significant change scores indicate participants who moved from the clinical to the non-clinical range following intervention, calculated using cut-offs ECBI-I < 131, ECBI-P < 15, DASS-total < 17, PS-total < 3.2 (clinical cut-off not available for IMP); ^a ECBI-I = Eyberg Child Behavior Inventory – Intensity, ^b ECBI-P = Eyberg Child Behavior Inventory – Problem; ^c DASS = Depression Anxiety Stress Scale; ^d Parenting Scale

(Δ PS-Verbosity, $p < 0.001$, $d = 0.51$; Δ PS-OR, $p < 0.001$, $d = 0.32$). For the IMP, Δ EAS was larger than changes in any other subscale ($p = 0.002$ to < 0.001 , $d = 0.16$ to 0.45), and Δ NJAPF was larger than three of five other subscales ($p = 0.038$ to < 0.001 , $d = 0.23$ to 0.28). Finally, at baseline, parent-focused IMP subscales (EAS, ENRP, NJAPF) were each significantly lower than child-focused IMP subscales (CC, EAC, LFA) (all at $p < 0.001$).

Discussion

The main aim of the current study was to determine which pre-treatment child, parent, and family characteristics predicted attendance and improvements in parent ratings of well-being, parenting approach, mindful parenting, and child behavior following attendance at a mindfulness-enhanced BPT program (MeBPT). Addressing this question helps determine which families are best suited to MeBPT and highlights characteristics that might signal a need for alternate or additional supports. We also sought to understand whether improved child behavior was associated with changes in parenting approach and/or mindful parenting. We hypothesized that MeBPT would meet diverse family needs, and therefore expected attendance and outcomes to be similar across a range of child, parent, family, and program-delivery factors, with stronger outcomes for families with more severe problems. Our primary analyses focused on improved outcomes and attendance, and secondary analyses

explored clinically significant change as indicated by movement from clinical to non-clinical status on pre- to post-intervention measures. We also hypothesized that improvements in parent-reported child behavior would be predicted by changes in parenting approach and mindful parenting, but not parent well-being. We found partial support for our hypotheses.

Attendance was similarly high across sociodemographic variables and all baseline measures of child behavior and parent well-being, approach, and mindfulness. The only variable that predicted attendance was parent age, with older parents more likely to attend a greater number of sessions. High session attendance, particularly for older parents, is consistent with previous MPP and BPT studies (e.g., Bögels et al., 2014; Dedousis-Wallace et al., 2021; Lundahl et al., 2006). This suggests the relationship between parent age and attendance is less about elements of the program and instead perhaps reflects perceived need for support and motivation. Since there were no associations between attendance and the child and family characteristics included as predictors, our findings indicate that MeBPT can engage a diverse range of families.

Pre- to post-intervention improvement in each of the five outcome measures was similarly large for most child, parent, family, and program-delivery factors. The only factor consistently found to predict stronger improvements was severity of problems at baseline. Our results indicated that families presenting with more severe child behavior problems achieved the largest improvements, and clinically significant

changes, in parent-reported child behavior following intervention. Likewise, more problematic parenting approach, parent well-being, and mindful parenting at baseline predicted larger and more clinically significant changes within each domain. Greater problem severity has been associated with stronger outcomes in extant BPT research, often attributed to increased motivation to change and room for improvement (Dedousis-Wallace et al., 2021; Leijten et al., 2018). Our findings extend previous research by confirming a similar pattern of results for MeBPT, and indicating that MeBPT is well-suited for families presenting with more severe problems.

From the other child predictors, MeBPT showed similar improvements in child behavior, parent well-being, approach, and mindfulness regardless of child age, sex, age of problem-onset, and use of medication. In our secondary analyses, only early problem-onset was found to predict greater clinically significant changes in child problems. It is possible that children who exhibit problems earlier have neurodevelopmental conditions and/or severe temperamental difficulties which manifest in more severe behavioral problems (Caspi et al., 2016). We would therefore expect high correlations between problem-onset and severity of child problems. Our results show a non-significant negative correlation between problem-onset and baseline child behavior problems, which is consistent in terms of direction but not magnitude of relationship. Alternately, the children with early-onset problems who recovered, as identified through the regression analyses, may represent a particular subgroup of children showing severe pre-intervention behavior problems. This explanation accounts for early problem-onset predicting clinically significant change and yet not predicting overall magnitude of improvement. Our dataset did not capture child diagnoses, and the correlation between early problem-onset and medication use was non-significant. We are therefore unable to elucidate this point further. Future studies should consider clinical diagnoses and subclinical traits of the child to start to understand the child behavior characteristics most amenable to change when parents have completed MeBPT.

In terms of parent/family characteristics, improvements across measures of child behavior, parenting approach, parent well-being, and mindful parenting were similar for parents across age, sex, education level, employment status, one-parent status, concession status, and ethnic identity. There were only two significant predictors: increased parent well-being was predicted by higher family income, and improved mindful parenting was predicted by more problematic parenting approach in addition to lower mindful parenting. The latter finding could be explained by the strong correlations between PS and IMP in our study. Namely, parents who were more reactive, lax, and over-wordy (high on PS) tended to be less mindful, and vice versa, with both having

motivation and room to improve. The finding in relation to family income predicting improvements in parent well-being may relate to the general relationship between social advantage, access to support and resources, and mental health (Kiely & Butterworth, 2013). Another interpretation could be that structural and pragmatic concerns impinge on parent well-being independent from child behavior concerns. Both considerations suggest that lower income parents may benefit from support for their emotional well-being in addition to attending MeBPT. Future studies need to investigate the type of support which would be most beneficial for parents with differing social status characteristics. Overall, MeBPT appears to meet the needs of a broad range of parents and families.

