

Randomised  
controlled trial and  
implementation  
process evaluation  
of the

# LIGHTHOUSE PARENTING PROGRAMME (LPP)



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# GLOSSARY OF TERMS / ABBREVIATIONS & ACRONYMS

Abbreviation / acronym / terms	Description
AF	Anna Freud
BANES	Bath and North East Somerset
CAPI	Child Abuse Potential Index
CIN	Child in Need (Plan)
CPP	Child Protection Plan
CSC	Children's Social Care
FA	Framework Analysis
LPP	Lighthouse Parenting Programme
LA	Local Authority
MBT	Mentalisation-Based Therapy
MOU	Memorandum Of Understanding
PLO	Public Law Outline
PPT	Participant
SPP	Supporting Parents Project
TAU	Treatment As Usual
WWCSC	What Works for Children's Social Care



# EXECUTIVE SUMMARY

## Introduction

Childhood maltreatment by a caregiver can have wide-reaching and long-lasting consequences, and effective interventions that target the root causes of maltreatment risk are sorely needed. Often, parents whose children are in need of child protection services have complex histories of relational trauma themselves, and these experiences can make parenting particularly challenging. This is because relational trauma can negatively impact parents' ability to 'mentalise' – in other words – understand and attune themselves to their own mental state and the mental states of others.

Parental mentalising helps caregivers to regulate their own and their child's emotional states and enables them to understand and respond sensitively to their child's needs. Interventions that support at-risk parents' mentalisation capabilities therefore have potential for reducing child maltreatment risk.

The Lighthouse Parenting Programme (LPP) is a manualised intervention designed specifically to improve the mentalisation capabilities of parents' at risk of maltreating their child. Lighthouse does this through a 20-week programme of activities aimed at increasing parents' understanding of their child's mental states and responding to them in a more sensitive and age-appropriate manner.

Preliminary studies conducted in the UK and abroad have observed improvements in parents' mentalisation capabilities, family functions and harsh or 'coercive' parenting practices. However, no study to date has robustly considered the extent to which LPP significantly reduces child maltreatment risk when delivered within children's social care settings. The aim of this study is to therefore rigorously examine the child and parent benefits of LPP when delivered by social care professionals in children's social care settings.

## Objectives

The Supporting Parents Project (SPP) evaluated the implementation and outcomes of the Lighthouse Parenting Programme (LPP) delivered by Children's Social Care (CSC) for parents and carers with children known to child protection services.

The overall aims were:

1. To evaluate the effectiveness of the LPP compared with treatment as usual (TAU) in the CSC context.
2. To assess the process of implementing the LPP in CSC and the factors involved in successful delivery and treatment change.
3. To assess the costs of LPP in CSC.



# Methods

## Research design

This was a randomised controlled trial delivered in five local authority CSC sites in England. Family support workers and social workers were trained and supervised to deliver the programme in six groups. The primary outcomes of interest were child abuse potential and the child's social care status. Secondary outcomes included parenting stress, epistemic trust, child psychopathology, parental reflective functioning, and parenting representational risk. The study also examined various aspects of the implementation of the intervention, including fidelity, acceptability, and scalability.

## Data collection

To assess impact, questionnaire and interview data were collected from participating parents at baseline (immediately after consent, before randomisation) and at follow-up (the end of the intervention period). For one outcome measure, social care status, a third data collection point took place 12 months after randomisation. For the implementation process evaluation, focus groups, semi-structured interviews and a survey were carried out with local authority managers and intervention facilitators and clinical supervisors.

## Sample recruitment and selection criteria

Participants were identified and referred to the study by their social care teams. Parents or carers were eligible to participate if they had at least one child aged 0–12 years who had a child on a Child in Need or Child Protection Plan or in Public Law Outline (PLO) proceedings. Out of 180 referrals, 70 declined to be part of the study. This resulted in a total of 110 eligible parents and carers that participated in the study: 57 participants were allocated to the LPP (in addition to usual care) and 53 allocated to usual care only.

## Key findings

- The recruitment and retention rates of participants in the study were relatively high (61% of eligible parents and 79% of those who joined the study, respectively).
- Social care teams and participants were, overall, positive about the project and the gap that it fills in usual service provision.
- Changes over time on the measures of child abuse potential, social care status, parenting stress, epistemic trust, child psychopathology, parental reflective functioning and representational risk did not provide statistically significant evidence of any differential treatment effects between the LPP and treatment as usual (TAU) groups.
- In the semi-structured interviews, some parents said that the LPP helped them to better understand their child's perspective and to regulate their feelings, and it gave them tools that they felt they could continue to use after the end of the intervention. Other parents felt that it did not bring about any changes for them personally.
- Delivering the model was, at times, challenging for the newly trained facilitators. Time was needed to put the learning into practice.



- The intervention was acceptable to just over half of the participants allocated to the LPP group (i.e. they engaged and did not withdraw from the programme). One-fifth of participants (20%) did not attend any sessions at all.
- Parents had mixed experiences of the group and online formats, demonstrating that individual work and face-to-face interventions may be more appropriate for some people.
- CSC staff and managers were highly positive about the potential for scalability of the programme. Almost all felt that the programme should be delivered in their service in future, and they would recommend it to other LAs.
- Ratings of fidelity to the model showed that about half the sessions were delivered in a way that adhered to Mentalisation Based Treatment (MBT) principles and the Lighthouse model. This means that adherence to the model was sub-optimal about half the time.
- Some adaptations of the LPP training, supervision, and delivery may be needed for it to be embedded in CSC, especially when delivered by social care professionals without any prior therapeutic training, for families on the edge of care.

## Recommendations and next steps

This was the first randomised controlled trial to examine the impact and implementation of the LPP in CSC and delivered by CSC practitioners. Despite promising findings from previous evaluations, this impact evaluation did not observe any statistically significant positive child or parent outcomes; only small differences were observed between the treatment and control groups.

These findings should be considered within the context of the intervention's delivery, which was atypical in several respects. Specifically, it was delivered online and by newly trained social care practitioners, without prior therapeutic training. It is therefore likely that these features compromised quality of delivery fidelity, which was rated as sub-optimal during the study. It is also worth noting that the trial only captured short-term outcomes, limiting our understanding of any potential longer-term impacts.

Since completing the trial, there is evidence that the local authorities involved in the study are implementing the programme more reliably over time and are better able to target families most likely to engage with and benefit from the programme. We therefore recommend that further feasibility work continue, building on the lessons learned from this study.





# 1. INTRODUCTION

Parenting difficulties associated with child abuse and neglect are consistently observed to have devastating short- and long-term consequences for the child (Gilbert et al., 2009). Such difficulties are more likely to occur in the context of complex family psycho-social difficulties (Berthelot et al., 2015), which includes a previous history of abuse, neglect, or intimate partner violence. Additionally, rates of child maltreatment are higher among parents with a diagnosed mental health problem or are experiencing high levels of economically related stress (van IJzendoorn et al., 2020).

Although a significant proportion of parents at risk of maltreating their children have mental health difficulties and histories of trauma, they may not present to mental health services. Instead, these families may first be seen within children's social care (CSC) due to parenting concerns. Despite being well placed to identify the root causes of parenting difficulties, CSC have few evidence-based psychologically informed interventions that they can directly provide. Research shows that the current support – usually parenting programmes focused on behaviour modification – may be less effective for families coping with more complex problems, including those associated with a parental history of abuse or ongoing mental health problems (Altafim et al., 2016; Euser et al., 2015). The Lighthouse Parenting Programme (LPP) was developed to support parents who have more complex needs known to children's social care services.

## Project background

Maltreatment has profoundly negative and long-term impacts on a child's life. Children who have suffered maltreatment from a caregiver are at increased risk of drug misuse, serious mental health difficulties, suicide attempts, risky sexual behaviour, and physical ill-health throughout later life (Norman et al., 2012). They achieve poorer educational outcomes and are more likely to participate in crime and violence in adolescence and adulthood (Gilbert et al., 2009).

Mentalising – the capacity to imagine mental states and to be attuned to mental states in self and others – is a highly appropriate domain for therapeutic intervention in harmful parenting. Child abuse and neglect can be conceptualised as arising from deficits or serious lapses of mentalising (Byrne et al., 2019). Findings from observational studies suggest that parents' own experiences of maltreatment in childhood may have disrupted the acquisition of ordinary mentalising capabilities (Fonagy & Allison, 2012; Ensink et al., 2023; Rosso, 2022). Deficits in mentalising, in which a parent cannot see or imagine their child's needs, may contribute to a pattern of consistent emotional or physical neglect. For instance, a parent who fails to recognise their baby as a person with their own wishes, desires, and intentions does not provide opportunities for growth, curiosity, play, or stimulation accordingly. Alternatively, in response to a baby's cries of hunger, fear, or loneliness, an avoidant/dismissive parent might not be roused into empathically responding, whereas a preoccupied/conflicted parent's own unmet needs might overwhelm them (Buisman et al., 2017).

During stressful conditions or challenging moments, the ability to mentalise can be overwhelmed by more primitive cognitive processes, which are driven by powerful physiological responses



(Luyten and Fonagy; 2015; Nolte et al., 2013). The complex array of emotions experienced by parents, such as guilt, protectiveness, worry, love, and anger, are integral to the ordinary parenting experience. However, when these emotional states are particularly intense, they can deplete parents' cognitive resources for maintaining a curious and reflective mindset. Several studies have highlighted the importance of mentalising during charged emotional states as critical in preventing caregivers from making hasty judgements and premature assumptions about their child's intentions (Condon et al., 2022; Ensink et al., 2023; Gervinskaitė-Paulaitienė et al., 2023).

Statutory health and social care services, while offering universal access, nonetheless have often been unsuccessful in engaging parents who have experienced complex trauma, developmental trauma, disorganised attachments, mental health difficulties, and multiple adverse childhood experiences. This is in part due to parents presenting with complex sets of difficulties – including emotional regulation – that can be challenging to professionals, but also reflects a tendency to label parents as 'hard-to-reach' rather than our services as 'difficult for some to reach'. Parents with one or more of these factors are more likely than the average parent to experience mentalising lapses, and when they do lapse, tend to show poorer parental sensitivity and have more difficulty becoming curious and flexible again (Fishburn et al., 2017). Moments in which a parent makes a hostile misattribution about a child's intentions may result in non-accidental injury, physical chastisement or instances of emotional and psychological abuse (Richey et al., 2016).

Parents at risk of maltreating their children are often reluctant to engage in treatment or parenting interventions, refuse outright to do so, or drop out. Neglect and emotional abuse in the parents' own histories often affect their development of epistemic trust – that is, an understanding of social interactions developed through authentic and open experiences. Epistemic trust is defined by Fonagy et al. (2017, p. 177) as 'trust in the authenticity and personal relevance of interpersonally transmitted knowledge about how the social environment works'. It is essential for the passing on of socially important information in human relationships – and is central to effective therapeutic interventions. As patterns of epistemic trust and social learning are often established in early childhood, a history of relational trauma in the parents' own past can bring about a state of chronic epistemic mistrust, which manifests in a tendency to treat others with deep suspicion and results in a difficulty in internalising new social knowledge from others (Bateman & Fonagy, 2016; Fonagy & Allison, 2012).

A Mentalisation Based Treatment (MBT) approach potentially has much to offer this population. MBT works directly with issues of trust, and there is robust evidence for its effectiveness at engaging adults who have complex histories of attachment trauma or neglect, poor emotion regulation, and difficulties building stable trusting relationships (Bateman et al., 2013; Bateman & Fonagy, 2008; Bateman et al., 2016). Parents may lose confidence in their caregiving role when they are referred to child protection services. This can further undermine their ability to provide consistent nurturing for their children and may exacerbate their heightened levels of stress. A successful intervention for families where children have been identified as at risk of maltreatment should serve to improve parental sensitivity and confidence and alleviate the amount of stress that such parents are already under.

The Lighthouse Parenting Programme (LPP) is an adaptation of MBT which aims to improve parental sensitivity and confidence, and reduce stress and the risk of child maltreatment by



attending to both parental deficits in mentalising and lapses in mentalising. It has been developed specifically for high-risk parents. The aim of the Supporting Parents Project is to evaluate the LPP in the settings where it can have the most impact – children’s social care. Frontline social care practitioners were trained to deliver this intervention and a rigorous evaluation of the implementation process and outcomes in such a setting was conducted.

## The Lighthouse Parenting Programme

The LPP was developed in a family assessment and safeguarding service, specifically for work with parents and carers whose children are at risk of removal due to serious parenting concerns. It was originally developed and delivered by experienced psychotherapists and clinical psychologists. In this study, the intervention was delivered in and by children’s social care services, as summarised in table 1 below.

