EVALUATION REPORT

Relationship Building Together

Trial addendum report

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University of Kent

Home Office

YOUTH ENDOWMENT FUND

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Children and young people at risk of becoming involved in violence deserve services that give them the best chance of a positive future. To make sure that happens, we fund promising projects and then use the very best evaluation to find out what works. Just as we benefit from robust trials in medicine, young people deserve support grounded in the evidence. We build that knowledge through our various grant rounds and funding activities.

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Executive summary

This addendum report explores the impact of Relationship Building Together (RBT) on children's and young people's outcomes 12 months after participants entered the trial. This addendum should be read alongside the main evaluation report, which analyses the impact of RBT after six months (Coulton et al., 2026).

The project

RBT aimed to develop trauma-informed practice across the local authority services that support children and young people aged 10–21 in Bridgend (Wales). Trauma happens when someone experiences something deeply distressing or harmful that has lasting effects on their well-being. Trauma-informed practice means shaping services and support in ways that recognise this impact and aim to avoid causing further harm. The programme, developed by the Trauma Recovery Academy and Bridgend County Borough Council, provides three to five days of training and support to practitioners across multiple services. Services involved include early support (early help hubs and youth development), targeted prevention and family support (edge of care and children's services) and statutory youth justice services. Children and young people are assessed based on their needs, and those with lower levels of trauma are supported by trained practitioners. For those with moderate and severe trauma experiences, a multi-agency meeting is held to map trauma histories. For severe trauma cases, a lead practitioner and a clinical psychologist develop a support plan, which is monitored and adapted over time. The programme aimed to better meet children and young people's needs, improve their well-being and reduce behavioural difficulties and offending.

The Youth Endowment Fund (YEF) and the Home Office funded a randomised controlled trial of RBT, with practitioners and children and young people randomised to either receive the programme or business as usual. A total of 401 children and young people entered the trial (200 intervention, 201 control), linked to 110 practitioners (56 intervention, 54 control). The initial evaluation aimed to establish whether RBT reduced children's and young people's offending behaviour over a six-month period, as measured by the Self-Report Delinquency Scale. It also measured the impact on other outcomes related to children and young people (emotional and behavioural difficulties, well-being, psychological health, family cohesion, police involvement, school attendance and exclusions) and on practitioners (attitudes towards trauma-informed practice). The study included an implementation and process evaluation to examine barriers to and facilitators of implementation and how both children and practitioners experienced the programme. This drew on interviews with 16 children and young people, 15 intervention delivery staff, 10 parents/carers and eight practitioners from the services involved. The study took place between November 2023 and May 2026. Ninety-seven per cent of the children and young people in the trial were from a White ethnic background. This addendum report explores the impact of RBT on children's and young people's outcomes 12 months after participants entered the trial.

Summary of addendum results

Key conclusions
The findings from the quantitative evaluation of RBT 12 months after participants entered the trial were consistent with the main evaluation report. RBT continued to show a moderate positive impact on children and young people's offending behaviour and mixed impacts on secondary outcomes.
RBT continued to show a **moderate positive impact** on children and young people's offending behaviour at the 12-month follow-up. Children and young people supported by practitioners who had received RBT training self-reported lower levels of offending behaviour than those supported by practitioners who had not received RBT training. This finding was consistent with the impact observed at the six-month follow-up.
Consistent with the main evaluation report, RBT showed mixed results on secondary outcomes at the 12-month follow-up. RBT had a small positive impact on behaviour, peer relationships, hyperactivity, internalising behaviours, psychological health, family conflict and school attendance. It had a small negative impact on emotional regulation and prosocial behaviour. RBT also showed a moderate negative impact on conduct problems, externalising behaviours, family cohesion and expressiveness. RBT showed no impact on well-being.
The 12-month analysis should be treated with caution. There was statistical uncertainty around all outcomes, and the findings were also consistent with there being no impact. The trial experienced 24% attrition: 24% of children and young people who started the trial were not included in the 12-month follow-up analysis.

Introduction

Background

Adverse childhood experiences (ACEs) are stressful or traumatic experiences that are considered to have an impact on children's development. They include physical, sexual and verbal abuse; emotional and physical neglect; and being brought up in an environment that includes adult substance use, mental health problems, domestic abuse or family breakdown. Exposure to ACEs in childhood has been found to have a strong association with a range of health behaviours and outcomes. These include substance use problems, such as the early onset of alcohol use (Dube et al., 2006), binge-drinking (Bellis et al., 2014a, Bellis et al., 2014b, Bellis et al., 2014c) and illicit drug use (Dube et al., 2003), as well as mental health difficulties, including depression (Anda et al., 2002, Chapman et al., 2004, Fang et al., 2016, Schilling et al., 2007), and low life satisfaction (Bellis et al., 2014c). Evidence also links multiple ACE exposures to future violent behaviour, both as a victim and perpetrator (Bellis et al., 2014c, Testa, 2022). In Wales, those who had experienced four or more ACEs were found to be 15 times more likely to have been the perpetrator of a violent incident (Bellis et al., 2015). A study of almost 12,000 young offenders in the United States (Fox et al., 2015) found that, on average, the risk of becoming a violent, serious or chronic offender increased by 35% with exposure to each additional ACE. More recent research out of the United States has echoed this, with accumulating ACEs being associated with a greater likelihood of incarceration, higher arrest rates and more periods of incarceration overall (Testa, 2022).

In Wales, in response to increasing complexity amongst youth offenders and attempts to further utilise a child-focused approach, trauma-informed practices were adopted within youth justice, supported by the Welsh Government and the Youth Justice Board. Trauma-informed practice, such as the Relationship Building Together (RBT) intervention model, aims to address the consequences of ACEs by changing the relationship between practitioners and young people and allowing young people to express their emotions and understand how they relate to their behaviour (Skuse and Matthews, 2015) in a safe environment. This safe environment allows those who have experienced trauma to see adults in a more positive light and aims to disrupt the transition from poor emotional regulation to dysfunctional behaviour.

The RBT intervention started with 3 days of training from the Trauma Recovery Model Academy for staff practitioners who were part of the intervention across edge of care, youth development, early help and youth justice services in Bridgend Council. Training was designed to aid practitioners in understanding the impact of prior trauma on young people's behaviour, developing strategies to reduce the behavioural consequences of trauma, building relationships and communicating, understanding the principles of case management and how to employ evidence-based interventions to promote positive development, and ensuring trauma histories are embedded in the case management process.

Trauma leads (selected staff who received additional training and oversaw the programme in each service) led trauma screening (looking at exposure to ACEs and assessing the cognitive, emotional and social functioning of children and young people) for any young person entering the service and randomised to the intervention. From this assessment, a young person was placed in a tier which guided the intervention approach taken:

Table 1: Relationship between tier, level of trauma and intervention approach

Tier	Level of trauma	Intervention approach
0	No evidence of trauma	Business as usual but delivered by a practitioner who had received the Trauma Recovery Model Academy training
1	Evidence of past trauma but not complex (for example, it may have been due to temporary family or financial difficulties), and the young person had experienced periods of recovery	Trauma lead offers guidance and support to a trained practitioner on engaging and supporting the young person in a trauma-informed manner and reviewing the progress of the young person against the trauma recovery model.
2	More complex trauma, with little evidence of periods of recovery, often a result of family breakdown or significant traumatic events	A multi-agency meeting led by the trauma lead creates a timeline from pre-birth to present for the young person, including key events and experiences to understand potential sources of trauma and the developmental journey. The trauma lead prepares an in-depth report from this, including the young person's trauma history, their developmental strengths and challenges, and recommendations for intervention. This report is shared by all professionals involved in the young person's care. Regular reviews are undertaken at specific intervals to assess the effectiveness of the interventions and adjust if necessary.
3	Significant history of trauma, often because of neglect, family breakdown or involvement in criminal activity, with no evidence of any periods of recovery	As with tier 2, but the process is led by a clinical psychologist.

Full details of the RBT intervention and the associated logic model are available in the six-month report (https://youthendowmentfund.org.uk/wp-content/uploads/2026/04/YEF.-RBT-Bridgend-Efficacy-Study.-April-2026.pdf), and the methods used in the evaluation are detailed in the original protocol (https://youthendowmentfund.org.uk/wp-content/uploads/2024/03/Bridgend-Youth-Services-Evaluation-Protocol-Mar-23.pdf).

The original study was a mixed-methods, prospective, individually randomised efficacy trial, with equal probability of allocation to one of two arms, the RBT intervention or business as usual (BAU). Outcomes were assessed six months after randomisation. Outcomes included self-reported offending, behaviour, emotional regulation, psychological health and well-being, and the family environment. The trial also included an implementation and process evaluation. This addendum report presents an analysis of outcomes 12 months after randomisation. The study was conducted between November 2023 and May 2026. The timeline for the study is available in Appendix I.

