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Evaluation of the impact of the HM Prison Service Enhanced Thinking Skills programme on reoffending Outcomes of the Surveying Prisoner Crime Reduction (SPCR) sample

Greg Sadlier

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Evaluation of the impact of the HM Prison Service Enhanced Thinking Skills programme on reoffending Outcomes of the Surveying Prisoner Crime Reduction (SPCR) sample

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Policy briefing

More than half of all crime is committed by offenders who have previously been through the criminal justice system.¹ Time spent in custody therefore presents an important opportunity for intervention to address prisoners' criminogenic needs.² Enhanced Thinking Skills (ETS) is an accredited offending behaviour programme that addresses thinking and behaviour associated with offending with the objective of reducing general reconviction rates.³

This research examined the impact of prison-based ETS on the one-year reconviction outcomes of 257 adult participants (all programme starters) between 2006 and 2008, with the following findings:

- a statistically significant reduction of six percentage points in the one-year reconviction rate compared with the reconviction rate of a matched comparison group;
- a statistically significant reduction in the frequency of reoffending of 60 recordable offences per 100 released prisoners;
- no statistically significant impact was found on the severe⁴ offence reconviction rate.

Almost identical impacts were found for completers alone, but the significance of the one-year reconviction rate was lost due to the reduction in sample size (by excluding drop-outs).

The research also examined participant suitability targeting, relative to the suitability criteria.

- Only 58% of ETS participants were found to have met the ETS suitability criteria fully (met both need and risk requirements simultaneously), though caveats apply. This suggests that the programme was not always administered to the most suitable prisoners, which may have limited its effectiveness.
- A stronger reduction in the reconviction rate and frequency of reoffending was found for participants meeting the suitability criteria.

Though the programme has been shown to be effective in practice, these findings suggest that a stricter application of the targeting criteria may have further enhanced the effectiveness of the programme in reducing reoffending.⁵

1 Home Office (2006).

2 Criminogenic needs refer to a wide range of factors (associated with the pathways) which are generally understood to be related to offending.

3 In 2009, ETS was replaced by the Thinking Skills Programme (TSP), representing a refresh and update of the cognitive skills programme in line with advances in theory and practice. Evaluation of reconviction outcomes of TSP participants is not yet possible as not enough time has passed since its introduction.

4 Approximately 150 of the 3,000 Home Office offence codes are defined as 'severe', including: violence against the person (e.g. murder, manslaughter), sexual offences, aggravated vehicle taking, and death by dangerous, drink or drug driving. A full list is available in Ministry of Justice (2010).

5 National Offender Management Service practitioners report that the accuracy of targeting has improved over time, meaning that a similar evaluation of ETS in a later period (post-2008) or TSP might find an even more significant effect.

Research summary

This research examined the impact of the Enhanced Thinking Skills (ETS) accredited offending behaviour programme on the one-year reconviction outcomes of 257 prison-based participants between 2006 and 2008.

ETS is a cognitive-behavioural offending behaviour programme that addresses thinking and behaviour associated with offending with the objective of reducing general reconviction rates. It is targeted at medium-high/high risk male and female offenders with a need for cognitive skills intervention. The programme consists of 20 two-hour interactive sessions, delivered three to five times per week for four to six weeks, with two facilitators and no more than ten participants.⁶

Evaluation of the effectiveness of interventions in reducing reoffending enables policy makers to prioritise and focus resources on the most productive programmes. The objective of the research was to evaluate the HM Prison Service Enhanced Thinking Skills accredited offending behaviour programme in terms of reconviction outcomes, whilst controlling for the different characteristics, needs and risk factors of offenders.

The research aims to provide some clarity to the discordant evidence base on the effectiveness of ETS in reducing reoffending. Early findings of a statistically significant reduction in reconviction (Friendship *et al.*, 2002) following ETS participation were later tempered by research studies finding little or no statistical differences between ETS participants and non-participants (Falshaw *et al.*, 2003; Cann *et al.*, 2003; Cann, 2006; McDougall *et al.*, 2009). However, all evaluations of reconviction outcomes (Friendship *et al.*, 2002; Falshaw *et al.*, 2003; Cann *et al.*, 2003; Cann, 2006) note a common methodological limitation as a possible explanation of their findings: the inability to control for potential selection bias due to differences in unmeasured dynamic risk factors⁷ between the participants and their comparators. The key added value of the current study is the ability to match on the basis of dynamic risk factors (for example, drug use, accommodation, motivation to stop offending, attitudes, education, marital status) and additional rich static risk factors (for instance, family criminal history) in addition to the standard static risk factors.

As the source of the novel dynamic risk factor data, the base sample for the analysis is that of the Surveying Prisoner Crime Reduction (SPCR) prisoner survey.⁸ The SPCR dataset was supplemented by data on offender treatment status from the offending behaviour programme interventions database (National Offender Management Service Rehabilitation Services Group), data on the assessed need and risk of prisoners from the Offender Assessment System (OASys) and criminal history and reconviction data from the Police National Computer (PNC).

6 In 2009, ETS was replaced by the Thinking Skills Programme (TSP), representing a refresh and update of the cognitive skills programme in line with advances in theory and practice. Evaluation of reconviction outcomes of TSP participants is not yet possible as not enough time has passed since its introduction.

7 Reoffending risk factors are split into 'static' factors that cannot be changed (e.g. age, gender, criminal history) and 'dynamic' factors that can be changed (e.g. drug misuse, motivation to stop offending, attitudes to crime).

8 A large-scale longitudinal cohort study of nearly 4,000 newly sentenced adult prisoners in England and Wales.

The final sample size was 2,771 prisoners sentenced to between one month and four years, including 2,405 (87%) men and 366 (13%) women. The treatment sample comprised 257 (9%) prisoners who participated on ETS between March 2006 and September 2008, including 20 (8% of participants) that did not complete the course. The remaining 2,514 prisoners did not participate on ETS and were used to select a matched comparison group.

A retrospective quasi-experimental research design was used to compare the one-year reconviction outcomes of participants with a matched comparison group that had not participated in the programme. Three outcome measures of proven reoffending⁹ were considered (all within one year of release): the proportion of prisoners that were reconvicted; the frequency of reoffending; and the proportion that were reconvicted of a severe offence.

Propensity score matching¹⁰ was used to select a comparison group that was statistically 'similar' to participants across a set of pre-selected characteristics that are predictive of ETS participation and reconviction, measured prior to treatment.

- **ETS suitability criteria:** level of criminogenic need (factors associated with offending behaviour); risk of reconviction; and responsiveness and readiness criteria.
- **Static risk factors:** age; gender; index offence type; Copas rate (a measure of criminal career length and intensity); sanctioning history (previous convictions and previous severe convictions); ethnicity; marital status; and family criminal history.
- **Dynamic risk factors:** motivation to stop offending; attitudes to offending; drug use; accommodation; educational attainment; and employment status before custody.

Equality of means testing confirmed no statistically significant difference between the treated and matched control group across all matching characteristics. Any observed difference in the average reconviction rates between the two groups is therefore assumed to be the causal effect of the ETS intervention, known as the average treatment effect on the treated (ATT).

Whilst every effort has been made to remove the selection bias, it is possible that an unmeasured bias may still remain uncontrolled. Further checks revealed some differences between the treatment and control groups. It was found that the average sentence length of the treatment group (975 days) was longer than that for the control group (727 days). It was also found that 6% of the treatment group and 2% of the control group had been on another accredited OBP during the SPCR sentence, though both proportions are small. It is also possible that prisoners may have participated on non-accredited OBPs or a substance

9 An offender is said to have committed a proven reoffence if the offender receives a conviction (by a caution or guilty verdict) at court for the reoffence. The reoffence must have been committed within the one-year follow up period, and the conviction must follow either within that one-year follow up, or in a further 6 months, which is to allow time for the offence to be proven at court.

10 Technical note: Controls were matched using a radius matching algorithm (calliper = 0.05) based on the odds ratio of the propensity score, predicted using logistic regression.

misuse treatment during their SPCR sentence period, which may have contributed to the observed treatment effect. The potential for such multiple interventions has not been controlled for as the sample size did not permit such analysis. The standard caveat covering generalisability of findings from limited sample sizes applies.

The results of this evaluation show that ETS was successful in significantly reducing both the reconviction rate and frequency of general reoffending of participants.

- The proportion of ETS participants that were reconvicted within one year (27.2%) was six percentage points lower (statistically significant) than the comparison group (33.5%).
- ETS participants were convicted of 60 fewer recordable offences within one year per 100 released prisoners than comparators (60.7 versus 120.8 offences), a statistically significant reduction.
- No statistically significant impact was found on the severe offence reconviction rate (a reduction of 0.1 percentage points was not statistically significant).

Almost identical impacts were observed for completers only (drop-outs were removed from the sample). The same significant reduction in frequency of reoffending was found, but the significance of the reduction in the rate of reconviction was lost due to the reduction in sample size (by excluding drop-outs). Nonetheless, evaluation based on all participants better captures the true effect of the intervention in practice (Colledge *et al.*, 1999).

A secondary finding of the research was a low adherence to the suitability targeting criteria among those prisoners that actually received the programme over the period 2006 to 2008, though caveats apply. Investigation revealed that only 58% of ETS participants were suitable for ETS (met both need and risk requirements simultaneously). This suggests that the programme was not always administered to the most suitable group of prisoners, which may have limited its effectiveness. The reconviction rate and frequency of reoffending was found to be lower for participants meeting the suitability criteria than those not meeting them. The one year reconviction rate for strictly suitable treated offenders (17.2%) was lower than that for not strictly suitable ones (32.9%). Similarly, the frequency of reoffending of strictly suitable offenders (39.8 reoffences) was also lower than that of the not strictly suitable offenders (72.6 reoffences).

The findings are encouraging for policy makers and practitioners alike. The fact that ETS has been found to significantly reduce the one-year reconviction rate and frequency of reoffending provides support for the funding and use of ETS (and by extension its replacement, TSP) in custody. Though the programme has been shown to be effective in practice, these research findings suggest that a stricter application of the targeting criteria

may have further enhanced the effectiveness of the programme in reducing reoffending.¹¹ National Offender Management Service practitioners report that the accuracy of targeting has improved over time, meaning that a similar evaluation of ETS in a later period (post-2008) or TSP might find an even more significant effect.

11 Research clearly demonstrates the importance of risk, need and responsivity targeting for effective treatment (Hollin, 1995; Taxman and Thanner, 2006; Palmer, *et al.*, 2009; Gendreau, *et al.*, 2009; Andrews and Bonta, 2010).

1 Context

Reoffending accounts for a substantial proportion of crime and reducing reoffending is an important policy objective of the criminal justice system.

As more than half of all crime is committed by offenders who have previously been through the criminal justice system,¹² today's prison population includes the likely offenders of tomorrow. Therefore, time spent in custody presents an opportunity for intervention to rehabilitate prisoners by addressing their criminogenic needs¹³ so as to improve their chances of re-integrating successfully into society on their release. Offending behaviour programmes (OBPs) – rehabilitation programmes designed to identify, reduce and monitor factors associated with offending – play an important role in this effort to break the cycle of crime.

This research examined the impact of the Enhanced Thinking Skills (ETS) accredited offending behaviour programme on the one-year reconviction outcomes of 257 prison-based participants between 2006 and 2008.

Research question

Evaluation of the effectiveness of interventions in reducing reoffending enables policy makers to prioritise and focus resources on the most productive programmes. Ineffective programmes can then be targeted for reform or termination, just as effective programmes can be identified, with improvements sought to further enhance effectiveness. This evaluation seeks to contribute to this process by evaluating what has been the most frequently delivered accredited OBP in HM Prison Service.