**Table 1. Description of the Lighthouse Parenting Programme delivered in the Supporting Parents Project using the template for intervention description and replication (TIDieR) guide**

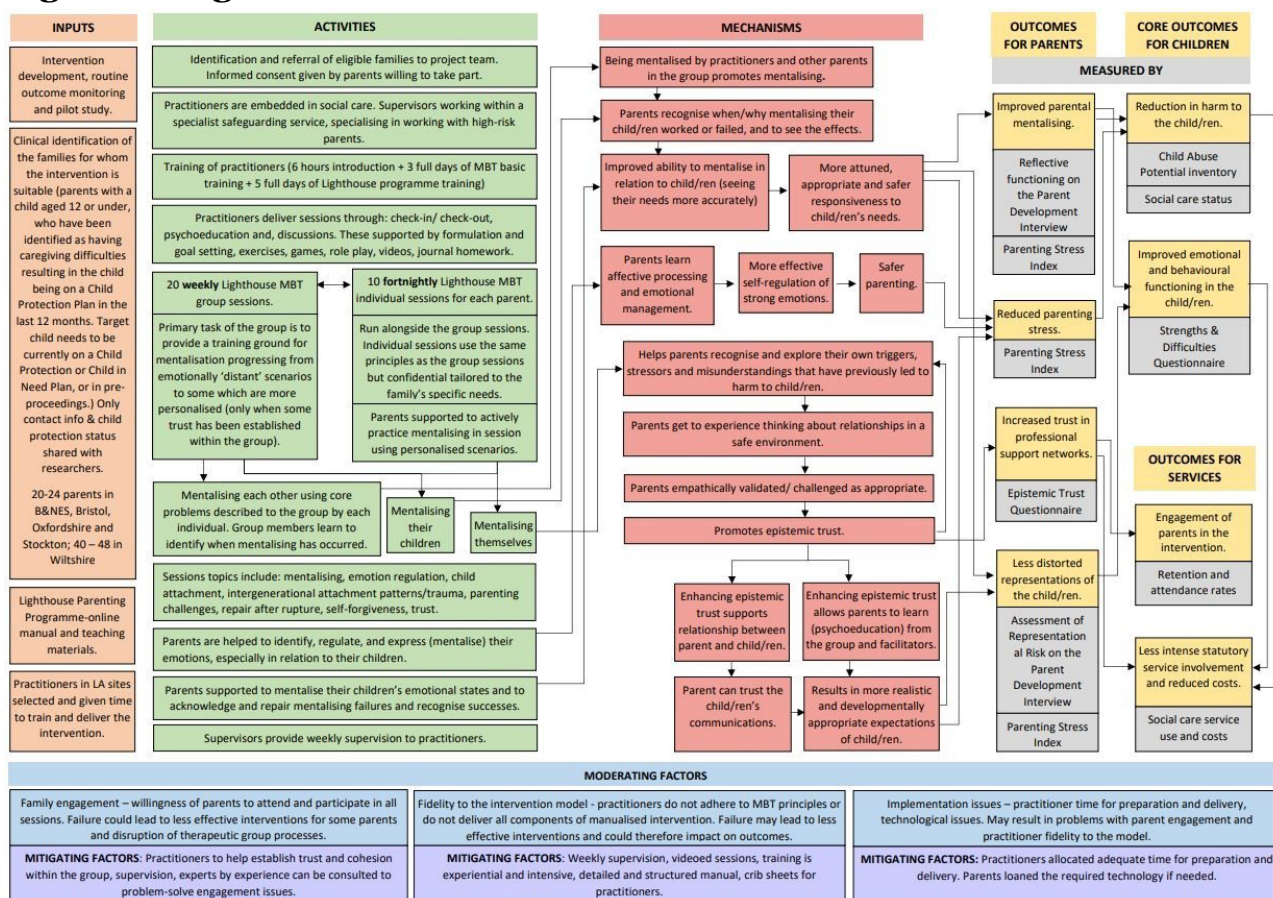
Item number	Item
	BRIEF NAME
1	The Lighthouse Parenting Programme (LPP)
	WHY
2	Mentalisation-based interventions may be effective in reducing the risk of harmful caregiving by helping caregivers to better see, understand, and respond to their children’s needs.
	WHAT
3	The LPP is a manualised programme. Practitioners were given online MBT and LPP-specific training in delivering the model. Digital materials, videos, printed manuals, and visual aids supported the training. Participants of the intervention received printed booklets and were invited to take part in 20 weekly group sessions and 10 fortnightly individual sessions.
4	Practitioners delivered sessions through psychoeducation and discussions supported by goal setting exercises, games, role play, videos, and journal homework. Parents and carers were supported to mentalise their children’s emotional states and to identify, regulate, and express their emotions in relation to their children. Practitioners received weekly supervision.
	WHO PROVIDED
5	Children’s Social Care staff who were skilled in working with high-risk families were selected to train as LPP practitioners. Training consisted of a six-hour introduction and three full days of MBT basic training and five days of LPP-specific training. Training was delivered by MBT experts and those who had developed and piloted the LPP model previously in a similar



	setting. During the delivery of the intervention, practitioners received weekly online supervision from an experienced Lighthouse MBT therapist.
	HOW
<b>6</b>	The intervention consisted of a 20-week online programme piloted in a previous study (for non-virtual delivery). For this project, all activity was carried out online due to the COVID-19 pandemic. Group sessions were held weekly, and individual sessions were held for each parent fortnightly. Practitioner training was delivered using Microsoft Teams video calling, and participants took part in the intervention using mobile devices and Microsoft Teams video calling.
	WHERE
<b>7</b>	Participants took part in the intervention virtually, from home. Technological difficulties were managed in various ways such as loaning devices or providing set-up support.
	WHEN and HOW MUCH
<b>8</b>	In addition to the weekly group intervention sessions, participants were instructed to practise learning at home and discuss progress at fortnightly individual sessions. This resulted in a possible 30 sessions in total.
	TAILORING
<b>9</b>	Participants were contacted via text message or phone call for personalised communication between sessions. Individual participants brought core problems and described them to the group whereby group members could mentalise them.
	MODIFICATIONS
<b>10</b>	The delivery was online (where previously it had been face-to-face). The delivery was from trained social care practitioners without prior experience in MBT and, for the majority of practitioners, without a core professional training or mental health qualification.
	HOW WELL
<b>11</b>	Practitioners' fidelity to MBT was assessed using a validated LPP Fidelity Rating tool. Overall MBT fidelity was defined as the percentage of sessions delivered according to the LPP model. To ensure LPP model adherence, practitioners received one hour of weekly group supervision overseen by the LPP creators.



**Figure 1. Logic model**



## Previous evaluations

The Lighthouse Parenting Programme (LPP) has been successfully developed, implemented, and piloted in Oxfordshire, Buckinghamshire, and Wiltshire's specialist Child and Adolescent Mental Health Services by psychological therapists, and it is the core model of treatment for families being referred to these services. Service data has shown that families usually commence treatment on child protection plans, in pre-proceedings or care proceedings and the majority move to Child in Need plans or discharge on completion of the programme. Of those parents participating in the programme in Oxford CAMHS in 2015–17, 76% were subject to a lower level of statutory care at discharge. In a significant number of cases, families are successfully reunified (Byrne & Webb, 2015).

A small non-randomised pilot evaluation of the programme in the UK further demonstrated improvements in parental sensitivity, parenting confidence, and parental stress from pre- to post-intervention with moderate to large effect sizes (Byrne et al., 2019). Interviews with participating parents indicated that most felt the programme had led them to make "life-changing" improvements in their capacity to care for their children. More recently, a 12-week version of the LPP delivered by psychotherapists and psychologists in Lithuania showed significant improvements in parental mentalisation, parental adjustment, and family functioning, and a reduction in coercive parenting practices after the intervention (Gervinskaitė-Paulaitienė et al., 2023). In all the evaluations described above, the interventions were delivered by practitioners



with qualifications in psychiatry, psychotherapy, or clinical psychology and all had substantial prior experience of working therapeutically with families with complex difficulties.

## **Evaluation context**

The promising evidence from the pilot evaluations suggests that LPP has the potential to improve parents' mentalisation capabilities, when delivered by specialist staff working in mental health teams. However, we do not know if these findings will be upheld in a more rigorous evaluation study involving random assignment.

Furthermore, small specialist services do not have the capacity to support the large numbers of parents presenting to children's social care. The SPP was designed to add to the preliminary evidence as a larger-scale, controlled study and to provide learning about the transferability of the model to delivery by social care practitioners without a core therapeutic training, in a CSC setting.

## **Design and aims**

The SPP was a two-arm randomised controlled trial of the LPP versus Treatment as Usual (TAU) in the CSC setting. The study aimed to assess whether frontline CSC practitioners, working with the large numbers of families who are struggling, can be trained to deliver this intervention successfully. The SPP was a rigorous evaluation of the implementation process and outcomes to assess effectiveness of the programme in such a setting.



## 2. OBJECTIVES

The overall research objectives were:

- To evaluate the effectiveness of the LPP compared with usual care in the CSC context
- To assess the process of implementing the LPP in CSC and the factors involved in successful delivery and treatment change
- To assess the costs of LPP in CSC.

The LPP aims to prevent child maltreatment, by promoting sensitive caregiving in parents, using a mentalisation-based approach. The programme is designed to enhance parents' capacity for curiosity about their child's inner world, to help parents 'see' (understand) their children clearly; to help parents make sense of misunderstandings in their relationship with their child (including misunderstandings that arise from unresolved difficulties in the parent's own attachment history); and to equip parents to inhibit harmful responses in those moments of misunderstanding, and to repair the relationship when ruptured.

## Research questions

### Impact evaluation

#### Primary research questions

1. What is the impact of LPP on the risk of child physical harm compared to treatment as usual for parents open to children's social care services?
2. What is the impact of LPP on child social care status compared to treatment as usual for parents open to children's social care services, as measured 12 months later?

#### Secondary research questions

1. What is the immediate impact of LPP on child social care status compared to treatment as usual for parents open to children's social care services, as measured at the end of the treatment period?
2. What is the impact of LPP on parenting stress compared to treatment as usual for parents open to children's social care services?
3. What is the impact of LPP on parental reflective functioning compared to treatment as usual for parents open to children's social care services?
4. What is the impact of LPP on parental representational risk compared to treatment as usual for parents open to children's social care services?
5. What is the impact of LPP on parental epistemic trust compared to treatment as usual for parents open to children's social care services?
6. What is the impact of LPP on parent-reported child social, emotional, and behavioural wellbeing compared to treatment as usual for parents open to children's social care services?



## **Implementation and process evaluation**

### **Model fidelity research questions**

1. To what extent are frontline CSC practitioners, without formal therapeutic training, able to stay 'on model' in the delivery of the LPP?
2. What changes to the training, supervision, and implementation may be needed to improve LPP model fidelity?

### **Acceptability research questions**

1. What were the retention rates of parents in the LPP intervention?
2. How did parents experience the LPP and what were the barriers or facilitators for parents to engage with the LPP?

### **Implementation and potential for scalability research questions**

1. From the perspective of project site staff, what were the barriers and facilitators of implementation?
2. How would any identified barriers and facilitators inform future planning for commissioning and delivery of the LPP on a wider scale?

### **Costs**

- What are the costs of training and delivery of the LPP in a CSC context?





## 3. METHODS

### Protocol registration and ethical review

The trial protocol was pre-registered with the OSF: Slead, M., Fearon, P., Midgley, N., Martin, P., Byrne, G. & Zywek, L. (2021, July 15). The Supporting Parents Project: A randomised controlled trial of the Lighthouse Parenting Programme. <https://doi.org/10.17605/OSF.IO/GXYS9>.

The study has been reviewed and approved by the University College London research ethics committee (Project ID Number: 9593/002).

Information for participants was clearly set out in the Participant Information Sheet, consent form, and privacy forms for the study. Each stated that participating was voluntary, and participants could withdraw at any time without giving a reason and without it affecting any benefits that they were entitled to or their legal rights. Participants could withdraw from the research and continue to receive their allocated intervention. Participants allocated to the LPP arm could also withdraw from the intervention and continue to receive the care they would usually be offered from CSC. Potential participants were told about the potential benefits and difficulties associated with participation in the trial before giving their consent. They were also informed that all data would be treated confidentially and only used for the purposes explained to them. The limits to confidentiality were also carefully explained. Detailed information regarding data security was set out in the data privacy forms approved by the Data Protection officer at Anna Freud. All data is being held in accordance with GDPR guidelines, 2018. A full data protection impact assessment has been carried out and has been under regular review.

### Research design

This was a two-arm randomised controlled trial comparing outcomes for families receiving usual care with outcomes for those who were invited to the LPP in addition to usual care.

Five local authority children's social care sites in England participated in the trial: Bath and North-East Somerset, Bristol, Oxfordshire, Stockton-on-Tees, and Wiltshire.

In each LA, two practitioners were selected to be trained and supervised in the delivery of the LPP intervention. They were family support workers or social workers with an interest in training and delivering parenting support services. Treatment as Usual was undefined by the trial protocol and consisted of the usual universal and targeted health and social care services that families would have been offered/referred to outside of the study. Services can be varied between LAs but some common examples include; parenting classes, family housing support, practical home help, single parent support, and help for children with special educational needs or disabilities.

### Referrals and randomisation

A total of 180 parents were referred for the project across all five participating local authorities. Of these, 70 parents did not participate as they could not be contacted or declined taking part, or the



referrer withdrew the referral due to a change in family circumstances. The final sample was comprised of 110 parents who were randomised, resulting in 57 parents in the Lighthouse Parenting Programme (LPP) plus usual care arm and 53 parents in the Treatment as Usual (TAU) arm (see table 2). The participant flow is shown in the consort diagram in Figure 2.

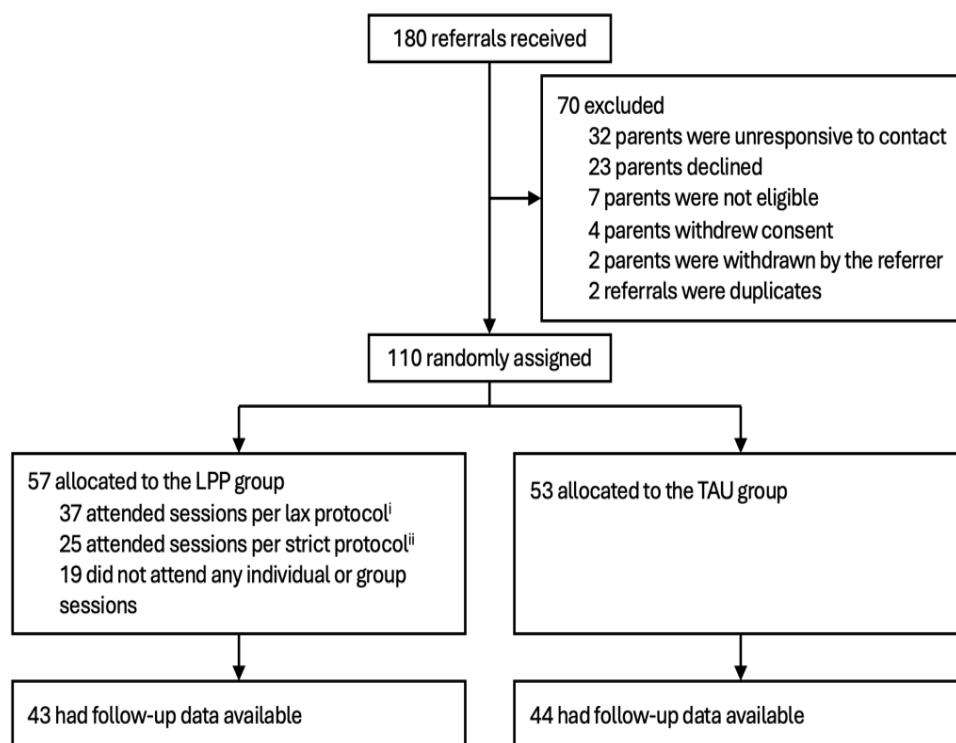
To prevent contamination, all participants who had any shared caregiving responsibilities and wished to participate in the trial at the same time (e.g. biological or step-parents, co-habiting partners, separated parents) were randomised to the same group. The dependency in the data was accounted for in the analyses. As LPP is a group-based intervention, randomisation was done en bloc in six clusters (four LA sites had a single cluster and one LA site had two clusters). Allocation was stratified by site. Randomised permuted blocks of size four were used at each site to allocate participants to either LPP (n=7–12 per cluster) or TAU (n=6–13). To maintain allocation concealment, allocation was done en bloc after a sufficient number of cases in that site were enrolled for a group intervention (minimum 14 parents, which would be likely to result in around 7 parents in the LPP group). This was done on a site-by-site basis, as recruitment was completed for that cluster. Group assignment was conducted by an independent statistician who was blind to all participant data. The code for randomisation was provided to them. The Principal Investigator and Project Manager received the outcome of the randomisation procedure from the statistician, and they let the participants and referrers know the outcome. In this way, the research assistants responsible for data collection remained blind to allocation status.