Methods

Trial design

Table 2: Trial design

Trial design, including the number of arms		Two-arm prospective, individually randomised controlled efficacy trial
Unit of randomisation		Individual participant and practitioner
Stratification variables (if applicable)		Staff: service *(*youth justice, edge of care, youth development, early help hubs) and speciality (generic versus specialist) Young people: service *(*youth justice, edge of care, youth development, early help hubs), sex (male, female), age group (<15 years, ≥ 15 years)
Primary outcome	Variable	Volume of self-reported delinquent acts at six months
	Measure (instrument, scale, source)	Self-Reported Delinquency Scale (SRDS)
Secondary outcome(s)	Variable(s)	**Participant** Number of self-reported delinquent acts at 12 months Self-report behaviour and personality attributes (overall behaviour, emotional symptoms, conduct problems, hyperactivity, peer relationships, prosocial behaviour, externalising behaviours, internalising behaviours), psychological health, well-being, family cohesion, police involvement, school exclusions, suspensions, managed moves and employment status at six and 12 months. **Staff** Attitudes and perceptions towards trauma-informed care, well-being, absence and turnover at six and 12 months
	Measures (instrument, scale, source)	**Participants** SRDS, Strengths and Difficulties Questionnaire (SDQ), General Health Questionnaire (GHQ12), Short Warwick-Edinburgh Mental Well-being Scale (SWEMWBS), Brief Family Relationship Scale (BFRS) and Self-Reported Client Service Receipt Inventory (CSRI) **Staff** Attitudes Related to Trauma-Informed Care Scale (ARTIC), SWEMWBS and staff records.
Baseline for primary outcome	Variable	Number of self-reported delinquent acts in the previous six months
	Measure (instrument, scale, source)	SRDS

Baseline for secondary outcome	Variable	**Participant** Number of delinquent acts in the six months prior to baseline. Self-report behavioural and personality attributes (overall behaviour, emotional symptoms, conduct problems, hyperactivity, peer relationships, prosocial behaviour, externalising behaviours, internalising behaviours) derived from the SDQ, psychological health, well-being and family relationships at baseline. Police involvement, school exclusions and suspensions, and employment status over the past six months at baseline. **Staff** Attitudes and perceptions towards trauma-informed care and well-being at baseline. Days of absence and turnover over the past six months at baseline.
	Measures (instrument, scale, source)	**Participants** SRDS, SDQ, GHQ12, SWEMWBS, BFRS, CSRI **Staff** ARTIC, SWEMWBS, staff records.

Addendum outcome measures

Baseline measures

Key demographic variables were collected by staff embedded within the local authority at baseline, prior to randomisation, using a bespoke data management tool. These variables included age, sex, ethnicity and index of multiple deprivation (IMD), which was derived from the participant's postcode and converted into IMD using the IMD Wales lookup tool: https://geoconvert.ukdataservice.ac.uk/help/faq.html.

Outcomes

Participants completed the same battery of outcomes at baseline and again at six and 12 months.

The theory of change states that the aim of the intervention is to reduce delinquency. Self-reported delinquency was assessed using the Self-Reported Delinquency Scale (SRDS; (Smith and McVie, 2003) over the preceding six months. This 19-item questionnaire collects data on the quantity and volume of a range of delinquent and criminal behaviours, including property crime, violence, theft and drug use. The quantity of criminal behaviour is the number of different offence categories endorsed by the young person, and the volume is the actual number of offences committed across all categories (Fonagy et al., 2018; (McAra and McVie, 2007). This outcome was assessed at baseline and at six and 12 months post-randomisation and scored as part of the analysis.

Emotional symptoms and behavioural difficulties were assessed using the self-completed Strengths and Difficulties Questionnaire (SDQ;(Goodman, 1997). This measure assesses behaviours across several domains, including conduct, hyperactivity, emotional regulation, peer relationships and prosocial behaviour, and it allows for the generation of two multi-component outcomes: internalising and externalising behaviours, with the latter highly associated with current or future delinquent behaviour. We assessed the total score, domain scores and multi-component scores. The outcome is widely used and has demonstrated excellent validity and moderate reliability in adolescent populations (Goodman, 2001). The SDQ is suitable for completion by those aged over 10 years and by those with mild learning disabilities (Law and Wolpert, 2014).

Well-being was assessed using the Short Warwick-Edinburgh Mental Well-being Scale (SWEMWBS; (Clarke et al., 2011). The SWEMWBS is a seven-item self-completed scale addressing different aspects of eudaimonic and hedonic mental health well-being. The scale is validated for adolescents and demonstrates good internal consistency (Ng Fat et al., 2017) and discriminant, construct and convergent validity (McKay and Andretta, 2017, Ng Fat et al., 2017). Non-psychotic psychological health was assessed using the General Health Questionnaire (GHQ12; (Goldberg and Hillier, 1979), using norms derived for adolescent populations. This 12-item instrument has established validity and reliability in adolescent populations (Baksheev et al., 2011). To assess potential impacts on the family environment, we used the Brief Family Relationship Scale (BFRS; (Fok et al., 2014); this 16-item instrument assesses family cohesion, expressiveness and conflict and has established convergent and discriminant validity. We used questions derived from the Self-Reported Client Service Receipt Inventory (CSRI; (Coulton et al., 2022) to assess the number of days of school and work absence, the number of exclusions and suspensions, and the number of criminal justice contacts over the previous six months. CSRI methods are an established and valid form of assessing participant resource use in randomised controlled trials and can be adapted for the target population (Knapp and Beecham, 1990). All outcomes were assessed at baseline and again at six and 12 months post-randomisation.

The exposure to ACEs for the RBT group was assessed at the screening stage and represented by the tier of intervention, with tier 0 experiencing no ACEs and tier 3 experiencing the most ACEs. Six months after randomisation, in both arms, young people were contacted by researchers by phone or email and asked to complete the short revised Therapeutic Alliance Scale for Children-revised (TASC-r; (Shirk and Saiz, 1992); this assesses the quality of the relationship between the young person and a staff member. Therapeutic alliance is a strong predictor of outcome, and this was used in the prognostic model.

Sample size

Sample size calculations were derived using Stata 16 and are based on the SRDS (Smith and McVie, 2003) over a six-month period.

In our pre-trial sample size calculation, we used an effect size difference of 0.25 as an important difference; this equates to a difference in volume of offences of circa 12% over a six-month period, which is similar to effects found in other psychologically focused interventions to reduce recidivism in adolescent populations (Hodgkinson et al., 2021). To detect this difference or greater using a two-sided test with alpha of 0.05 and power of 80% required 506 young people to be followed up at our primary endpoint, six months post-randomisation, i.e. 253 in each group. Similar randomised controlled trials in similar populations (Coulton et al., 2023, Fonagy et al., 2018) suggest a pre–post-test correlation for the SRDS of 0.644 (95% confidence interval [CI]: 0.474, 0.815); we erred on the side of caution and included a correlation of 0.5 in the sample size calculation, and this reduces the required sample at the primary endpoint to 380: 190 in each group. We estimated a potential loss to follow-up of 10%, similar to attrition found in our other studies of young people (Coulton et al., 2023); this inflated the required baseline sample to 422.

We recruited 401 participants; hence, the minimum detectable effect size at randomisation was 0.29, assuming a loss to follow-up of 10%. We had primary outcome data at the six-month endpoint for 335 (83.5%) of the young people, but the actual pre–post-test correlation for the SRDS was higher than we estimated, 0.58 rather than 0.50; hence, the minimum detectable effect size for the analysed sample (0.25) was similar to the original sample size calculation. At the 12-month endpoint, we followed up 304 (75.8%)

of the original randomised sample; the pre–post-test correlation was 0.45; hence, at month 12, the minimum detectable effect size was 0.29.

Table 3: Minimum detectable effect size at baseline and the 12-month endpoint

		Protocol	Randomisation	At month 12
Minimum detectable effect size		0.25	0.29	0.29
Pre–post-test correlations	Level 1 (participant)	0.50	0.50	0.45
Alpha		0.05	0.05	0.05
Power		0.8	0.8	0.8
One-sided or two-sided?		Two-sided	Two-sided	Two-sided
Number of participants	Intervention	190	200	148
	Control	190	201	156
	Total	380 (422, allowing for 10% attrition at month six)	360 (410, allowing for 10% attrition at month six)	304

Randomisation

There were two levels of randomisation in the study. Level one included participating staff being allocated to be trained in RBT or to continue to deliver BAU. This allocation was conducted after baseline staff data collection for all staff members who volunteered and consented. Staff members already trained in RBT in the youth justice services were ineligible. Because allocations are done at the same time and we wanted to maximise balance across the groups on key parameters, we employed minimisation for the allocation of staff. Minimisation works by assigning staff members to the group that maintains balance in the allocated groups. Our aim was to maximise balance in terms of service (youth justice services, edge of care, youth development, early help hubs) and specialism (specialist or generic workers). Provision was made to conduct additional waves of staff randomisation and RBT training if there was high staff turnover throughout the trial – high turnover is being defined as turnover that exceeds 30%. High staff turnover created situations, particularly in smaller teams, where insufficient staff members were allocated to RBT or BAU. During the conduct of the study, Bridgend Children's Services also underwent a restructuring, with some trained staff members being redeployed to other services. Both of these situations led to a further wave of randomisation and training, and the restructuring allowed additional referrals through children's and school services.

Level two allocation involved the randomisation of young people to the RBT intervention or BAU. Randomisation was conducted after informed consent had been obtained and the baseline assessment completed. Allocation used equal probabilities of receiving the RBT intervention or BAU and employed random permuted blocks of variable size (4, 6 or 8), with a random block seeded throughout. Randomisation was conducted by research staff using a secure, independent randomisation service, Sealed Envelope Ltd. Randomisation was stratified by service (youth justice services, edge of care, youth development, early help hubs), sex (male, female) and age group (<15 years, ≥15 years). Stratification variables were chosen to

ensure allocation was balanced across service, sex and age, as some workers specialise in working with older or younger males and females. A full quality assurance audit trail was kept of all allocations, and research staff could not see future allocations. The allocated group was relayed to delivery staff members in the services, who decided which staff member a young person should be assigned to, matching their allocated intervention or control group.

It was not possible to blind young people or staff to their allocated group, although follow-up at six and 12 months was conducted by researchers who were blind to the allocation. Follow-up questionnaires were completed by participants and were the same for both groups: the questionnaires collected no details on which group the participant was allocated to.

Statistical analysis

The statistical analysis of the 12-month outcomes followed the same methods as those presented in the six month report (https://youthendowmentfund.org.uk/wp-content/uploads/2026/04/YEF.-RBT-Bridgend-Efficacy-Study.-April-2026.pdf) and the statistical analysis plan (https://youthendowmentfund.org.uk/wp-content/uploads/2023/11/Bridgend-Youth-Services-Statistical-Analysis-Plan.pdf). Two deviations were made from the plan in the analysis of outcomes at 12-months.

First, we planned on conducting an analysis of staff turnover and sickness rates, comparing staff trained in RBT to those not trained. As noted above, during the study, children's services at Bridgend County Borough Council underwent a major restructure, with some departments merged and staff redeployed. The data relating to turnover and sickness could not be made available; as a result, this analysis was not undertaken. In addition, attrition from the staff survey at month six was high, at 51%, so a second wave of questionnaires at month 12 was not undertaken.

Second, we planned to explore the effect of the RBT intervention in the presence of non-compliance using a complier average causal effects (CACE) approach at the individual participant level. CACE in this scenario usually employs a two-stage statistical model: the first stage predicts who in the control group would have complied if they had been allocated to the RBT intervention, and the second estimates the effects, accounting for the probability of compliance in the control group. Those allocated to the RBT arm received interventions based on an initial trauma screening and were allocated to a tier of intervention, with tier 0 the least severe and tier 3 the most severe. So, a CACE model in this context would need to be a three-stage model, with the first stage estimating the probability of being in each tier. This approach runs the risk of creating an unreliable and overfitted model. In addition, the interventions a participant may receive as part of the intervention and control are influenced by an assessment of their needs and the service providing the intervention. This creates a heterogeneous sample, with a variety of different interventions delivered to participants. As a result, the operationalisation of compliance was simplified. Compliance was defined in the following ways: for those in tier 0, being allocated to a trained trauma-informed practitioner; for those in tier 1, receiving support and guidance from a trained trauma lead; for those in tier 2, conducting a relationship-mapping exercise and multi-agency meeting led by a trauma lead; and for those in tier 3, conducting a relationship-mapping exercise and multi-agency meeting led by a clinical psychologist.

Our analytical approach to estimate CACE effects assumes that randomisation would result in a similar number of participants in each tier with a similar propensity to comply with the intervention (Angrist et al.,

2025, Schochet and Chiang, 2011). In this approach, an estimate of the effect in the presence of compliance is calculated as:

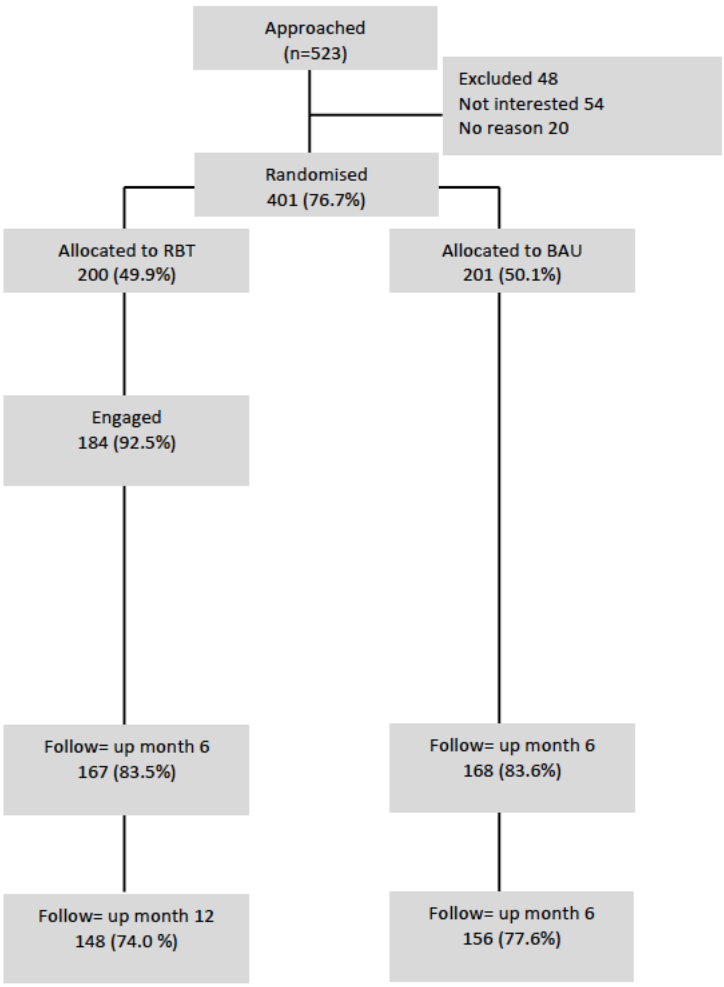
$$\frac{ITT_{effect}}{Proportion\ compliant}$$

Because the CACE analysis was not reported in the six-month report due to data access issues, we report it here in addition to the CACE analysis at 12 months.

Participant flow including losses and exclusions

Overall, 523 young people were approached to participate. Of those approached, 401 (76.7%) were willing to consent, 48 (9.2%) were excluded because the service the young person had been referred to did not consider the young person to be in need of a service, 54 (10.3%) were not interested and 20 (3.8%) gave no reason for not wanting to take part in the study. Of those randomised, 200 (49.9%) were allocated to RBT and 201 (50.1%) to BAU. Of those allocated to RBT, 184 (92%) received the RBT intervention. Reasons for not receiving the RBT intervention included not being allocated to a caseworker, moving out of the area or being referred to a different service prior to receiving trauma screening. Overall follow-up rates at month six were 83.5% and were similar in the RBT group (83.5%) and the BAU group (83.6%). At 12 months, follow-up rates were 148 (74.0%) in the RBT group and 156 (77.6%) in the BAU group. A CONSORT diagram is provided in Figure 1.

Figure 1: CONSORT diagram showing participants' progression through the trial



Addendum attrition

Details of attrition at month 12 for the main secondary outcome are provided in Table 4. Attrition was slightly higher in the RBT arm (26.0%) than the BAU arm (22.4%), but this difference was marginal between the groups. The attrition at month 12 indicates that the minimal detectable effect size is 0.29 (see Table 3).

Table 4: Young person level attrition from the trial (main secondary outcome)

		Intervention	Control	Total
Number of participants	Randomised	200	201	401
	Analysed	148	156	304
Participant attrition (from randomisation to analysis)	Number	52	45	97
	Percentage	26.0	22.4	24.0

No differential attrition was apparent by ethnicity or sex (Table 5) in either arm of the study. In terms of sex, 74.6% of males and 77.2% of females were followed up at month 12, with an odds ratio of 0.86 (95% CI: 0.53 to 1.40, p = 0.54).

Table 5: Demographic characteristics

	Referred	Recruited	Randomised	T0 data Baseline	T1 data Month 6	T2 data Month 12
Ethnicity						
Asian or Asian British	1	1	1	1	1	1
Treatment			1	1	1	1
Control			0	0	0	0
Black, Black British, Caribbean or African	2	2	2	2	2	2
Treatment			2	2	2	2
Control			0	0	0	0
Mixed or multiple ethnic groups	7	6	6	6	4	3
Treatment			0	0	0	0
Control			6	6	4	3
White	506	385	385	385	322	292
Treatment			192	192	160	141
Control			193	193	162	151
Another ethnic group	1	1	1	1	1	1
Treatment			1	1	1	1
Control			0	0	0	0
Unknown		6	6	6	5	5
Treatment			4	4	3	3
Control			2	2	2	2
Sex						
Male	255	204	204	204	170	152
Treatment		101	101	101	85	70
Control		103	103	103	85	82
Female	268	197	197	197	165	152
Treatment		99	99	99	82	78
Control		98	98	98	83	74
Prefer not to say	0	0	0	0	0	0
Treatment			0	0	0	0
Control			0	0	0	0

Out of the 150 participants allocated to the intervention who were followed up at month 12, 60 (40%) had been screened as tier 0, 60 (40%) as tier 1, 29 (19%) as tier 2 and 1 (1%) as tier 3.

Addendum outcomes and analysis

Main secondary analysis

The primary analysis was conducted at month six. The main secondary outcome at month 12 was the volume of self-reported delinquency by young people in the six months between month six and month 12 post-randomisation, derived from the SRDS. This questionnaire contains 19 offence categories, and the volume score is the number of offence categories endorsed. The main analysis was based on the intention-to-treat (ITT) data set. This contains all available data for participants who were randomised, regardless of whether they complied with their allocation. This data set included participants who were withdrawn/withdrew from the trial post-randomisation. These analyses are a lower-bound estimate of treatment effects, as they represent the effect of offering an intervention rather than the effect of receiving the intervention.

At baseline, 99 young people, followed up at month 12 (32.6%), indicated that they had not engaged in any delinquency in the previous six months. At 12 months post-randomisation, this figure was 150 (49.3%), with 76 (25.0%) of the 304 followed up stating that they had not engaged in any delinquency at baseline or 12 months. The mean volume of delinquency was lower at month 12, at 4.82 (standard deviation = 9.03), than at baseline, at 8.79 (standard deviation = 12.15), and at month six, at 6.79 (standard deviation = 11.62).

Table 6: Delinquent behaviour at baseline and month 12 for the 304 followed up at month 12

		Engaged in delinquency at month 12		
		No	**Yes**	**Total**
Engaged in delinquency at baseline n (%)	**No**	76 (25.0%)	23 (7.6%)	99 (32.6%)
	Yes	74 (24.3%)	131 (43.1%)	205 (67.4%)
	Total	150 (49.3%)	154 (50.7%)	304 (100%)

We analysed the main secondary outcome at month 12 using a negative binomial regression model on account of the presence of both zero inflation and over-dispersion (see Appendix III). We included stratification factors used in the randomisation – service, age group and sex – in the model and incorporated the baseline value of the main secondary outcome as a covariate. Table 7 provides the outcome of this analysis.

Table 7: Negative binomial model with self-reported volume of delinquency at month 12 as the dependent variable, controlling for baseline delinquency, age group, sex and service

	Incident rate ratio (95% CI) n = 304	Mean difference (95% CI)	Cohen's d (95% CI)	p-value
Age group [a]				
Less than 15 years	1.55 (1.05; 2.28)	-	-	0.028
Service[b]				
Early help East	1.04 (0.41; 2.64)	-	-	0.932
Early help North	1.16 (0.43; 3.08)	-	-	0.771
Early help West	0.48 (0.18; 1.30)	-	-	0.149
Edge of care	0.76 (0.24; 2.38)	-	-	0.640
Youth development	0.74 (0.32; 1.71)	-	-	0.474
Youth justice	0.68 (0.28; 1.64)	-	-	0.394
Sex [c]				
Male	1.08 (0.76; 1.56)	-	-	0.652
RBT intervention[d]	0.86 (0.59; 1.26)	−0.17 (−2.02; 1.68)	−0.17 (−0.39; 0.06)	0.448

[a] Contrast with 15 years or more
[b] Contrast with children's services
[c] Contrast with female
[d] Contrast with business as usual
Note: CI = confidence interval; RBT = Relationship Building Together

The rate of self-reported delinquency was lower in the RBT group than the BAU group (Incident Rate Ratio 0.86; 95% CI: 0.59 to 1.26), and the adjusted mean volume of delinquency at month 12 was 4.90 (95% CI: 3.65 to 6.16) in the BAU group and 4.73 (95% CI: 3.46 to 6.00) in the RBT group, with a mean difference between the RBT and BAU groups of −0.17 (95% CI: −2.02 to 1.68) and a Cohen's *d* effect size of −0.17 (95% CI: −0.39 to 0.06). This result is slightly larger than and in a similar direction to the effect size detected at month six: −0.15 (95% CI: −0.37 to 0.06). As the CI was wide and included zero, this difference was not statistically significant at the 5% level, the threshold set in the sample size calculation.

Missing data analysis

Missing data imputation was conducted for the primary outcome, self-reported delinquency at the primary endpoint, month six. It is not usual practice to conduct missing data imputation for secondary outcomes at follow-up endpoints. Conducting missing data imputation on secondary outcomes increases the Family-Wise Error Rate and the probability of reporting type I errors, i.e. identifying effects when none exist. To address this would require a statistical correction, and this impacts the minimum detectable effect size. As a consequence, no missing data imputation was undertaken for the secondary addendum analysis at month 12.

Analysis in the presence of non-compliance

To explore the potential impact of compliance with the RBT intervention, we used both a per-protocol (PP) data set and a CACE analysis.

The PP data set contains all data for participants who completed the trial as planned – in the RBT group and the control group – without any major protocol violations or exclusions. The PP data set contains those young people who engaged with the service they were referred to: 137 (91.3%) of the 150 were followed up at month 12. This means that the PP data set represents a likely best-case scenario for treatment effect estimation.

The main secondary outcome was analysed using the PP data set and the same methods as for the primary analysis: a negative binomial regression model adjusted for the baseline values of the randomisation stratification factors.

Table 8: Negative binomial model with the volume of delinquency at month 12 as the dependent variable, controlling for baseline delinquency, age group, service, sex and intervention, including only those who complied with the allocated intervention.

	Incident rate ratio (95% CI) n = 261	Mean difference (95% CI)	Cohen's d (95% CI)	p-value
Age group [a]				
Less than 15 years	1.95 (1.31; 2.88)	-	-	0.001
Service[b]				
Early help East	1.02 (0.34; 3.02)	-	-	0.973
Early help North	0.77 (0.27; 2.17)	-	-	0.619
Early help West	0.67 (0.19; 2.36)	-	-	0.536
Edge of care	0.41 (0.12; 1.42)	-	-	0.158
Youth development	0.66 (0.25; 1.77)	-	-	0.414
Youth justice	0.62 (0.22; 1.73)	-	-	0.359
Sex [c]				
Male	1.15 (0.79; 1.68)	-	-	0.485
RBT intervention[d]	0.77 (0.53; 1.13)	−0.60 (−2.30; 1.09)	−0.24 (−0.49; 0.03)	0.182

[a] Contrast with 15 years or more

[b] Contrast with children's services

[c] Contrast with female

[d] Contrast with business as usual

Note: CI = confidence interval; RBT = Relationship Building Together

The rate of self-reported delinquency was lower in the RBT group than the BAU group (Incident Rate Ratio 0.77; 95% CI: 0.55 to 1.13) and a Cohen's *d* effect size of −0.24 (95% CI: −0.49 to 0.03). As the CI was wide and included zero, this difference was not statistically significant at the 5% level. The effect was larger than

in the ITT analysis, suggesting that compliance is associated with lower rates of self-reported delinquency; this difference is not large or statistically significant.

A CACE analysis was undertaken using the following formula:

$$\frac{ITT_{effect}}{Proportion\ compliant}$$

The proportion compliant is estimated as the proportion of participants in the intervention who complied in accordance with their tier of need. At month six, the proportion of those followed up who complied was 0.905. The CACE-adjusted mean difference comparing RBT versus BAU was −0.58 (95% CI: −3.90 to 2.71), with a Cohen's d effect size of −0.16 (95% CI: −0.41 to 0.07). At month 12, the proportion of those followed up who complied was 0.913. The CACE-adjusted mean difference was −0.19 (95% CI: −2.21 to 1.84), with a Cohen's d effect size of −0.19 (95% CI: 0.43 to 0.06). Neither of these outcomes was statistically significant at the 5% significance level, and neither was significantly different from the ITT analysis. Complying with the intervention had no major influence on the outcomes observed, and this is to be expected considering the high proportion of participants who complied. It is important to note that compliance here relates to engaging with the elements of the intervention associated with the participant's tier rather than completing specific interventions.

Secondary analysis

Strengths and Difficulties Questionnaire

Self-reported behaviours and personality attributes were derived from the SDQ at 12 months post-randomisation: total score, emotional regulation, conduct problems, hyperactivity, peer relationships, prosocial behaviour, externalising behaviours and internalising behaviours. The total score is the sum of the emotional, conduct, hyperactivity and peer scores and has a maximum value of 40, with a higher score indicating more behavioural difficulties. The subscales have a maximum value of 10, with a higher score indicating more difficulties in that particular domain, with the exception of the prosocial score, where a higher score indicates more prosocial behaviour.

As the outcomes were normally distributed (see Appendix III), we conducted an ordinary least squares (OLS) linear regression, adjusting for the baseline value of the outcome as a covariate and for stratification factors used at randomisation: age group, sex and service.

The results are presented in Table 9. The RBT group had fewer overall problems (SDQ total score, Cohen's d = −0.02), lower prosocial behaviour scores (Cohen's d = −0.051), fewer problems with peers (Cohen's d = −0.09), lower hyperactivity scores (Cohen's d = −0.05), greater problems with emotional regulation (Cohen's d = 0.02), greater conduct problems (Cohen's d = 0.14), more externalising behaviours (Cohen's d = 0.11) and fewer internalising behaviours (Cohen's d = −0.06) compared with the BAU group. All results had wide CIs that included zero. No statistically significant differences were observed at the 0.05 level.

Table 9: Strengths and Difficulties Questionnaire (SDQ) domains at month 12 – mean difference derived from ordinary least squares linear regression: mean difference, effect size and associated 95% confidence intervals (CIs)

	Month 12 Intervention (n = 147) Mean (SE)	Month 12 Control (n = 156) Mean (SE)	Mean difference (95% CI)	Cohen's d (95% CI)	p-value
SDQ total	18.04 (0.38)	18.19 (0.39)	−0.15 (−1.20; 0.90)	−0.02 (−0.24; 0.20)	0.778
Regulation	5.02 (0.17)	4.98 (0.16)	0.04 (−0.43; 0.50)	0.02 (−0.20; 0.25)	0.881
Prosocial	7.35 (0.13)	7.46 (0.14)	−0.11 (−0.48; 0.28)	−0.05 (−0.18; 0.28)	0.599
Peer problems	3.42 (0.14)	3.62 (0.14)	−0.19 (−0.58; 0.20)	−0.09 (−0.14; 0.32)	0.343
Hyperactivity	6.73 (0.15)	6.76 (0.16)	−0.03 (−0.47; 0.42)	−0.05 (−0.27; 0.18)	0.905
Conduct	2.89 (0.13)	2.79 (0.12)	0.10 (−0.46; 0.26)	0.14 (−0.08; 0.37)	0.598
Externalising	9.60 (0.23)	9.57 (0.23)	0.03 (−0.69; 0.63)	0.11 (−0.12; 0.33)	0.931
Internalising	8.47 (0.25)	8.58 (0.24)	−0.12 (−0.79; 0.56)	−0.06 (−0.29; 0.16)	0.735

SE = standard error

Young people's well-being and psychological health

Well-being was derived from the SWEMWBS, which has a range from 7 to 35, with higher scores indicative of greater well-being, and psychological health was derived from the GHQ12, which has a range of 0 to 36, with higher scores indicative of worse mental health functioning, in the six months after the month six follow-up for those receiving the RBT intervention and those receiving BAU.

As both outcomes were normally distributed (see Appendix III), an OLS linear regression was conducted. The means, standard deviations, mean differences and effect sizes are presented in Table 10. The RBT group had fewer psychological health problems (Cohen's d = −0.09) and marginally lower well-being (Cohen's d = −0.01). The CIs were wide and included zero, and no statistically significant differences were observed between the groups.

Table 10: Psychological health and well-being, mean difference derived from ordinary least squares linear regression: mean difference, effect size and associated 95% confidence intervals (CIs)

	Month 12 Intervention (n = 147) Mean (SE)	Month 12 Control (n = 155) Mean (SE)	Mean difference (95% CI)	Cohen's d (95% CI)	p-value
GHQ12	12.52 (0.51)	13.67 (0.56)	−1.15 (−2.64; 0.34)	−0.09 (−0.13; 0.32)	0.130
SWEMWBS	19.86 (0.24)	19.92 (0.29)	−0.06 (−0.81; 0.69)	−0.01 (−0.22; 0.23)	0.880

SE = standard error; SWEMWBS = Short Warwick-Edinburgh Mental Well-being Scale; GHQ12 = General Health Questionnaire

Family environment

Three domains of the BFRS were derived at 12 months after randomisation: family cohesion, family expressiveness and family conflict. Lower scores indicate lower levels of family cohesion, expressiveness and conflict. As the outcomes were normally distributed (see Appendix III), an OLS linear regression was conducted. The means, standard deviations, mean differences and effect sizes are presented in Table 11. The RBT group exhibited lower levels of family cohesion (Cohen's d = −0.21), lower levels of family expressiveness (Cohen's d = −0.19) and lower levels of family conflict (Cohen's d = −0.08). The CIs were wide and included zero, and no statistically significant differences were observed between the groups at the 0.05 level.

Table 11: Family environment, mean difference derived from ordinary least squares linear regression: mean difference, effect size and associated 95% confidence intervals (CIs)

	Month 12 Intervention (n = 146) Mean (SE)	Month 12 Control (n = 156) Mean (SE)	Mean difference (95% CI)	Cohen's d (95% CI)	p-value
Cohesion	1.16 (0.13)	1.53 (0.15)	−0.38 (−0.77; 0.17)	−0.21 (−0.44; 0.02)	0.060
Expressiveness	0.58 (0.07)	0.71 (0.08)	−0.13 (−0.34; 0.08)	−0.19 (−0.42; 0.03)	0.220
Conflict	1.76 (0.14)	1.95 (0.13)	−0.19 (−0.57; 0.19)	−0.08 (−0.30; 0.15)	0.330

SE = standard error

Self-reported service use

Service use explored missed workdays, school absences, school exclusions, school suspensions, police warnings and charges, days in court and days in custody in the six months prior to the 12-month follow-up.

We conducted an OLS linear regression, adjusting for the baseline value of the outcome as a covariate and for stratification factors used at randomisation: age group, sex and service. The RBT group had fewer missed work days (Cohen's d = −0.34), although it should be noted that only 92 (30.5%) of the sample reported being in work; fewer missed school days (Cohen's d = −0.03); were more likely to be excluded (Cohen's d=0.56), noting that only 8 (5.1%) participants experienced an exclusion in the previous six months across both groups; and had fewer suspensions from school (Cohen's d = −0.57), although the same number in each group (19) reported at least one suspension. No participants in the sample who were followed up at month 12 reported any managed move; only eight reported an exclusion, six reported any police warnings, two reported police charges, three reported spending time in court and only one reported time spent in custody. The results of a regression of these events could be potentially misleading, as they are rare events and small differences between the groups can have large effects; therefore, they have not been reported. The CIs for missed school days and suspensions were wide and included zero, and no statistically significant differences were observed between the groups at the 0.05 level for those outcomes.

Table 12: Service use, mean difference derived from ordinary least squares linear regression model: mean differences, effect size and associated 95% confidence intervals (CIs)

	Month 12 Intervention (n = 146) Mean (SE)	Month 12 Control (n = 156) Mean (SE)	Mean difference (95% CI)	Cohen's d (95% CI)	p-value
Missed work days	1.39 (0.55)	3.02 (0.71)	−1.62 (−3.01; 0.17)	−0.34 (−0.77; 0.09)	0.022
Missed school days	8.84 (1.27)	9.18 (1.69)	0.34 (−3.68; 4.37)	0.03 (−0.32; 0.25)	0.868
School suspensions	1.75 (1.26)	3.04 (1.15)	−1.32 (−4.17; 1.54)	−0.57 (−1.21; 0.09)	0.366

SE = standard error

Note: mean differences, 95% CIs and p-values are generated from adjusted analysis. Effect sizes are estimated from the unadjusted analysis.

Subgroup analyses

To explore whether there were specific clusters of young people who had different self-reported delinquency profiles at month 12, we conducted a latent class analysis after item reduction. The model contained delinquency at month 12 (yes/no), age group and service. The latent class analysis identified no specific clusters of characteristics associated with delinquency. This is probably due to a low delinquency rate and model entropy resulting from a lack of sample variability.

Additional analyses and robustness checks

Prognostic regression

A prognostic regression analysis was performed to model the relationship between pre-randomisation factor scores at baseline – service, age, sex, ethnicity, IMD, SDQ, BFRS, GHQ and SWEMWBS – and the volume of offending at month 12. In order to implement an efficient regression approach, we needed to assess the association between each variable that could potentially be included in the model and the outcome. This approach ensured we identified the most predictive variables and avoided over-fitting a model to the data, which would mean the model would only be applicable to the data and not generalisable. To achieve this, we checked the association between each variable and the outcome and only included those that demonstrated an association at a significance level of 0.1 or lower. The factors included in the model were service, SDQ conduct score, SDQ hyperactivity score, SDQ prosocial score, GHQ12, SWEMWBS, family expressiveness and the baseline covariate for the main secondary outcome. Coefficients and associated 95% CIs are provided in Table 13. Prognostic predictors of delinquency at month 12 included the baseline SDQ conduct score, with higher conduct problems predicting greater delinquency and family cohesion and greater family cohesion predicting greater delinquency.

Table 13: Predictors of self-reported offending at month 12, coefficients and standard errors (SEs)

	ß (SE)	p-value
Service[a]		
Early help East	0.76 (0.53)	0.149
Early help North	0.48 (0.52)	0.361
Early help West	0.31 (0.58)	0.590
Edge of care	−0.46 (0.60)	0.450
Youth development	0.03 (0.48)	0.948
Youth justice	0.10 (0.50)	0.836
SDQ conduct	0.29 (0.05)	<0.001
SDQ hyperactivity	−0.08 (0.05)	0.120
SDQ prosocial	−0.09 (0.05)	0.080
GHQ12	0.03 (0.18)	0.141
SWEMWBS	0.06 (0.04)	0.092
Cohesion	0.15 (0.06)	0.013
Expressiveness	−0.07 (0.12)	0.556

Note: SDQ = Strengths and Difficulties Questionnaire; GHQ12 = General Health Questionnaire; SWEMWBS = Short Warwick-Edinburgh Mental Well-being Scale

We repeated this analysis for those in the RBT intervention group alone, augmenting the variables with the tier of intervention and therapeutic alliance at month six, derived from the TASC-r. The factors included in the model were tier, age, SDQ conduct score, SDQ hyperactivity score, SDQ prosocial score, SWEMWBS, family conflict, family expressiveness, family cohesion, therapeutic alliance and the baseline covariate for the primary outcome. Coefficients and associated 95% CIs are provided in Table 14. Prognostic predictors of

delinquency for those in the RBT intervention group at month 12 were tier of intervention and conduct problems at baseline, with those in higher tiers and with greater conduct problems at baseline predicting greater delinquency at month 12. Lower prosocial behaviours at baseline predicted greater delinquency at month 12.

Table 14: Predictors of the self-reported volume of delinquency at month 12 for those in the intervention group: coefficients and standard errors (SEs).

	ß (SE)	p-value
Tier[a]		
1	0.64 (0.39)	0.095
2	0.63 (0.38)	0.101
3	1.98 (0.52)	<0.001
Age	0.18 (0.11)	0.106
SDQ conduct	0.25 (0.08)	0.001
SDQ hyperactivity	−0.06 (0.08)	0.477
SDQ prosocial	−0.22 (0.08)	0.009
SWEMWBS	−0.01 (0.04)	0.774
Cohesion	0.19 (0.10)	0.064
Expressiveness	−0.16 (0.19)	0.396
TASC-r	−0.12 (1.80)	0.694

[a] Contrasted with Tier 0, indicative of no trauma

Note: SDQ = Strengths and Difficulties Questionnaire; TASC-r = Therapeutic Alliance Scale for Children-revised; SWEMWBS = Short Warwick-Edinburgh Mental Well-being Scale

Summary of research questions addressed in the 12-month addendum analysis

1. What is the difference in the volume of self-reported delinquency, derived from the SRDS, at 12 months after randomisation for those receiving the RBT intervention versus those receiving BAU?

   The difference in the mean volume of delinquency in the previous six months for those receiving the RBT intervention versus those receiving BAU was −0.17 (95% CI: −2.02 to 1.68, p = 0.448), with an effect size of −0.17 (95% CI: −0.39 to 0.06). This difference was a moderately positive effect in favour of the intervention but was not statistically significant. An analysis accounting for compliance demonstrated larger effect sizes in the same direction as the ITT analysis. This finding is similar to those at month six.

2. What is the difference in emotional regulation, prosocial behaviour, peer problems, hyperactivity, conduct problems, internalising behaviour and externalising

behaviour, derived from the SDQ, in the 12 months after randomisation for those receiving the RBT intervention versus those receiving BAU?

- The mean difference in the total SDQ score was −0.15 (95% CI: −1.20 to 0.90, p = 0.778), with an effect size of −0.02 (95% CI: −0.24 to 0.20), a small positive effect comparing the intervention with BAU.
- Emotional regulation was 0.04 (95% CI: −0.43 to 0.50, p = 0.881), with an effect size of 0.02 (95% CI: −0.20 to 0.25), a small negative effect comparing the intervention with BAU.
- Prosocial behaviour was −0.11 (95% CI: −0.48 to 0.28, p = 0.599), with an effect size of −0.05 (95% CI: −0.18 to 0.28), a small negative effect comparing the intervention with BAU.
- Peer problems was −0.19 (95% CI: −0.58 to 0.20, p = 0.343), with an effect size of −0.09 (95% CI: −0.14 to 0.32), a small positive effect comparing the intervention with BAU.
- Hyperactivity was −0.03 (95% CI: −0.47 to 0.42, p = 0.905), with an effect size of −0.05 (95% CI: −0.27 to 0.18), a small positive effect comparing the intervention with BAU.
- Conduct problems was 0.10 (95% CI: −0.46 to 0.26, p = 0.598), with an effect size of 0.14 (95% CI: −0.08 to 0.37), a moderate negative effect comparing the intervention with BAU.
- Internalising behaviour was −0.12 (95% CI: −0.79 to 0.56, p = 0.735), with an effect size of −0.06 (95% CI: −0.29 to 0.16), a small positive effect comparing the intervention with BAU.
- Externalising behaviour was 0.03 (95% CI: −0.69 to 0.63, p = 0.931), with an effect size of 0.11 (95% CI: −0.12 to 0.33), a moderate negative effect comparing the intervention with BAU.

All outcomes were derived from the SDQ at 12 months after randomisation for those receiving the RBT intervention versus those receiving BAU. These results indicated no statistically significant differences between the groups. These findings are similar to those at month six, with the exception of emotional regulation and conduct problems, where the effect sizes are small but in the opposite direction to those observed at month six.

3. What is the difference in well-being, derived from the SWEMWBS, 12 months after randomisation for those receiving the RBT intervention versus those receiving BAU? The mean difference in well-being, derived from the SWEMWBS, in the 12 months after randomisation for those receiving the RBT intervention versus those receiving BAU was lower for those receiving the RBT intervention than for those receivingb

BAU but was not statistically significant (−0.06; 95% CI: −0.81 to 0.69, p = 0.880), with an effect size of −0.01 (95% CI: −0.22 to 0.23), an effect size that suggests no impact. This finding is in the opposite direction to that observed at month six.

4. What is the difference in psychological health, derived from the GHQ12, 12 months after randomisation for those receiving the RBT intervention versus those receiving BAU?

   The mean difference in psychological problems, derived from the GHQ12, in the 12 months after randomisation was lower for those receiving the RBT intervention versus those receiving BAU but was not statistically significant (−1.15; 95% CI: −2.64 to 0.34, p = 0.130), with an effect size of −0.09 (95% CI: −0.13 to 0.32), a small positive effect comparing the intervention with BAU. This finding is similar to that observed at month six.

5. What is the difference in family environmental domains, cohesiveness, expressiveness and conflict, derived from the BFRS, 12 months after randomisation for those receiving the RBT intervention versus those receiving BAU?

   The mean difference in family environment domains are cohesiveness at −0.38 (95% CI: −0.77 to 0.17, p = 0.06), with an effect size of −0.21 (95% CI: −0.44 to 0.02), a moderate negative effect comparing the intervention with BAU; expressiveness at −0.13 (95% CI: −0.34 to 0.08, p = 0.220), with an effect size of −0.19 (95% CI: −0.42 to 0.03), a moderate negative effect comparing the intervention with BAU; and conflict at −0.19 (95% CI: −0.57 to 0.19, p = 0.330), with an effect size of −0.08 (95% CI: −0.30 to 0.15), a small positive effect comparing the intervention with BAU. They were derived from the BFRS at 12 months after randomisation for those receiving the RBT intervention versus those receiving BAU and were not statistically significant. These findings are similar to those observed at month six.

6. What is the difference in service use, work days missed, school days missed, school suspensions, school exclusions, police warnings, police charges, days in court and days in custody, derived from the self-reported CSRI, in the previous six months for those receiving the RBT intervention versus those receiving BAU?

   The mean difference of work days missed was −1.62 (95% CI: −3.01 to 0.17, p = 0.02), with an effect size of −0.34 (95% CI: −0.77 to 0.09), a large positive effect comparing the intervention with BAU, although only 92 (30%) out of the sample reported being in work; school days missed was 0.34 (95% CI: −3.68 to 4.37, p = 0.868), with an effect size of 0.03 (95% CI: −0.32 to 0.25), a small positive effect comparing the intervention with BAU; school suspensions was −1.32 (95% CI: −4.17 to 1.54, p = 0.366), with an effect size of −0.57 (95% CI: −1.21 to 0.09), a large positive effect comparing the intervention with BAU, although the numbers of participants reporting any suspension was the same for both groups (19), and those in the BAU group reported a higher frequency of suspension; school exclusions were relatively rare, with five in

the intervention group and three in the BAU group; reported police warnings were relatively rare, with three in both the RBT and BAU groups; there was one reported police charge in each groups; there were two days in court in the RBT intervention group and one in the BAU group; and only one young person in the BAU group reported any time in custody. As these events are rare, no formal inferential analysis was undertaken for these outcomes.

7. Which factors – service, age, sex, ethnicity, material deprivation (IMD), family environment (BFES), behavioural problems (SDQ), well-being (SWEMWBS), and psychological health (GHQ12) – impact the main secondary outcome at month 12 for both groups?

   After data reduction, the following variables were included in a negative binomial regression model, with the volume of delinquency at month 12 as the dependent variable: service; SDQ conduct, hyperactivity and prosocial scores; psychological health; well-being; family cohesion; and expressiveness. The analysis was controlled for the volume of delinquency at baseline. The SDQ conduct score predicted the volume of delinquency at month 12 (ß = 0.29, standard error = 0.05, p = <0.001), indicating that higher conduct problem scores at baseline are associated with a greater volume of delinquency at month 12. Family cohesion also predicted the volume of delinquency at month 12 (ß = 0.15, standard error = 0.06, p = 0.01), with higher family cohesion scores at baseline associated with a greater volume of delinquency at month 12.

8. Which factors – service, age, sex, ethnicity, material deprivation (IMD), family environment (BFES), behavioural problems (SDQ), well-being (SWEMWBS), psychological health (GHQ12), tier of support and therapeutic alliance (TASC-r) – impact the main secondary outcome observed at month 12 for those in the RBT intervention group only?

   After data reduction, the following variables were included in a negative binomial regression model, with the volume of delinquency at month 12 as the dependent variable: tier of intervention; age; SDQ conduct, hyperactivity and prosocial scores; well-being; family cohesion; expressiveness; and therapeutic alliance. The analysis was conducted for those in the intervention group only. The tier of intervention was found to be predictive, with those in the highest tier predicting an increased volume of delinquency at month 12 (ß = 1.98, standard error = 0.52, p = <0.001). Higher baseline SDQ conduct problems (ß = 0.25, standard error = 0.08, p = 0.01) and lower baseline SDQ prosocial scores (ß = −0.22, standard error = 0.08, p = 0.009) predicted a higher volume of delinquency at month 12. The previous finding that a stronger therapeutic relationship was associated with a lower volume of self-reported delinquency at month six was not apparent at month 12.

9. Are there specific clusters of participant baseline outcomes that are associated with the self-reported volume of delinquency in the 12 months after randomisation?

   Latent class analysis found no significant subgroups of baseline demographic variables that were associated with the volume of delinquency at month 12. This is probably due to a lack of substantial variation in baseline demographics.

Addendum conclusions

Table 15: Key addendum conclusions

Key conclusions
The findings from the quantitative evaluation of RBT 12 months after participants entered the trial were consistent with the main evaluation report. RBT continued to show a moderate positive impact on children's and young people's offending behaviour and mixed impacts on secondary outcomes.
RBT continued to show a **moderate positive impact** on children and young people's offending behaviour at the 12-month follow-up. Children and young people supported by practitioners who had received RBT training self-reported lower levels of offending behaviour than those supported by practitioners who had not received RBT training. This finding was consistent with the impact observed at the six-month follow-up.
Consistent with the main evaluation report, RBT showed mixed results on secondary outcomes at the 12-month follow-up. RBT had a small positive impact on behaviour, peer relationships, hyperactivity, internalising behaviours, psychological health, family conflict and school attendance. It had a small negative impact on emotional regulation and prosocial behaviour. RBT also showed a moderate negative impact on conduct problems, externalising behaviours, family cohesion and expressiveness. RBT showed no impact on well-being.
The 12-month analysis should be treated with caution. There was statistical uncertainty around all outcomes, and the findings were also consistent with there being no impact. The trial experienced 24% attrition: 24% of children and young people who started the trial were not included in the 12-month follow-up analysis.

Interpretation

The findings of the main secondary outcome, self-reported volume of delinquency at month 12, found an effect size difference of −0.17 between the groups, RBT versus BAU, although the CI was wide (−0.39 to 0.06) and not statistically significant. This result is similar to the findings at the six-month follow-up point. When compliance with the RBT intervention is considered, the effect size is greater (−0.24; 95% CI: −0.49 to 0.03), which tends to suggest that compliance with the RBT intervention has some influence on reducing self-reported delinquency at month 12.

Of the 304 followed up at month 12, 150 (49.3%) reported no delinquency in the previous six months, and 76 (25.0%) reported no delinquency in the six months prior to the 12-month follow-up point and none in the six months prior to baseline.

In addition, the population did not appear to exhibit evidence of severe trauma, with 120 (80.0%) of those allocated to the intervention and followed up at month 12 either having no trauma – 40% in tier 0, the lowest level of trauma – or lower levels of trauma – 40% in tier 1, with only one young person (0.7%) having trauma at the highest level, requiring a tier 3 psychologist-led multi-agency case formulation process. This compares with the initial estimated 75% of young people in the target population having trauma experiences that impacted their development. It may be the case that the target population did not exhibit delinquent behaviour or trauma at a level that would benefit from an intervention.

This is further highlighted by the lack of statistically significant findings for most of the secondary outcomes, including behaviour, psychological health, well-being and family environment. Higher conduct problems and family cohesion at baseline predicted a greater volume of offences at month 12, and when this analysis was restricted to those in the RBT arm of the study, greater conduct problems and lower prosocial behaviours at baseline predicted a greater volume of offences at month 12. The previous finding that a stronger therapeutic relationship was associated with a lower volume of offending at month six was not apparent at month 12.

The current evidence for redesigning services and training staff to respond to trauma in young people's services in order to reduce crime and violence is weak (Gaffney et al., 2021), and questions have been raised regarding the role childhood trauma has on behaviour (Smith et al., 2021). The reasons include a lack of consistency in the definition of trauma and a lack of scientifically rigorous evaluation. This was one of the first scientifically rigorous randomised controlled trials of trauma-informed practice with children and young people, and the results at month 12 echo the conclusions of the main analysis at month six – whilst it found some influence of the intervention on self-reported offending at month 12, this was not statistically significant. As noted in the main report, this is probably due to several reasons, including limitations in terms of staff and resources, limitations in access to clinical psychologist input, challenges of working across multiple agencies, difficulties in attempts to embed a new way of working across multiple agencies that have different priorities for meeting the needs of children, dilution and contamination. Dilution occurs because many young people involved with children's services do not exhibit trauma, and in the majority of those who do exhibit trauma, it is non-complex and transient. Contamination occurs when professionals working with young people have tacit and experiential knowledge of addressing trauma as part of their practice, which causes an overlap between trauma-informed practice and BAU. The findings also echo those of Asmussen et al. (Asmussen et al., 2022): to make a difference in individual outcomes, trauma-informed service redesign should not be prioritised over evidence-based trauma-informed therapy for those identified as being most in need.

Racial and ethnic disparities

Only 2.5% of the young people who reported their ethnicity in this study were non-White, reflecting the demographic profile of Bridgend, where 97% of the population describes their ethnicity as White. A greater proportion of White potential participants dropped out at the consent stage, 24% versus 10% of those stating their ethnicity as not White. The proportion of those followed up who stated their ethnicity as White was 96% at both the six- and 12-month follow-up points. The lack of diversity in the sample means that a detailed analysis of racial and ethnic disparities is not possible.

Limitations and lessons learned

The limitations and lessons learned from the addendum analysis are the same as those from the analysis at month six. It is clear from the participants included in the study that they had relatively low rates of offending at both baseline and at the 12-month follow-up point, with a large proportion of the sample reporting no offending at all. The sample also appeared to have relatively low levels of trauma; the majority were identified at screening as having no trauma or the lowest level of trauma. In addition, the population was heterogeneous, being derived from several different services within Bridgend County Borough Council; some services have short, time-limited intervention periods: edge of care, for example, is a crisis intervention service, with interventions lasting a few weeks, whereas youth justice interventions can last several months. Overall, there is a question about whether this was the appropriate target population, with most not experiencing significant trauma and being unlikely to benefit from a specific trauma-informed approach. It may, for example, have been more appropriate to intervene after trauma screening and only for those in tiers 2 and 3, employing trauma screening as triage.

There is a large body of literature (Asmussen et al., 2022) that highlights that professionals working with young people already work in a trauma-informed way, applying their own tacit and experiential knowledge to address issues associated with trauma without a specific trauma-informed model of care. This raises the

concern about whether effects are less noticeable between the RBT intervention and BAU groups because of contamination.

A further limitation is the lack of information on what was delivered as part of the RBT intervention. RBT is a model of trauma-informed care, where similar interventions are delivered to both groups, but interventions in the RBT intervention group are informed by the young person's level of trauma experienced and, in some cases, a multi-agency case formulation. Interventions in both groups are delivered as part of a team, so associating change with the skill set of a specific practitioner is difficult. However, it was noted that increased compliance with RBT was associated with a lower volume of offending at 12 months.

Future research and publications

Further research questions include:

- What is the relationship between the level of trauma experienced and behaviour?
- What is the relative effectiveness of different types of trauma therapy for those young people who have experienced significant childhood trauma?
- How effective is trauma-specific therapy versus generic trauma-informed practice for those with the greatest level of need?
- Is there a relationship between the cultural appropriateness of trauma-informed interventions and outcomes for different ethnic groups?

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Addendum appendices

Appendix I – study timeline

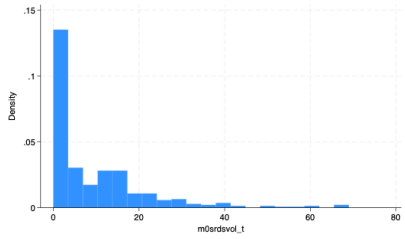
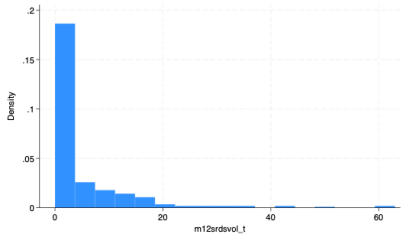
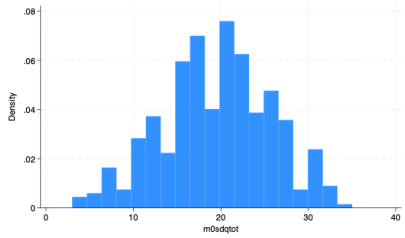
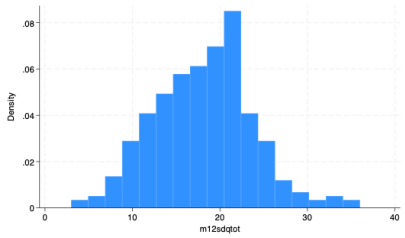
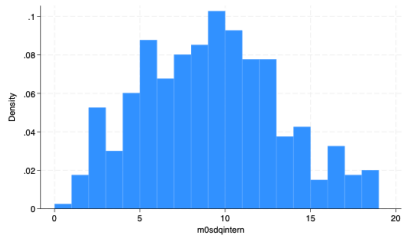
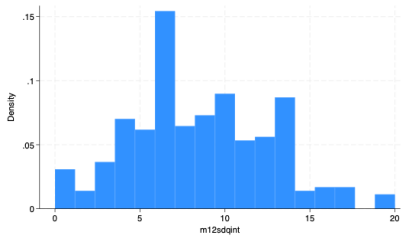
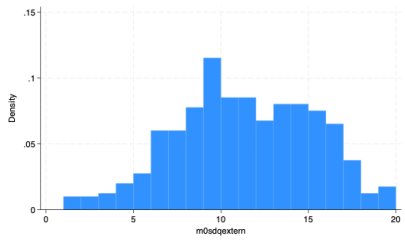
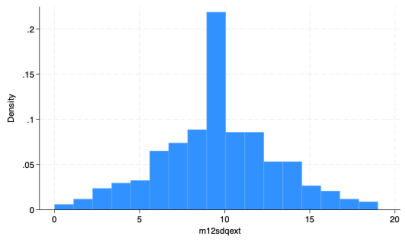
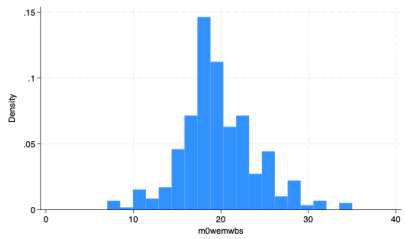
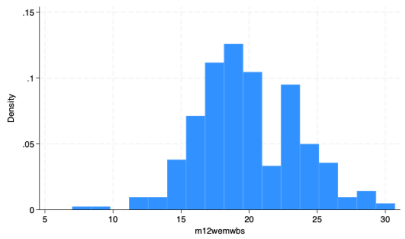
Dates	Activity	Staff responsible / leading
01/07/23–15/07/23	Prepare and submit the evaluation protocol	University of Kent/Teesside University
01/07/23–31/08/23	Identify staff for randomisation	Bridgend
21/08/23–30/09/23	Submit ethics and receive approvals	University of Kent
01/09/23–14/09/23	Conduct pre-randomisation staff survey	University of Kent
15/09/23–30/09/23	Deliver Relationship Building Together (RBT) intervention training	Bridgend County Borough Council/ Relationship Building Together Academy
01/11/23–30/01/24	Develop and submit the statistical analysis plan	University of Kent
01/03/24–15/03/24	Conduct the post-randomisation staff survey	University of Kent
01/01/24–28/02/25	Conduct qualitative interviews	Teesside University
20/11/23–10/03/25	Recruit participants	University of Kent
20/11/23–10/08/25	Deliver the RBT intervention or BAU	Bridgend County Borough Council
20/05/24–10/08/25	Conduct the month 6 follow-up	University of Kent
11/08/25–31/08/25	Complete data quality assurance	University of Kent
01/09/25–30/09/25	Conduct data analysis	University of Kent
01/03/25–30/09/25	Conduct qualitative analysis	Teesside University
01/10/25–31/10/25	Prepare the month 6 draft report	University of Kent/Teesside University
20/11/24 – 10/03/26	Conduct 12-month follow-up	University of Kent
11/03/26 – 30/03/26	Prepare 12-month data for analysis	University of Kent
01/04/26 – 31/05/26	Conduct 12-month analysis	University of Kent
01/05/26 – 31/05/26	Prepare the month 12 draft report	University of Kent

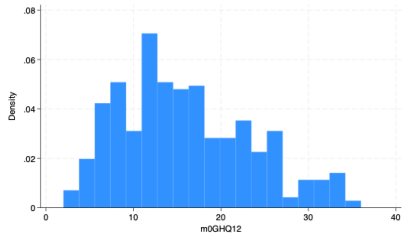
Appendix II – Effect size estimation

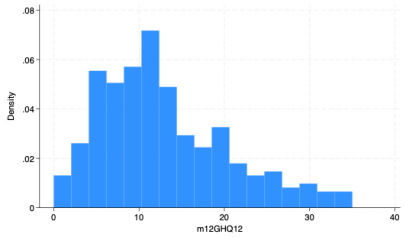
			Intervention group		Control group			
Outcome	Unadjusted difference	Adjusted difference	n (missing)	Variance of outcome	n (missing)	Variance of outcome	Pooled variance	Population variance (if applicable)
Self-report delinquency – volume score at month 12	-1.52	-0.17	148 (52)	106.87	156 (45)	57.01	81.59	
SDQ total score at month 12	0.11	-0.15	148 (52)	32.72	156 (45)	34.10	33.33	
SDQ emotional regulation score at month 12	-0.06	0.04	148 (52)	7.04	156 (45)	6.80	6.90	
SDQ Conduct score at month 12	0.22	0.10	148 (52)	3.94	156 (45)	3.31	3.62	
SDQ hyperactivity score at month 12	0.10	-0.03	148 (52)	4.93	156 (45)	4.74	4.82	
SDQ Peer problems score at month 12	-0.19	-0.19	148 (52)	4.67	156 (45)	4.66	4.66	
SDQ Prosocial behaviour score at month 12	-0.11	-0.11	148 (52)	4.23	156 (45)	4.92	4.57	
SDQ externalising behaviour at month 12	0.37	0.03	148 (52)	17.15	156 (45)	15.77	16.40	
SDQ interernalising behaviour at month 12	0.77	-0.12	148 (52)	12.87	156 (45)	11.27	12.04	

SWEMWBS wellbeing score at month 12	-0.02	-0.06	144 (56)	11.34	154 (47)	15.63	13.50	
GHQ12 Psychological Health at month 12	0.85	-1.15	144 (56)	48.29	154 (47)	59.31	53.93	

Appendix III: Distribution of outcomes

Month 0	Month 12	
		Volume of offences – negative inflated with overdispersion – negative binomial regression
		SDQ total score – Normal distribution – OLS linear regression
		SDQ internalisation score – Normal distribution – OLS linear regression
		SDQ externalisation score – Normal distribution – OLS linear regression
		Wellbeing WEMWBS score – Normal distribution – OLS regression





Psychological Health GHQ12 – Normal distribution – OLS regression