The objective of the research was to evaluate the HM Prison Service Enhanced Thinking Skills accredited offending behaviour programme by linking interventions in prison to reconviction outcomes, whilst controlling for the different characteristics, needs and risk factors¹⁴ of offenders. Incorporating new data on dynamic risk factors, the analysis is based on the Surveying Prisoner Crime Reduction (SPCR) prisoner survey sample.

Whilst the ETS programme has been evaluated previously (Friendship *et al.*, 2002; Falshaw *et al.*, 2003; Cann *et al.*, 2003; Cann, 2006; McDougall *et al.*, 2009), this is the first time that dynamic risk factors (including drug use, accommodation, motivation to stop offending, attitudes, marital status) and additional rich static risk factors (for instance, family criminal history) provided by the SPCR survey, have been available to improve comparison group matching.

12 Home Office (2006).

13 Criminogenic needs refer to a wide range of factors (associated with the pathways) which are generally understood to be related to offending.

14 Reoffending risk factors are split into 'static' factors that cannot be changed (e.g. age, gender, criminal history) and 'dynamic' factors that can be changed (e.g. drug misuse, motivation to stop offending, attitudes to crime).

The Enhanced Thinking Skills programme

Enhanced Thinking Skills (hereafter referred to as ETS) is a short group-based general offending behaviour programme delivered by HM Prison Service that addresses thinking and behaviour associated with offending with the objective of reducing general reconviction rates.¹⁵ Following the cognitive-behavioural approach, it is based on the premise that cognitive skills deficits (for example, poor problem solving and critical reasoning) are important factors in explaining offending behaviour, and that such skills can be taught (Clarke, 2000).

Through a sequenced series of structured exercises, ETS aims to boost prisoners' cognitive skills to enhance offenders' ability to achieve worthwhile goals and ultimately reduce recidivism. The exercises are designed to target six key aspects of thinking skills linked with offending: impulse control, cognitive style (flexible thinking), social perspective taking, values/moral reasoning, critical reasoning and interpersonal problem solving.

ETS was developed by the Prison Service in the early 1990s and was first accredited for use in custody in 1996.¹⁶ The programme consists of 20 two-hour sessions, run between three and five times per week for a period of four to six weeks. Sessions involve interactive exercises, assignments, role playing and discussions, and are run by two facilitators with no more than ten participants per group.

In 2009, ETS was replaced by the Thinking Skills Programme (TSP), representing a refresh and update of the cognitive skills programme in line with advances in theory and practice.

Suitability criteria

ETS is targeted at male and female offenders who are medium-high risk or above with a need for cognitive skills intervention. The specific risk and need requirement participant identification tools (jointly referred to as 'suitability criteria') applicable during the period of treatment are set out below.¹⁷

15 Since 2000, an amended version of ETS has been delivered by HM Probation Service to offenders in the community.

16 Ministry of Justice (2009).

17 The suitability criteria for ETS have been revised over time. Those employed in this analysis are based on the *Assessing Suitability for Offending Behaviour Programmes: Risk, Need & Responsivity Guidance for Treatment Managers* published in August 2007 (HM Prison Service, 2007). The ETS start dates of treated individuals in the SPCR sample stretch from March 2006 to September 2008, so this guidance was introduced in the middle of this period. Nonetheless, as an indication and selector of suitability for the intervention, the guidance is retrospectively relevant. With the emergence of OGRS version 3 (Howard *et al.*, 2009), later guidance (National Offender Management Service, 2009) has defined the risk requirement for ETS (and its replacement, TSP) with reference to OGRS3 (2 year reconviction, 50 and above).

Risk requirements¹⁸

The assessment of risk of proven reconviction ensures that the programme is appropriate for the individual. The risk threshold specified for ETS is the point on either the Offender Assessment System (OASys) or Offender Group Reconviction Scale¹⁹ version 2 (OGRS2) scale (with the higher score band used if both are completed) that divides 'low-medium' from 'high-medium' risk offenders:

- OASys score: 56 or above; or
- OGRS2 score: 41 or above.

Need requirements²⁰

The assessment of need ensures that the programme is relevant to the individual's needs. Potential need for cognitive skills intervention is considered present if the sum of the prisoner's scores on a selected seven of the ten Section 11 (Thinking and Behaviour) items of the OASys assessment totals 7 or above, or totals 4 or above with at least one individual score of 2 (indicating significant problems). The seven selected Section 11 items are: impulsivity, ability to recognise problems, problem solving skills, awareness of consequences, achieves goals, understands other people's views, and concrete/abstract thinking.

Responsivity and readiness criteria

Though more advisory than prescriptive, consideration is also given to the responsiveness and readiness of the individual to benefit from the programme. This is assessed in relation to: intellectual ability, literacy, dyslexia/learning difficulty, mental and physical health, psychopathic traits, motivation to change behaviour, and disability. This ensures that the programme's mode of delivery matches the learning styles and other diverse needs of participants.

Prioritisation of suitable candidates

Once assessed as suitable for the programme, candidates are then prioritised according to: risk of serious harm, likelihood of reconviction, proximity to release, timing of hearings, likelihood of positive impact, group composition and other opportunity for treatment.²¹

18 Prior to August 2007, the Sentence Planning Risk Predictor was used as the risk tool when assessing suitability for any OBP. There is some flexibility in the application of the risk requirement, with prisoners within three points of the OASys/OGRS2 cut-off permitted to progress for need requirement consideration. There are also exemptions to the cut-offs for indeterminate sentenced prisoners and sex offenders who score at least medium on the Risk Matrix 2000.

19 The Offender Group Reconviction Scale (OGRS) is a risk assessment measure used to predict the likelihood of reconviction for individual offenders based on static risks (age, gender and criminal history) alone.

20 The original indicator of criminogenic needs, the ETS Semi-Structured Interview, has gradually been replaced by OASys Section 11 scores, as confirmed in later guidance (National Offender Management Service, 2009).

21 HM Prison Service (2007).

Previous evaluation research

Previous evaluations of ETS have produced mixed results on the effectiveness of the programme. Early findings of a statistically significant and large reduction in reconviction were later tempered by research studies finding little or no statistical differences between ETS participants and non-participants. Results have also differed depending on whether starters or completers are included and whether a one- or two-year reconviction outcome is used. Several reasons for the disparity in findings have been speculated, with all studies citing the potentially important role of unmeasured dynamic factors. This is a shortcoming that this study sought to address.

All reconviction studies to date have used a retrospective quasi-experimental research design that compares the reconviction outcomes of the ETS treatment group with those of a comparison group matched on a narrow range of static risk factors.

The first evaluation of ETS, by Friendship *et al.* (2002), examined the pre-accreditation ETS programme delivered by HM Prison Service (from 1992 to 1996). The research found statistically significant reductions in the two-year reconviction rate of male ETS participants. Specifically, participation in either ETS or Reasoning and Rehabilitation (R&R)²² was found to significantly reduce the two-year reconviction rates for medium-to-low (by 14 percentage points) and medium-to-high (11 percentage points) risk offenders. No significant effect was found for either low or high risk offenders.

Subsequent studies of the post-accreditation programme could not reproduce these positive results. In contrast, Falshaw *et al.* (2003, 2004) failed to find a statistically significant difference in the two-year reconviction rates of adult ETS participants (1996 to 1998) in any of the OGRS risk bands, whether programme non-completers were included or excluded. A similar evaluation by Cann *et al.* (2003) investigated the temporal effects of ETS by studying both the one- and two-year reconviction rates for male adult and young offenders (1998 to 2000). Whilst no difference was detected for all adult males who had started the programme, a significant reduction in the one-year rate was found for males (2.6 percentage points on average, and 7.0 for high risk offenders) and young offenders (3.6 percentage points on average) who had completed the programme. However, these differences were not maintained a further year on, with no significant effect found for any group at the two-year post-release stage, suggesting that the impact of ETS on reoffending behaviour may be short-lived.

The possibility of a differential gender impact of ETS was considered by Cann (2006) who assessed the impact of ETS on a group of female (only) participants – the only evaluation to consider female prisoners. The results were similar to the post-accreditation evaluations of ETS delivered to males, with no significant differences in the one- and two-year reconviction rates of female ETS participants.

²² The researchers note that “[a]s Reasoning and Rehabilitation (R&R) and Enhanced Thinking Skills (ETS) share the same theoretical basis, the programmes are analysed alongside one another.” (Friendship *et al.*, 2002, pp.2-3.)

More recently, a randomised control trial (RCT) evaluation of ETS in HM Prison Service by McDougall *et al.* (2009) focused on the short-term impact of the programme. They found that ETS was effective in reducing impulsivity and changing the self-reported offending-related thinking of adult male prisoners. No examination of reconviction outcomes was possible however, as ethical considerations of treatment denial meant that the comparison group also participated in an ETS programme later in their sentence prior to release. Nonetheless, as impulsivity has been linked to reoffending (Blackburn, 1972; Eysenck and McGurk, 1980; Mak, 1991) this finding suggests an expected reduction in recidivism for participants. This result supports earlier findings (Clarke *et al.*, 2004) that ETS participation brought short-term non-reconviction benefits, including increased self-confidence, developed interpersonal skills and improved prisoner behaviour. The nature of prisoners' motivations for participating in a cognitive behaviour programme was also found to be a key factor in assessing the effectiveness of the programme (Clarke *et al.*, 2004).

Rationale for this evaluation

Existing evaluation evidence on ETS is therefore inconclusive (McDougall *et al.*, 2009). Reflecting on the disagreement of later findings with those of Friendship *et al.* (2002), it has been suggested (Falshaw *et al.*, 2003; Cann *et al.*, 2003) that the early large significant impact may have reflected an initial enthusiasm of programme tutors, motivation of participants, and/or the focused nature of delivery prior to its accreditation and later expansion.²³ Such an explanation would, if true, create doubts about the efficacy of OBP accreditation and roll-out of programmes across the Prison Service.

Alternatively, another factor may drive the variability of evaluation results. Whilst disagreeing in terms of research findings, all previous evaluations of ETS note one common methodological limitation as a possible explanation of their findings: the inability to control for potential differences in dynamic risk factors (Friendship *et al.*, 2002; Falshaw *et al.*, 2003; Cann *et al.*, 2003; Cann, 2006). As very little data have been available to date on dynamic factors, previous studies have been constrained to matching based on a narrow range of static risk factors alone (for example, age, gender, ethnicity, criminal career variables). Consequently, potential selection bias due to differences in unmeasured dynamic risk between the participants and their comparators has not been controlled. Such bias could plausibly account for the variation of the evidence to date.

The key advantage and added value of this research is the opportunity to match using dynamic risk factors in addition to static ones, afforded by SPCR prisoner survey and OASys data. Some of the dynamic risk factors on which data are available are: motivation to stop offending, attitudes to crime, substance misuse, physical and mental health, educational

²³ For a qualitative examination of the process of ETS implementation and delivery in a prison context, please see Clarke *et al.* (2004).

attainment and skills level, employment status, accommodation status, marital status, and needs. The prisoner survey also allows matching on additional rich static risk factors (for example, family contact with the criminal justice system).

A further limitation of previous evaluations has been the reliance on Offenders Index data to assess reconviction, which may not be the most complete source of such information (Falshaw *et al.*, 2003). The current study improves on this aspect by drawing its reconviction data from the Police National Computer, the official source of criminal conviction histories.

2 Approach

The research methodology of the study, covering data sources, final sample details and analysis techniques employed, is summarised and explained in this section. More details on technical points are provided in the Technical Annex.

This evaluation assessed the impact of the HM Prison Service ETS programme on reoffending using a retrospective quasi-experimental research design that compared the one-year reconviction outcomes of participants with those of a matched comparison group that had not participated in the programme. The research set out to test the hypothesis that ETS has no significant impact on the reconviction rates of programme participants.