**Table 2. Referral and randomisation numbers by local authority**

	Parents referred	Consented & Randomised	Random allocation		Followed up at T2	
		N (% of referrals)	LPP n	TAU n	LPP n (%)	TAU n (%)
Bath & North-East Somerset	26	19 (73%)	10	9	3 (30%)	6 (67%)
Bristol	23	13 (56%)	7	6	7 (100%)	6 (100%)
Oxfordshire	35	22 (63%)	12	10	9 (75%)	9 (90%)
Stockton-on-Tees	28	18 (64%)	9	9	8 (89%)	6 (67%)
Wiltshire 1	42	24 (57%)	11	13	7 (78%)	12 (92%)
Wiltshire 2	26	14 (54%)	8	6	9 (90%)	5 (83%)
<b>Total</b>	<b>180</b>	<b>110 (61%)</b>	<b>57</b>	<b>53</b>	<b>43 (75%)</b>	<b>44 (83%)</b>



**Figure 2. Consort diagram**



## Sample size and minimum detectable effect size calculations

Recruiting sites, and recruiting participants, in the context of child social care is a challenge. In this study, therefore, an assessment of a practically achievable sample size preceded statistical calculations of the associated power. The starting point for power calculations was a target sample size of 136 and six Lighthouse groups. The minimum detectable standardised effect size for the primary outcome CAPI was then calculated on the basis of having six treatment groups with an average of about 11 participants per group (68 participants), and an equal number of control participants (total  $n=136$ ). Power analysis was conducted using formulae published by Moerbeek & Teerenstra (2016) for a partially clustered design. The within-cluster correlation was estimated to be 0.01 and the within-participant correlation to be 0.6. The power analysis assumed that the outcomes are not related to site, which is conservative; within-site correlation would increase the power, as each site would act as its own control. We allowed for 20% loss to follow-up. Based on these parameters, the minimum standardised effect size detectable with 80% power is 0.5. The actual power would be 80.6%.

It was determined that 0.5 was a realistic effect size to expect. The LPP pilot evaluation (Byrne et al., 2019) did not include the CAPI as an outcome measure, but the Parental Stress Index yielded a standardised before–after effect size of 0.61. Ethier et al. (2000) used the CAPI Abuse Scale to evaluate two interventions for families at risk of child neglect and observed before–after effect sizes of 0.85 and 0.41, respectively. Most study participants were expected to have CAPI scores at or above the cut-off for elevated risk of abuse (215). Pre-treatment standard deviations for an at-risk population were estimated to be around 80 (Ethier et al., 2000). It was expected that TAU was



unlikely to result in meaningful change in CAPI scores, but that LPP participants would experience reductions in CAPI score of around 40 (one-point reduction in approximately half of the 77 scale items). This would translate to a standardised effect size of 0.5.

The achieved study sample size was smaller than anticipated (n=110 actual versus n=136 planned), thus reducing the actual power of the trial.

## Sample recruitment and selection criteria

In each site, social work teams who were working with the target population lead on the identification and recruitment of participants. The project evaluation and delivery team held a recruitment workshop for referrers and managers in each site prior to recruitment starting. The project manager worked with the site coordinators to provide support for the identification and referral of families. The initial identification of participants was done by the social care teams who applied the criteria to open cases. As some of the inclusion/exclusion criteria (see below) required professional judgement and knowledge that was not available from the data records, case-holding social workers then further screened and shortlisted potential participants based on their knowledge of the families. Social care workers gave the potential participants information about the study and invited them to join. If the parent agreed, the team made the referral online to the research team through a secure website link. A researcher then contacted the potential participant to provide them with further information about the study and, if the parent wished to participate, the researcher took informed consent. Once a parent gave consent, baseline (Time one) data was collected.

The inclusion and exclusion criteria were decided by a working group involving the Lighthouse clinical team, social care partners, and the evaluation team. These criteria, listed below, were based on clinical considerations of the parents who would be able to engage safely in MBT and group-based interventions, ethical considerations, and practical considerations for conducting an RCT in CSC.

### Inclusion criteria

1. Parent has at least one child aged 0–12 years (the ‘target child’).
2. Parent has been identified as having caregiving difficulties which has resulted in the child being:
  - on a Child Protection Plan, or
  - on a Child in Need Plan, or
  - in pre-proceedings.

### Exclusion criteria

1. The target child is currently in care proceedings.
2. The referring professional considers the family likely to proceed to care proceedings in the next six months.
3. The referring professional considers the parent to be unsuitable for a group-based intervention as they may compromise the safety of others in a group setting. For example, this may be the case if they have a diagnosis of Anti-Social Personality Disorder.



4. The parent has been a perpetrator of sexual abuse or has a history of sexual predatory behaviour.
5. The parent has been a perpetrator of sadistic abuse of children (deliberate physical harm/torture).
6. The parent has severe learning difficulties.
7. The parent has acute psychosis (at the time of referral).

## Data collection

The research team collected data from participating parents at Time 1 (immediately after consent, before randomisation) and at Time 2 (the end of the intervention period) approximately 8–10 months later. For one outcome measure, social care status, a third data collection point took place 12 months after randomisation (Time 3). This was the primary endpoint for this measure. Each participating parent completed the battery of measures, even if they were a co-parent with another participant. All research interviews were done online over Microsoft Teams or over the telephone. The research interviews were independent of the interventions and the researchers conducting the interviews were blind to allocation status at Time 2. To maintain researcher blinding, all follow-up outcome data was collected first, and then the researcher was unblinded to be able to carry out the qualitative interviews about service use experience. If the researcher became unblinded prior to the completion of outcome measures, the participant was reallocated to one of the other blind researchers on the team where possible. A record of accidental unblinding and the measures taken to ameliorate the risk of bias was kept.

The social care teams ensured that participants had appropriate technological resources to facilitate online meetings and some funding was available for families needing additional support. During the interviews, the researcher went through the demographic form (Time 1 only), all questionnaires, and a semi-structured interview. Two or more appointments were needed to complete the measures. In total, the research interviews lasted about one to two hours at each time point. All participants were given a voucher to the value of £25 for each time point that they participated in, as compensation for their time (£50 value if they participated at Time 1 and 2).

## Impact evaluation measures

### Primary outcome measures

- Child Abuse Potential Inventory (CAPI; Milner, 1994), a parent-report measure developed to estimate the risk of a parent physically abusing a child (Chaffin & Valle, 2003; Walker & Davies, 2010).
- Social care status. This was recorded for each key child of participating parents at three time points: baseline (T1), end of treatment (T2), and 12 months after randomisation (T3). The primary endpoint was from T1 to T3. Data were extracted from social care records and included whether the child was closed to social care, on a Child in Need or Child Protection Plan, or if the family had entered court proceedings or the child was looked after. Change for each child of the parent participant was measured as step up (a negative outcome), step down (a positive outcome) and no change in terms of risk status as recorded by social services, measured from baseline to the T3 endpoint. An amendment to the original protocol was made for the endpoint for the primary outcome to be changed from T2 (end-of-treatment) to one year following



randomisation (T3). This was based on advice from the delivery leads and on the basis that child protection case reviews may only happen every 6–12 months and therefore any changes resulting from the intervention may not be recorded by the time of the end of treatment follow-up.

### **Secondary outcome measures**

1. Parenting Stress Index (PSI-4) (Abidin, 1995), a well-validated parent-report measure of stress relating to the parenting role.
2. Parent Development Interview – Short Version (PDI; Slade et al, 2004). This interview taps parents' caregiving experiences with their child. It was coded by reliable coders who were blind to treatment allocation on: 1) the Parental Reflective Functioning scale (Slade et al., 2004), a measure of parental mentalising and 2) the Assessment of Representational Risk (ARR; Slead et al., 2021b), a measure of parenting representations that are associated with relational risk and attachment disorganization. These two coding schemes relate to two separate secondary research questions.
3. Epistemic Trust, Mistrust and Credulity Questionnaire (ETMCQ; Campbell et al., 2021), a self-report measure of parent's epistemic trust in communication knowledge.
4. The Strengths & Difficulties Questionnaire – Total Difficulties score (Goodman, 2001), a measure of child emotional, behavioural and social well-being. The parent-report version was administered in relation to the target child.

## **IPE measures and instruments**

### **Fidelity**

All sessions were video-recorded as part of the routine supervision process. Adherence was assessed on a sample of 18 group sessions (15% of 120 potential group sessions conducted within the program) by an MBT trainer and expert. For this purpose, three sessions were randomly drawn from each site leading to a reliability set of early (six sessions), middle (eight sessions) and late phases (four sessions) of the programme. The Lighthouse Intervention Scale (Georg & Taubner, 2022) developed for the UBICA-II Study (Understanding and Breaking the Intergenerational Circle of Abuse, Neukel et al., 2021) was used to assess fidelity. The scale consists of ten items that reflect the core interventions of the Lighthouse programme described as facilitators' behaviours and actions in the group session (e.g. expressing a not-knowing MBT stance, addressing child mental states, utilising lighthouse metaphors). Each intervention is rated on a 7-point Likert scale from 0 (not at all characteristic) to 6 (extremely characteristic). A mean value on the ten items was calculated in order to determine adherence. A session was regarded as adherent if, on average, the ten behaviours or actions of the facilitators were present on separate occasions with some follow-up which is equivalent to a mean value of  $\geq 4$ . This criterion was selected as clinically meaningful by the expert coders.

To calculate the inter-rater reliability, nine randomly selected video tapes of sessions (7.5% of the total available sessions and 50% of the reliability set) were coded by the two raters, one expert of MBT and one clinical psychologist who was trained in the fidelity scale before. Inter-rater agreement was examined using weighted Cohen's Kappa, leading to estimates of  $\kappa = .62$  which is regarded as a substantial inter-rater reliability (Landis & Koch, 1977). The intraclass correlation was .89.



An interview with the expert rater was carried out after the rating was completed to provide further qualitative data to contextualise and to provide meaning to the quantitative adherence scale ratings.

In order to examine what changes to the training and supervision may be needed to support model fidelity if the intervention is scaled up, the LPP practitioners (n=10) and, separately, the supervision team (n=5) took part in two focus groups at the end of the delivery phase. Supervisors were asked their views on how well the model was adhered to, how the training and supervision supported treatment fidelity and any adaptations that should be made to improve model fidelity.

### **Acceptability**

The retention and attendance rates in the LPP were assessed as proxy measures of the acceptability of the intervention. Retention was assessed by facilitator views on whether or not the parent 'dropped-out' of the intervention. Attendance of more than half of the group and individual sessions were taken as a potential indicator (alongside those mentioned below) that participants felt the intervention was acceptable. Record forms were provided to each site to keep accurate data on attendance and retention of families in both treatment arms during the delivery phase. This data was used as one marker of treatment acceptability as indicated by parent engagement in the relative interventions.

In addition, at the end of the intervention period, parents who took part in the LPP were invited to participate in semi-structured interviews about their experiences of the support they received. Purposive sampling was used to select a range of voices, from all sites, that fell into three groups: Non-attenders (0 group sessions attended) (n=2); Partial attenders who first engaged but then withdrew (n=4); and Completers (attended most sessions and engaged to the end) (n=4). This sampling strategy was not intended to be representative of the full sample but was rather selected in order to obtain as full an understanding as possible of what may have made the intervention less acceptable to some families, as well as to understand what elements were acceptable. The interviews explored parents' experiences of the intervention offered, how acceptable they found it, and any facilitators or barriers they found in engaging with the programme. For those who stopped attending the LPP, or who had low attendance, there was an exploration of reasons for stopping/non-attendance, and of potential barriers to participation. Interviews were audio-recorded and transcribed.

### **Implementation and potential for scalability**

An online survey was emailed to all stakeholders in the local authority sites (facilitators, case workers, and managers) to gain their views on barriers and facilitators of implementation, and to gather views on the scalability of the programme at the end of the delivery phase.

### **Costs of LPP**

The unit cost for LPP training and supervision was provided by the LPP developer. The costs for practitioner time were estimated by the lead delivery LA and were based on the average salaries and oncosts for a facilitator team of one social worker and two family support workers (using 2022 rates). These costs were used to estimate costs of their time for training and delivery of the programme.



To estimate if there were any knock-on effects or costs offset during the intervention period, CSC service use data were recorded for all participants in both groups during the intervention period.

## Data management and processing

The collection of participant data was essential to achieve the aims of the study. Data protection for the study was overseen by Anna Freud and a Data Protection Impact Assessment was carried out and kept under review throughout the study. We ensured that study data was only accessible to authorised study personnel, that data processing agreements were in place, and that observed and identifiable study data was not shared outside of the specified teams. A privacy notice was provided at the point where potential participants were invited to participate. The evaluation team followed established processes and procedures written with guidance from the Anna Freud Data Protection Officer and followed the UK Policy Framework for Health and Social Care Research. Data transfers were made securely through Microsoft Teams and Microsoft Forms.

Interview recordings were automatically transcribed using Microsoft Teams and later ‘cleaned’ by authorised and named team members. All identifying information was removed in the transcription process. Microsoft Office software was used for data management and analysis. Only the evaluation team has access to data, minimising any risk of mishandling or loss. Individual channels enabled data sharing between each site and the evaluation team, and only relevant, named personnel have access to these channels.

All data is stored electronically, held in a restricted access folder and is pseudonymised. The key is held separately. Personally identifiable data will be held for ten years in total, and thereafter will be deleted. After this retention period, the data will be fully anonymised and archived for research purposes.

## Analysis

### Quantitative data analysis

For the implementation process evaluation, descriptive statistics were used to summarise treatment attendance and the stakeholder survey responses.

For the impact study, the first primary outcome was CAPI Physical Abuse Scale score at follow-up, controlling for baseline CAPI score. The primary analysis used a partially clustered mixed effects model allowing for heteroscedastic individual-level errors. The between-cluster variation in the treatment group was modelled as a random effect. The model also controlled for site, child age, and baseline CAPI score via fixed effects without interactions. Thus, our target estimand was the average treatment effect across sites. The model was estimated using restricted maximum likelihood (REML). We used the BIC criterion to investigate if controlling for clustering of participants in families (in the case of co-parent participants) improved the model. The null hypothesis of no treatment effect was evaluated using a t-test on the coefficient of the treatment indicator, using a two-sided significance level of 0.05. The primary analysis was intention-to-treat, such that all participants randomised to the treatment arm are analysed as such even if protocol violations occur. A standardised effect size was calculated by rescaling the observed group





difference using the pooled pre-treatment standard deviation. A 95% confidence interval for the standardised effect size was estimated using a non-parametric bias-corrected and accelerated bootstrap with 2,000 replications.

The second primary outcome ‘social care status’ was assessed at baseline and at the primary endpoint (T3). For this outcome, the unit of analysis was the target child. A three-level outcome was constructed: less severe, no change, and more severe. ‘Less severe’ means a move towards less social care oversight (e.g. a step down from ‘Child Protection Plan’ status to ‘Child in Need’ status), while ‘more severe’ means a move towards more social care oversight. Our intention was to assess the treatment effect via a mixed effects multinomial regression model (with ‘no change’ as the reference category) with a random intercept to account for clustering of participants, and fixed effects for site and treatment. However, this model did not converge. Data exploration showed that sparsity was a problem (empty cells in the crosstabulations treatment by status change and site by status change). We therefore fitted a fixed effects multinomial regression model instead, with treatment as the only independent variable.

We also analysed social care status change from baseline to end of treatment (T2) as a secondary outcome, using the same model as for change to T3 (again, the mixed effects model did not converge and sparsity was identified as the likely reason). All other secondary outcomes were interval-scale and were analysed according to the same principle as the CAPI primary outcome. The unit of analysis for secondary outcomes was the parent, except for the SDQ score, where the unit of analysis was the child. The Benjamini–Hochberg procedure was used to control the false discovery rate for secondary outcomes, using a 5% level of significance.

Two per-protocol analyses were also carried out. These were based on two definitions of what constituted minimum participation for ‘treatment per protocol’ based on clinical recommendations: the ‘strict’ per-protocol analysis included participants who attended at least 10 of the 20 group sessions and at least one individual session (i.e. the minimum contact to be considered as attendance on the programme); the ‘lax’ per-protocol analysis included participants who attended at least one group session and at least one individual session (i.e. experienced some MBT input that could have an impact on outcomes).

## Qualitative data analysis

The qualitative data drawn from the focus groups and individual interviews were analysed using Framework Analysis (FA; Parkinson et al., 2016). FA is a qualitative analytical method that combines categories chosen a priori with a stance of flexibility towards the contents of a dataset (i.e. emerging themes), being especially useful when researchers have specific questions to address while remaining open to the participants’ subjective experience. In accordance with the research questions of the IPE, the present framework was divided into four categories: acceptability of the intervention, implementation of the intervention, impact, and fidelity.

The analytical process was carried out in different steps by three researchers, to enhance the credibility of data. These steps were: (1) a preliminary framework for analysis was developed by the research team, based on the research questions set out above; (2) each researcher familiarised themselves with the overall dataset; (3) the researchers participated in two ‘group indexing’ meetings, in which they collectively discussed one interview and agreed upon how to extract the



data excerpts into the framework categories; (4) after establishing a shared understanding of the extraction process, the researchers were allocated the remaining interviews and extracted them to the framework individually; (5) after all data was extracted within the framework categories, the researchers analysed the data within each framework category inductively, leading to the development of key themes in relation to each category; (6) at different stages of analysis, the qualitative lead of the project (NM) reviewed the themes and provided feedback, which led to refinement of the coding and of the final themes.

Despite being analysed jointly, the different framework categories are presented separately in the Key findings section (see chapter 4) according to the different research questions they aim to answer. Themes related to ‘impact’ are presented as part of the Impact evaluation, while ‘Acceptability’, ‘Implementation’, and ‘Fidelity’ are presented in the Implementation process evaluation section.



## 4. KEY FINDINGS

Given the mixed-methods nature of this study, the key findings below are presented in relation to the project's specific research questions, combining the quantitative and qualitative data streams.

### Description of sample

The demographic characteristics are presented in table 3. The sample was comprised of mostly birth mothers and fathers (91%), with a small number being kinship carers or non-related caregivers. Almost all participants were born in the United Kingdom (n=107, 97%) and only three parents were born in another country. All parents spoke English fluently, and almost all (94%) described themselves as being of white ethnicity. When compared with local authority census data, the sample under-represented Black, Asian and minoritised ethnic groups, in most of the participating local authorities, by 3–8% (except Bristol which was under-represented by 18%). In Oxfordshire, Black, Asian and minoritised ethnic groups were over-represented by 10%.

**Table 3. Participant characteristics (N=110)**

	TAU	LPP	Total
Parent Gender: n (%)			
Female	39 (74%)	48 (84%)	87 (79%)
Male	13 (25%)	9 (16%)	22 (20%)
Non-binary	1 (2%)	0 (0%)	1 (1%)
Parent Age: mean (sd) years	34 (8.2)	32 (8.4)	33 (8.3)
range	20-56	20-63	20-63
Parent Ethnicity: n (%)			
White	49 (93%)	54 (95%)	103 (94%)
Black or minoritised ethnic group	3 (5%)	3 (5%)	6 (5%)
Prefer not to say	1 (2%)	0 (0%)	1 (1%)
Single Parent household: n (%)	34 (64%)	39 (69%)	73 (66%)
Parent Work status: n (%)			
Employed	13 (25%)	18 (32%)	31 (28%)
Not employed, not looking for work	32 (60%)	32 (56%)	64 (58%)
Not employed, looking for work	6 (11%)	6 (11%)	12 (11%)
Household yearly income category: n (%)			
Prefer not to say	4 (8%)	3 (5%)	7 (6%)
Under £10,000	13 (25%)	15 (26%)	28 (25%)
£10,000–20,000	22 (42%)	34 (60%)	56 (51%)
£20,000–30,000	8 (15%)	3 (5%)	11 (10%)
Over £30,000	6 (11%)	2 (4%)	8 (7%)
Source of household income: n (%)			
State benefits only	30 (57%)	43 (75%)	73 (66%)
State benefits and earnings	15 (28%)	9 (16%)	24 (22%)
Earnings only	8 (15%)	5 (9%)	13 (12%)
Number of children in household:			



% two or more (range)	81% (1-5)	70% (1-8)	75% (1-8)
Social care records*: n (%)			
Police involvement	30 (51%)	29 (49%)	59 (54%)
Emergency Duty Team involvement	12 (46%)	14 (54%)	26 (24%)
Section 47 investigation	11 (46%)	13 (54%)	24 (22%)
Recorded incidence of domestic violence	6 (33%)	12 (67%)	18 (17%)
	<b>TAU</b>	<b>LPP</b>	<b>Total</b>
Child Gender: n (%)			
Female	22 (46%)	26 (49%)	48 (48%)
Male	26 (54%)	27 (51%)	53 (52%)
Child Age: mean (sd) years range	8 (3.7) 0.8 – 14	7 (4.6) unborn – 15	7 (4.2) unborn – 15
Social care status at randomisation: n (%)			
Closed to social care	7 (15%)	3 (6%)	10 (10%)
Child in Need	22 (46%)	23 (43%)	45 (45%)
Child Protection Plan	16 (33%)	22 (42%)	38 (38%)
Public Law Outline Proceedings	3 (6%)	1 (2%)	4 (4%)
Care Proceedings	0 (0%)	1 (2%)	1 (1%)
Child Looked After	0 (0%)	3 (6%)	(3%)

Notes: \* Social care records of significant incidents in the six months prior to randomisation.

Most families were low income, with only 10% of them receiving an annual household income of £30,000 or more and only a quarter of participating parents in paid employment. Almost all the families (90%) were living in council, housing association or private rented accommodation.

Most families in the sample (74%) had two or more children living in the household, with the number of children ranging from one to eight. Children of the participating parents ranged in age from unborn babies to 18 years old. All families had at least one child under 12 years of age, as per the inclusion criteria. Participating parents chose to focus on one key child in the data collection. The average age of key children was seven years.

A principal criterion for inclusion was that the target child was on a Child in Need or Child Protection Plan or in Public Law Outline (PLO) proceedings. All families met these inclusion criteria at referral. However, by the time the families were randomly allocated, some children's social care status had been stepped down (closed to social care or targeted team around the child-8%) or stepped up (Care Proceedings or Child Looked After – 5%).

The family social care records show that for the six months prior to randomisation: 59 (54%) families had a record of police involvement; 26 (24%) families had a record of Emergency Duty Team involvement; 24 (22%) families had a Section 47 investigation; and 18 (17%) families had a recorded incidence of domestic violence.

## Impact evaluation

### Primary outcomes



## CAPI Physical Abuse Scale

Of the 110 participants (53 TAU, 57 Lighthouse), 107 provided baseline CAPI scores. Of these, 79 provided CAPI scores at follow-up (39 TAU, 40 Lighthouse). Follow-up rates were thus moderate but similar in both groups (TAU: 74%, Lighthouse: 70%). The intention-to-treat analysis of the CAPI Physical Abuse Scale is based on these 79 participants, and table 4 presents their descriptive statistics by group and time.

**Table 4. CAPI descriptives ITT**

	Baseline		Follow-up	
	TAU	Lighthouse	TAU	Lighthouse
<b>Mean</b>	230.3	254.5	213.2	220.2
<b>SD</b>	105.4	89.8	111.4	91.9
<b>Minimum</b>	41	62	40	49
<b>1st quartile</b>	142	182	99	146
<b>Median</b>	261	264	218	224
<b>3rd quartile</b>	308	325	309	283
<b>Maximum</b>	429	386	400	411
<b>N</b>	39	40	39	40

Notes: Pooled baseline SD: 97.8.

The estimate of the treatment effect, Lighthouse vs TAU, on the CAPI Physical Abuse Scale is provided by a partially clustered linear mixed effects model, which accounts for clustering of Lighthouse participants in treatment groups via a random intercept, and controls for baseline CAPI Physical Abuse Scale score, age of the key child, and site via fixed effects. The estimates from this model are presented in table 5.

**Table 5: Estimates from a partially clustered mixed effects model of CAPI Physical Abuse score at follow-up (n=79)**

	Coef	SE	(95 % C.I.)		t	df	p
<b>Lighthouse (vs. TAU)</b>	-9.27	17.98	(-52.63,	34.09)	-0.52	6.38	0.623
<b>CAPI baseline</b>	0.74	0.09	(0.56,	0.91)			
<b>Key child age (years)</b>	-0.19	2.16	(-4.44,	4.07)			
<b>Site (ref: 1)</b>							
<b>2</b>	-37.65	34.62	(-108.68,	33.37)			
<b>3</b>	-57.71	32.59	(-123.78,	8.36)			
<b>4</b>	-11.58	34.99	(-82.75,	59.59)			
<b>5</b>	-33.03	29.79	(-93.54,	27.48)			
<b>Intercept</b>	76.93	34.68	(7.82,	146.04)			
<b>Random effects</b>	<b>Variance</b>				<b>ICC</b>		



<b>Lighthouse Group</b>	$6 \times 10^{-5}$			$5.5 \times 10^{-9}$	
<b>Residuals (Lighthouse)</b>	7237.57				
<b>Residuals (TAU)</b>	4359.12				

Notes: Coef: regression coefficient; SE: standard error; CI: confidence interval; df: degrees of freedom; ICC: intraclass correlation coefficient.

Degrees of freedom were estimated using the Satterthwaite correction.

The model allows for heteroscedastic residuals, hence there are separate residual variance estimates for the Lighthouse group and the TAU group.

The treatment effect estimate, Lighthouse vs TAU, is  $-9.27$  (95% CI:  $-52.63, 34.09$ ). Thus the mean CAPI Physical Abuse Score after Lighthouse treatment is estimated to be 9.27 points lower than with TAU, controlling for baseline CAPI score, site, and child age. This corresponds to a standardised effect size of 0.09 (95% CI:  $-0.25, 0.46$ ). That is, according to the confidence interval, the data are compatible with Lighthouse causing an improvement in the CAPI Physical Abuse Score of up to 0.44 standard deviations, or causing a deterioration in the score by up to 0.27 standard deviations. The confidence interval and the t-test of the null hypothesis of no effect ( $p = 0.623$ ) indicate that there is essentially no evidence from this data that Lighthouse treatment affects the CAPI Physical Abuse score compared to treatment as usual.

A model that added a random intercept for family to account for the presence of parental couples in the data was also estimated. This did not improve the prediction of the outcome according to the BIC criterion (BIC = 898.5 for the reported model, BIC = 902.8 for the model including a family effect), nor did it yield different coefficient or standard error estimates (to 2 decimal points – see [appendix table A5](#)).

The intraclass correlation was almost zero (ICC estimate:  $5.5 \times 10^{-9}$ ), suggesting that there was little influence of the particular Lighthouse group attended on CAPI Physical Abuse score, among those who completed the CAPI at follow-up. However, follow-up rates differed substantially by Lighthouse group, as described in [table 2](#).