In terms of program-delivery factors, there was only one significant predictor across all dependent measures. Parents who attended a more mature version of the program with greater integration of mindfulness components showed greater improvements and clinically significant changes in their perception of child problems, although not in their ratings of child problem severity or other outcome measures. Other studies have also found stronger effects with program maturity (Michelson et al., 2013), although our results found program maturity only impacted the ECBI-P subscale, suggesting a more specific benefit. The ECBI distinguishes between parents' view of problem severity (ECBI-I) and parents' experience of this being a problem for them (ECBI-P). It is possible that attendance at MeBPT allowed parents to observe their child's behavior with less judgment and greater emotional regulation and detachment. Thus, although parents continued to endorse frequent daily child behavioral issues, they may have been able to respond rather than react and therefore experienced their child's behavior as less problematic (Dumas, 2005).

The final area of investigation focused on mechanisms of change. We hypothesized that parenting approach and mindful parenting would both be active change agents. Contrary to expectation, we found that changes in mindful parenting (IMP) and not parenting approach (PS) or parent well-being (DASS) predicted improvements in parent-reported child behavior. Change in mindful parenting was also the only significant change score predictor for improvements in parenting approach and parent well-being. Contrary to our results, Emerson et al. (2021) found parenting approach and not mindful parenting predicted improved child behavior, although other studies have shown that changes in mindful parenting are associated with improvements in child behavior (Meppelink et al., 2016). Previous research has identified that aspects of the intervention or sample may influence the mechanism of change (Whittingham et al., 2019). Our results do not appear to be explained by these factors. Emerson et al. (2021) reported change in parenting approach and not mindful parenting as the primary change

agent for a Mindful Parenting protocol, whereas we found mindful parenting as the primary change agent for a protocol that included behavioral skills and mindfulness. Both samples included a mixture of children with behavioral problems and neurodevelopmental problems, with similar severity of problems, within a clinical context. The discrepant findings could instead be accounted for by the strong and significant correlations between parenting approach and mindful parenting. The secondary correlational analyses revealed moderate to strong associations between some subscales of the PS and IMP. It is therefore possible that mindful parenting and parenting approach were both important change agents, and that the mindful parenting measure had the greater unique variance. Alongside these considerations, it is likely that some parents benefited from behavioral components to improve parenting approach, some gained from mindfulness components to assist with self-regulation and self-compassion, and others were helped by cascading effects from the integration of both types of components (Borkovec et al., 2002).

Exploration at a subscale level provides further clues in relation to the action of mindful parenting. The Emotional Awareness of Self subscale demonstrated the largest pre- to post-intervention changes on the IMP. Changes in Non-Judgmental Acceptance of Parenting Function and Non-Reactivity in Parenting were next highest, and were each higher than the other subscales of the IMP (Compassion for Child, Emotional Awareness of Child, Listening with Full Attention). This suggests that changes in mindful parenting, and downstream changes in child behavior, were associated with how parents perceived and related to themselves more than how they related to their child. This is consistent with a recent cross-sectional study which found an association between parental self-compassion, parental well-being, and child behavior problems (Cohen & Naaman, 2023). Overall, at a subscale level, the IMP-EAS and PS-Over-reactivity showed the strongest associations and could be considered for future research as mediators of child behavior changes.

Limitations and Future Research

One of the strengths of the current study was the opportunity to access a relatively large naturalistic sample of parents who were struggling with clinically significant child behavioral and parenting problems, and who had undertaken a novel mindfulness-enhanced BPT intervention. However, there were also inherent limitations associated with naturalistic research. The lack of control condition meant that improvements may have been influenced by regression to the mean or social desirability, and we were restricted from exploring mediators and moderators (Kazdin, 2007). That said, demand characteristics were likely to be low given

measures were integrated as part of routine care and program-delivery. There were also gaps in demographic data and diagnostic information, a reliance on parent-report, and a lack of group process measure (Webster-Stratton & Herbert, 1993). Our sample comprised mostly middle-income, two-parent families identifying as Australian, which was sociodemographically representative of regional Australia, although may not be generalizable to more diverse urban or remote areas (ABS, 2021). The MeBPT under investigation (CCCK) aimed to improve the cultural sensitivity of Western-oriented parenting practices by embedding the implementation of behavioral skill components in parents' unique values, and by drawing on mindfulness from Asian traditions (Kabat-Zinn, 2003; Stewart & Bond, 2002). Despite these efforts, CCCK may not be generalizable to other cultures and countries.

Despite limitations, we have shown that mindfulness-enhanced BPT appears to meet the needs of the sociodemographic spectrum of families within this study, and particularly those with greater need. We have also shown that changes in child behavior are associated with improvements in parents' capacity to be more accepting and self-aware. Future studies can build on our findings with controlled research that allows examination of mediators and moderators of change, utilizes multi-informant measures, and recruits more ethnically and racially diverse samples. There are also opportunities to compare engagement and outcomes for fully integrated versus sequenced MeBPT. If our promising results are replicated, MeBPT has potential to become the preferred parenting intervention supported by evidence, service providers, funding bodies, and policymakers.

Author Contribution MD: conceptualization (lead), methodology (lead), data curation, formal analysis, writing – original draft preparation, writing – reviewing and editing (lead). EB, JH, and JP: conceptualization and methodology (supporting), supervision (equal), writing – reviewing and editing (supporting).

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Data Availability The raw data supporting the conclusions of this article will be made available upon reasonable request.

Declarations

Ethics Approval Ethical approval was gained from the University of Wollongong Human Research Ethics Committee (HREC 2020/010).

Consent to Participate De-identified archival data was extracted as specified by HREC 2020/010.

Conflict of Interest The authors declare no competing interests.

Artificial Intelligence AI was not used for editing the manuscript.

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