Based on the SPCR prisoner sample and incorporating data from the Offending Behaviour Programme Interventions Database, Offender Assessment System (OASys) and the Police National Computer (PNC), the assembled dataset provides a profile of prisoners' characteristics, needs, experiences and outcomes of unprecedented detail. The combined dataset comprises more than 1,800 variables on a final sample of 3,277 prisoners.

The comparison (matched control)²⁴ group was generated using a statistical matching technique such that it is sufficiently 'similar'²⁵ to the ETS participant (treatment) group to permit valid comparison. The effect of this technique is to balance the programme suitability, offending-risk characteristics and criminogenic needs across the treatment and matched control groups. A strong match has been achieved taking account of 42 variables, meaning that the treatment and control groups are statistically 'similar', or unbiased, such that we would expect to observe the same reoffending outcomes for each group on average. Any observed difference in the average reconviction rates between the two groups may therefore be assumed to be the causal effect of the ETS intervention, known as the average treatment effect on the treated (ATT).

The analysis was carried out on an 'intention-to-treat' basis (consistent with Colledge *et al.*, 1999), whether the participant completed the ETS programme or not, though analysis of completers only has also been run for completeness.

24 A note on terminology used for the remainder of the report: following the evaluation literature, the term 'treatment group' is used in this report to refer to those prisoners in the sample that received ETS in the relevant sentence period. Conversely, the term 'untreated' is used to distinguish those prisoners in the sample that did not receive ETS in the relevant sentence period. The term 'control' (and 'matched control') is reserved to refer to the untreated prisoners that form part of the matched control group following propensity score matching.

25 'Similar' is defined as having mean values that are not statistically different from those of the participant group across a set of variables pre-selected as being simultaneously predictive of the probability of treatment and the probability of reconviction.

Data sources and sample details

As the source of the novel dynamic risk factor data, the base sample for the analysis is that of the SPCR prisoner survey. The SPCR dataset is supplemented by merging to three further data sources: data on which prisoners received ETS in what time period from the Offending Behaviour Programme Interventions Database; data on the assessed need and risk of prisoners from the Offender Assessment System (OASys); and criminal history and reconviction data from the Police National Computer. Each data source is described in turn.

SPCR prisoner survey (wave 1)

Surveying Prisoner Crime Reduction (SPCR) is a large-scale longitudinal cohort study of nearly 4,000 newly-sentenced adult prisoners in England and Wales comprising four waves of interviews conducted between 2005 and 2009.

This evaluation uses wave 1 data only. Wave 1, conducted at the point of reception into prison, describes the characteristics and needs²⁶ of the cohort of prisoners: demographics, background and family; offending history; educational achievements; employment status; physical and mental health; substance misuse; accommodation and relationships; attitudes;²⁷ needs to help prevent them from reoffending; and plans and expectations for the future (upon release from prison). All data are self-reported and as the survey responses relate to the start of the particular custodial sentence, all responses are measured before any treatment could have commenced.

Prisoners were selected from the Ministry of Justice's (MoJ) Inmate Information System (IIS) database, and their current location found using MoJ's Local Inmate Data System (LIDS). The minimum sentence length accepted was one month, due to the time taken to locate the prisoner and interview them, and the maximum sentence length was four years, to allow for a reasonable data-collection period. Prisoners were recruited into the study on the basis of fully informed consent, and ethical guidelines for social research were followed. Prisoners were interviewed by specially trained researchers using computer-assisted (CAPI) questionnaires.

Interview targets were set for every reception prison (except those with very low throughput), based on the proportional sizes of receptions at each prison. Prison reception characteristics were found to be highly variable, and targets were compiled using the most recent information available. Over-sampling targets were calculated to allow for any difficulties in accessing prisoners. Thus, the interviews were drawn from 40 prisons from a possible 53 eligible prisons.

26 The term 'needs' is used throughout to refer to a wide range of factors (associated with the pathways) which are generally understood to be related to offending, sometimes known as "criminogenic needs". A summary of the general problems and needs of these newly sentenced prisoners has already been published (Stewart, 2008).

27 Attitudes are measured using CRIME-PICS II (Frude *et al.*, 1994), a widely used and validated questionnaire-based instrument for examining, and detecting changes in, offenders' attitudes to offending. Special thanks are due to Jennifer Poyser in Offender Management Analytical Services at MoJ for the conversion of SPCR attitude question responses to CRIME-PICS II scores.

The full sample (after removal of ineligible participants)²⁸ at wave 1 was 3,849 adult prisoners sentenced to between one month and four years.²⁹ This represents the base sample for this evaluation, though the final sample will be smaller, due to failed matches in database merging and data completion filters.

Offending Behaviour Programme Interventions Database

To determine the treatment status of the base sample (that is, which prisoners had received ETS during their sentence period), the SPCR wave 1 dataset was linked to the OBP prison interventions database compiled by the National Offender Management Service (NOMS) Rehabilitation Services Group.³⁰

The database is based on administrative records of interventions delivered to prisoners (71,521 unique prisoner numbers) from 1994 to 2009. It covers accredited OBPs only, including: Controlling Anger and Learning how to Manage it (CALM), Cognitive Skills Booster (CSB), Cognitive Self Change Programme (CSCP), Enhanced Thinking Skills (ETS), Focus on Resettlement (FOR), Healthy Relationships Programme (HRP), Reasoning and Rehabilitation (R&R), Chromis, JETS, and Sex Offender Treatment Programme (SOTP).

When matched to the SPCR sample (by prisoner number), it was found that 449 (12%) of the 3,849 SPCR prisoners had received an accredited intervention. The magnitude of this intervention rate was validated by comparison of total ETS programme participants and total prison population figures. More specifically, 371 (10%) prisoners were identified as having participated in ETS within the SPCR sentence period. All started the programme between March 2006 and September 2008.³¹ ETS was by far the most common OBP intervention delivered, and the only individual programme with a sufficient number of participants to permit a statistical analysis of effectiveness.

Offender Assessment System (OASys)

For verification of suitability for the programme and to allow matching of control prisoners based on these characteristics, data are required on the risk and need of the prisoners in the sample. This data requirement is fulfilled by the Offender Assessment System (OASys).

28 Twenty-eight participants were removed due to ineligibility. Please see the SPCR Technical Report for more information.

29 There are two sub-samples within SPCR: Sample 1 (Reception Prisoners) is representative of the entire prison reception population (the 'flow' into prison) at the time of sampling (n=1,435); Sample 2 (Longer-term Prisoners) is a booster sample to reflect the higher proportion of longer-term prisoners in the prison population (the 'stock' of prisoners) (n=2,414). Please see the SPCR Technical Report for more information. This evaluation study uses the combined sample and does not distinguish between the two sub-samples. That said, ETS tends to be reserved for longer-term prisoners.

30 Previously known as the Interventions & Substance Misuse Group (ISMG).

31 If a prisoner was recorded as receiving more than one ETS course in the SPCR sentence period, the latest start date was used.

OASys is NOMS's principal risk/need assessment and management tool for adult offenders in England and Wales, and is used to assess suitability for ETS. Introduced in 2001, OASys produces standardised assessments of offenders' risks and needs by combining actuarial methods of prediction with structured professional judgement. In terms of outputs, OASys provides data on the likelihood of reconviction, criminogenic factors (need) and risk of harm.

The SPCR sample was matched to the OASys database by PNC number. All OASys assessments completed for the prisoners in the SPCR sample, subject to data completion criteria,³² were provided by the OASys Data Evaluation and Analysis Team (O-DEAT), numbering some 29,564.³³ Nonetheless, as OASys assessments are not mandatory and the coverage of OASys is not universal, an OASys assessment is available for only 3,512 prisoners (316 of which were treated).

With an average of eight assessments provided per prisoner, the one OASys assessment relevant to the instance of ETS participation was selected for each prisoner. The method of selection differed for treated and untreated prisoners. As the start date of ETS is known for each participant, the most recent assessment prior to the start date was selected. As there is no start date for the untreated group, the OASys assessment completed closest (before or after) to the SPCR sentence prison reception date was selected.

Police National Computer

Criminal conviction history and reconviction data were obtained from the Police National Computer (PNC). The SPCR sample was matched to the PNC database (June 2010 snapshot) using personal identifiers (surname, forenames, gender, date of birth), returning 3,615 valid matches.³⁴ Respondents must have been released for a minimum of one and a half years (allowing one year to reoffend and six months to be convicted) to be included in the matched sample. Respondents that were deceased, deported or had absconded were excluded from the sample.

Final achieved sample details

Following merging of the four datasets, 2,771 of the 3,849 full SPCR sample (and 257 of the 371 ETS participants) had complete data: a valid OASys assessment, matched to the PNC, and had no missing data on any variables employed in the statistical modelling. The sample included 2,405 (87%) men and 366 (13%) women.

32 All assessments provided met the following minimum standards of data completion: Each of the scored sections (1 to 12) within the core OASys assessment must have had at least four-fifths of their scored items completed – ensuring that each criminogenic need was assessed properly; and In the risk of serious harm sections, the screening must have been completed, the decision whether to complete a full risk analysis should have been consistent with the information provided, and the four ratings of risk of serious harm in the community must have been completed. (OASys Data Evaluation and Analysis Team, 2010).

33 All OASys assessments used in the analysis are pre-OASys release 4.3.1 (August 2009) assessments.

34 Special thanks are due to Richard Boorman in Offender Management Analytical Services at MoJ for matching the SPCR sample to the PNC and completing the reconviction analysis.

The participant sample comprised 257 (9% of the final sample) treated prisoners who started ETS between March 2006 and September 2008. This includes 20 (8% of all treated) participants that did not complete the course, a similar proportion observed in previous studies (Friendship *et al.*, 2002; Falshaw *et al.*, 2003; Cann *et al.*, 2003; Cann, 2006). The remaining 2,514 prisoners did not undertake ETS which provides a reasonable pool from which to select a matched control group.³⁵

Outcome measures

To assess programme effectiveness, the impact of ETS is measured with reference to the one-year reconviction outcomes of participants and comparators. To reflect the fact that a successful outcome for ETS could include no reconviction (general and/or severe) or a reduction in the frequency of reoffending, three separate measures of proven reoffending³⁶ are examined, defined as follows:

- **reconviction rate (one-year):** binary (yes/no) indicator of whether the offender was convicted of a recordable offence that was committed within the 12-month period after release from the SPCR custodial sentence;
- **reoffending frequency (one-year):** continuous measure of how many recordable offences the offender was convicted of that were committed within the 12-month period after release from the SPCR custodial sentence (note that there may be more than one offence per conviction); and
- **severe offence reconviction rate (one-year):** binary (yes/no) indicator of whether the offender was convicted of a severe offence that was committed within the 12-month follow-up period after release from the SPCR custodial sentence. . The designation of an offence as 'severe' follows a standard definition under which approximately 150 of the 3,000 Home Office offence codes are defined as severe.³⁷

Evaluation research design

To evaluate the impact of ETS, it would be desirable to compare each treated prisoner's reconviction outcome after treatment with what it would have been without treatment. The latter is, of course, not observable – a treated individual cannot have an untreated outcome – and so a proxy must be created.

³⁵ It is possible that prisoners (participants and non-participants) may have participated in other intervention programmes, accredited (for example, another OBP or substance misuse treatment) and/or non-accredited (of varying quality), during their SPCR sentence period. Analysis of the level of participation on other accredited OBPs by the treatment group and matched control groups is presented later in this section.

³⁶ An offender is said to have committed a proven reoffence if the offender receives a conviction (by a caution or guilty verdict) at court for the reoffence. The reoffence must have been committed within the one-year follow up period, and the conviction must follow either within that one-year follow up, or in a further 6 months, which is to allow time for the offence to be proven at court.

³⁷ Severe offence types include: violence against the person (murder, attempted murder, manslaughter, wounding), sexual offences (sexual assault, rape, sexual activity with a minor or a person with a mental disorder, abuse of children through prostitution and pornography, trafficking for sexual exploitation), aggravated vehicle taking, and death by dangerous, drink or drug driving. A full list of severe offence types is available in 'Appendix G: List of most serious (severe) offences' of Ministry of Justice (2010).

Due to the active selection mechanism for ETS treatment (see suitability criteria in section 1), it is likely that prisoners selected for treatment differ, on average, from untreated prisoners even before treatment commences. ETS participants should be characterised by a medium-to-high reconviction risk and a high level of criminogenic needs, whereas non-participants should have a profile that is more reflective of the general prison population. This is known as selection bias. For this reason, any difference observed in a simple comparison of the average outcome of the treatment group with that of the untreated group could be explained by factors other than the intervention treatment. It is important, therefore, to remove as much of the selection bias as possible between the treatment group and comparison groups prior to comparison of the average outcomes. The Propensity Score Matching (Rosenbaum and Rubin, 1983) statistical technique has been developed for this very purpose.

A primer on Propensity Score Matching

Whilst only a Randomised Control Trial (RCT)³⁸ can ensure a random distribution of any unobserved sources of potential bias, ethical and practical considerations can mean that RCT is not an easy-to-use methodology to evaluate the impact of interventions on reconviction rates.

Instead, Propensity Score Matching (PSM) has been selected to estimate the causal treatment effect of ETS.³⁹ On the *Scientific Methods Scale adapted for reconviction studies* (Harper and Chitty, 2005; National Offender Management Service, 2005), PSM rates as a level 4 research design “that controls for bias by using the most robust method of matching individuals on all variables that affect participation in the intervention as well as all variables that affect outcome.”⁴⁰ As differences in the variables influencing the treatment and the outcome are controlled for after the treatment intervention, the approach is defined as a retrospective quasi-experimental design.

The basic idea of PSM is to select a group of untreated individuals that are statistically ‘similar’ to the group of treated individuals across the set of relevant observed characteristics measured at the pre-treatment (and pre-allocation) stage.⁴¹ Once the group is well matched (little or no statistical difference in the means of the matching variables) to the treatment group, it is an adequate control group to generate the proxy untreated outcome. Differences between the outcomes of the treated and untreated groups can then be attributed to the intervention.

38 “An RCT compares outcomes when the intervention is used to outcomes without the intervention or with an alternative (seen in the control group). In an RCT, participants are randomly allocated to an intervention or a control group which differs systematically in the type or amount of the intervention received. The groups are otherwise equivalent because all other differences are randomly distributed.” (National Offender Management Service, 2005, p.2).

39 In the ‘Scientific Methods Scale adapted for reconviction studies’ (National Offender Management Service, 2005), a five-level ‘standard of research’ scale (5 representing the highest standard) of methodologies to evaluate the impacts of an intervention on reoffending and other offence-related outcomes, propensity score matching rates as a level 4 research design (RCT is the only level 5 method). Level 4 is defined as: “Comparison group matched to intervention group on theoretically relevant factors, e.g. risk of reconviction (well-matched comparison group)” (National Offender Management Service, 2005 p.3).

40 National Offender Management Service (2005), p. 3.

41 Specifically, PSM matches individuals based on their probability (propensity score) of participating in the intervention programme given their observed characteristics.

Matching methodology

The matching methodology used to generate the matched control group comprises five components: suitability filter; pre-selected matching variables; matching algorithm; the parsimonious PSM model; and assessment of the match quality. Consultation on the methodology employed was undertaken with analyst and policy colleagues at MoJ and NOMS.

Suitability filter of potential control matches

The codification of the suitability criteria defining the prisoner needs and characteristics that determine selection into the programme presents the opportunity to control directly for selection bias. Assuming that untreated prisoners satisfying the suitability criteria did not receive treatment due to practical barriers (for example, ETS was not provided at the establishment, the prisoner was participating on another programme, or was moved/released whilst on waiting list), non-participants could be filtered by the suitability criteria to yield an ETS-suitable pool of untreated potential control matches.

Such a filter was successfully implemented, though with an unexpected result. As the OASys data provided did not include OGRS2 scores, the risk requirement was assessed with respect to the OASys score. This is not invalid, as the guidance notes: "If an offender passes the cut-off on one but not both scales [i.e. OGRS2 and OASys total weighted score], you can consider them to be suitable to progress to the needs assessment stage."⁴²

To ensure the relevance of the filter, a cross-check was carried out by applying the same filter to the treatment group, with the expectation of finding a high rate of compliance. However, this analysis revealed that a substantial proportion (up to 42%) of ETS participants failed to satisfy even the basic need and risk requirements for ETS suitability.⁴³ This is the first noteworthy finding of this research and has important implications for the evaluation. Full results are presented and discussed in the following Results section.

The direct implication of this finding is that an explicit suitability criteria filter of the potential control pool would be unnecessarily restrictive, seeing as the treatment group itself does not satisfy the criteria. It also has an important implication for the potential effectiveness of the programme. If the suitability criteria are designed so as to identify the individuals that are most likely to benefit from the intervention, then a weak adherence to these suitability criteria would constrain the potential effectiveness that the intervention programme could actually achieve in practice (Andrews and Bonta, 2010). This is an important point, as a programme

42 HM Prison Service (2007), p.5.

43 It is important to note some caveats to this analysis (explained fully in the Results section). The specification of the risk tool to OGRS2 or OASys was only introduced in August 2007, half-way through the period under analysis (March 2006 to September 2008). A secondary indicator of criminogenic needs, the ETS Semi-Structured Interview, was also used historically, though emphasis was placed on the OASys Section 11 scores in the assessment of need. There is also some flexibility allowed in the application of the suitability criteria: individuals with an OASys or OGRS2 score within three points below the cut-off may be progressed to ETS; and special considerations are made for indeterminate sentence prisoners and sex offenders.

evaluation result of no statistically significant reduction in reconviction may actually be reflecting poor targeting rather than a poor programme.

Pre-selected matching variables

Prior to undertaking the matching and outcome analysis, a wide range of factors were identified as being the most important drivers of participation in the intervention and the reconviction outcome. These variables have two functions. First, they form the basis of the full specification of the matching model. Second, the quality of the control group match is assessed by comparing its mean values with those of the treatment group on each one of these variables. In addition to ETS suitability criteria and the standard static risk factors, the list includes several dynamic risk factors, unlike previous evaluations.

The first group of factors identified are those that (should) determine the probability of treatment – the ETS suitability criteria: level of criminogenic need; risk of reconviction; and responsivity and readiness criteria (motivation to change behaviour and whether the prisoner has problems with reading, writing, numeracy, learning difficulties, psychological problems/ depression, or psychiatric problems).

The second group are static reconviction risk factors, selected as the variables underpinning the OGRS3 score, found to be a more accurate predictor of reconviction than OGRS2 and the Sentence Planning Risk Predictor (Howard *et al.*, 2009). Namely, the individual static factors include: age; gender; index offence type (explained below); the Copas rate;⁴⁴ sanctioning history (total previous convictions and previous severe convictions, and their quadratics). Additional static risk factors from SPCR survey responses have also been included: ethnicity (White, Black, Mixed, Asian and Other background); marital status; family criminal history.

Every offence type has a distinct Home Office code, of which there are more than 3,000, which are grouped into 20 categories in the standardised OGRS classification. After checking the distribution of the ETS participants across these 20 categories, most had too few observations to be statistically useful. Accordingly, the 20 offence categories have been further grouped into six categories that are both meaningful (similar offences) and contain 20 or more treated prisoners.⁴⁵ The final offence type groupings with grouped OGRS categories are: **Violent** (violence; and public order/riot offences); **Robbery**; **Sexual** (sexual offences not against a child; sexual offences against a child; and soliciting/prostitution); **Acquisitive**: (burglary (domestic); burglary (other); theft (non-motor); handling stolen goods; fraud and forgery; taking and driving away and related offences; and theft from vehicles); **Drug** (drugs import, export, production or supply; and drugs possession/small-scale supply); **Other** (absconding/bail offences; other motoring; drink driving; criminal damage; and any other offences).

44 The Copas rate (Copas and Marshall, 1998) is a measure that reflects both the intensity and length of the offender's criminal career, calculated as: $\log [(\text{number of sanction occasions}) / (10 + \text{years between first and current sanction})]$. The higher the Copas rate, the more convictions an offender has amassed in a given amount of time, and the more likely it is that the offender will reoffend within one year.

45 An exception is the 'Other' category, the reference category for modelling, which has 15 treated participants.

Box 2.1 *Matching variables pre-selected as being predictive of ETS participation and reconviction risk*

Programme suitability criteria

- Need: Sum of OASys Section 11 Thinking and Behaviour scores (OASys)
- Risk: OASys total weighted score (OASys)
- Motivation to change behaviour (OASys)
- Problems with reading/writing/numeracy (OASys)
- Problems with learning difficulties (OASys)
- Problems with current psychological problems/depression (OASys)
- Problems with current psychiatric problems (OASys)

Static risk factors

- Gender (SPCR)
- Age (SPCR)
- Marital status, Married (SPCR)
- Marital status, Living with a partner (SPCR)
- Ethnicity, Any Mixed background (SPCR)
- Ethnicity, Any Asian background (SPCR)
- Ethnicity, Any Black background (SPCR)
- Ethnicity, Any Other background (SPCR)
- Copas rate, on release (PNC)
- Previous convictions (PNC)
- Previous convictions, squared (PNC)
- Previous severe convictions (PNC)
- Previous severe convictions, squared (PNC)
- Index offence type, Violent (PNC)
- Index offence type, Sexual (PNC)
- Index offence type, Acquisitive (PNC)
- Index offence type, Drug (PNC)
- Index offence type, Robbery (PNC)
- Family member has been convicted of a non-motoring offence (SPCR)
- Family member has been in prison (SPCR)

Dynamic risk factors

- Agree: Want to stop offending (SPCR)
- Disagree: Want to stop offending (SPCR)
- Agree: Want to get help to stop offending (SPCR)
- Disagree: Want to get help to stop offending (SPCR)
- General attitude to offending, CRIME-PICS (SPCR)
- Anticipation of reoffending, CRIME-PICS (SPCR)
- Victim hurt denial, CRIME-PICS (SPCR)
- Evaluation of crime as worthwhile, CRIME-PICS (SPCR)
- Used class A drugs in the four weeks before custody (SPCR)
- Used class B/C drugs in the four weeks before custody (SPCR)
- Injected illegal drugs in the four weeks before custody (SPCR)
- Transient accommodation prior to custody (SPCR)
- Sleeping rough prior to custody (SPCR)
- Educational (qualifications) attainment (SPCR)
- Was in paid work in the four weeks before custody (SPCR)

Note: Data source is listed in parentheses.

A range of dynamic risk factors found to be incrementally predictive of general reconviction in addition to static risk factors (Howard, 2009) have also been included. These factors are: motivation to stop offending, attitudes to offending, drug use, accommodation, educational attainment and employment status before custody.

Many of the factors are categorical and so have been converted to indicator variables (also known as 'dummy variables'). For instance, ethnicity has been split into five separate yes/no variables – one for each individual ethnic background. The full set of variables is listed in Box 2.1.

Matching algorithm

A variety of propensity score matching methods are available to adjust for pre-treatment observable differences between the treatment group and untreated groups, each best suited to particular types of data. The algorithm developed to match the control group for this evaluation and the motivation underlying its choice are briefly explained here. The propensity score matching analysis was undertaken in the Stata statistical software programme, using the `psmatch2` module (Leuven and Sianesi, 2003).

First, a logistic regression was used to predict the probability of treatment (the propensity score) for all treated and untreated prisoners based on their observed characteristics. The resultant propensity scores summarise each prisoner's characteristics on all matching variables in one measure that is used as the basis for matching.

Since the sample consists of comparatively few treated prisoners in relation to many untreated ones, radius matching (Dehejia and Wahba, 2002) was chosen as the matching algorithm. This technique uses the maximum amount of data whilst the imposition of a tolerance threshold avoids the risk of bad matches. All untreated prisoners whose propensity score falls within a defined range of tolerance (radius calliper) of a treated prisoner's score are matched to that prisoner. A radius calliper of 0.05 of a standard deviation of the logit of the propensity score has been used.⁴⁶ The benefit of radius matching is lower propensity score variances than would result from one-to-one nearest-neighbour matching. As a further step to ensure comparability, prisoners with propensity scores outside the range of values where both treated and untreated observations are found were dropped, a requirement of the technique.⁴⁷

46 The appropriate calliper size is not clearly prescribed by the empirical literature (Smith and Todd, 2005). The inventors of propensity score matching, Rosenbaum and Rubin (1983), recommend a calliper of a quarter of a standard deviation of the logit of the propensity score as appropriate in general. This would be equivalent to 0.236 in this case, which was tried and rejected due to returning a weak match quality. The radius calliper size was iteratively reduced until the point (0.05) that a further reduction would drop treated observations. Sensitivity analysis was carried out on radius calliper size (0.0001 to 0.25) which found that the results were not highly sensitive to calliper size.

47 Technically, this is referred to as imposing common support.

With a choice-based sample such as this, participants are likely to be over-sampled relative to their frequency in the eligible prisoner population (Caliendo and Kopeinig, 2005). To control for this over-sampling, matching was undertaken on the odds-ratio of the propensity scores (Heckman and Smith, 1995).⁴⁸

The outcome of this methodology was that each ETS participant was matched with a synthetic control observation composed of the average of all non-participants sufficiently similar (propensity score within the radius limit) to the participant.

Parsimonious PSM model

Due to the limited size of the sample, there was a focus on parsimony (simplification without any loss of power) in development of the model. Dropping insignificant variables from the logistic regression gains degrees of freedom (fewer parameters to be estimated) and observations (due to missing values on some variables) without losing explanatory power. The final model was reduced to a smaller set of 16 variables, listed in Box 2.2.⁴⁹ To check that this process did not introduce a bias, the correlation of the propensity scores of the reduced model and the full model was checked and found to be greater than 0.91.

Box 2.2 Parsimonious Propensity Score Matching model matching variables

Programme suitability criteria

- Need: Sum of OASys Section 11 Thinking and Behaviour scores (OASys)
- Risk: OASys total weighted score (OASys)
- Motivation to change behaviour (OASys)
- Problems with reading/writing/numeracy (OASys)
- Problems with current psychiatric problems (OASys)

Static risk factors

- Gender (SPCR)
- Age (SPCR)
- Index offence type, Violent (PNC)
- Index offence type, Sexual (PNC)
- Index offence type, Acquisitive (PNC)
- Index offence type, Drug (PNC)
- Index offence type, Robbery (PNC)

Dynamic risk factors

- Agree: Want to get help to stop offending (SPCR)
- Victim hurt denial, CRIME-PICS (SPCR)
- Used class B/C drugs in the four weeks before custody (SPCR)
- Sleeping rough prior to custody (SPCR)

Note Data source is listed in parentheses.

48 Caliendo and Kopeinig (2005) note that weights are required to consistently estimate the probability of treatment when sampling is choice based. However, as an odds-ratio estimated using incorrect weights will be a scalar multiple of the true odds-ratio (a monotonic transformation of the propensity score), matching may proceed on the odds-ratio even when sampling weights are unknown (Heckman and Smith, 1995).

49 The full model (including all 42 pre-selected variables) was run successively with the least significant variable dropped each time using the stepwise function with a confidence limit for retention equal to 0.1.

Assessment of control match quality

The robustness of the calculated treatment effect depends on the quality of the match achieved. The degree of 'similarity' between the treatment and the control group was tested using a range of statistical techniques (namely standardised bias reduction and t-tests of equality of means). Please refer to the Technical Annex for the detailed results of these tests.

In summary, equality of means testing confirmed no statistically significant difference between the treatment and matched control group across all 42 characteristics pre-selected as being predictive of ETS participation and reconviction risk. The control group is therefore well matched on the pre-selected matching characteristics, with a similar expected reconviction rate as the treatment group, allowing robust estimation of the treatment effect.

Whilst every effort has been made to remove the selection bias, it is possible that an unmeasured bias may still remain uncontrolled. Further checks on average sentence length and participation on other accredited OBP interventions (using the Offending Behaviour Programme Interventions Database) were carried out, which revealed some differences between the treatment and control groups. It was found that the average sentence length of the treatment group (975 days) was longer than that for the control group (727 days). It was also found that 6% of the treatment group and 2% of the control group had been on another accredited OBP during the SPCR sentence, though both proportions are small.

3 Results

The results of this evaluation show that ETS was effective in bringing about a statistically significant reduction in both the reconviction rate and frequency of reoffending in the year following release from custody for 257 prison-based participants on ETS between 2006 and 2008. Almost identical results were found for completers (when drop-outs were excluded), though the significance of the reduction in the one-year reconviction rate was lost due the reduction in the size of the sample.

A secondary finding of the research was a low adherence to the suitability targeting criteria among those prisoners that actually received the programme over the period. This suggests that the programme was not always administered to the most suitable group of prisoners, which may have limited the effectiveness of the programme in reducing reoffending.

The research findings are presented and summarised in this section. The conclusions and policy-relevant implications of the results are discussed in the Implications section. More detail on the results is contained in the Technical Annex.

Effectiveness of ETS in reducing reoffending

The impact of the programme is identified as the average causal effect of participation on the ETS programme (the treatment) on reconviction outcomes. As the control group was created using a methodologically robust propensity score matching model and established as valid by tests on the quality of the match, it represents a good proxy for the counterfactual untreated outcome of the treatment group.⁵⁰ The observed difference in the average conviction rates between the treatment and control groups may therefore be considered the causal effect of the ETS intervention, known as the average treatment effect on the treated (ATT).

All programme participants

The reconviction rate and the frequency of reoffending of all ETS participants (including non-completers) was found to be significantly lower than the matched control group in the year following release from custody. No statistically significant impact was found on the severe offence reconviction rate.

The average reconviction outcomes of the treated and untreated groups and the difference between them (ATT, with t-stat) are presented in Table 3.1. The results show that the proportion of programme participants that were reconvicted within one year (27.2%) was six percentage points below that observed in the control group (33.5%), and that this difference was statistically significant. A statistically significant difference was also found in terms of frequency of reoffending, as participants (60.7 offences) were reconvicted of 60 fewer recordable offences within one year per 100 released prisoners than the control group (120.8 offences).

⁵⁰ Testing revealed no statistical difference in the mean values of the two groups across all 42 variables pre-selected as being predictive of ETS participation and reconviction risk.

These are the noteworthy results of this analysis as they show that ETS was successful in significantly reducing both the reconviction rate and frequency of reoffending of participants. After contradictory evidence and debate, the results seem to support Friendship *et al.s'* (2002) positive results, though the magnitude of the effect is smaller. Whilst the severe offences reconviction rate was lower in the treatment group, the difference was not significant. This is not surprising, given the programme is not designed to target severe offending and the rarity of severe offences.

Table 3.1 Impact of ETS on reconviction outcomes of the SPCR sample

| Sample | Reconviction rate (one-year) | Reoffences per 100 released prisoners (one-year) | Severe offences reconviction rate (one-year) |
|-------------------------|------------------------------|--|--|
| Average outcomes | | | |
| Treatment group (n=257) | 27.2% | 60.7 | 0.8% |
| Matched control group | 33.5% | 120.8 | 0.9% |
| Treatment effect (ATT) | -6.2 ^a | -60.1 ^b | -0.1 |
| (t-stat) | -2.04 | -5.47 | -0.13 |

Note: Average treatment effect on the treated (ATT), is the difference between the mean outcome of the treatment group and the matched control group.

a Statistically significant at the 0.05 level.

b Statistically significant at the <0.001 level.

Completers only

The evaluation has followed the 'intention-to-treat' approach in general (consistent with Colledge *et al.*, 1999). However, not all participants completed the programme – 8% of the treated final sample did not complete the course. As in previous evaluations, non-completers have been removed from the analysis to test any sensitivity of the treatment effect to programme completion.

The results are summarised in Table 3.2, showing an almost identical, though not statistically significant, reduction in the rate of reconviction for completers, when drop-outs were excluded. The loss in significance was most likely due to the reduction in the size of the sample. The statistically significant reduction in the frequency of reoffending was retained with an almost identical effect size. No significant impact was again found for the severe offences reconviction rate.

Table 3.2 Impact of ETS on reconviction outcomes of the SPCR sample, completers only

| Sample | Reconviction rate (one-year) | Reoffences per 100 released prisoners (one-year) | Severe offences reconviction rate (one-year) |
|-------------------------|------------------------------|--|--|
| Average outcomes | | | |
| Treatment group (n=237) | 27.0% | 59.9 | 0.8% |
| Matched control group | 33.5% | 120.8 | 0.9% |
| Treatment effect (ATT) | -6.5 | -60.9 ^a | 0.0 |
| (t-stat) | -1.56 | -3.21 | -0.01 |

Note: Average treatment effect on the treated (ATT), is the difference between the mean outcome of the treatment group and the matched control group.

a Statistically significant at the 0.01 level.

Completers of intervention programmes are often found to have a stronger effect than non-completers. This may be due to a self-selection effect whereby completers may be more motivated, or have fewer needs, or have a lower risk of reoffending. Therefore, effectiveness of the programme should not be evaluated against completers alone, whose outcomes may have been better even without the intervention. Rather, the true effect of the intervention as it is used in practice should be evaluated by considering all participants, both completers and non-completers (Colledge *et al.*, 1999; National Offender Management Service, 2005). Accordingly, more weight should be placed on the findings for all participants.

Assessment of suitability targeting

The HM Prison Service guidance to assess suitability for ETS and other OBPs notes:

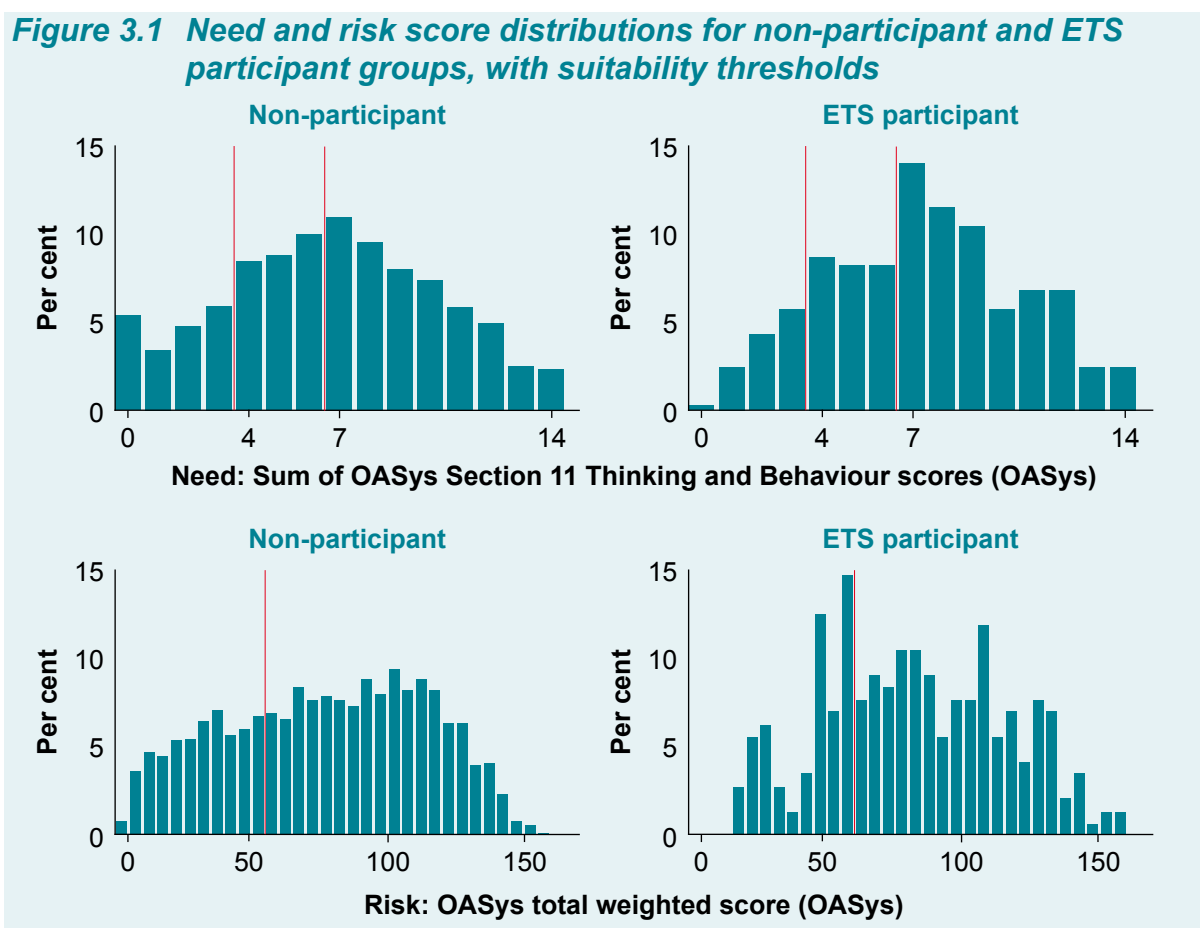
“One of the principles of effective interventions is appropriate targeting. An offender is more likely to benefit from participation in an offending behaviour programme if he/she demonstrates levels of risk and need that are appropriate for the particular intervention.”⁵¹

To facilitate appropriate targeting, HM Prison Service designed a set of risk, need and responsivity suitability criteria to identify those prisoners that were most suitable for the programme. These criteria were set out in the Context section. Strict adherence to these criteria should ensure that ETS is appropriate and relevant for all participants.

51 HM Prison Service (2007), p.3.

Need and risk requirements

The need and risk⁵² profiles of the participant and non-participant groups⁵³ were compared. The comparison is presented graphically in Figure 3.1 with need/risk ETS programme suitability thresholds marked with vertical red lines (observations to the right of the line rate as 'suitable' for ETS). In the case of need, the dual thresholds of 7 or 4 (with at least one individual score of 2, indicating significant problems) are marked. A single vertical red line for 56 and above is marked as the risk threshold.



With regard to both need and risk, the participant and non-participant distributions follow a broadly similar pattern. The majority of the non-participant group had a need/risk profile that would have made them suitable for ETS. This is good news for matching purposes as it means that similar prisoners at the pre-treatment stage could have been treated or remained untreated. More importantly, a lot of prisoners in the participant group fall to the left of the red vertical line in both charts – and so rated as ‘not strictly suitable’ for ETS.

52 As the OASys data do not include OGRS2, it has only been possible to define suitability with respect to the OASys total weighted score. This is not necessarily invalid, as the guidance notes: “If an offender passes the cut-off on one but not both scales [i.e. OGRS2 and OASys total weighted score], you can consider them to be suitable to progress to the needs assessment stage.” HM Prison Service (2007), p.5.

53 This analysis is based on the full sample of 3,512 (316 participants and 3,196 non-participants) and not the treatment and matched control groups.

Further investigation of the need and risk (OASys total weighted score) scores revealed that only 58% of the participant group were suitable for ETS (met both need and risk requirements simultaneously), while 49% of the non-participant group would have been suitable (Table 3.3).

Table 3.3 ETS suitability criteria fulfilment, non-participant and ETS participant groups

| Suitability | Non-participants | | ETS participants | |
|-------------------------------|------------------|-------|------------------|-------|
| | N | % | N | % |
| Not strictly suitable for ETS | 1,629 | 51.0 | 134 | 42.4 |
| Strictly suitable for ETS | 1,567 | 49.0 | 182 | 57.6 |
| Total | 3,196 | 100.0 | 316 | 100.0 |

Note: Suitability is defined with reference to risk (an OASys score: 56 or above) and need (a total score of 7 or above, and a total score of 4 or above with at least one individual score of 2 (indicating significant problems)).

It is important to note some caveats to this analysis. The suitability criteria for ETS have been reviewed and changed over time. The ETS start dates of participants in the SPCR sample stretch from March 2006 to September 2008, whilst the specification of the risk tool as OGRS2 or OASys was only introduced in August 2007 (the Sentencing Planning Risk Predictor was used previously). Similarly this period covers a time when both a local semi-structured interview and the OASys assessment were sources of need information for programme staff. As the programme did not itself change substantially during this period, later indicators of suitability for the intervention are retrospectively relevant from a targeting perspective,⁵⁴ though the retrospective application of the later indicators provides no reflection of the accuracy in the application of the targeting criteria during the earlier period.

There is also some flexibility allowed in the application of the suitability criteria: individuals with an OASys or OGRS2 score within three points below the cut-off may be progressed to ETS; and special considerations are made for indeterminate sentence prisoners and sex offenders. The original indicator of criminogenic needs, the ETS Semi-Structured Interview, has gradually been replaced by OASys Section 11 scores, as confirmed in later guidance (National Offender Management Service, 2009).⁵⁵

54 Assuming that amendments to the suitability identification tools over time represent improvements in targeting, later indicators applied retrospectively are likely to provide a better indicator of suitability than older indicators. Accordingly, this analysis provides no reflection on the selection process of treatment managers at the time, but rather a pure view of suitability of treated participants.

55 later guidance also specified definition of risk groups suitable for ETS with reference to OGRS3 (score 50 or above).

Readiness and responsivity criteria

A similar comparative analysis was also carried out for the readiness and responsivity criteria. The HM Prison Service (2007) guidance lists assessment items in the 'Responsivity Assessment' and 'Readiness Assessment' sections, including: intellectual ability; literacy; dyslexia; mental and physical health; psychopathic traits; motivation to change behaviour; disability. However, the guidance does not specify the data variables or the thresholds to be used. To investigate these readiness and responsivity criteria, the 'exclusion criteria' for general offending programmes from the OASys Manual⁵⁶ were used.

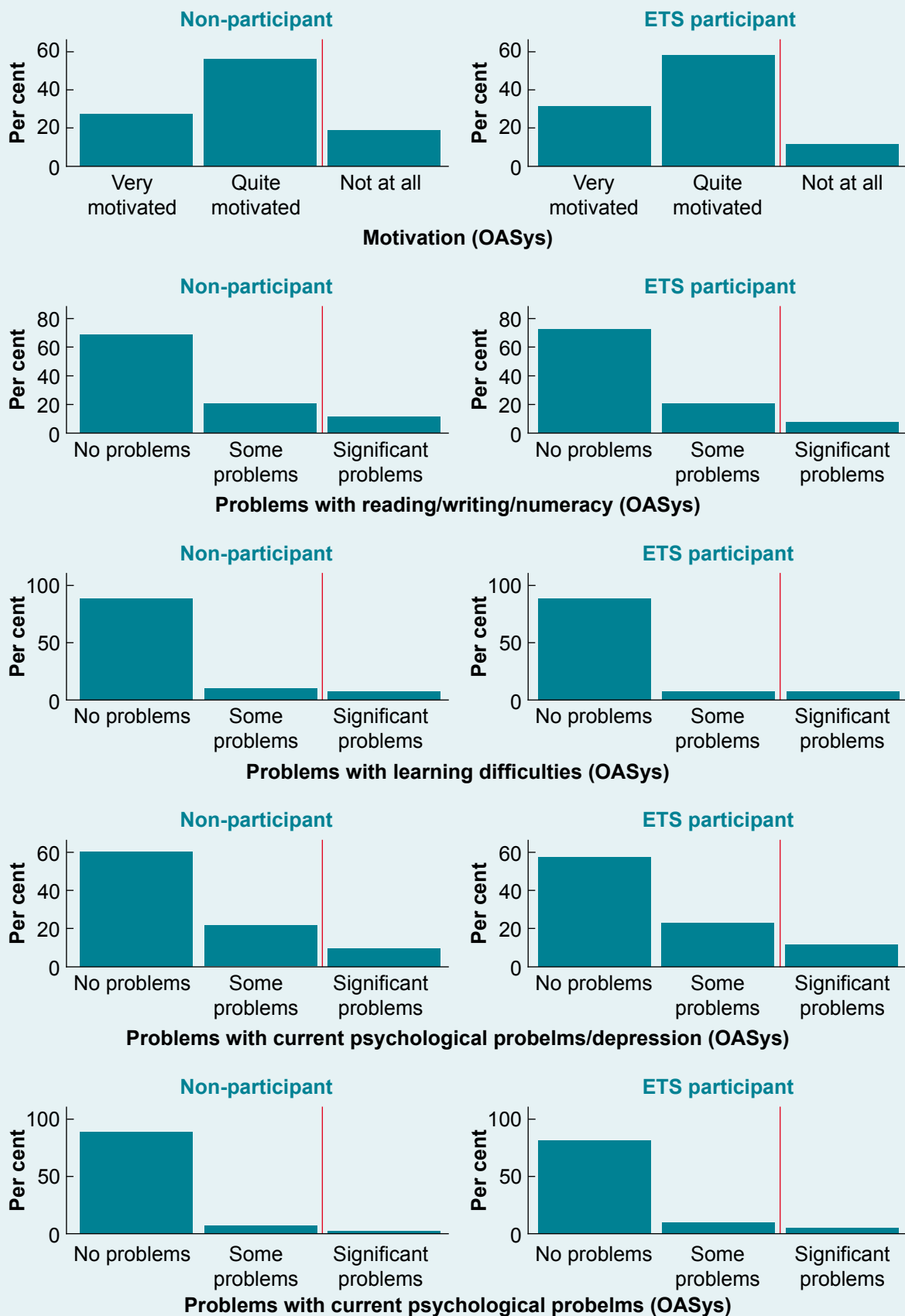
Again the profiles of the participant and non-participant groups⁵⁷ were compared, with a similar pattern emerging. Figure 3.2 plots the distributions side-by-side with the readiness and responsivity thresholds marked by red vertical lines (this time profiles to the right of the line are not strictly suited to ETS). As with the need and risk profiles, the two distributions are unexpectedly similar, with a number of the participant group recorded as 'not at all' motivated or having 'significant problems'. More specifically, of the participant group:

- 10.9% were scored as 'not at all' motivated to change their behaviour;
- 7.4% had 'significant problems' with reading/writing/numeracy;
- 6.1% had 'significant problems' with learning difficulties;
- 10.3% had 'significant problems' with current psychological problems/depression; and
- 5.8% had 'significant problems' with current psychiatric problems.

⁵⁶ OASys development team (2001), p.167.

⁵⁷ This analysis is based on the full sample of 3,512 (316 participants and 3,196 non-participants) and not the treatment and matched control groups.

Figure 3.2 Readiness and responsivity score distributions for non-participant and ETS participant groups, with suitability thresholds



Analysis of treatment effect by suitability

To investigate the importance of adherence to the need and risk principles in participant targeting, the reconviction outcomes of the treatment group were also analysed according to participant suitability. As before, suitability is defined with reference to risk (an OASys score: 56 or above) and need (a total score of 7 or above, and a total score of 4 or above with at least one individual score of 2 (indicating significant problems)). As there is some flexibility in the application of the criteria, this is termed ‘strict suitability’.

Of the treatment group, 164 (64%) were strictly suitable for ETS, whereas 1,404 (56%) of the control group were strictly suitable. The remainder of each group were not strictly suitable.

The results of the analysis (Table 3.4) show that the one-year reconviction rate for strictly suitable treated offenders (17.2%) was lower than that for not strictly suitable ones (32.9%). Similarly, the frequency of reoffending of strictly suitable offenders (39.8 reoffences) was also lower than that of the not strictly suitable offenders (72.6 reoffences).

Table 3.4 Impact of ETS on reconviction outcomes of the SPCR sample, ‘not strictly suitable’ and ‘strictly suitable’ participants only

| Sample | Reconviction rate (one-year) | Reoffences per 100 released prisoners (one-year) | Severe offences reconviction rate (one-year) |
|------------------------------|------------------------------|--|--|
| Not strictly suitable (n=93) | 32.9% | 72.6 | 1.2% |
| Strictly suitable (n=164) | 17.2% | 39.8 | - |

Caveats and limitations of the research

It is important to note that the number of ETS-treated prisoners provided by SPCR (257) is a limited sample, falling in the lower range of previous evaluation samples (from 114 to 2,195 participants) as a result of a low intervention rate and missing data filters. Results based on limited samples may not be reliable indicators of the wider population, and in some cases, the sample sizes may be too small to detect differences which may actually exist.⁵⁸ Tests of statistical significance are carried out on the results of this evaluation for this reason. The low intervention rate means that there is a large pool (2,514) from which to form a well-balanced matched control group. It should also be noted that all SPCR data are self-reported.

Whilst every effort has been made to remove the selection bias, it is possible that an unmeasured bias may still remain uncontrolled. Further checks revealed some differences between the treatment and control groups. It was found that the average sentence length of the treatment group (975 days) was longer than that for the control group (727 days).

⁵⁸ This caveat is more relevant where no effect is detected – in which case the correct conclusion may be that the sample was insufficient to detect an effect, rather than that the intervention had no effect. For a discussion of sample size, detection power and reliability of reconviction rates, please see Harper and Chitty (2004), p.8.

The possibility of multiple intervention participation has not been controlled for, as the sample size did not permit such analysis. Examination revealed that 6% of the treatment group and 2% of the control group had been on another accredited OBP during the SPCR sentence, though both proportions are small. It is also possible that prisoners may have participated on non-accredited OBPs or a substance misuse treatment during their SPCR sentence period, which may have contributed to the observed treatment effect. If the rate of participation in other programmes was higher in the ETS treated group, the estimated treatment effect of ETS would represent a pooled effect of all treatments received and so may be overstated. If the rate of participation in other programmes was higher in the ETS control group, the estimated treatment effect of ETS may be understated.

This evaluation has been limited to using one-year conviction rates, as two-year reconviction outcome data will only become available in 12 months' time. Thus, it is not possible at this time to conclude on the duration of the impact of ETS – that is to say whether the observed one-year effect endures two years on from release, or whether it dissipates (as found by Cann *et al.* 2003). It is planned to conduct a follow-up study of reconviction at the two-year post-release stage (please see the Further research section).

4 Implications

This report has evaluated the effectiveness of the prison-based ETS programme by linking participation to reconviction outcomes. The evaluation results show that ETS was successful in significantly reducing both the reconviction rate and frequency of general reoffending of participants. The most important implications of these results are outlined below.

This research has added some clarity to the discordant evidence base on the effectiveness of ETS by improving on key methodological limitations of previous evaluation studies. This provides a more solid evidence base of support on which to build intervention-based policy.

The most important message for policy makers is that ETS, the most frequently delivered offending behaviour programme over the past decade, did work to significantly reduce reoffending in the short term (one year) at least. This result should assist policy makers to prioritise and focus operational resources towards the most productive intervention efforts. Though ETS has since been replaced by the Thinking Skills Programme (TSP), the results of this evaluation demonstrate that cognitive-behavioural OBPs can work to significantly reduce reoffending for offenders released from prison. The findings are likely to be particularly relevant for TSP, which represents a refresh and update of ETS in line with advances in theory and practice. However, these specific findings cannot be generalised to other cognitive-behavioural intervention programmes. Each programme has its own distinct objectives, delivery methods and targeted characteristics, and so would require a discrete evaluation.

For practitioners, although the findings on reduced reconviction rates are encouraging and reflect a job well done, there are also lessons to be learned. A low adherence to the risk, need and responsivity suitability criteria was found among those prisoners that actually received the programme between 2006 and 2008. This suggests that the programme was not always administered to the most suitable prisoners. Given that research supports the importance of risk, need and responsivity targeting for effective treatment (Hollin, 1995; Taxman and Thanner, 2006; Palmer, *et al.*, 2009; Gendreau, *et al.*, 2009; Andrews and Bonta, 2010) and the finding of lower reconviction rates for strictly suitable prisoners, this may have limited the effectiveness of the programme in reducing reoffending. The fact that a significant reduction in reconviction was found in spite of this finding suggests that a stricter application of the targeting criteria might further enhance the effectiveness of the programme. National Offender Management Service practitioners report that the accuracy of targeting has improved over time, meaning that a similar evaluation of ETS in a later period (post-2008) or TSP might find an even more significant effect.

Future researchers may be able to draw on the methodology developed for this research as a methodological blueprint for further evaluations. The findings of this research could be complemented and enhanced by addressing some of the outstanding evidence gaps framed by a set of research questions and proposed research designs set out in the Further research section.

5 Further research

Whilst this evaluation has added some clarity to the evidence base on the effectiveness of general cognitive-behavioural programmes, evidence gaps remain. These gaps are defined by the research questions listed below with suggested research designs that could provide robust answers to complement and enhance the findings in this paper.

- **Duration of the reduction in reoffending effect:** Does ETS have a lasting impact or will the observed one-year effect have dissipated after two years, as found by Cann *et al.* (2003)? It is planned to conduct a follow up study of the treated and matched control individuals of this evaluation two years after their release, applying the same methodology to investigate the duration of the ETS impact in one year's time.
- **Cost-effectiveness of the programme:** Is the cost of ETS provision justified by the observed reduction in reoffending? The reduction in reoffences estimated in this evaluation could be used as the basis for a cost-benefit analysis of the ETS programme. Linking the estimated reduction in reoffending to estimates of the social cost of criminal offences, the avoided social costs of crime (the benefit) could be compared to data on the cost of ETS provision (estimated to be in the region of £2,000 per prisoner).⁵⁹
- **Generalisability of the findings:** Would the observed effect be verified, or even more significant, in a larger sample? By repeating the evaluation methodology, but replacing SPCR variables with OASys data variables where possible, the full population of prisoners undertaking ETS could be evaluated. The downside to this approach is the compromised choice of data for dynamic risk factors. Other benefits would be the ability to employ more matching variables and being able to evaluate some of the smaller accredited programmes. This research could also be used as a methodological blueprint to evaluate substance misuse intervention programmes.
- **What works for whom:** What are the characteristics of the prisoners that benefit most from ETS and other OBPs? The difference in reconviction outcome for each treated prisoner compared with the matched control could be regressed on a range of treated prisoners' characteristics to identify which kinds of offenders, under which circumstances, most benefit from undertaking ETS.
- **The effectiveness of TSP:** Does ETS's replacement, the Thinking Skills Programme (TSP), have a lesser, similar or greater impact on reconviction? A similar evaluation methodology could be used to evaluate the effectiveness of TSP in reducing reconviction outcomes, though this would not be possible for a couple of years as TSP was only introduced in 2009.

59 Social Exclusion Unit (2002), p. 81.

- **Database of research findings:** What does the evidence base tell us about the effectiveness of ETS? Policy makers are often influenced by the latest study to be published rather than the synthesised message of the collective body of evaluation research. The formation and maintenance of a database of outcome studies could be used for systematic reviews and meta-analytic analysis to produce a comprehensive review of ETS efficacy to inform and guide policy makers and practitioners (for example, see Tong and Farrington, 2006).

In the longer term, samples of the other cohort studies being conducted by MoJ – the probation sample of the Offender Management Community Cohort Study (OMCCS), and the juvenile offenders sample of the Juvenile Cohort Study (JCS) – could be similarly linked to the same management information databases (for example, OASys) as linked to SPCR in this evaluation. When combined with OASys assessment data and viewed as a collective database, this would be the richest known single evidence base in existence on the static and dynamic factors involved in offending behaviour.

6 Additional resources

Readers interested in researching further the issues and topics probed in this paper further may want to consult the following publications, websites and other useful sources of information.

HM Prison Service, Offender Behaviour Programmes (OBPs):

<http://www.hmprisonservice.gov.uk/adviceandsupport/beforeafterrelease/offenderbehaviourprogrammes/>

Ministry of Justice Research:

<http://www.justice.gov.uk/publications>

National Offender Management Service:

<http://www.justice.gov.uk/about/noms.htm>

Correctional Services Accreditation Panel:

<http://www.justice.gov.uk/about/correctional-services-accreditation.htm>

National Reducing Reoffending Delivery plan (National Offender Management Service (NOMS) website):

<http://noms.justice.gov.uk/>

Social Exclusion Unit (Cabinet Office):

http://www.cabinetoffice.gov.uk/social_exclusion_task_force.aspx

Office for National Statistics (ONS):

<http://www.statistics.gov.uk/>

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Appendix 1 Technical annex

Full set of matching variables (covariates)

Programme suitability criteria

| | |
|---------------|---|
| oasys_need | Need: Sum of OASys Section 11 Thinking and Behaviour scores (OASys) |
| oasys_score | Risk: OASys total weighted score (OASys) |
| oasys_motiv | Motivation to change behaviour (OASys) |
| oasys_litnum | Problems with reading/writing/numeracy (OASys) |
| oasys_lrndiff | Problems with learning difficulties (OASys) |
| oasys_psychgl | Problems with current psychological problems/depression (OASys) |
| oasys_psychtr | Problems with current psychiatric problems (OASys) |

Static risk factors

| | |
|---------------------|---|
| sprcr_genderf | Gender, Female (SPCR) |
| sprcr_age | Age (SPCR) |
| sprcr_marst_mar | Marital status, Married (SPCR) |
| sprcr_marst_lvp | Marital status, Living with a partner (SPCR) |
| sprcr_ethnic_mix | Ethnicity, Any Mixed background (SPCR) |
| sprcr_ethnic_as | Ethnicity, Any Asian background (SPCR) |
| sprcr_ethnic_bl | Ethnicity, Any Black background (SPCR) |
| sprcr_ethnic_oth | Ethnicity, Any Other background (SPCR) |
| pnc_copas | Copas rate, on release (PNC) |
| pnc_ttlprevconv | Previous convictions (PNC) |
| pnc_ttlprevconv2 | Previous convictions, squared (PNC) |
| pnc_ttlprevconvsev | Previous severe convictions (PNC) |
| pnc_ttlprevconvsev2 | Previous severe convictions, squared (PNC) |
| pnc_index_vio | Index offence type, Violent (PNC) |
| pnc_index_sxl | Index offence type, Sexual (PNC) |
| pnc_index_acq | Index offence type, Acquisitive (PNC) |
| pnc_index_drg | Index offence type, Drug (PNC) |
| pnc_index_rob | Index offence type, Robbery (PNC) |
| sprcr_famconv | Family member has been convicted of a non-motoring offence (SPCR) |
| sprcr_fampris | Family member has been in prison (SPCR) |

Dynamic risk factors

| | |
|----------------------|--|
| sprcr_motivstoffs | Agree: Want to stop offending (SPCR) |
| sprcr_motivstoffs | Disagree: Want to stop offending (SPCR) |
| sprcr_motivhlpstoffs | Agree: Want to get help to stop offending (SPCR) |
| sprcr_motivhlpstoffs | Disagree: Want to get help to stop offending (SPCR) |
| sprcr_attg | General attitude to offending, CRIME-PICS (SPCR) |
| sprcr_atta | Anticipation of reoffending, CRIME-PICS (SPCR) |
| sprcr_attv | Victim hurt denial, CRIME-PICS (SPCR) |
| sprcr_ate | Evaluation of crime as worthwhile, CRIME-PICS (SPCR) |
| sprcr_drug4wka | Used class A drugs in the four weeks before custody (SPCR) |
| sprcr_drug4wkb | Used class B/C drugs in the four weeks before custody (SPCR) |
| sprcr_drug4wkinj | Injected illegal drugs in the four weeks before custody (SPCR) |
| sprcr_accomtrans | Transient accommodation prior to custody (SPCR) |
| sprcr_accomrough | Sleeping rough prior to custody (SPCR) |
| sprcr_edqual | Educational (qualifications) attainment (SPCR) |
| sprcr_job4wk | Was in paid work in the four weeks before custody (SPCR) |

Logistic regression model

Table A1 *Logistic regression model of prisoner characteristics influencing probability of treatment (ETS) and reconviction outcomes*

| | Coefficient | Standard error | P-value |
|--|--------------------|----------------|---------|
| ETS suitability | | | |
| Need (thinking and behaviour) | 0.082 | 0.027 | 0.002 |
| Risk (OASys score) | 0.005 | 0.003 | 0.069 |
| Motivation to change behaviour (OASys) | 0.323 | 0.122 | 0.008 |
| Problems with reading/writing/numeracy | -0.303 | 0.116 | 0.009 |
| Problems with current psychiatric problems | 0.335 | 0.131 | 0.011 |
| Gender | | | |
| Male | Reference category | | |
| Female | 0.736 | 0.177 | 0.000 |
| Age | -0.030 | 0.009 | 0.000 |
| Index offence type | | | |
| Other | Reference category | | |
| Violent | 1.223 | 0.296 | 0.000 |
| Sexual | 2.094 | 0.389 | 0.000 |
| Acquisitive | 0.243 | 0.313 | 0.438 |
| Drug | 1.192 | 0.309 | 0.000 |
| Robbery | 1.552 | 0.329 | 0.000 |
| Motivation to stop offending | | | |
| Disagreed with "I want to get help to stop offending", all other responses | Reference category | | |
| Agreed with "I want to get help to stop offending" | 0.315 | 0.091 | 0.001 |
| Offending-related attitudes | | | |
| Victim hurt denial | 0.078 | 0.026 | 0.003 |
| Drug use | | | |
| Used Class B/C drugs in the 4 weeks before custody | -0.195 | 0.150 | 0.193 |
| Accommodation | | | |
| Stable accommodation prior to custody | Reference category | | |
| Temporary accommodation prior to custody | Reference category | | |
| Sleeping rough prior to custody | -0.709 | 0.409 | 0.083 |
| Constant | -4.933 | 0.554 | 0.000 |

Notes: Number of observations = 2,771 (257 treated; 2,514 untreated); Pseudo R2 = 0.0958; LR chi2(16)=163.97, prob>chi2: 0.0000.

Calculation of the average treatment effect on the treated (ATT)

Outcome measures

pnc_reconvind Indicator of reconviction within one year
 pnc_reoffreq Frequency of proven reoffending within one year
 pnc_reconvindsev Indicator of severe offence reconviction within one year

Table A2 *Average treatment effect on the treated (ATT)*

| Variable | Sample | Treated | Controls | (Difference) ATT ^a | Standard error | t-stat |
|------------------|--------------|---------|----------|----------------------------------|-------------------|--------|
| pnc_reconvind | Unmatched | 0.272 | 0.370 | (-0.098) | 0.031 | -3.11 |
| | Matched, ATT | 0.272 | 0.335 | -0.062 | 0.031 | -2.04 |
| pnc_reoffreq | Unmatched | 0.607 | 1.422 | (-0.815) | 0.182 | -4.47 |
| | Matched, ATT | 0.607 | 1.208 | -0.601 | 0.110 | -5.47 |
| pnc_reconvindsev | Unmatched | 0.008 | 0.007 | (0.001) | 0.006 | 0.11 |
| | Matched, ATT | 0.008 | 0.009 | -0.001 | 0.006 | -0.13 |

a ATT is the difference between the mean outcome of the treatment group and the matched control group.

Tests of covariate balancing

Table A3 Means, standardised bias reduction and t-tests for equality of means in the treatment and control groups, before and after matching

| Variable | Sample | Mean | | % bias | % bias reduction | t-test | |
|---------------------|-----------|-----------|---------|--------|------------------|--------|------|
| | | Treatment | Control | | | t | p>t |
| oasys_need | Unmatched | 7.381 | 6.703 | 20.3 | 83.4 | 2.99 | 0.00 |
| | Matched | 7.381 | 7.269 | 3.4 | | 0.39 | 0.70 |
| oasys_score | Unmatched | 77.335 | 75.658 | 4.8 | 83.6 | 0.70 | 0.49 |
| | Matched | 77.335 | 77.060 | 0.8 | | 0.09 | 0.93 |
| oasys_motiv | Unmatched | 1.210 | 1.141 | 11.0 | 86.4 | 1.65 | 0.10 |
| | Matched | 1.210 | 1.201 | 1.5 | | 0.17 | 0.87 |
| oasys_litnum | Unmatched | 0.350 | 0.416 | -10.2 | 83.0 | -1.50 | 0.13 |
| | Matched | 0.350 | 0.361 | -1.7 | | -0.20 | 0.84 |
| oasys_lrndiff | Unmatched | 0.187 | 0.184 | 0.5 | -151.0 | 0.08 | 0.94 |
| | Matched | 0.187 | 0.180 | 1.3 | | 0.14 | 0.89 |
| oasys_psychgl | Unmatched | 0.486 | 0.426 | 8.9 | 79.1 | 1.39 | 0.17 |
| | Matched | 0.486 | 0.499 | -1.9 | | -0.20 | 0.84 |
| oasys_psychtr | Unmatched | 0.237 | 0.142 | 19.4 | 86.1 | 3.27 | 0.00 |
| | Matched | 0.237 | 0.224 | 2.7 | | 0.28 | 0.78 |
| spcr_genderf | Unmatched | 0.214 | 0.124 | 24.3 | 83.8 | 4.08 | 0.00 |
| | Matched | 0.214 | 0.199 | 3.9 | | 0.41 | 0.68 |
| spcr_age | Unmatched | 28.008 | 30.216 | -23.8 | 83.9 | -3.49 | 0.00 |
| | Matched | 28.008 | 28.364 | -3.8 | | -0.46 | 0.65 |
| spcr_marst_mar | Unmatched | 0.070 | 0.093 | -8.4 | 77.6 | -1.23 | 0.22 |
| | Matched | 0.070 | 0.075 | -1.9 | | -0.23 | 0.82 |
| spcr_marst_lvp | Unmatched | 0.296 | 0.256 | 9.0 | -14.9 | 1.40 | 0.16 |
| | Matched | 0.296 | 0.250 | 10.3 | | 1.17 | 0.24 |
| spcr_ethnic_mix | Unmatched | 0.062 | 0.038 | 11.0 | 9.2 | 1.87 | 0.06 |
| | Matched | 0.062 | 0.040 | 10.0 | | 1.12 | 0.26 |
| spcr_ethnic_as | Unmatched | 0.047 | 0.041 | 2.8 | -105.6 | 0.44 | 0.66 |
| | Matched | 0.047 | 0.035 | 5.7 | | 0.67 | 0.50 |
| spcr_ethnic_bl | Unmatched | 0.035 | 0.065 | -13.7 | 7.6 | -1.89 | 0.06 |
| | Matched | 0.035 | 0.063 | -12.7 | | -1.45 | 0.15 |
| spcr_ethnic_oth | Unmatched | 0.000 | 0.004 | -8.9 | 43.1 | -1.01 | 0.31 |
| | Matched | 0.000 | 0.002 | -5.1 | | -0.76 | 0.45 |
| pnc_copas | Unmatched | -0.902 | -0.880 | -2.7 | 64.4 | -0.40 | 0.69 |
| | Matched | -0.902 | -0.910 | 1.0 | | 0.11 | 0.91 |
| pnc_ttlprevconv | Unmatched | 10.946 | 12.746 | -16.3 | 64.8 | -2.27 | 0.02 |
| | Matched | 10.946 | 11.580 | -5.7 | | -0.69 | 0.49 |
| pnc_ttlprevconv2 | Unmatched | 212.140 | 314.300 | -13.3 | 55.2 | -1.63 | 0.10 |
| | Matched | 212.140 | 257.960 | -6.0 | | -0.82 | 0.41 |
| pnc_ttlprevconvsev | Unmatched | 0.132 | 0.146 | -3.4 | -130.0 | -0.50 | 0.62 |
| | Matched | 0.132 | 0.165 | -7.9 | | -0.87 | 0.39 |
| pnc_ttlprevconvsev2 | Unmatched | 0.163 | 0.209 | -5.7 | -65.7 | -0.74 | 0.46 |
| | Matched | 0.163 | 0.239 | -9.5 | | -1.02 | 0.31 |

| Variable | Sample | Mean | | % bias | % bias reduction | t-test | |
|---------------------|-----------|---------|---------|--------|------------------|--------|------|
| | | Treated | Control | | | t | p>t |
| pnc_index_vio | Unmatched | 0.327 | 0.245 | 18.2 | 80.4 | 2.88 | 0.00 |
| | Matched | 0.327 | 0.311 | 3.6 | | 0.39 | 0.70 |
| pnc_index_sxl | Unmatched | 0.078 | 0.040 | 16.2 | 98.2 | 2.86 | 0.00 |
| | Matched | 0.078 | 0.078 | -0.3 | | -0.03 | 0.98 |
| pnc_index_acq | Unmatched | 0.175 | 0.303 | -30.2 | 84.7 | -4.30 | 0.00 |
| | Matched | 0.175 | 0.195 | -4.6 | | -0.57 | 0.57 |
| pnc_index_drg | Unmatched | 0.218 | 0.195 | 5.7 | 71.8 | 0.88 | 0.38 |
| | Matched | 0.218 | 0.211 | 1.6 | | 0.18 | 0.86 |
| pnc_index_rob | Unmatched | 0.144 | 0.065 | 26.1 | 85.8 | 4.69 | 0.00 |
| | Matched | 0.144 | 0.133 | 3.7 | | 0.37 | 0.71 |
| spcr_famconv | Unmatched | 0.463 | 0.403 | 12.1 | 50.3 | 1.85 | 0.06 |
| | Matched | 0.463 | 0.433 | 6.0 | | 0.67 | 0.50 |
| spcr_fampris | Unmatched | 0.396 | 0.334 | 12.9 | 32.2 | 2.00 | 0.05 |
| | Matched | 0.396 | 0.354 | 8.8 | | 0.98 | 0.33 |
| spcr_motivstoffy | Unmatched | 1.720 | 1.670 | 9.3 | 98.5 | 1.39 | 0.17 |
| | