

*Clinical outcomes and cost-effectiveness of brief guided parent-delivered cognitive behavioural therapy and solution-focused brief therapy for treatment of childhood anxiety disorders: a randomised controlled trial*

Article

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## TITLE PAGE

Title: A randomised controlled trial of Brief Guided Parent-delivered Cognitive Behaviour Therapy and Solution Focused Brief Therapy for the treatment of child anxiety disorders: Clinical outcome and cost-effectiveness

Brief title: Brief treatments for child anxiety disorders

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## ABSTRACT

*Background*—Half of lifetime anxiety disorders emerge before 12 years of age, however access to evidence-based psychological therapies for affected children is poor. This Randomised Controlled Trial (RCT) compared the clinical outcome and cost-effectiveness of two brief psychological treatments for anxious children referred to routine child mental health settings.

*Methods*—Children (5-12 years) referred to Primary Child and Mental Health Services across Oxfordshire, UK, for anxiety difficulties were randomly allocated (1:1) to brief Guided Parent-Delivered Cognitive Behavior Therapy (GPD-CBT) or Solution Focused Brief Therapy (SFBT). The primary outcome was Clinical Global Impressions of Improvement (CGI-I). Secondary outcomes were absence of primary anxiety diagnosis and all anxiety disorder diagnoses, self- and parent-reported anxiety symptoms and interference. Parents recorded patient level resource use. Quality Adjusted Life Years (QALYs) were derived from the CHU9D. Assessments were conducted pre-, post- (primary endpoint), and 6- months after treatment.

*Findings*—136 patients were assigned to GPD-CBT (n=68) or SFBT (n=68). Analyses were conducted with the intent to treat population. No significant differences were observed on any clinical (CGI-I; Relative Risk (RR) = 1.01 (0.86, 1.19),  $p = 0.95$ ) or economic (QALY mean difference = 0.006 (-0.009- 0.02),  $p = 0.42$ ) outcome measure. However, the GPD-CBT treatment was associated with lower costs (mean difference: -£448; 95% CI: -£934, £37;  $p=0.070$ ).

*Interpretation*— There was no evidence of clinical superiority, however brief GPD-CBT is likely to be a cost-effective alternative to brief psychological treatment (SFBT) and could be considered as a first-line treatment for children with anxiety problems.

Words: 250

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## INTRODUCTION

Anxiety disorders are among the most common mental health disorders and, due to their high prevalence, persistence and associated impairment, have a greater economic burden than any other mental health condition.<sup>1</sup> Half of all lifetime cases emerge before the age of 11 years.<sup>2</sup> Effective treatments for anxiety disorders in children exist,<sup>3</sup> however less than one third of children with an anxiety disorder access professional help.<sup>4</sup> Both parental preferences<sup>5</sup> and treatment side-effect profiles<sup>6</sup> indicate the use of psychological treatments as the first-line treatment yet evidence-based psychological treatments are typically lengthy (e.g. 14-16 hour-long sessions)<sup>4</sup> and evaluations have predominantly been conducted in specialist settings. Cost-effective psychological treatments suitable for routine clinical practice are required.

Systematic evaluations of psychological interventions for childhood anxiety disorders have been limited to Cognitive Behaviour Therapy (CBT).<sup>7</sup> While there is good evidence for efficacy in comparison to wait-list controls, few studies have compared CBT to an active comparator and where this has been done the comparison has most commonly been an attention-control condition rather than an established treatment.<sup>3</sup> CBT can be effectively delivered in a brief form, where parents are supported in applying CBT principles. This approach is superior to a wait-list comparison<sup>8</sup> with similar outcomes to CBT delivered in a more intensive traditional form.<sup>9</sup> Indeed, brief Guided Parent-Delivered CBT may be a cost-effective first-line treatment for childhood anxiety disorders. It remains unclear, however, whether it would be superior to a credible, alternative, brief psychological treatment. A randomised clinical trial was therefore conducted, in routine UK National Health Service (NHS) settings, to compare the effectiveness and cost-effectiveness of two brief psychological treatments for childhood anxiety, Guided Parent-Delivered CBT (GPD-CBT) and Solution Focused Brief Therapy (SFBT). SFBT was



selected as the comparator as it is widely used in National Health Service (NHS) mental health settings in which only a limited number of sessions can be provided. Although it has not been evaluated with children with anxiety disorders specifically, our consultations revealed that it was the most commonly used approach for working with children with a range of difficulties, including anxiety, in the NHS services participating in this trial.

## METHOD

### Approvals

This study was approved by the University of Reading (12/02) and Oxford Health NHS Foundation Trust (11/SC/0472) Research Ethics Committees.

### Participants

Children were recruited between March 2012 and March 2014 from referrals to four NHS Primary Child and Adolescent Mental Health Services across Oxfordshire, UK. Families were invited to participate if they met the following criteria: (i) child aged 5 to 12 years; (ii) child's primary presenting problem was anxiety associated with clinical impairment. Exclusion criteria were: (i) child prescribed psychotropic medication, (ii) parent or child had limited understanding of English, or (iii) parent or child had a physical or intellectual impairment (including autistic spectrum disorder) that would interfere with their ability to participate in assessments or treatment. Meeting diagnostic criteria for an anxiety disorder was not an inclusion criteria as we

wanted to include all children referred for anxiety related problems but 90% of participants met criteria for a diagnosis of current anxiety disorder.

#### Randomisation and concealment of allocation

Baseline assessments were conducted as part of routine clinical assessments prior to randomisation. Eligible children and their parents /main carers were invited to participate. Parents provided written consent and children written assent prior to randomisation. The researcher who enrolled participants then informed the study clinical supervisor, who was independent of the recruitment process, who allocated participants to trial arms, informed families and allocated clinicians. Participants were randomly allocated to trial arm using a secure online minimisation tool developed by a researcher with no clinical involvement in the trial. The tool was developed to balance the two treatment groups for child age (in months), gender (male/female), anxiety severity (ADIS Clinician Severity Rating; mild, moderate, severe), and level of parental anxiety (DASS-21; mild, moderate, severe).<sup>10</sup> The minimisation algorithm operated on the basis of 80% minimisation and 20% random allocation. However the first 9 patients were all allocated randomly to ensure that the algorithm was not predictable to research staff. To ensure appropriate allocation concealment, the allocation sequence was retained on the secure online minimisation programme which was only accessible to the PI and the clinical supervisor who allocated participants to clinicians. The allocation sequence was not accessible to the researcher enrolling participants to the trial or to study assessors. The trial adhered to procedures to maintain separation between research staff that took outcome measurements and clinical staff that delivered the intervention. Research staff who obtained outcome measurements

were not informed of the treatment arm assignment. Clinical staff who delivered the intervention did not take outcome measurements.

#### Treatment conditions

Families in both treatment arms received approximately 5 hours of treatment which were audio recorded to allow for checks of treatment adherence.

#### Brief Guided Parent-Delivered CBT (GPD-CBT).

As in previous studies,<sup>8,11</sup> parents were given a self-help book<sup>12</sup> and received up to 8 weekly sessions of therapist supported GPD-CBT (5 hours total contact). Four of these were conducted face-to-face (approximately 45 minutes) and four were brief, telephone reviews (approximately 15 minutes). The treatment focused on psychoeducation about child anxiety, identifying and testing anxious thoughts, graded exposure, and problem solving. Parents completed homework tasks between sessions, both independently and with their child. The therapists followed a treatment manual specific to this programme<sup>13</sup> which instructed them in how to support and encourage parents to work through the self-help book, rehearse skills and problem solve any difficulties that arose. .

#### Solution Focused Brief Therapy (SFBT)

SFBT is a form of counselling that is future-focused and works with the strengths and resources of the individual to build solutions. The delivery format was based on usual practice within the participating services and consultations with an expert advisor from BRIEF (a leading international centre for SFBT training). SFBT comprised an initial face-to-face session with the parent and child to initiate treatment (60 minutes), four face-to-face sessions of solution-focused brief therapy with the child (4 x 45 minutes), and a final session with the child and parent (60 minutes) (5 hours total contact). Therapists followed a manualised approach adapted from 'Briefer: A solution focused practice manual' and was consistent with the European Brief Therapy Association practice definition.<sup>14</sup>

#### Outcome measures

The assessment points were baseline (pre-randomization), post-treatment (primary end-point; June 2012-September 2014), and 6 months after treatment completion (November 2012-December 2014). Timing of assessments did not differ significantly between arms. Assessments were typically conducted in participants' homes (unless, as on rare occasions, this was not possible/wanted and an alternative venue, e.g. school, was organised). Data collection was in pen and paper form and was initially entered in to SPSS datasheets (SPSS Version 22).

#### Primary clinical outcome

##### Clinician rated recovery

The primary indicator of recovery was that the child's difficulties were 'much' or 'very much' improved on the basis of Clinical Global Impression of Improvement (CGI-I)<sup>15</sup> as determined by independent assessors (reliability mean Kappa= .92 (.86-1.0)). The CGI-I was established on the basis of the parent and child report on the Anxiety Disorders Interview Schedule (ADIS-c/p)<sup>16</sup> which assesses the frequency and severity of symptoms of DSM-IV anxiety disorders and associated interference. The ADIS-c/p has not been validated in a child report form with children below 7 years old, so parents of children aged 5 and 6 years completed the full ADIS and children were administered a brief version. Inter-rater reliability for anxiety disorder diagnoses on the ADIS-c/p was high (Kappa=.86 (.75-.98)).

#### Secondary clinical outcome measures

Clinical Severity Ratings (CSR) from the ADIS-C/P (Inter-rater reliability: ICC =.91 (.79-1.0)), and parent and child report questionnaires of anxiety symptoms and interference. Symptoms of anxiety were assessed among children from 7 years with the Spence Children's Anxiety Scale (SCAS-c/p),<sup>17</sup> a parent and child-report questionnaire validated with children of this age.<sup>18,19</sup> All children completed the Koala Fear Questionnaire which has been validated with children from 4 years.<sup>20</sup> Interference associated with anxiety within school, social, and home/family domains was assessed with the Child Anxiety Impact Scales (CAIS-C/P).<sup>21,22</sup> The CAIS-C was used with children from 7 years of age; we removed two items about dating that are not typically applicable at this age.

For the subgroup of children who met diagnostic criteria for a current anxiety disorder (n = 122; 90%), the following dichotomous outcomes were also examined: recovery from primary anxiety disorder and recovery from all anxiety disorders as assessed by the ADIS-c/p.

#### Resource use/costs and quality of life

A societal perspective for costs was adopted. Treatment-related health care and other patient level resource use data were collected over three separate time periods (3 months before baseline assessment, baseline to post-treatment, post-treatment to 6-month follow up) on a modified Client Service Receipt Inventory form<sup>23</sup> using parent-report patient-health diaries. These included all health, social care, non-NHS (e.g. educational) cost-generating services, and lost leisure and productivity time estimates for parents.

Child quality of life was assessed using the CHU-9D,<sup>24</sup> a pediatric generic preference based measure of health-related quality of life, completed by children and their main caregiver. Preference weights for the CHU-9D valuation were obtained from a UK general population sample.<sup>24</sup> The EQ-5D-Y<sup>25</sup> was used in sensitivity analyses. Both measures allow calculation of quality adjusted life years (QALYs) for use in cost utility analysis.

#### Therapist training and treatment fidelity

The 19 therapists were Primary Mental Health Workers employed within participating services with a range of backgrounds, including health visiting, nursing, occupational therapy, social and youth work, clinical psychology and psychology graduate; and with varying degrees of

experience in working with parents and children (none to several years). Before delivering treatment 17/19 therapists reported that they used SFBT and 19/19 used CBT at least 'sometimes'. Therapists varied in whom they typically worked with in their routine practice with children with anxiety problems (Work with children/ parents/ both: 17/28/11% sometimes, 44/50/61% frequently, 39/22/28% always).

Therapists received two days of training in each treatment approach and fortnightly supervision throughout the trial. They were each allocated to deliver one treatment for the first half and the other treatment for the second half of the trial (with training before each treatment phase).

Participants were allocated for treatment with the next available clinician who was assigned to the appropriate treatment within their locality team. Recordings of a random sample of 52 treatment sessions were rated for treatment adherence by raters blind to treatment arm. Session content was clearly differentiated with GPD-CBT having more 'GPD-CBT allowable' content than SFBT ( $t(50)=16.88, p<.0001$ ) and SFBT having more 'SFBT allowable' content than GPD-CBT ( $t(50)=22.31, p<.0001$ ).

#### Role of the funding source

The study funders reviewed the study proposal, awarded funding and monitored the conduct of the study. The funders did not have a role in the study design, collection, analysis, and interpretation of data, the writing of the report, or in the decision to submit the paper for publication.

## Power analysis

Likely outcomes for CGI-I were not available for SFBT for childhood anxiety so the study was powered on the basis of (i) a two-thirds difference in the proportion of recovered children, as this could be considered justification for service changes required to adopt a new approach; (ii) a meta-analysis of mixed outcomes of SFBT<sup>26</sup> reported an effect size of .26 for internalising problems (including anxiety) compared to .52 in feasibility work using GPD-CBT.<sup>11</sup> A sample size of 136 provides 80% power to detect either difference at the 5% significance level.

## Data analysis

### Clinical outcomes

A full data analysis plan was produced and signed off by the statistician (HF) and PI (CC) prior to data-lock. The analyses were conducted on a complete case basis on unblinded data. Analyses were intention-to-treat (ITT) using all 136 randomly assigned participants. For primary and secondary analyses mixed models were fitted to each outcome including the fixed effects: treatment, time-point (categorical: pre, post, 6 mths), treatment-time-point interaction, child's gender, age, primary disorder type, and parental anxiety level (at the minimisation stage). For the primary analysis (CGI-I) a log-binomial mixed model was fitted including the additional fixed effect baseline severity of child's primary anxiety disorder (ADIS CSR). Linear mixed models were fitted for the continuous secondary analyses which also included the fixed effect baseline total score for the endpoint being analysed. The baseline severity of the child's primary anxiety disorder was not included in the analysis due to its high correlation with the baseline total score of the endpoints being analysed. Additional analyses were conducted to model the binary



outcomes: free from primary diagnosis, and free from all anxiety diagnoses. The same underlying model as the primary CGI-I analysis was fitted to these endpoints. Repeated measurements were taken into account by including a random child effect in all models. Relative risks or differences were estimated to compare categorical fixed effects. Parameter estimates were obtained for continuous fixed effects. Confidence intervals at the 95% level were calculated for all estimates. Significance levels were set to 5% (two-sided).

Lack of convergence in the generalised mixed models for CGI-I, ‘free from primary’, and ‘free from all diagnoses’ resulted in the fixed effects of child’s type of primary disorder, baseline severity of the child’s primary anxiety disorder, and parental anxiety level, being removed from these models. The fixed effect gender was also removed from the model of ‘free from primary diagnosis’.

One child randomised to SFBT received GPD-CBT in error; as such the analysis was repeated on the treatment received populations resulting in no changes in the overall conclusions.

Analyses of clinical outcomes were conducted using SAS software Version 9.3.

#### Health economic outcomes

The base-case economic evaluation adopted a cost-utility analysis (CUA) framework to assess the cost-effectiveness of GPD-CBT compared to SFBT from a societal perspective. Current best-practice methods for conducting and reporting economic evaluation alongside trials<sup>27</sup> were followed. Costs were expressed in Pounds Sterling (£) in 2013/14 prices. Due to the short time frame of the trial and follow-up, discounting was not applied to costs or effects. An ITT approach was adopted in the base-case analysis. Missing data on resource use and health

outcomes were imputed using mean imputation for missing values considered highly deterministic (e.g., face-to-face therapists contact), and multiple imputation for other resources (e.g., use of medications), under the assumption of missing at random.<sup>28</sup> For each trial participant, all components of treatment costs, stratified by category of resource use and other wider societal costs (educational services, travel costs, time off school and - for the main caregiver- time off work) were computed by multiplying units of resource use by their unit costs (see Supplementary Material 1). These were then summed to obtain a total cost for each patient. [A deviation from the original protocol was that, ‘days off school’ were considered a consequence rather than an outcome and were included in the costs part of the economic analysis, in line with relevant economic literature].<sup>29</sup> Effects were identified and measured using QALYs, derived from the CHU9D child-report in the base-case analysis. Incremental costs, incremental effects, and the associated 95% confidence intervals (CIs) were estimated comparing the two intervention arms. Incremental cost-effectiveness ratios (ICERs) were estimated and reported where relevant. Uncertainty in the cost-effectiveness results was analysed using cost-effectiveness acceptability curves (CEACs), over a range of potential threshold values that the health system may be willing to pay for an additional QALY gained.<sup>30</sup> Furthermore, nine sensitivity analyses (SA) were undertaken to examine robustness of the base-case analysis results, as shown in Supplementary Material 2. A cost-effectiveness analysis using the main clinical outcome CGI-I (percentage of ‘CGI-I much/very much improved’ children) was also performed.