Residual analysis did not indicate violations of the assumptions of linearity of relationships, or of normality and homoscedasticity of errors, conditional on the group-specific error variances allowed for in the model. The residual variance in the Lighthouse group (7237.57) was much larger than in the TAU group (4359.12). Data exploration showed that this was because a larger proportion of Lighthouse than TAU participants reported either large improvement or large deterioration in their CAPI scores. This phenomenon was also reflected in the within-participant correlations, i.e. the correlations between baseline and follow-up CAPI scores. For the treatment group, the within-participant correlation was 0.44 (95% CI:  $[0.15; 0.66]$ ,  $n=40$ ). In the control group, it was much higher at 0.83 (95% CI:  $[0.70; 0.91]$ ,  $n=39$ ). The overall within-participant correlation was 0.67 (95% CI:  $[0.52; 0.77]$ ,  $n=79$ ). We did not pre-specify a hypothesis about residual variances, but the difference in outcome variation is large enough in our study to merit investigation in further research, to confirm whether it reflects a real effect.

### **Sensitivity analysis**

A single Lighthouse participant provided a follow-up CAPI score, but no baseline score. Imputing the missing baseline score as the baseline mean and adding a missingness indicator to the model leads to identical estimates to the model reported (see also [table A1](#) in the appendix).



The trial protocol proposed further sensitivity analyses exploring the influence of potential bias on the treatment effect resulting from differential attrition, via multiple imputation under the assumption of data not missing at random. However, since follow-up rates were very similar in the TAU and intervention groups, and since there was no other indication of reasons for attrition being related to treatment, these analyses would not add any insight to our findings, and thus were not conducted. We instead explored the demographic characteristics of those included in the CAPI score ITT analysis (n=79) with those not included due to missing CAPI scores (n=31), separately for each treatment group. These analyses are presented in the [appendix](#), tables A7 to A11. One interesting result is that, while there were fewer male than female participants in the study, male participants were more likely to provide complete CAPI scores. Eighty-six per cent of male participants (19 out of 22) could be included in the primary analysis, compared to 68% of women (59 out of 87). However, this pattern was the same in both treatment groups.

To assess the potential effect of differential missingness associated with baseline characteristics, we estimated our primary analysis model with the addition of the following covariates: participant age, participant sex, household income, participant partnership status, and child's social care status at baseline. The results are presented in the [appendix](#), [table A12](#). The estimate of the treatment effect (-7.8, standard error 18.1) is much the same as for the primary analysis. There is thus no indication from this analysis that differential loss-to-follow up has biased our primary study result. Of course, bias due to missingness associated with unmeasured variables cannot be ruled out, but we have found no indication for it.

### *Per protocol analyses*

[Table A1](#) shows the results of per protocol analyses, using the two definitions of 'Lighthouse treatment received' described in the Methods section (see chapter 3). None of these analyses observe a statistically significant benefit for Lighthouse intervention compared to TAU, although for the 'strict' per protocol analysis the point estimate of the treatment effect is over twice as large as in the other analyses, albeit with a large standard error and confidence interval.

### **Social care status at 12 months follow-up**

The 110 participants chose 101 different 'target children' to report on due to some parenting couples choosing the same target child. Reporting on the social care status of these children was complete, i.e. there were no missing values. [Table A2](#) presents social care status at baseline, 6-month follow-up, and 12-month follow-up.

Table 6 below shows the same information categorised by the direction of change: moving to a less severe care category, moving to a more severe one, or being in the same category at 12 months follow-up compared to baseline. This shows that the children in both treatment groups were more likely to 'improve' their social care status than transition to a worse one. Compared to children of TAU participants, a slightly higher proportion of children of Lighthouse participants 'improved' their status; conversely, a slightly higher proportion of children of Lighthouse participants 'deteriorated' in their status. Children of TAU participants remained in the same category more often than children of Lighthouse participants.



**Table 6. Social care status change, 12-month follow-up compared to baseline, by treatment group**

Social care status at 12-month follow-up	TAU		Lighthouse	
	Number	Per cent	Number	Per cent
Less severe	27	56.2 %	34	64.2 %
Same	14	29.2 %	9	17.0 %
More severe	7	14.6 %	10	18.9 %
<b>Total</b>	<b>48</b>	<b>100.0 %</b>	<b>53</b>	<b>100.0 %</b>

Table 7 reports results from a multinomial logistic regression model of social care status change from baseline to 12 months. The results suggest that the observed group differences described in the previous paragraph are not evidence of an actual treatment effect, but are compatible with the null hypothesis of no influence of treatment on social care status change at 12 months. The likelihood ratio test of this null hypothesis yields  $p = 0.335$ .

**Table 7. Multinomial regression of social care status change from baseline to 12 months**

Care status at 12 months:		Coef	SE	RRR	(95 % CI)	z	p
Less severe	Lighthouse (vs TAU)	0.80	0.65	2.22	(0.63, 8.29)	1.22	0.221
	Intercept	-0.69	0.46				
No change	Base	0		1			
More severe	Lighthouse (vs TAU)	0.67	0.50	1.96	(0.75, 5.36)	1.35	0.178
	Intercept	0.66	0.33				

Notes: Cis are profile likelihood.

Likelihood ratio test of  $H_0$ :  $RRR_{\text{less severe}} = RRR_{\text{more severe}} = 1$ :  $LRT = 2.19$ ,  $df = 2$ ,  $p = 0.335$ .

### **Per protocol analyses**

Table A3 shows the results of per protocol analyses for social care status change to 12 months. These results do not differ substantively from the intention-to-treat analysis.





## Secondary outcomes

### Social care status at end of intervention period

A secondary outcome was the social care status change of the 101 key children from baseline to T2, the end of the treatment period. This was an interim measure of change before the primary endpoint at 12 months. For numbers and percentages in each of the care status categories, see [table A2](#) in the appendix. Table 8 below shows the same information categorised by the direction of change: moving to a less severe care category, moving to a more severe one, or being in the same category at six months follow-up compared to baseline. This shows that the children in both treatment groups were more likely to ‘improve’ their social care status than transition to a worse one. However, in contrast to our hypothesis, children of TAU participants were both more likely to ‘improve’ and less likely to ‘worsen’ their status than children of Lighthouse participants.

**Table 8. Social care status change, end of treatment compared to baseline, by treatment group**

Social care status at end of treatment follow-up	TAU		Lighthouse	
	Number	Per cent	Number	Per cent
<b>Less severe</b>	26	54.2 %	19	35.8 %
<b>Same</b>	16	33.3 %	21	39.6 %
<b>More severe</b>	6	12.5 %	13	24.5 %
<b>Total</b>	48	100.0 %	53	100.0 %

Table 9 reports results from a multinomial logistic regression model of social care status change. The results suggest that the observed group differences described in the previous paragraph are not evidence of an actual (detrimental) treatment effect, but are compatible with the null hypothesis of no influence of treatment on social care status change at six months. For a formal evaluation of this statistical null hypothesis see table 10 below.

**Table 9. Multinomial regression of social care status change from baseline to 6 months**

Care status at 6 months:		Coef	SE	RRR	(95 % CI)	z	p
<b>Less severe</b>	Lighthouse (vs TAU)	-0.59	0.45	0.56	(0.23, 1.33)	-1.31	0.192
	Intercept	0.49	0.32				
<b>No change</b>	Base			1			



<b>More severe</b>	Lighthouse (vs TAU)	0.50	0.59	1.65	(0.53,	5.58)	0.84	0.399
	Intercept	-0.98	0.48					

Notes: Cis are profile likelihood.

Likelihood ratio test of  $H_0: RRR_{\text{less severe}} = RRR_{\text{more severe}} = 1: LRT = 4.16, df = 2, p = 0.125$ .

## Parent-reported secondary outcomes

Table 10 presents achieved sample sizes for the main analyses of secondary outcome measures. Sample sizes vary slightly between the different questionnaires, and are also slightly lower than for the CAPI score, due to selective non-reporting (the researchers prioritised the order questionnaires to be completed when participants had limited time or willingness to complete questionnaires). Follow-up rates do not differ appreciably between the Lighthouse and TAU groups.

**Table 10. Treatment effect estimates for secondary outcomes**

	N (TAU)	N (LH)	Estimated coefficient		Std Error	(95% CI)	p	Benjamini–Hochberg <sup>#</sup>	Direction of difference favours
<b>PSI</b>	31	30	-	10.15		(-39.47, 13.04)	0.251	Retain $H_0$	LH
<b>ETMCQ: Trust</b>	37	38	-0.14	0.33		(-1.00, 0.72)	0.687	Retain $H_0$	TAU
<b>ETMCQ: Mistrust</b>	37	38	0.15	0.19		(-0.29, 0.60)	0.440	Retain $H_0$	TAU
<b>ETMCQ: Credulity</b>	37	38	-0.26	0.20		(-0.76, 0.24)	0.250	Retain $H_0$	LH
<b>SDQ</b>	33	32	-0.37	1.35		(-3.54, 2.80)	0.790	Retain $H_0$	LH
<b>PDI: RF</b>	30	35	-0.26	0.27		(-0.86, 0.35)	0.366	Retain $H_0$	TAU
<b>PDI: ARR</b>	30	35	-0.66	1.24		(-3.58, 2.26)	0.611	Retain $H_0$	LH
<b>Social care status (T2)*</b>	48	53	-	-	-	-	0.125	Retain $H_0$	TAU

\*Social Care Status: this is a categorical outcome, and estimates are displayed in table 12. The p-value from the likelihood ratio test of no overall group difference was used for the Benjamini–Hochberg correction procedure.

<sup>#</sup>The Benjamini–Hochberg correction was carried out for  $\alpha = 0.05$ . Since all observed  $p > 0.05$ , the null hypothesis  $H_0$  is retained for all secondary outcomes.

See [table A6](#) in the appendix for standardised effect sizes of numeric outcome measures.



Table 10 also presents treatment effect estimates for all numeric secondary outcomes (see [table A4](#) in the appendix for descriptives of these outcome measures). Residual analyses were conducted for all models based on numeric outcomes, and no indications of departure from standard model assumptions were identified. To evaluate the statistical evidence for the presence of treatment effects in the presence of multiple secondary outcomes, the Benjamini–Hochberg correction was carried out using  $\alpha = 0.05$ . Since all observed p-values were larger than 0.05, the null hypothesis  $H_0$  is retained for all secondary outcomes.

## **Parenting Stress Index**

A total of 97 participants provided baseline responses to the Parenting Stress Index (PSI; 50 TAU, 47 Lighthouse). Of these, 61 provided PSI scores at Time 2 (31 TAU, 30 Lighthouse). [Table A4](#) gives the descriptive statistics for these 61 participants by group and time. In the main analysis model, the estimate of the treatment effect is  $-13.21$  (95% CI:  $-39.47, 13.04$ ; see table 10 above), indicating that Lighthouse participants on average experienced less stress at follow-up than TAU participants, by about 13 points on the PSI, controlling for baseline PSI, child age, and site. This corresponds to a standardised effect size of 0.25 (95% CI:  $-0.19, 0.63$ ). The confidence interval and the t-test of the null hypothesis of no effect ( $p = 0.251$ ) indicate that there is little evidence from this data that Lighthouse treatment has greater impact on the PSI than TAU.

## **Epistemic trust, mistrust, and credulity**

A total of 106 participants provided baseline responses to the Epistemic Trust, Mistrust, and Credulity Questionnaire (ETMCQ; 51 TAU, 55 Lighthouse). Of these, 75 provided ETMCQ scores at follow-up (37 TAU, 38 Lighthouse). Separate models estimated the treatment effect on each of the three dimensions of the ETMCQ: trust, mistrust, and credulity. See table 10 above for results. At follow-up and compared to TAU participants, Lighthouse participants in this study scored lower on trust and slightly higher on mistrust (that is, in the opposite to the expected direction) and slightly lower on credulity (the expected direction). However, the confidence intervals and p-values suggest that there is essentially no evidence for treatment effects (positive or negative) on the dimensions of the ETMCQ. All of the observed groups differences were small; the observed standardised effect sizes were  $-0.13$  (95% CI:  $-0.67, 0.29$ ) for trust,  $-0.15$  (95% CI:  $-0.47, 0.27$ ) for mistrust, and 0.21 (95% CI:  $-0.18, 0.54$ ) for credulity.

## **Child psychopathology**

A total of 93 participants provided baseline responses to the Strengths and Difficulties Questionnaire (SDQ) about the designed ‘target child’ in their family (47 TAU, 46 Lighthouse). Of these, 65 provided SDQ ratings at follow-up (33 TAU, 32 Lighthouse). In the main analysis model, the estimate of the treatment effect is  $-0.37$  (95% CI:  $-3.54, 2.80$ ; see table 10), indicating that Lighthouse participants on average rated their children lower on the Total Difficulties scale of the SDQ by about 0.37 points, controlling for baseline SDQ, child age, and site. This corresponds to a standardised effect size of 0.05 (95% CI:  $-0.44, 0.42$ ). The confidence interval and the t-test of the null hypothesis of no effect ( $p = 0.790$ ) indicate that there is essentially no evidence from this data



that Lighthouse treatment has a greater impact on parent-rated SDQ Total Difficulties scores than treatment as usual.

A model that added a random intercept for child to account for the fact that some parental couples reported on the same child was also estimated. This did not improve the prediction of the outcome according to the BIC criterion (BIC = 419.9 for the reported model, BIC = 423.9 for the model including a child effect), nor did it yield substantially different coefficient or standard error estimates.

## **PDI: Reflective Functioning (RF) and Assessment of Representational Risk (ARR)**

A total of 103 participants provided baseline Parent Development Interviews (PDI; 49 TAU, 54 Lighthouse). Of these, 65 provided PDIs at follow-up (30 TAU, 35 Lighthouse). Separate models estimated the treatment effect on each of two measures derived from the PDI: Reflective Functioning (RF) and Assessment of Representational Risk (ARR). See table 10 for results. At follow-up and compared to TAU participants, Lighthouse participants in this study scored slightly lower on RF and slightly lower on ARR, when controlling for baseline score, child age, and site. However, the confidence intervals and p-values suggest that there is essentially no evidence for treatment effects (positive or negative) on either RF or ARR. The estimated standardised effect sizes were  $-0.20$  (95% CI:  $-0.64, 0.21$ ) for RF and  $0.10$  (95% CI:  $-0.27, 0.49$ ) for ARR.

## **Parent's experience of the impact of the intervention**

In addition to the outcome measures, the qualitative data analysis also provided important insights about the possible impact of the LPP for families. For the sake of brevity, and to protect confidentiality of participants, a single data extract is provided in support of each of the key findings. The participants were purposively selected to represent a range of perspectives, so were not necessarily representative of the whole group. (For example, parents who dropped out were purposively selected for interview, although the number of parents who dropped out was relatively low).

The 'impact' category of the framework analysis revealed three themes reflecting the participants' perceived outcomes after the LPP:

**(1) Being able to mind the child and being able to regulate oneself.** Some parents reported feeling better able to understand their children's subjective perspective after attending the LPP:

“Sometimes if you look at what you would have considered as being naughty, it's just kids pushing the boundaries and having fun.”

The parents' reports indicated that many had developed a capacity of understanding their children's behaviour, having a more empathic perception of their inner world.

This acquired capacity seemed to take place beyond the parenting context, to include a better understanding of other family members:



“Sometimes my mam can be a bit ... snappy and rather than thinking ‘oh, she’s in a right mood’. I don’t think like that, now ... I wonder what is going on with her.”

In that sense, the qualitative data suggests that some parents sensed that the LPP benefits may not only be perceived in their relationship with their children, but also in broader contexts.

Furthermore, some parents also linked this capacity to better understand others’ mental states with an improved capacity to not react impulsively during interpersonal interactions:

“Just keeping my mouth shut, understanding that if I say anything to her it’s gonna put ... us in argument ... and it’s gonna kick off in front of my son and it’s gonna upset him. Things like that. I didn’t really think about before.”

According to some parents’ accounts, it seems that the improvement of their capacity of understanding others’ inner world promoted a better sense of affect regulation.

**(2) The LPP can give parents tools to ‘move on without it’.** Some parents reported that the LPP promoted positive changes in them that would endure after the programme:

“I can walk away from this now feeling like I put my input in enough and I’ve got enough out of this to know what I can do now to move forward.”

The potential for change to be long-lasting was described in a range of domains, such as establishing new friendships, having the agency to move away from unhealthy relationships, and having overall better acceptance of different aspects of life. This was also reflected through some practitioners’ perspectives, who perceived the LPP as a more long-lasting aid compared to what they had previously been offering in the CSC services:

“And it feels that for years we’ve been sticking plasters ... it felt like ... that this could be not the plaster. This could be something that’s there for kind of life.”

**(3) Not all parents attending LPP experienced change.** Alongside the participants who felt that the LPP had made a real difference for them and their children, there were also parents who did not see any benefit from the LPP, and didn’t feel it provided something different to what they had accessed before:

“It hasn’t really [helped] ’cause it’s nothing new to me, but I do feel it just depends where you are coming from.”

According to some parents, their overall life experiences could impact how they would benefit from LPP. For instance, the parent mentioned above reported having an extensive support network outside LPP, and therefore the programme did not add something perceived as ‘new’ to them. However, they recognised that other participants might come from different backgrounds and could benefit from attending the groups.



# Implementation process evaluation

## Model fidelity

Of the 18 sessions that were rated on the Lighthouse Intervention Scale by the MBT expert, nine sessions (50%) were rated as showing model adherence that was above the cut-off score. Thus, the practitioners were delivering the programme in a way that was considered to adequately adhere to the model about half the time. Half of the sessions were considered to be delivered in a way that did not adhere strongly to the model, and so could be considered 'sub-optimal'.

The interview with the MBT expert who conducted the fidelity ratings provided some context and elaboration for these findings. According to this rater, the facilitators were delivering the programme content and MBT techniques routinely, but sometimes missed opportunities for further in-depth exploration of difficult topics, particularly when these were likely to elicit conflictual feelings and discussions. Furthermore, there were some missed opportunities for the facilitators to address low mentalising modes (such as 'pretend mode' where very idealised and defensive ways of thinking prevail). The rater felt that this was possibly due to the fact that the facilitators were recently trained and still relatively inexperienced in MBT:

“I think tackling this manifestation of low mentalising, called Pretend Mode, is very hard, even for very well-trained therapists. We all struggle with it ... So there were a few of the transcripts I was going through where ... it felt like the facilitators or therapists were getting into a bit of cheerleading in terms of their sort of 'Oh, you're brilliant, You're doing so well, You're great' kind of thing, and it felt a bit sort of pretend, you know, not a genuine sort of ... But yeah, and I thought I could see in the narrative some more difficult things that you might have wanted the therapist to sort of bring their curiosity to.”

The rater felt that a more prolonged period of training is necessary for delivering MBT to a high level of adherence, especially for those with no prior therapeutic skills training:

“The fact that this was [the practitioner's] first delivery of the model, I think is an issue. Because actually ... for a lot of people who are drawn to this kind of work, I think they learn intuitively through practising it, trial and error, sort of practising it. So I think the training could have been perhaps sort of spread out a bit and ... people could be sort of, um, trialling certain skills and techniques within their setting and getting some supervision on that and coming back and reflecting on that and then building on that and then doing the more specific lighthouse work. I think a period of training in basic MBT skills around ... trying to sort of take this attitude of a curious as authentic, genuine wish to try and find out about someone's subjectivity ... Learning to notice these low mentalising modes and how to try to intervene with them and practising that over time.”

Alongside the findings from the LPP Fidelity Scale, the focus groups with supervisors and facilitators revealed two themes relating to what might support or hinder model fidelity:



**(1) ‘Learning-by-doing’: being ‘on model’ required time and experience.** The practitioners reported that the learning process for delivering the LPP didn’t end with the training itself, but carried on afterwards. The training’s content made more sense throughout their practice:

“I did struggle ... in the beginning, but to be honest, all the way through, even delivering it, it’s been a learning curve.”

Their reports indicate that they became increasingly more confident about their skills over time. This was particularly relevant to the site that had the opportunity to run two sequential groups, with practitioners feeling more prepared for the second one:

“The first time for the first group and the first time for the second group, huge difference ... the confidence and an understanding of ... the metaphors.”

Consequently, the qualitative data indicates that practitioners felt important differences concerning their skill set at the beginning of the study and by the end of it, with increased practice playing a key role.

**(2) Challenging situations impacted fidelity to the model.** Practitioners and supervisors noted that a range of situations impacted their fidelity to the LPP model. These situations included managing the practitioners’ own anxiety about their skills, or even managing technical malfunctions:

“For ... some of the practitioners there [was] ... anxiety or concern about delivering the teaching material correctly.”

These challenging situations also emerged in their relationship with parents, in sessions experienced as ‘difficult’:

‘One of the things that we did ... comment on that was challenging was managing conflict in a mentalising way. So, we had a little bit of that in the group’.

## Acceptability of the intervention

### Parent and carer experiences

The qualitative data analysis of interviews provided some insights about the acceptability of the intervention. The framework analysis led to five themes.

**(1) Participants had ‘internal’ and ‘external’ reasons to engage in the LPP.** Different factors motivated parents to attend. Some of them reported ‘internal’ reasons such as feeling the need to help their child and keep custody:

“I was basically just trying to do anything ... [that was] thrown at me ... Because ... I wanted to keep her [child] more than anything.”

Other parents, however, also mentioned feeling pressured by the CSC services to engage, encompassing more ‘external’ motivations:



“I was pushed by the social worker.”

**(2) Participants mostly felt the LPP was different from previous experiences of parenting support.** Many participants highlighted that during the LPP they felt cared for, which was experienced as a novel or unusual experience for them when it came to professional services:

“Social services just try ... to kick you off at the first stop with the cheapest fare, whereas I haven’t been kicked off of the first of the cheapest fare. We’ve been taken to the end of the line and make sure we’re alright and all the time someone was keeping an eye on us.”

Alongside the qualitative data on the LPP impact, this suggests that the programme may fill a gap in the support parents currently get at the CSC services.

This was particularly relevant for this population, where trust may be difficult to establish. Many participants had experienced adverse experiences throughout their lives, with abuse being experienced in different settings. Some participants reported feeling safe to share these experiences in the programme and know that they would be understood. When asked how the parent felt towards the practitioners, one replied:

“Heard. Heard. I mean for women that have gone through numerous forms of abuse, mental, physical, emotional. The one thing that you’re left with is this victim blaming ... So, to have a practitioner sit there and go, ‘I hear you. That’s OK’, you know, was just reassuring to feel that you’re safe.”

**(3) Childcare/practical duties and mental health difficulties were some of the main reasons for not attending.** The main obstacles that parents attributed to their non-attendance were childcare/practical duties and mental health difficulties. Concerning childcare, for some parents their parenting activities made them struggle to attend:

“I was pregnant with [other child] ... in hospital most of the time and having appointments ... I had to work it [LPP] in between picking up [target child].”

In addition to childcare and practical duties, some parents also referred to the burden of their mental health issues. According to some of them, depressive feelings impeded them from engaging in the LPP:

“I struggle with depression and sometimes it was my down days and I just couldn’t be bothered.”

**(4) Working in groups was a divisive experience.** Some parents considered the group format to be a feature that made the programme ‘work’ for them. According to some, the group format of LPP offered an opportunity to share their experiences in a productive and/or validating way:

“To see so many women who have felt the way I have there ... us ... all could relate to one another ... I was more than happy to express and share my views and opinions and ... it was brilliant.”





In some cases, the interaction between parents in the LPP would develop to relationships outside the programme, which was seen as a positive aspect for some:

“We live in a very small-ish local community here and it turns out that afterwards, I’ve met these people in the community just through natural going about in the community. So it works well.”

In contrast, for others, the possibility of meeting LPP peers outside the programme was a reason for not joining:

“I struggle with groups as it is ... and when the lady told me that there was some people from [place name], I was like ‘what if I bump into them?’ like ‘what happens if they try and talk to me?’. It like set off real bad anxiety.”

In addition, some parents referred to some differences between the group members that could lead to some awkward feelings:

“You don’t always feel like you relate to everybody entirely and maybe it’s just partially of my age. I don’t always feel like I’ve really related to, I don’t really feel like I related to, I’m not talking about the practitioners here, but the other people who were attending, I didn’t feel like I related to any of them really ... So that does bring about feelings of feeling uncomfortable.”

Factors such as age difference and social care experience (e.g. parents who lived with their children attending the same LPP group with parents who had their child removed) were described as potential causes of discomfort or awkwardness.

**(5) Working online allowed parents to more easily engage in the programme.** Parents overall appreciated how convenient the online format was, and how this made it possible for them to carry on with other life duties such as childcare:

“We didn’t have to get up and you didn’t have to rush around ... We couldn’t get anybody to babysit [child] at the time, we had just moved house, so it would be in a lot of travelling and a lot of expenses.”

This aspect was particularly relevant when considered alongside Theme 3, indicating that practical duties and childcare were some of the main reasons reported for non-attendance. Some parents also reported feeling more comfortable through video calls than face to face

“It’s a lot easier to be open on Teams than there’s to be face to face because you haven’t got the in the room embarrassment.”

This difference between the online and face-to-face modalities indicates that the virtual delivery of the LPP can bring some unique benefits for this intervention and cater for parents with specific needs. However, other parents raised the opposite opinion, wishing it was delivered in person:

“I just think it’s off-putting. I think face to face is so much better.”



This perception of the online modality being ‘off-putting’ was also met with considerations of communicating in this approach being less ‘natural’ or easy to engage than in a physical setting. When speaking about the benefits of meeting in person, one parent explained:

“It’s just more like you’re in a different atmosphere, so it’s more easy to engage with other people and like it’s just sort of more natural communication.”

## **CSC practitioner views**

An online survey was sent to 187 practitioners, which was completed by 21 (14%) of them. In the survey, CSC practitioners were asked to consider the experiences of families they knew of who attended the LPP and to rate their experiences on a 5-point scale. Three practitioners (14%) did not have contact with parents that went through the LPP. Of the remaining 18 respondents who had contact with families who went through the LPP, seven (39%) rated their experience as ‘very positive’ and six (33%) as ‘quite positive’. These practitioners reported increased reflective capacity in the parents who went through the LPP, although some parents expressed concerns about the poor attendance of other parents. Five (28%) of the practitioners reported neutral or mixed experiences from the parents they had contact with. Among those, they reported that some parents thought mentalising was challenging, or that the programme offered information they already knew. They also found that some other parents struggled with attending. No practitioners reported that the parents they knew of who attended the LPP had negative experiences.

## **Attendance**

Participant attendance was recorded every week throughout the 20-week programme period for both group and individual sessions (see table 11 below). The parent, carer, and practitioner feedback is reflected in the attendance and retention rates, particularly the reasons for not attending. In total, 57 participants were allocated to the LPP arm. Of these, 30 (53%) participants actively withdrew, or were assumed withdrawn, at varying stages throughout the programme. 12 (21%) of those 30 could not be contacted or did not wish to engage in any sessions throughout the 20-week period. The mean number of group sessions that participants attended ranged between 6 and 14, which yields an average of 11 sessions per group. The mean number of individual sessions that participants attended ranged from four to nine sessions, yielding an average of six sessions per group. Overall attendance rates per group was 36%, ranging from 16% to 48% of participants attending their LPP group. This corresponds to an average group size of two to five participants per site. Across all sites, 37 (65%) participants attended at least one group session and one individual session, and 25 (44%) participants attended at least ten group sessions and one individual session. In post-hoc analyses, neither the number of sessions attended nor withdrawing from LPP were correlated with baseline social care status ( $r=.08$ ,  $p=.520$  and  $r=-.06$ ,  $p=.659$ , respectively). This indicates that baseline social care status severity does not seem to play a role in parents’ engagement to LPP.



**Table 11. Attendance and retention rates for LPP group and individual sessions**

	Group A	Group B	Group C	Group D	Group E	Group F	All LAs
<b>Allocated to LPP: N (%)</b>	10 (100%)	9 (100%)	12 (100%)	7 (100%)	9 (100%)	10 (100%)	<b>57 (100%)</b>
<b>No contact or engagement: N (%)</b>	3 (30%)	3 (30%)	3 (25%)	0 (0%)	3 (33%)	0 (0%)	<b>12 (21%)</b>
<b>Withdrew (actively or assumed) at any stage: N (%)</b>	7 (70%)	3 (33%)	6 (50%)	1 (14%)	5 (56%)	8 (80%)	<b>30 (53%)</b>
<b>No. group sessions attended per participant: Mean (range)**</b>	6 (2-12)	14 (10-15)	11 (3-18)	11 (0-20)	12 (5-17)	9 (2-20)	<b>11 (0-20)</b>
<b>No. individual sessions attended: Mean (range)**</b>	6 (2-14)	9 (7-12)	6 (2-9)	5 (1-9)	7 (3-9)	4 (1-7)	<b>6 (1-14)</b>
<b>Attended sessions per lax protocol: N (%)***</b>	5 (50%)	6 (67%)	9 (75%)	5 (71%)	6 (67%)	6 (60%)	<b>37 (65%)</b>
<b>Attended sessions per strict protocol: N (%)****</b>	2 (20%)	6 (67%)	6 (50%)	4 (57%)	5 (56%)	2 (20%)	<b>25 (44%)</b>
<b>Attended no group or individual sessions: N (%)</b>	5 (50%)	3 (33%)	3 (25%)	1 (14%)	3 (33%)	4 (40%)	<b>19 (33%)</b>
<b>Mean group size per week: N (% of group)</b>	2 (16%)	4 (46%)	5 (43%)	3 (48%)	4 (41%)	3 (27%)	<b>21 (36%)</b>

Notes: \* Withdrew from LPP at any stage, as reported by group facilitator(s).

\*\* Mean only for participants who attended at least one individual or group session (i.e. excluding those who had no contact with the intervention at all).

\*\*\* As per lax protocol: For those who engaged in at least one group session and one individual session.

\*\*\*\* As per strict protocol: For those who engaged in at least ten group sessions and one individual session.

## Implementation of the intervention and potential for scalability

### CSC staff views

In the survey, practitioners were asked if they felt that the LPP should be provided by their service in future. Most, (n=16, 76%) felt that it should, while the remaining five (24%) reported being unsure about it. Out of the latter, one mentioned that they were unsure about how practical it



would be to implement the LPP in their LA. None of the respondents said that the LPP should not be provided by their service in future. When asked if they would recommend the LPP to other local authorities, 18 (86%) practitioners stated that they would, while 3 (14%) said that they were unsure about it. None of the respondents said that they would not recommend the programme.

Practitioners were asked about what they thought the challenges to implementing the programme in CSC might be. The most reported challenge was families being unable to attend due to external circumstances (e.g. due to time, childcare, work commitments, etc.; 13 practitioners, 62%), followed by families not wanting to attend (10, 48%). Eight (38%) of the practitioners also reported that social care practitioners do not have the time to deliver the LPP. Furthermore, five (24%) of them thought that the LPP should be delivered by therapists, not social care practitioners. Two practitioners (9%) reported that the LPP is too expensive to deliver and one of them mentioned that some families already have experiences with parenting programmes and will be sceptical about the LPP.

The online survey was also sent to 65 managers in participating LAs and completed by nine of them (12% response rate). Managers were asked if the LPP could be feasibly delivered in the CSC context, and all said yes. Some commented that specific funding and a dedicated team to train and run the programme would be required. Seven of the eight managers were unsure about the LPP having promoted an impact in services' wider culture (n=7). One manager identified positive change in their wider service, noticing a knock-on effect of the mentalising training and supervision in the wider social care team and their work with families.

All managers agreed that families receiving the programme valued it and stated that they would recommend the LPP to other LAs. All of them also reported thinking that the LPP should be provided in their service in the future. While explaining their answers, some managers reported that the LPP offered aspects of service provision that were not covered beforehand.

## **LPP facilitator and supervisor views**

The Framework Analysis of interview and focus group data identified two themes relating to implementation.

**(1) Delivering the LPP required adaptations for the CSC services.** The LPP is a way of working that was developed by psychotherapists and has previously been delivered by mental health professionals. Bearing that in mind, the interviews with supervisors shed light on adaptations that may be needed if this programme is delivered by CSC professionals. These adjustments included the complexity and depth the training and supervisions could reach over time:

'I think some concepts were quite challenging to get their heads around and it took a bit of time to explain'.

This was also accompanied by ideas about some changes in the supervision style, with supervisors feeling the need to praise or soothe practitioners who were anxious about their performance in this novel task:



“I had to give a lot of praise ... I felt I had to ... emphasise how well they were doing.”

Lastly, it was identified that the practitioners’ workload and roles with the CSC could compromise their capacity to keep a mentalising stance:

“It’s hard to explain ... to team managers or people holding the money that ... two hours, it’s not just two hours ... it’s all the prep time and then the debriefing time because it’s very hard to mentalise continuously for two hours, particularly with people who really struggled to mentalise.”

**(2) There are technical implications about adopting an online format.** Delivering the LPP online to CSC service users requires attention to access issues. Some participants reported not having compatible devices or internet connection that could support attendance at the programme:

“I couldn’t get on the Zoom ... so she went and got a tablet for me, bought it out, set it up and she showed me how I could do.”

## Costs of the LPP

The costs of delivering the LPP in CSC are broken down in table 12 below. The total cost for training three practitioners was £3,817.

The cost of delivery, which includes all preparation, delivery and supervision time, is £16,637 per group intervention. This would equate to about £1,660 per parent for a complete group.

**Table 12. Training and delivery costs of LPP**

<b>Training Costs</b>	
Training costs 1-day basic skills (3 people @ £150pp)	£450
Lighthouse/Lightship Training – 5 days (3 people @ £375pp)	£1,125
3 Practitioners’ working hours (6 days)	£2,242
<b>Total training cost per LA (for 3 practitioners)</b>	<b>£3,817</b>
<b>Delivery Costs</b>	
20 LHP sessions (time for 3 practitioners)*	£46,432
Lighthouse Supervision (x9, for 20 weeks programme)	£900
<b>Delivery cost per LH group (with 3 practitioners)</b>	<b>£16,637</b>

Notes: \* Cost based on 14.5 hours a week for 20 weeks for 3 practitioners.

Furthermore, data on children’s social care service use during the intervention period was collected for all participants in both arms. Contrary to our expectation that the LPP costs would be offset by a lower number of CSC contacts while parents engage in the intervention, the LPP parents, in fact, had a greater number of contacts with social workers and family support workers, and a greater number of family group conferences or review meetings (see table 13).



**Table 13. Service use during intervention period by treatment allocation**

Group	Contact with Social Workers		Contact with Family Support Workers		Family Group Conferences/ Review Meetings	
	LPP	TAU	LPP	TAU	LPP	TAU
<b>Mean</b>	10.79	7.28	2.98	1.47	2.44	1.92
<b>Min.</b>	0	0	0	0	0	0
<b>Max.</b>	31	24	19	14	9	6



## 5. DISCUSSION

This study was the first randomised control trial evaluating the implementation and efficacy of the Lighthouse Parenting Programme in a Children's Social Care setting.

The study did not observe any statistically significant benefits for LLP parents or children in comparison to those receiving treatment as usual. However, the LPP group appeared to have more parents who improved or deteriorated compared to the TAU group, who showed less change in either direction. This was the case in both primary outcome measures, the CAPI Physical Abuse Score and the child's Social Care Status. This result was not anticipated, and not subject to a pre-specified hypothesis, so it cannot be considered a firm finding from this study alone. The reasons why LPP may apparently induce positive change in some participants, but negative change in others, according to our outcome measures, are not clear. It might be that some families really benefitted from the intervention, while for others, it brought up difficulties that escalated concerns in the immediate follow-up period.

A potentially related finding was that the LPP families appeared to have significantly more CSC attention during the intervention period (more contacts with their social workers, family support workers, and more family group conferences or review meetings). This additional attention, which could be seen as more support and/or more scrutiny, may have confounded the results concerning the children's social care status, as greater scrutiny among the LPP families may have led to heightened detection of child protection concerns. The more intensive input for the LPP group may have also resulted in more frequent changes in their status. This suggestion is confirmed by the fact that the social care status of children of parents in the LPP group were more likely to have changed (both for the better, and for the worse), while children of parents in the TAU group were more likely to have remained on the same social care status.

This study benefits from a number of strengths, including relatively good recruitment and retention rates, successful randomisation, the inclusion of mothers and fathers, and a single-blind design. However, there are also several limitations involving the delivery of the intervention and the implementation of the evaluation, which suggest that these findings be viewed with caution.

### Delivery limitations

#### Fidelity

The assessment of fidelity to the LPP model indicated that 50% of sessions were not delivered 'on model', with qualitative data analysis indicating that it was challenging for social care professionals, without prior therapeutic experience, to deliver the programme 'on model' in an online setting, with groups in which some parents could be challenging to engage. This may have impacted on the evaluation of the impact of the LPP intervention.

#### Eligibility

The need to recruit parents swiftly to the trial meant that some may not have been representative of those who were most likely to benefit. This may have contributed to the mixed attendance rates



and reports from parents, with some reporting that LPP had made a real difference in their parenting and relationships, while others did not engage with the intervention or had mixed feelings about its benefits. Furthermore, some parents may have been motivated by the financial incentive for participation in the research rather than an interest in the intervention itself.

## **Online delivery**

The COVID-19 pandemic required that LPP be delivered online, although it had been developed to be delivered in person. While many parents found the online format to be a positive feature of the programme and reported that it made it accessible for them to join, it also may have negatively impacted engagement in the intervention. For example, participants were easily able to turn off their cameras or leave sessions when they found things difficult, whereas in person, these moments of ‘rupture’ or heightened affect might create opportunities that could bring about therapeutic changes.

## **Social worker delivery**

During the study, LPP was delivered for the first time by newly trained social care practitioners in five of the six groups. As the implementation evaluation showed, the practitioners felt that there was a lot to learn and they were required to apply their learning after a relatively brief and condensed training. The practitioners that were able to deliver the intervention twice in the study felt that they were much better equipped to deliver the intervention to a high standard the second time. Future work should give the intervention facilitators more time to put their learning into practice and develop their skills in delivering the intervention prior to testing it.

Since the completion of the trial, participating local authorities that have continued to provide the intervention outside of the study have been delivering it to families who have been screened for their readiness to make a change and are usually at an ‘earlier stage’ of child protection concern. For families experiencing more acute and complex difficulties, delivery partners reported that they would prefer a model of delivery with social care practitioners co-facilitating with more experienced mental health practitioners (such as clinical psychologists) with more extensive experience in MBT.

## **Conclusion**

LPP could benefit from further testing with more refined delivery processes and eligibility criteria to ensure that the intervention is reaching the families who most need it. The implications of this are discussed further below, both in relation to the limitations of the study and in terms of the recommendations for future work.

## **Study limitations**

### **Insufficient power**

This was a small-scale trial with potentially insufficient power to detect statistically significant changes. In this respect, the achieved sample of 110 participants was 10 shy of the minimum number of 120 specified in the protocol. While comparable samples have achieved statistically





significant positive impacts in similar intervention models, a larger sample would have been ideal. Further research is therefore needed before firm conclusions can be made regarding the impact of the intervention in this setting.

## **Lack of longer-term follow-up**

This study considered short-term outcomes only. Parental outcomes were assessed when the intervention ended (8–10 months post-randomisation) and children’s social care status was assessed at 12 months post-randomisation. In hindsight, this may not have provided parents with sufficient opportunity to ‘put into practice’ the full learning of the intervention.

## **Generalisability**

Almost all study participants were White British and low income, and many were long-term unemployed. While the sample is fairly representative of the families open to children’s social care in the study sites, this may not be representative nationally. Four of the five local authorities were in the south-west of England and geographically very close to each other, further limiting diversity in the sample of families and the services around them.

## **External validity**

As this was a randomised controlled trial, tight inclusion and exclusion criteria and screening and referral processes were in place. While this reduced selection bias and confounding variables, the external validity of the study is limited. In usual practice, social care staff would take time and care to refer parents to interventions based on their individual circumstances, and only when they are ready and able to make use of the programme. This means that some families referred into the study may not have been ready to engage with the LPP, and some families who may have benefitted from the intervention might have been excluded from the trial. This is a common limitation in efficacy trials.

## **Recommendations and next steps**

The results of both the impact and implementation elements of the study have provided useful data that informs the next steps. The recommendations for future work have been developed in consultation with the delivery partners in the participating local authorities and two Experts by Experience who have provided their expertise throughout the study.

- Further evaluation of the evidence for the LPP is needed and seems warranted. However, we would recommend that a further study should consider the following:
  - A review of the inclusion and exclusion criteria based on the learning from this study. Many stakeholders reported that this model of implementation and delivery by CSC practitioners would be well suited in early help (Child in Need or below) settings rather than for families who have very complex needs and who are experiencing crises that led to child protection plans being put in place. Families and practitioners were better able to make the most of the programme when it was delivered at a time when there was less chaos or stress in families’ lives.
  - If further impact evaluation is undertaken, future research should evaluate the intervention following a longer period of training and learning-by-experience for the practitioners. Any



study of the evidence should evaluate the impact that intervention is likely to have after an initial period of embedding it in the service. The practitioners who have delivered subsequent groups reported feeling much more confident in their skills after the initial group delivery.

- A longer follow-up period with a more suitable endpoint than the end of intervention is needed.
- Further adaptations of the LPP itself may be needed, so that it is more suitable as an intervention in a CSC context. These may include:
  - Greater attention to how the training itself needs to be adapted for practitioners in a CSC context, perhaps through further co-production work.
  - Clarity with CSC managers about what level of commitment and support may be needed to enable frontline practitioners to deliver the LPP.
  - A model of co-delivery with CSC practitioners together with qualified psychologists or psychotherapists may be more appropriate for caregivers with more complex mental health difficulties.
- Further research could develop better understanding of implementation issues, in order to better prepare for any future impact evaluation. This would include further examination of what the barriers and facilitators to implementation are, and what contexts best support delivery of the LPP. This would include attention to selection and suitability of families, including capacity to engage in a group programme, practical support to enable attendance and/or preliminary exploration of attitudes to working in an in-person or online setting.
- Future implementation and research with the LPP should be co-developed with service users. Adequate time for co-development should be built into any future programme. This would be valuable for responding to some of the questions that arose from this study, such as the most suitable target groups, and the relative strengths and limitations of online versus in-person delivery.

Future power calculations should take into account the challenges we experienced in recruiting eligible participants into the study. Based upon the power calculations in the protocol, the 110 achieved was small, and may have been inadequate to observe a statistically significant finding. Future power calculations may want to accommodate these challenges, as well as assumptions around the anticipated effect size.

Since the end of the delivery phase of the project, most partner local authorities have been continuing the work that was started as part of this project. Almost all of them reported seeing a lasting impact of embedding this approach in their service. The LAs are either continuing to run LPP groups or outreach individual MBT work (known as the 'Lightship' model) or are considering ways that some further work could be feasible and most appropriate. More practitioners in these sites have been trained, and top-up training and supervision has been provided and embedded as usual practice in some LAs. This implementation work provides a further context for learning and evaluation. Any further evaluation or implementation of the Lighthouse Parenting Programme can be informed by this extended experience of tailoring the programme to the CSC context.



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# APPENDIX

## Appendix A: Additional tables

**Table A1. CAPI Physical Abuse Scale: Overview of ITT, sensitivity and per protocol analysis results**

	N (TAU)	N (LH)	Coef	SE	95 % CI		p
<b>Intention-to-treat, complete cases</b>	39	40	-9.27	17.98	(-52.63,	34.09)	0.623
<b>Mean imputation + missing indicator</b>	39	41	-9.27	17.98	(-52.63,	34.09)	0.623
<b>Per protocol (lax)</b>	39	28	-7.56	20.18	(-58.80,	43.67)	0.723
<b>Per protocol (strict)</b>	39	19	-21.59	26.08	(-92.85,	49.68)	0.453

**Table A2. Social care status of participants' designated 'target child', by time and group**

	Care Status Category	TAU		Lighthouse	
		Number	Per cent	Number	Per cent
<b>T1 (Baseline)</b>	Closed to Social Care	7	15%	3	6%
	Child in Need Plan	22	46%	23	43%
	Child Protection Plan	16	33%	22	42%
	PLO Proceedings	3	6%	1	2%
	Care Proceedings	0	0%	1	2%
	Child Looked After	0	0%	3	6%
	Total	48	100%	53	100%
<b>T2 (end of treatment)</b>	Closed to Social Care	24	50%	16	30%
	Child in Need Plan	13	27%	12	23%
	Child Protection Plan	7	15%	12	23%
	PLO Proceedings	1	2%	5	9%
	Care Proceedings	0	0%	0	0%
	Child Looked After	3	6%	8	15%



	Total	48	100%	53	100%
<b>T3 (12-month follow-up)</b>	Closed to Social Care	30	62%	28	53%
	Child in Need Plan	6	12%	9	17%
	Child Protection Plan	8	17%	9	17%
	PLO Proceedings	1	2%	0	0%
	Care Proceedings	1	2%	0	0%
	Child Looked After	2	4%	7	13%
	Total	48	100%	53	100%

**Table A3. Social care status at 12-month follow-up: Overview of ITT and per protocol analysis results**

		<b>Social care status at 12 months vs baseline:</b>										
		Less severe (vs no change)					More severe (vs no change)				Overall	
	N (TAU)	N (LH)	RRR	(95 % CI)		p	RRR	(95 % CI)		p	LRT (2 df)	P
<b>ITT</b>	48	53	2.22	(0.63	8.29	0.22	1.96	(0.75,	5.36)	0.178	2.29	0.335
<b>PP (lax)</b>	48	35	1.43	(0.32	6.26	0.63	1.70	(0.60	5.16)	0.326	0.99	0.610
<b>PP (strict)</b>	48	25	1.50	(0.24	8.80	0.65	2.33	(0.70	9.26)	0.188	1.97	0.373

Note: RRR: Relative risk ratio, Lighthouse vs TAU; LRT: Likelihood ratio test of no overall difference between Lighthouse and TAU; CI: Confidence interval (profile likelihood); ITT: Intention-to-treat; PP: per protocol; TAU: Treatment as usual; LH: Lighthouse.





**Table A4. Descriptives of numerical secondary outcome measures**

Measure	Time	Group	Mean	SD	Min	1st quartile	Median	3rd quartile	Max	N	Missing	Response rate
<b>CAPI Abuse</b>	<b>T1</b>	<b>LPP</b>	248.6	96.8	22	168.5	260	326	391	55	2	96%
		<b>TAU</b>	238.5	99.8	41	150.5	260.5	317	429	52	1	98%
	<b>T2</b>	<b>LPP</b>	219.2	91	49	152	217	282	411	41	16	72%
		<b>TAU</b>	213.2	111.4	40	98.5	218	308.5	400	39	14	74%
<b>PSI Total Stress</b>	<b>T1</b>	<b>LPP</b>	79.3	19.1	20	68	81	96.5	100	47	10	82%
		<b>TAU</b>	73.2	23.2	0	64.2	77	89.8	100	50	3	94%
	<b>T2</b>	<b>LPP</b>	71.5	22	28	56.5	73	92.5	100	35	22	61%
		<b>TAU</b>	75.6	22.1	10	59	79	94.2	100	32	21	60%
<b>PDI RF</b>	<b>T1</b>	<b>LPP</b>	3.4	1.1	1	3	3	4	6	54	3	95%
		<b>TAU</b>	3.7	1.5	0	3	4	5	7	49	4	92%
	<b>T2</b>	<b>LPP</b>	2.9	1	0	2	3	3	5	37	20	65%
		<b>TAU</b>	3.3	1.2	1	2.5	3	4	7	31	22	58%
<b>PDI ARR</b>	<b>T1</b>	<b>LPP</b>	27.1	6.9	15	21.2	27	32.8	43	54	3	95%
		<b>TAU</b>	26.5	6.6	13	22	26	31	43	49	4	92%
	<b>T2</b>	<b>LPP</b>	26.9	5.9	15	23	27	30	41	37	20	65%
		<b>TAU</b>	27.3	5.9	18	23	26	32	40	31	22	58%
<b>Epistemic Trust</b>	<b>T1</b>	<b>LPP</b>	5.1	1.1	2.2	4.4	5.2	6	7	55	2	96%
		<b>TAU</b>	5.1	1.2	1	4.4	5.3	5.8	7	52	1	98%
	<b>T2</b>	<b>LPP</b>	5.2	1.2	1.4	5	5.4	5.8	7	38	19	67%
		<b>TAU</b>	5.4	0.9	3.4	4.8	5.5	6	6.8	38	15	72%
<b>Epistemic Mistrust</b>	<b>T1</b>	<b>LPP</b>	4.8	1	2.4	4	4.8	5.6	6.8	55	2	96%
		<b>TAU</b>	4.7	1	1.8	4.2	4.8	5.4	6.8	52	1	98%
	<b>T2</b>	<b>LPP</b>	4.7	1	2.4	4.2	4.4	5	7	38	19	67%
		<b>TAU</b>	4.4	0.9	2.4	3.7	4.5	5.2	6	38	15	72%
	<b>T1</b>	<b>LPP</b>	4.1	1.4	2	3.1	4	5	7	55	2	96%



<b>Epistemic Credulity</b>		<b>TAU</b>	4.1	1.2	1.4	3.2	4.3	5.2	5.8	52	1	98%
	<b>T2</b>	<b>LPP</b>	4	1.2	1.8	3.2	4	4.6	6.4	38	19	67%
		<b>TAU</b>	3.9	1.2	1.6	3	4	5	6.4	38	15	72%
<b>SDQ Total Difficulties</b>	<b>T1</b>	<b>LPP</b>	18.4	7.6	4	13.5	18	23	36	47	10	82%
		<b>TAU</b>	17.1	7.5	2	10.5	17.5	22.8	32	46	7	87%
	<b>T2</b>	<b>LPP</b>	16.5	8.4	3	9	17	23	34	35	22	61%
		<b>TAU</b>	16.9	7.4	2	13	16	21	36	35	18	66%



**Table A5. Estimates from a partially clustered mixed effects model of CAPI Physical Abuse score at follow-up (n=79). Primary ITT model, including a random effect for Family**

	Coef	SE
Lighthouse (vs TAU)	-9.27	17.98
CAPI baseline	0.74	0.09
Key child age (years)	-0.19	2.16
Site (ref: 1)		
2	-37.65	34.62
3	-57.71	32.59
4	-11.58	34.99
5	-33.03	29.79
Intercept	76.93	34.68
<b>Random effects</b>	<b>Variance</b>	
Lighthouse Group	0.00	
Family	0.00	
Residuals (Lighthouse)	7237.57	
Residuals (TAU)	4359.12	

Notes: Coef: regression coefficient; SE: standard error.  
The model allows for heteroscedastic residuals, hence there are separate residual variance estimates for the Lighthouse group and the TAU group.

**Table A6. Estimated standardised effect sizes and 95% confidence intervals for numeric outcomes (ITT models)**

	Stand. Effect	(95 % CI)		Direction of estimate favours
CAPI	0.09	(-0.25,	0.46)	LH
PSI	0.25	(-0.19,	0.63)	LH
ETMCQ: TRUST	-0.13	(-0.67,	0.29)	TaU
ETMCQ: MISTRUST	-0.15	(-0.47,	0.27)	TaU
ETMCQ: CREDULITY	0.21	(-0.18,	0.54)	LH
SDQ	0.05	(-0.44,	0.42)	LH
PDI: RF	-0.20	(-0.64,	0.21)	TaU



<b>PDI: ARR</b>	0.10	(-0.27,	0.49)	LH
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Notes: Stand. Effect: Standardised effect size estimate. Standardised effects are directed such that a positive number indicates a result that favours the intervention (Lighthouse).

CI: confidence interval (estimated by bias-corrected and accelerated bootstrap with 2,000 replications).

**Table A7. Distribution of child age, participant age, and CAPI baseline score by treatment group and whether the participant was included in the primary ITT outcome analysis of the CAPI Physical Abuse Score**

Included in primary analysis?		Missing		Included	
Group		TAU	LPP	TaU	LPP
Child age	Mean	7.0	7.5	7.6	5.9
	SD	3.9	4.5	3.7	4.6
Participant age	Mean	31.4	34.5	34.6	31.3
	SD	6.9	7.2	8.5	8.8
CAPI baseline score	Mean	263.2	233.1	230.3	254.5
	SD	79.4	115.5	105.4	89.8
Total		14	17	39	40

**Table A8. Distribution of participant sex by treatment group and whether the participant was included in the primary ITT outcome analysis of the CAPI Physical Abuse Score**

Included in primary analysis?		Missing		Included	
Sex		TAU	LPP	TAU	LPP
Female		12	16	27	32
		86%	94%	69%	80%
Male		2	1	11	8
		14%	6%	28%	20%
Non-binary		0	0	1	0
		0%	0%	3%	0%
Total		14	17	39	40

**Table A9. Distribution of household income by treatment group and whether the participant was included in the primary ITT outcome analysis of the CAPI Physical Abuse Score**

Included in primary analysis?		Missing		Included	
Household income		TAU	LPP	TAU	LPP
Missing		2	0	2	3
		14%	0%	5%	8%
Less than £10,000		4	6	9	9
		29%	35%	23%	22%



£10,000 or more	8	11	28	28
	57%	65%	72%	70%
Total	14	17	39	40

**Table A10. Distribution of single parenthood by treatment group and whether the participant was included in the primary ITT outcome analysis of the CAPI Physical Abuse Score**

Included in primary analysis? Relationship status	Missing		Included	
	TAU	LPP	Group	TAU
Single parent	12	13	22	26
	86%	76%	56%	65%
Lives with partner	2	4	17	14
	14%	24%	44%	35%
Total	14	17	39	40

**Table A11. Distribution of baseline child social care status by treatment group and whether the participant was included in the primary ITT outcome analysis of the CAPI Physical Abuse Score**

Included in primary analysis? Care Status	Missing		Included	
	TAU	LPP	Group	TAU
Child in Need or closed to social care	11	9	20	17
	79%	53%	51%	42%
Child Protection Plan or more severe status	3	8	19	23
	21%	47%	49%	58%
Total	14	17	39	40

**Table A12. Estimates from a partially clustered mixed effects model of CAPI Physical Abuse score at follow-up (n=79)**

	Coef	SE	(95 % C.I.)	
<b>Lighthouse (vs TAU)</b>	-7.64	18.11	(-53.66,	38.38)
<b>CAPI baseline</b>	0.71	0.09	(0.53,	0.89)
<b>Key child age (years)</b>	-0.21	2.42	(-4.98,	4.56)
<b>Site (ref: 1)</b>				
<b>2</b>	-35.61	35.48	(-108.60,	37.39)
<b>3</b>	-46.12	33.52	(-115.39,	23.15)
<b>4</b>	4.29	35.90	(-69.57,	78.14)
<b>5</b>	-15.94	32.02	(-81.45,	49.57)
<b>Child's baseline social care status (ref: CiN or lower)</b>				



<b>CPP or higher</b>	-22.00	19.79	(-61.09,	17.09)
<b>Participant age</b>	-0.18	1.14	(-2.52,	2.15)
<b>Sex (ref: Female or non-binary)</b>				
<b>Male</b>	-28.88	22.61	(-73.45,	15.69)
<b>Partnership status (ref: lives with partner)</b>				
<b>Single parent</b>	-19.25	20.16	(-59.50,	21.00)
<b>Income (ref: less than £10,000)</b>				
<b>£10,000 or greater</b>	-32.55	21.54	(-75.13,	10.03)
<b>Missing</b>	-54.12	40.19	(-133.45,	25.21)
<b>Intercept</b>	133.16	52.79	(28.66,	237.66)
<b>Random effects</b>	<b>Variance</b>			
<b>Lighthouse group</b>	0.00			
<b>Residuals (Lighthouse)</b>	4160.81			
<b>Residuals (TAU)</b>	7359.13			

Notes: Coef: regression coefficient; SE: standard error; CI: confidence interval; df: degrees of freedom; ICC: intraclass correlation coefficient; CiN: Child in Need; CPP: Child Protection Plan.

Degrees of freedom were estimated using the Satterthwaite correction.

The model allows for heteroscedastic residuals, hence there are separate residual variance estimates for the Lighthouse group and the TAU group.