All analyses of economic outcomes were conducted using STATA software version 13.1.

## RESULTS

136 children were randomized to either GPD-CBT or SFBT. Figure 1 depicts the patient flow chart and Table 1 summarises baseline clinical and demographic characteristics. Supplementary Material 4 shows the time lags between study time points.

### Adverse effects

No treatment- or trial-related adverse events were reported in either group.

### Primary outcome

In the ITT population comparison of treatment arms, there was no significant difference between treatment for the primary outcome measure of Clinical Global Impressions of Improvement across both time-points (CGI-I; RR = 1.01 (0.86, 1.19),  $p = 0.95$ ; see Table 2 and 3) with 59% of children in the GPD-CBT arm and 69% of children in the SFBT arm ‘much’ or ‘very much’ improved at the primary end-point (post-treatment) and 66% and 72% at the follow-up assessment.

### Secondary outcomes

There were no significant differences between treatments for any of the continuous secondary outcomes, however there were significant reductions over time for all secondary endpoints (with the exception of the CAIS-c), see Table 2 and 3.

## Health economic outcomes

### All participants

There was not a significant difference in QALYs gained over the trial period between the GPD-CBT and SFBT arms in the base-case analysis (mean difference (md): 0.006; 95% CI: -0.009, 0.02;  $p = 0.42$ ). The mean societal cost for children was £1494 (standard error (se) = 143.34) and £1942 (se = 198.99) for the GPD-CBT and SFBT arms, respectively, representing a cost saving of £448 (95% CI: -£934, £37;  $p = 0.070$ ) in favour of the GPD-CBT arm. The main cost-saving drivers were treatment costs (md = -£133; 95% CI = -£204, -£63;  $p < 0.0001$ ), other child and parent health, social care and non-health care costs (md = -£142; 95% CI = -£541, £257  $p = 0.48$ ), and time off school/work/leisure time for children and parents (md = -£200; 95% CI = -£386, -£13;  $p = 0.036$ ). In particular, despite the fact that both treatments lasted a similar time, cost-savings occurred in the therapists' travel costs associated with the treatment delivery, both in terms of opportunity cost of their time (i.e. time that they could have spent in other activities), mileage cost, and time spent in administrative tasks, with cost savings per child of £66 (95% CI: -£93, -£39;  $p < 0.0001$ ), £37 (95% CI: -£53, -£20;  $p < 0.0001$ ), and £13 (95% CI: -£20, -£7;  $p < 0.0001$ ) respectively, in favour of the GPD-CBT arm. (Detailed results on QALYs and costs available from the authors). Results of incremental analyses of the GPD-CBT treatment compared with the SFBT control are summarized in Supplementary Material 2 for the base-case and the nine sensitivity analyses.

Taking sampling uncertainty into consideration, the CEAC for the base-case analysis shown in Supplementary Material 3 reveals that, given the joint distribution of costs and effects, the probability that GPD-CBT is cost-effective in comparison with SFBT is around 96%, given

current UK National Institute for Health and Care Excellence thresholds for accepted levels of willingness to pay for an extra QALY (usually between £20,000 and £30,000). Sensitivity analyses supported this finding with probability of GPD-CBT being a cost-effective alternative to standard practice ranging from 74% to 99%.

When GPD-CBT was compared to SFBT in terms of the societal costs per extra ‘CGI-I much/very much improved’ child (effect md: -0.008; 95% CI: -0.160, 0.144;  $p=0.92$ ); cost md: -£448; 95% CI: -£934, £37;  $p=0.070$ ), the CEAC, which accounts for sampling uncertainty, indicated (detailed values available from the authors) that if the NHS and society were willing to pay £1000 per extra ‘CGI-I much/very much improved’ child, the probability that GPD-CBT is cost-effective compared to SFBT would be 96%, and would still be 83% and 57% for willingness to pay of £5000 and £20000, respectively. However, the maximum threshold value that society is willing to pay for an extra ‘CGI-I much/very much improved’ child is unknown.

## DISCUSSION

Treatment outcomes for children with anxiety disorders did not differ significantly according to whether they received brief Guided Parent-Delivered CBT or Solution Focused Brief Therapy. However, when a societal based cost-effectiveness analysis was conducted, GPD-CBT was found to be likely to represent a cost-effective use of resources compared with SFBT. Despite the actual time spent delivering treatment being similar across the two treatment arms, cost savings were found across all resource categories, particularly in travel costs because of the ability to conduct phone-based review sessions with parents in GPD-CBT. The differences in

administrative costs were unexpected. Future studies are needed to see if different ways of delivering these two treatments would lead to different cost results.

Given the brevity of both treatments it is striking that the outcomes were similar to those achieved following more intensive (child-focused) CBT approaches. For example, in the large multi-centre CAMS trial, 60% of children were ‘Much’/‘Very much improved’ after 14 hour-long sessions of CBT and 72% at 6 month follow-up,<sup>31</sup> very similar to the rates in the current trial. It is also important to note, that significant improvements were made between the post-treatment and 6 month follow-up assessments. This may suggest that if either treatment is adopted as part of a ‘stepped-care’ approach to treatment it may not be necessary to ‘step-up’ all children who don’t recovery immediately, but to allow a period of monitoring after treatment. Further investigations are required to help inform decision making about who to step up, when, and, indeed, what they should be stepped up to.

A strength of the study is that it took place within a routine NHS clinical setting. Despite not restricting the study population to those who met formal anxiety disorder diagnostic criteria, 90% did and baseline scores on parent and child report measures were similar to those reported in studies with populations with anxiety disorders.<sup>8,9</sup> A development from most previous child anxiety treatment trials, is that we compared two active treatment approaches used routinely by the participating therapists.

A further strength of the study was that it included a full cost-effectiveness analysis. Notably the economic findings were consistent across various sensitivity analyses, and were reinforced when

“real-world” conditions were accounted for, such as larger time gaps between treatment sessions and assessments (i.e. SA 1, 2b, 3b, 7b). Results based on a restricted healthcare provider perspective confirmed the main finding but revealed that costs associated with child anxiety disorders would be highly underestimated on this basis (SAs 7a and 7b, Supplementary Material 2), emphasizing the importance of accounting for all costs borne by society in mental health studies. It is important to note that the current study was not powered to detect differences in cost so further trials are warranted to validate these promising findings.

A number of study limitations need to be highlighted. The study was powered to detect superiority of one treatment over another and did not aim to allow us to comment on their equivalence. Attrition from the trial meant that we did not achieve the number of participants needed to meet our power calculation. However, we believe that had the recruitment sample sizes been higher to better account for participant drop-out, and we had met our required sample size, results would have been the same given the negligible differences between treatment outcomes ( $RR = 1.01$  ( $0.86, 1.19$ ),  $p = 0.95$ ). While representative of many parts of the UK, as a group, participating families were highly educated, affluent and not ethnically diverse. We focused on children aged 5-12 years, yet only one self-report measure had previously been validated with children under the age of 7 years (the KFQ), and we therefore relied heavily on parent report. Our study did not include a waitlist comparison, however GPD-CBT has previously been shown to produce better outcomes than a waitlist control.<sup>8</sup> This, together with the fact that the outcomes were similar to those from other CBT trials suggests that both interventions were effective. Further investigation will be of interest to examine the mechanisms

by which each treatment has its effects. For example, it is possible that both treatments may have ultimately encouraged children to face fears, test beliefs and/or problem solve effectively.

For the economic analysis, although a high percentage of complete data were obtained for treatment resource use (98·2% to 99·8%), missing data on other resource use varied from 8·8% to 26·5% and 25% of participants did not have QALY data at every time-point. However our sensitivity analyses show that the results are consistent even in the complete-case scenario. Additionally, this study only provides an indication of the short-term cost-effectiveness of GPD-CBT compared to SFBT, and future follow-up assessments are warranted to determine cost-effectiveness in the longer term. Finally, while the costs attributed to school absence for children followed methods used in previous studies,<sup>29</sup> focusing mainly on government expenditure per pupil, they are likely to underestimate the longer term educational disadvantage that children may experience as a consequence of mental health difficulties.

The limitations notwithstanding, the current study provides evidence to support the use of GPD-CBT as a likely cost-effective, brief psychological approach to treating child anxiety problems.



### Author contributions

CC, MV and PC were responsible for the overall design of the study. CC, MP, GA and EW oversaw the day to day conduct of the study. HF was responsible for statistical analysis. MV was responsible for the health economic analyses. All authors made substantial contributions to the interpretation of the data and drafting the article.

### Declaration of Interests

CC is the author of a published book for parents that was used in one arm of this trial ('Overcoming your child's fears and worries') and PJC is the series editor. CC receives royalties from sales of this book.

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## RESEARCH IN CONTEXT

### **Evidence before this study**

Anxiety disorders are among the most common mental health disorders. They have a median age of onset of 11 years and affect a substantial proportion of children worldwide. There is good evidence that Cognitive Behaviour Therapy (CBT) is an effective treatment for childhood anxiety, compared to waitlist controls, with recovery rates around 60%. However it remains unclear how this compares to other psychological therapies that are used in child mental health services. Furthermore, most trials of CBT involve at least 9 face to face treatment sessions though this is not always practical in routine health settings where resources are often limited. We conducted a systematic review of PsycINFO and MEDLINE from 1<sup>st</sup> January 2000 to 1<sup>st</sup> April 2016 with the search terms (1) ‘anxi\*’, (2) ‘Child’, ‘adolescent’, ‘paediatric’, ‘pediatric’, ‘youth’, (3) ‘treatment’, ‘intervention’, ‘therapy’, ‘psychotherapy’, ‘bibliotherapy’, ‘computer\*’, ‘technology’, and (4) ‘randomi\* controlled trial’, ‘clinical trial’ to identify brief psychological interventions for childhood anxiety disorders. The most frequently evaluated brief treatment for child anxiety disorders was guided parent-delivered CBT (GPD-CBT; 4 studies) in which parents are supported by a therapist in working through a book that provides strategies to help them implement CBT strategies in their child’s day to day life, however none of the studies compared a brief psychological intervention to a credible control treatment and none included an economic analysis.

### **Added value of this study**

This study is the first to compare two brief psychological interventions with children referred for problems with anxiety on both clinical and economic outcomes. Our findings suggest there is no

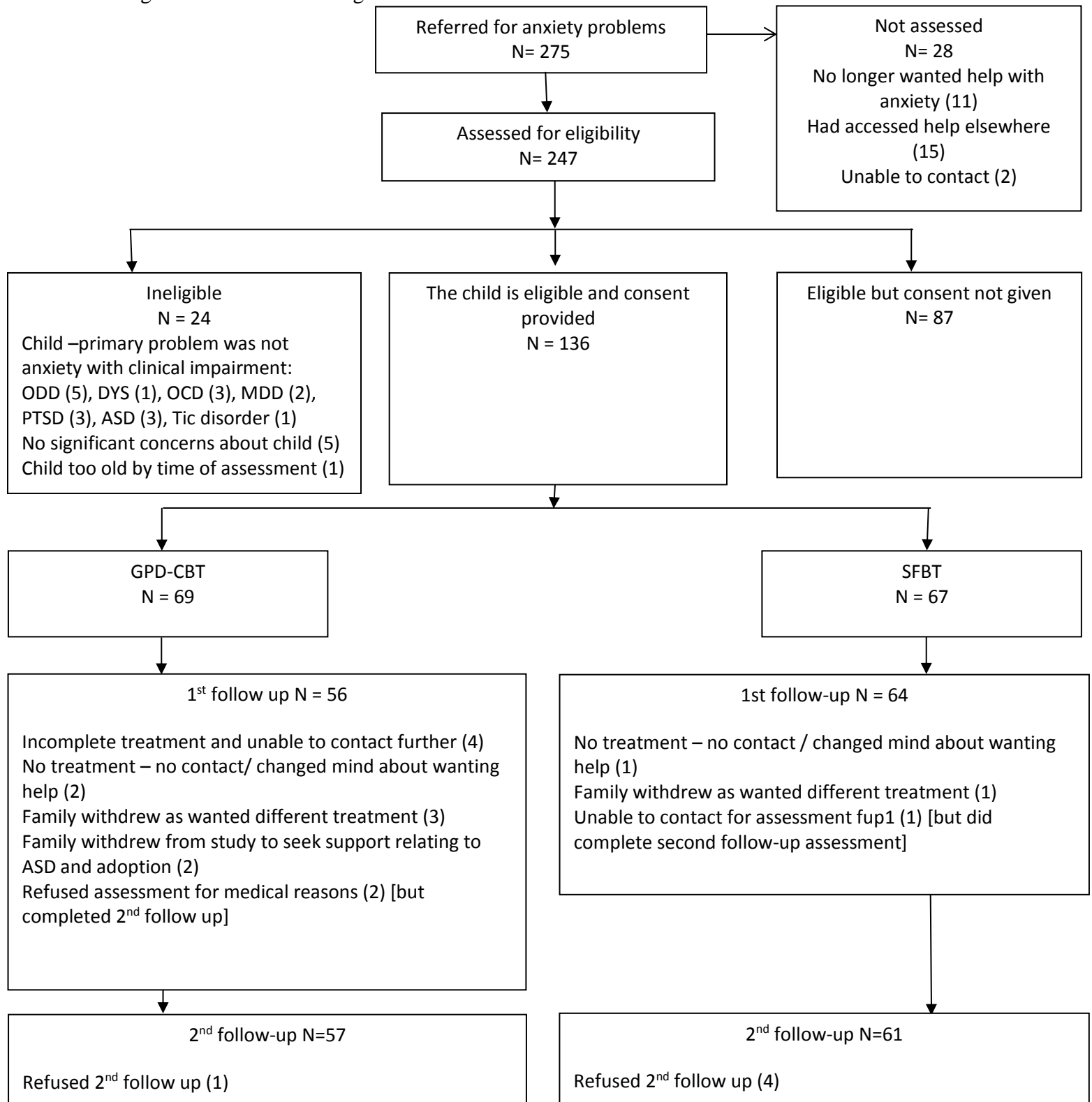
evidence that brief GPD -CBT was superior to Solution Focused Brief Therapy (SFBT), both delivered with 5 hours of therapist contact. The treatments were associated with clinical improvement in 59-69% participants after treatment and 66-72% 6 months later (RR = 1.01 (0.86, 1.19),  $p = 0.95$ ). It appeared that GPD-CBT could be provided at lower cost than SFBT.

### **Implications of all the available evidence**

To our knowledge, our randomised controlled trial is the first to provide data comparing the outcomes of GPD-CBT and SFBT for child anxiety disorders in routine clinical practice.

Previous studies have shown that GPD-CBT is an effective treatment for childhood anxiety disorders compared to waitlist controls, however our findings suggest that it is no better than an alternative brief psychological treatment, SFBT, in terms of children's outcomes. Nonetheless GPD-CBT may be a more cost-effective approach, building on previous studies which support its use as a low intensity intervention in order to improve access to evidence based treatments for childhood anxiety. Further studies are needed to examine how effective psychological treatments can be delivered at reduced costs without negatively affecting clinical outcomes and to establish the longer-term cost-benefits of intervention for children with these common, debilitating and often chronic difficulties.

Figure 1 Consort flow diagram



*Footnote:* ODD Oppositional Defiant Disorder; DYS Dysthymia; OCD Obsessive Compulsive Disorder; MDD Major Depressive Disorder; PTSD Post Traumatic Stress Disorder; ASD



Autistic Spectrum Disorder; GPD-CBT Guided Parent Delivered CBT; SFBT Solution Focused Brief Therapy.

Table 1

Demographic and clinical characteristics by treatment arm (ITT)

	GPD-CBT		SFBT	
	(n = 68)		(n= 68)	
Age (months; mean, sd)	111.31	21.93	109.74	26.76
Sex (% female, n)	53	36	53	36
Ethnic group (% White British, n)	91	62	96	65
Parent marital status (% 2 parent family, n)	88	60	82	56
Participating parent employment status (% , n)				
Unemployed	26	18	22	15
Part-time work	56	38	53	36
Full-time work	16	11	22	15
Household income (% , n)				
< £10,000	7	5	9	6
£10-15,000	7	5	4	3
£15-20,000	12	8	9	6

£20-25,000	12	8	18	12
£35-40,000	12	8	18	12
£40-45,000	7	5	10	7
£45- 50,000	10	7	3	2
>£50,000	30	20	27	66
Participating parent education (% higher education, n)	40	27	32	22
Socio-economic status- higher of parent or partner (% higher- associate professional/technical, n)	62	42	59	40
Participating parent anxiety (DASS-A) (% , n)				
‘Normal’ (0-3)	75	51	74	50
‘Borderline’ (4-7)	19	13	19	13
‘High’ (8 +)	6	4	7	5
Child Anxiety Disorder Diagnoses				
Children with the following primary diagnoses (% , n)				
Separation Anxiety Disorder	15	10	19	13
Social Anxiety Disorder	9	6	12	8

Generalised Anxiety Disorder	49	33	53	36
Specific phobia	25	17	15	10
Other (Panic Disorder +/- agoraphobia, anxiety disorder not otherwise specified)	3	2	1	1
<hr/>				
ADIS-c/p CSR				
Mild (3)	9	6	12	8
Moderate (4-5)	46	31	47	32
Severe (6-8)	46	31	41	28

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*Footnote:* ITT: Intention to Treat; DASS-A: Depression Anxiety and Stress Scales- Anxiety subscale; ADIS-C/P CSR: Anxiety Disorders Interview Schedule for DSM-IV- child/ parent version Clinical Severity Rating

Table 2

Primary, secondary and economic outcome measures (ITT)

GPD-CBT				SFBT		
(n=68 <sup>a</sup> )				(n=68 <sup>a</sup> )		
Dichotomous measures of outcome						
	%	n		%	n	
CGI-I ‘Much’/’Very much’ improved						
Post-treatment	59	40		69	47	
6 mth follow-up	66	45		72	49	
Free of primary anxiety disorder diagnosis						
Post-treatment	50	33		59	40	
6 mth follow-up	69	47		68	46	
Free of all anxiety disorder diagnoses						
Post-treatment	37	25		44	30	
6 mth follow-up	50	34		51	35	
Continuous measures of outcome						
	Mean	sd	n	Mean	sd	n
ADIS-c/p CSR of primary diagnosis						
Baseline	5·10	1·08	68	5·13	1·02	68
Post-treatment	2·60	2·00	55	2·77	1·94	65
6 mth follow-up	1·88	1·90	56	1·89	1·96	62
SCAS-c						

Baseline	38.61	20.31	54	34.15	20.06	60
Post-treatment	31.49	24.09	45	24.36	18.28	59
6 mth follow-up	23.77	18.96	44	19.55	17.08	55
SCAS-p						
Baseline	35.41	17.55	66	32.56	13.54	66
Post-treatment	24.76	12.88	51	24.44	13.61	62
6 mth follow-up	22.41	11.58	51	23.05	14.67	58
CAIS-c (25 items)						
Baseline	15.95	11.89	55	16.85	11.44	62
Post-treatment	10.55	12.02	44	10.39	9.80	59
6 mth follow-up	9.68	13.56	41	7.88	7.90	52
CAIS-p (25 items)						
Baseline	20.43	12.24	64	19.90	11.47	62
Post-treatment	13.59	12.41	51	12.04	9.91	57
6 mth follow-up	10.84	11.79	49	12.27	10.93	55
KFQ-c						
Baseline	59.93	11.33	68	58.68	12.04	68
Post-treatment	52.96	14.22	50	51.56	13.17	62
6 mth follow-up	50.23	11.75	47	47.40	12.94	58
CHU-9D-c						
Baseline	0.87	0.09	64	0.88	0.09	65
Post-treatment	0.90	0.10	49	0.90	0.09	59
6 mth follow-up	0.91	0.08	47	0.91	0.08	55

# CHU-9D-p

Baseline	0.85	0.10	46	0.89	0.07	54
Post-treatment	0.92	0.07	53	0.92	0.07	53
6 mth follow-up	0.93	0.07	48	0.92	0.07	56

# EQ-5D-Y-c

Baseline	0.82	0.15	63	0.80	0.20	67
Post-treatment	0.88	0.21	48	0.86	0.21	61
6 mth follow-up	0.87	0.19	47	0.91	0.16	57

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*Footnote:* <sup>a</sup>%s of full randomized sample; ITT – Intention To Treat; GPD-CBT Guided Parent delivered- Cognitive Behavior Therapy; SFBT Solution Focused Brief Therapy; ADIS CSR Anxiety Disorders Interview Schedule for DSM-IV child/ parent version Clinical Severity rating; SCAS – c Spence Children’s Anxiety Scale- child report; SCAS – p Spence Child Anxiety Scale – parent report; CAIS – c Child Anxiety Impact Scale – child report; CAIS – p Child Anxiety Impact Scale – parent report; KFQ – c Koala Fear Questionnaire – child report. For all these measures a higher score indicates higher symptoms/ severity; CHU-9D- c Child Health Utility-9D- child report; CHU-9D – p Child Health Utility-9D- parent report; EQ-5D -Y EuroQol-5D- Youth version- child report. For these measures a higher score indicates higher quality of life

Table 3

## Clinical Outcomes

Primary and Secondary Analysis Results: Intention To Treat (ITT) Population (GPD-CBT n=68, SFBT n=68)

	CGI-I [Primary outcome]			Free from primary diagnosis			Free
	p-value <sup>+</sup>	Relative Risk	95% CI	p-value <sup>+</sup>	Relative Risk	95% CI	p-value <sup>+</sup>
<b>Treatment</b>							
GPD-CBT vs SFBT (ref)	0.95	1.003	(0.864, 1.165)	0.64	1.091	(0.915, 1.300)	0.78
<b>Time-point</b>	0.036	0.883	(0.788, 0.990)	0.0014	0.773	(0.668, 0.894)	0.0020
Post-treatment (ref) vs 6 month follow-up							
<b>Treatment*Time-point interaction</b>	0.76	0.964	(0.733, 2.125)	0.37	0.873	(0.402, 1.437)	0.67
GPD-CBT vs SFBT (ref) at post-treatment	0.83	0.977	(0.782, 1.22)	0.88	0.979	(0.733, 1.307)	0.98
GPD-CBT vs SFBT (ref) at 6 month follow-up	0.87	1.013	(0.863, 1.89)	0.23	1.121	(0.930, 1.352)	0.54
<b>Gender</b>							
Male vs Female	0.0093	0.794	(0.662, 0.951)	-	-	-	0.50
<b>Age</b>	0.91	1.004	(0.968, 1.042)	0.404	1.018	(0.965, 1.074)	0.49
KFQ				SCAS-c			

	p-value	Estimate	95% CI	p-value	Estimate	95% CI	p-value
<b>Treatment</b>							
GPD-CBT vs SFBT (ref)	0.65	0.817	(-2.785, 4.418)	0.098	4.944	(-0.932, 10.820)	0.27
<b>Time-point</b>							
Post-treatment (ref) vs 6 month follow-up	0.0049	2.737	(0.847, 4.627)	0.0003	5.267	(2.491, 8.042)	0.0022
<b>Treatment*Time-point interaction</b>	0.31	-1.917	(-5.613, 1.778)	0.17	3.72	(-1.596, 9.053)	0.28
GPD-CBT vs SFBT (ref) at post-treatment	0.94	-0.142	(-3.99, 3.703)	0.040	6.808	(0.312, 13.305)	0.57
GPD-CBT vs SFBT (ref) at 6 month follow-up	0.41	1.775	(-2.46, 6.015)	0.34	3.08	(-3.33, 9.487)	0.16
<b>Child's baseline endpoint score</b>	<0.0001	0.764	(0.597, 0.931)	<0.0001	0.637	(0.487, 0.787)	<0.0001
<b>Gender</b>							
Male (ref) vs Female	0.44	-1.440	(-5.152, 2.272)	0.16	-4.340	(-10.372, 1.693)	0.29
<b>Age</b>	0.97	0.018	(-1.017, 1.054)	0.72	0.364	(-1.628, 2.355)	0.94
<b>Parental level of anxiety</b>	0.68	a	a	0.53	a	a	0.29
Borderline (ref) vs Normal	0.69	-0.957	(-5.733, 3.819)	0.55	-2.340	(-10.146, 5.467)	0.15
Borderline (ref) vs High	0.38	-3.600	(-11.715, 4.516)	0.26	-7.075	(-19.447, 5.297)	0.23
<b>Type of child's primary anxiety disorder</b>	0.54			0.92			0.023



GAD (ref) vs SAD	0.27	-2.844	(-7.893, 2.205)	0.53	-2.701	(-11.151, 5.749)	0.33
GAD (ref) vs Social Phobia	0.49	2.384	(-4.498, 9.267)	0.98	0.207	(-13.541, 13.955)	0.14
GAD (ref) vs Other	0.76	0.698	(-3.782, 5.178)	0.91	0.410	(-6.652, 7.472)	0.016
CAIS-c				CAIS-p			
	p-value	Estimate	95% CI	p-value	Estimate	95% CI	p-value
<b>Treatment</b>							
GPD-CBT vs SFBT (ref)	0.56	1.129	(-2.668, 4.927)	0.60	-0.832	(-4.008, 2.344)	0.56
<b>Time-point</b>							
Post-treatment (ref) vs 6 month follow-up	0.48	0.617	(-1.106, 2.340)	0.013	1.931	(0.411, 3.451)	<0.0001
<b>Treatment*Time-point interaction</b>							
GPD-CBT vs SFBT (ref) at post-treatment	0.87	0.296	(-3.414, 4.008)	0.96	0.087	(-3.521, 3.696)	0.41
GPD-CBTvs- SFBT (ref) at 6 month follow-up	0.39	1.962	(-2.568, 6.493)	0.30	-1.751	(-5.143, 1.640)	0.84
<b>Child's baseline endpoint score</b>							
Male (ref) vs Female	<0.0001	0.456	(0.305, 0.608)	<0.0001	0.724	(0.570, 0.878)	0.0007
<b>Gender</b>							
Male (ref) vs Female	0.17	-2.587	(-6.257, 1.083)	0.86	-0.296	(-3.527, 2.935)	0.71

			1.083)			2.934)	
<b>Age</b>	0.82	-0.132	(-1.304, 1.039)	0.17	0.632	(-0.271, 1.534)	0.1005
<b>Parental level of anxiety</b>	0.80			0.12			0.99
Borderline (ref) vs Normal	0.96	-0.115	(-5.046, 4.818)	0.059	-4.135	(-8.432, 0.163)	>0.999
Borderline (ref) vs High	0.55	-2.374	(-10.162, 5.414)	0.99	-0.075	(-8.383, 8.233)	0.91
<b>Type of child's primary anxiety disorder</b>	0.55			0.077			0.063
GAD (ref) vs SAD	0.31	2.678	(-2.538, 7.894)	0.13	3.559	(-1.109, 8.226)	0.26
GAD (ref) vs Social Phobia	0.40	-3.086	(-10.375, 4.203)	0.17	-4.188	(-10.208, 1.831)	0.15
GAD (ref) vs Other	0.64	1.055	(-3.382, 5.492)	0.26	-2.299	(-6.311, 1.712)	0.088

*Footnote:* <sup>+</sup> p-values from the fixed effects of the generalised (log-binomial) mixed models. <sup>a</sup> p-values assessing the overall effect of categorical factors with 3 or more levels do not have a corresponding single effect measure so estimates and 95% CIs are not presented. GPD-CBT Guided Parent delivered- Cognitive Behavior Therapy; SFBT Solution Focused Brief Therapy; CGI-I Clinician Global Impression- Improvement; ADIS CSR Anxiety Disorders Interview Schedule for DSM-IV child/ parent version Clinical Severity Rating; SCAS – c Spence Children's Anxiety Scale- child report; SCAS – p Spence Child Anxiety Scale – parent report; CAIS – c Child Anxiety Impact Scale – child report; CAIS – p Child Anxiety Impact Scale – parent report; KFQ – c Koala Fear Questionnaire – child report; GAD Generalised Anxiety Disorder; SAD Separation Anxiety Disorder.

## Supplementary Material 1

### Unit costs. All costs in 2013/2014 UK prices

Item	Unit cost (£s)	Source	Notes
Therapist	£38 per hour; £77 per hour of client contact	Pay and Conditions Circular (AforC) 1/2014 <a href="http://www.nhsemployers.org/case-studies-and-resources/2014/03/pay-and-conditions-circular-aforc-12014">http://www.nhsemployers.org/case-studies-and-resources/2014/03/pay-and-conditions-circular-aforc-12014</a> (accessed 25/03/15)  and  <a href="http://www.pssru.ac.uk/project-pages/unit-costs/2014/">http://www.pssru.ac.uk/project-pages/unit-costs/2014/</a> (accessed 25/03/15)	Annex C: Pay bands and pay points on the second pay spine in England from 1 April 2014. Table 10. Average across Pay bands 5 and 6, and calculated according to the methodology adopted in PSSRU, Unit Costs of Health & Social Care 2014. University of Kent, 2014. Table 12·6 Generic single-disciplinary CAMHS team
Supervisor	£47 per hour; £106 per hour of client contact	Pay and Conditions Circular (AforC) 1/2014 <a href="http://www.nhsemployers.org/case-studies-and-resources/2014/03/pay-and-conditions-circular-aforc-12014">http://www.nhsemployers.org/case-studies-and-resources/2014/03/pay-and-conditions-circular-aforc-12014</a> (accessed 25/03/15)  and  <a href="http://www.pssru.ac.uk/project-pages/unit-costs/2014/">http://www.pssru.ac.uk/project-pages/unit-costs/2014/</a> (accessed 25/03/15)	Annex C: Pay bands and pay points on the second pay spine in England from 1 April 2014. Table 10. Pay band 7 (spine point 30), and calculated according to the methodology adopted in PSSRU, Unit Costs of Health & Social Care 2014. University of Kent, 2014. Table 9·5 Clinical Psychologist
Mileage allowance	£0·56 per mile	Pay and Conditions Circular (AforC) 3/2014 <a href="http://www.nhsemployers.org/case-studies-and-resources/2014/07/amended-mileage-rates-from-1-july-2014">http://www.nhsemployers.org/case-studies-and-resources/2014/07/amended-mileage-rates-from-1-july-2014</a> (accessed 02/03/15)	Table 7. Car (all types of fuel) Annual mileage up to 3,500 miles (standard rate)
Family doctor (GP consultation in surgery)	£42	Personal Social Services Research Unit. Unit Costs of Health & Social Care 2014. University of Kent, 2014. <a href="http://www.pssru.ac.uk/project-pages/unit-costs/2014/">http://www.pssru.ac.uk/project-pages/unit-costs/2014/</a> (accessed 13/05/15)	Table 10·8b. Cost including qualifications, excluding other direct care staff costs.
Social worker	£79	As above.	Table 11·3. Cost per hour of face-to-face contact, including qualifications.
Practice nurse (nurse consultation in surgery)	£13·69	As above.	Table 10·6. Cost including qualifications, and based on duration of contact of 15·5 minutes.
Psychologist	£135	As above.	Table 9·5. Cost per hour of client contact (includes A to E: A.

			Wages/salary; B. Salary oncosts; C. Qualifications; D. Overheads; E. Capital overheads).
Consultant: psychiatrist	£365.78	Personal Social Services Research Unit. Unit Costs of Health & Social Care 2013. University of Kent, 2013. <a href="http://www.pssru.ac.uk/project-pages/unit-costs/2013/">http://www.pssru.ac.uk/project-pages/unit-costs/2013/</a> (accessed 13/05/15)	Table 15.7. Cost per face-to-face contact, including qualifications. Price adjusted for inflation using HCHS 2013/2014 (see also Table 16.2. Personal Social Services Research Unit. Unit costs of Health & Social Care 2014. University of Kent, 2014. <a href="http://www.pssru.ac.uk/project-pages/unit-costs/2014/">http://www.pssru.ac.uk/project-pages/unit-costs/2014/</a> (accessed 13/05/15)
Community psychiatrist nurse (nurse –mental health)	£74	Personal Social Services Research Unit. Unit Costs of Health & Social Care 2014. University of Kent, 2014. <a href="http://www.pssru.ac.uk/project-pages/unit-costs/2014/">http://www.pssru.ac.uk/project-pages/unit-costs/2014/</a> (accessed 13/05/15)	Table 10.2. Cost per hour of face-to-face contact (including qualifications)
Education welfare officer	£21.74	Creswell C. et al. 2015. Treatment of childhood anxiety disorder in the context of maternal anxiety disorder: a randomised controlled trial and economic analysis. Health Technol Assess 2015; Vol.19; No.38.	Table 89. Adjusted for inflation using RPI.
Educational psychologist	£39.66	As above.	Table 89. Adjusted for inflation using RPI.
Family liaison officer (school) (approximated with family support worker)	£50	Personal Social Services Research Unit. Unit Costs of Health & Social Care 2014. University of Kent, 2014. <a href="http://www.pssru.ac.uk/project-pages/unit-costs/2014/">http://www.pssru.ac.uk/project-pages/unit-costs/2014/</a> (accessed 13/05/15)	Table 11.8. Costs per hour of client related work.
Teacher	£37.66	Creswell C. et al. 2015. Treatment of childhood anxiety disorder in the context of maternal anxiety disorder: a randomised controlled trial and economic analysis. Health Technol Assess 2015; Vol.19; No.38.	Table 89. Adjusted for inflation using RPI.
Paediatrician - out-patient attendance: paediatrics	£235	National Schedule of Reference Costs Year: '2013-2014'. <a href="https://www.gov.uk/government/publications/nhs-reference-costs-2013-to-2014">https://www.gov.uk/government/publications/nhs-reference-costs-2013-to-2014</a> (accessed 18/05/15)	National Schedule of Reference Costs Year: '2013-2014' – NHS Trusts. Consultant led outpatient attendances: Non-Admitted Face to Face Attendance, First. Currency Code: WF01B Service code: 420
Audiology – out-patient attendance: paediatric audiological Medicine (A), audiological Medicine (B), audiology (C)	£112.36	As above.	As above. Weighted average of (A), (B) and (C). Currency Code: WF01B- (A): Service code 254 – (B): Service code 310 – (C): Service code: 840
Speech and language (community speech and language therapist)	£36	Personal Social Services Research Unit. Unit Costs of Health & Social Care 2014. University of Kent, 2014. <a href="http://www.pssru.ac.uk/project-pages/unit-costs/2014/">http://www.pssru.ac.uk/project-pages/unit-costs/2014/</a> (accessed 13/05/15)	Table 9.3. Cost including qualifications.
Ophthalmology – out-patient attendances: Ophthalmology (A), Paediatric Ophthalmology (B), Medical	£102.95	National Schedule of Reference Costs Year: '2013-2014'. <a href="https://www.gov.uk/government/publications/nhs-reference-costs-2013-to-2014">https://www.gov.uk/government/publications/nhs-reference-costs-2013-to-2014</a> (accessed 18/05/15)	National Schedule of Reference Costs Year: '2013-2014' – NHS Trusts. Consultant led outpatient attendances: Non-Admitted Face to Face Attendance, First. Currency Code: WF01B Weighted average of (A), (B), (C) and (D). - (A): Service code 130 – (B): Service code 216 – (C): Service code: 460 – (D): Service code 655 – (E): Service code 662

Ophthalmology (C), Orthoptics (D), Optometry (E)			
Hospital A&E Department	£108.96	As above.	National Schedule of Reference Costs Year: '2013-2014' – Emergency Medicine: No Leading to Admitted. Weighted average of all Services in the category. Currency codes from VB01Z to VB011Z
Hospital inpatient services - short stay	£1227.95	As above.	National Schedule of Reference Costs Year: '2013-2014' – Weighted average of elective and non-elective inpatients services - short stay
Hospital inpatient services - long stay	£2991.56	As above.	National Schedule of Reference Costs Year: '2013-2014' – Weighted average of elective and non-elective inpatients services - long stay
Day hospital	£698	As above.	National Schedule of Reference Costs Year: '2013-2014' – Day case
Occupational therapist	£36	Personal Social Services Research Unit. Unit Costs of Health & Social Care 2014. University of Kent, 2014. <a href="http://www.pssru.ac.uk/project-pages/unit-costs/2014/">http://www.pssru.ac.uk/project-pages/unit-costs/2014/</a> (accessed 13/05/15)	Table 9-2. Cost including qualifications.
Paediatric dietician	£37	As above.	Table 13-4. Cost including qualifications.
Paediatric physiotherapist	£36	As above.	Table 9-1. Cost including qualifications.
Paediatric play Specialist	£12.28	Creswell C. et al. 2015. Treatment of childhood anxiety disorder in the context of maternal anxiety disorder: a randomised controlled trial and economic analysis. Health Technol Assess 2015; Vol.19; No.38.	Table 89. Adjusted for inflation using RPI.
Family therapist (family support worker)	£50	Personal Social Services Research Unit. Unit Costs of Health & Social Care 2014. University of Kent, 2014. <a href="http://www.pssru.ac.uk/project-pages/unit-costs/2014/">http://www.pssru.ac.uk/project-pages/unit-costs/2014/</a> (accessed 13/05/15)	Table 11-8. Costs per hour of client related work.
Community children's nurse	£99	National Schedule of Reference Costs Year: '2013-2014'. <a href="https://www.gov.uk/government/publications/nhs-reference-costs-2013-to-2014">https://www.gov.uk/government/publications/nhs-reference-costs-2013-to-2014</a> (accessed 18/05/15)	National Schedule of Reference Costs Year: '2013-2014' – Community Health Services: Nursing Services for Children – Service code: NURS Currency code: N12
Child & adolescent mental health worker	£69	Personal Social Services Research Unit. Unit Costs of Health & Social Care 2014. University of Kent, 2014. <a href="http://www.pssru.ac.uk/project-pages/unit-costs/2014/">http://www.pssru.ac.uk/project-pages/unit-costs/2014/</a> (accessed 13/05/15)	Table 12-6. Generic single-disciplinary CAMHS
Primary mental health worker	£69	Personal Social Services Research Unit. Unit Costs of Health & Social Care 2014. University of Kent, 2014. <a href="http://www.pssru.ac.uk/project-pages/unit-costs/2014/">http://www.pssru.ac.uk/project-pages/unit-costs/2014/</a> (accessed 13/05/15)	Table 12-6. Generic single-disciplinary CAMHS
Housing department	£21.07	Creswell C. et al. 2015. Treatment of childhood anxiety disorder in the context of maternal anxiety disorder: a randomised controlled trial and economic analysis. Health Technol Assess 2015; Vol.19; No.38.	Table 89. Adjusted for inflation using RPI.
Citizens advice bureau	£16.48	As above.	Table 89. Adjusted for inflation using RPI.
Family centre (family support)	£50	Personal Social Services Research Unit. Unit Costs of Health & Social Care 2014. University of Kent, 2014. <a href="http://www.pssru.ac.uk/project-pages/unit-costs/2014/">http://www.pssru.ac.uk/project-pages/unit-costs/2014/</a>	Table 11-8. Costs per hour of client related work.

worker		(accessed 13/05/15)	
Home-start	£98.30	McIntosh E, Barlow J, Davis H, Stewart-Brown (2009). Journal of Public Health. Sep;31(3):423-33.	Table 1, page 427. Price inflated to 2013/14 prices using the HCHS index
Family planning clinic	£71	National Schedule of Reference Costs Year: '2013-2014'. <a href="https://www.gov.uk/government/publications/nhs-reference-costs-2013-to-2014">https://www.gov.uk/government/publications/nhs-reference-costs-2013-to-2014</a> (accessed 18/05/15)	National Schedule of Reference Costs Year: '2013-2014' Outpatient Attendances Data – Total. Service code: FPC
Self-help groups	free	Self Help UK – the guide to patient support and self-help. <a href="http://www.self-help.org.uk/search/">http://www.self-help.org.uk/search/</a> (accessed 19/05/15)	There are a variety of self-help groups, support groups and advice line, covering a variety of disease areas, free of charge
Alternative medicine	£50	<a href="http://www.nhs.uk/conditions/homeopathy/Pages/Introduction.aspx">http://www.nhs.uk/conditions/homeopathy/Pages/Introduction.aspx</a> (accessed 19/05/15)	The price for an initial consultation with a homeopath can vary from around £20 to £80. Average price is here considered.
Advice line	free	Self Help UK – the guide to patient support and self-help. <a href="http://www.self-help.org.uk/search/">http://www.self-help.org.uk/search/</a> (accessed 19/05/15)	There are a variety of self-help groups, support groups and advice line, covering a variety of disease areas, free of charge
Other healthcare and social care resource use	£74.79	Authors' calculations.	Average of all other unit costs excluding hospital admissions and day hospital.
NHS prescription costs	BNF1: £5.35 BNF2: £3.20 BNF3: £16.15 BNF4: £9.58 BNF5: £4.85 BNF6: £12.29 BNF7: £12.83 BNF8: £53.51 BNF9: £11.36 BNF10: £6.37 BNF11: £6.73 BNF12: £6.37 BNF13: £7.38 BNF14: £ 8.68 BNF15: £13.35	Prescription Cost Analysis: England 2013. <a href="http://www.hscic.gov.uk/catalogue/PUB17274">http://www.hscic.gov.uk/catalogue/PUB17274</a> (accessed 20/05/2015)	Totals by BNF Chapters
Over-the-counter (OCT) medicines	£2.60	PAGB Fast facts <a href="http://www.pagb.co.uk/media/facts.html">http://www.pagb.co.uk/media/facts.html</a> (accessed 20/05/2015)	OCT medicines: Average product cost
Mother time off-work/leisure (daily rate)	£91.76	Annual survey of hours and earnings, 2013 Revised Results. Office for National Statistics 2014 <a href="http://www.ons.gov.uk/ons/rel/ashe/annual-survey-of-hours-and-earnings/2013-revised-results/index.html">http://www.ons.gov.uk/ons/rel/ashe/annual-survey-of-hours-and-earnings/2013-revised-results/index.html</a> (accessed 20/05/17)	Table 1.1a - Weekly pay - Gross (£) - For female employee jobs: United Kingdom, 2013: Median gross weekly earning Table 1.9a - Paid hours worked - Total - For female employee jobs: United Kingdom, 2013
Cost of day of school absence	£23.55	School spend per pupil 2012-2013. <a href="http://www.education.gov.uk/schools/performance/2013/download_data.html">http://www.education.gov.uk/schools/performance/2013/download_data.html</a> (accessed 20/05/15)	National per pupil medians Income and Expenditure data 2012-2013

## Supplementary Material 2

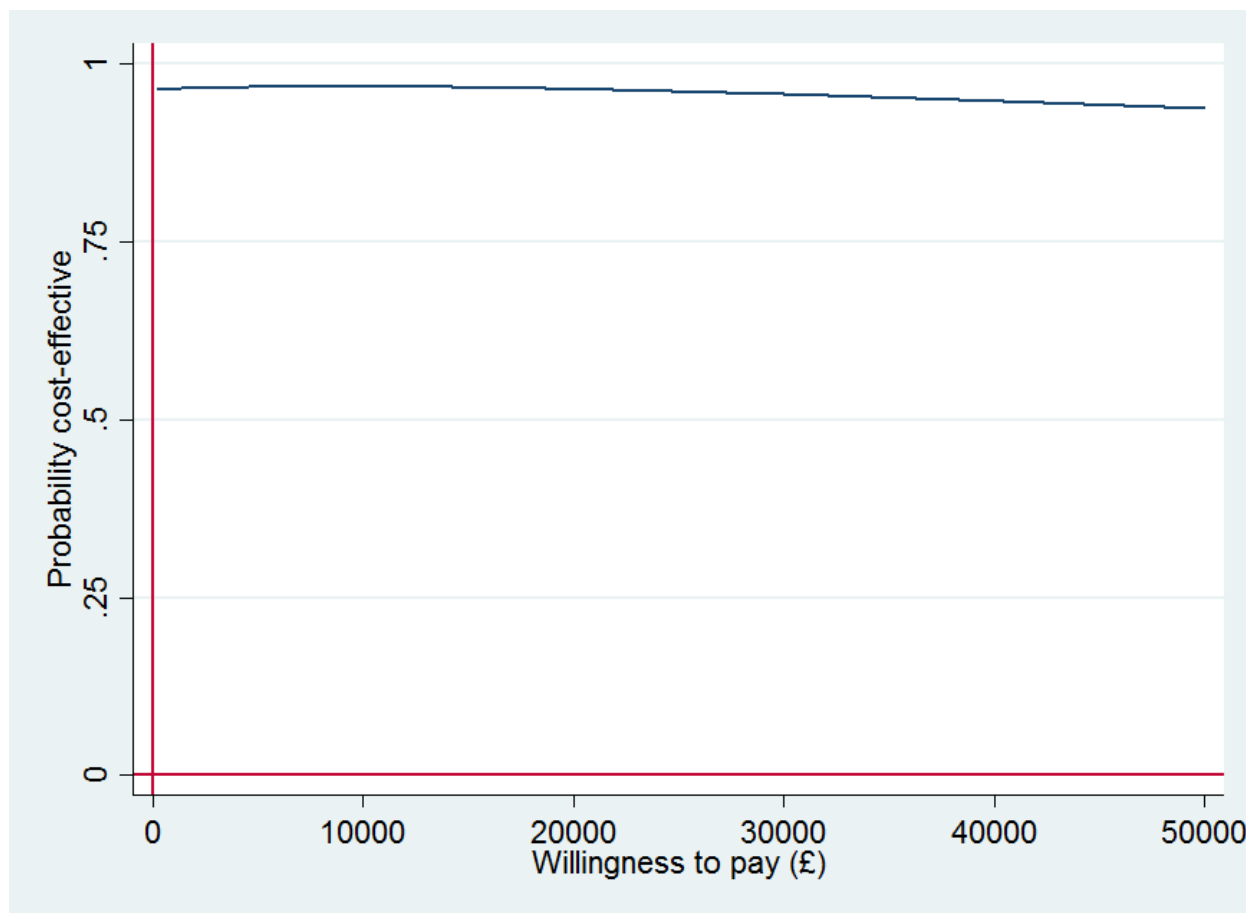
### Cost Utility Analysis results

Sensitivity analysis (SA)	Cost mean difference	95% CI	p-values	Effect mean difference <sup>a</sup>	95% CI	p-values	Incremental analysis (ICER reported when appropriate)	Probability cost-effective at willingness to pay equal to £20000 per QALY gained <sup>b</sup>	Probability cost-effective at willingness to pay equal to £30000 per QALY gained <sup>c</sup>
Base case	-£448.30	(-£933.66, £37.06)	0.070	0.006	(-0.009, 0.020)	0.42	GPD-CBT treatment dominates	0.964	0.957
SA 1	-£448.30	(-£933.66, £37.06)	0.070	0.038	(-0.004, 0.080)	0.076	GPD-CBT treatment dominates	0.977	0.975
SA 2a	-£448.30	(-£933.66, £37.06)	0.070	0.007	(-0.008, 0.022)	0.34	GPD-CBT treatment dominates	0.984	0.983
SA 2b	-£448.30	(-£933.66, £37.06)	0.070	0.043	(-0.0003, 0.087)	0.051	GPD-CBT treatment dominates	0.993	0.991
SA 3a	-£448.30	(-£933.66, £37.06)	0.070	-0.008	(-0.040, 0.247)	0.65	£59445-56038	0.739	0.642
SA 3b	-£448.30	(-£933.66, £37.06)	0.070	0.022	(-0.030, 0.073)	0.41	GPD-CBT treatment dominates	0.891	0.870
SA 4	-£475.27	(-£960.06, £9.5)	0.055	0.007	(-0.008, 0.021)	0.37	GPD-CBT treatment dominates	0.973	0.967
SA 5	-£468.83	(-£936.37, -£ 1.29)	0.049	0.006	(-0.009, 0.020)	0.42	GPD-CBT treatment dominates	0.971	0.963
SA 6	-£251.49	(-£645.58, £142.60)	0.21	0.002	(-0.014, 0.018)	0.80	GPD-CBT treatment dominates	0.869	0.838
SA 7a	-£133.38	(-£203.69, -£63.07)	<0.0001	0.006	(-0.008, 0.020)	0.42	GPD-CBT treatment dominates	0.952	0.919
SA 7b	-£133.38	(-£203.69, -£63.07)	<0.0001	0.038	(-0.004, 0.080)	0.076	GPD-CBT treatment dominates	0.981	0.975

**Footnote:** CI Confidence Interval; ICER Incremental Cost Effectiveness Ratio; QALY Quality Adjusted Life Years; GPD-CBT Guided Parent Delivered CBT; SFBT Solution Focused Brief Therapy; <sup>a</sup>Adjusted for baseline utility; <sup>b</sup>Probability associated with a threshold of £20000 per QALY gained; derived from the relevant CEAC; <sup>c</sup>Probability associated with a threshold of £30000 per QALY gained; derived from the relevant CEAC; SA 2a -effects measured by CHU9D parent-report ; SA 3a - effects measured by EQ-5D-Y; SA 4 -actual treatment received approach; SA 5 - adjustment for baseline costs; SA 6 - complete-case analysis; SA 7a - healthcare provider perspective; SAs, 1, 2b, 3b, 7b - use of actual time between assessments for estimation of QALYs.

### Supplementary Material 3

Cost Effectiveness Acceptability Curve (CEAC) for GPD-CBT treatment compared with SFBT treatment - base case cost utility analysis



*Footnote:* GPD-CBT Guided Parent Delivered CBT; SFBT Solution Focused Brief Therapy



## Supplementary Material 4

Months between treatment and assessment time points across treatment arms

	GPD-CBT (months) Mean (sd)	SFT (months) Mean (sd)	Mean difference	p-value	95% CI	t-test statistic
Randomisation to end of treatment GPD-CBT (N=59) SFBT (N=66)	3.305 (1.263)	2.955 (1.221)	0.351	0.117	(-0.0895, 0.791)	t(123)=1.577
End of treatment to assessment 1 (post-treatment) GPD-CBT (N=56) SFBT (N=65)	0.661 (0.900)	0.539 (0.812)	0.122	0.434	(-0.186, 0.430)	t(119)=0.786
End of treatment to assessment 2 (6 months post treatment) GPD-CBT (N=56) SFBT (N=62)	5.661 (0.880)	5.677 (1.198)	0.0167	0.932	(-0.403, 0.370)	t(116)=0.086

*Footnote:* GPD-CBT Guided Parent delivered- Cognitive Behavior Therapy; SFBT Solution Focused Brief Therapy

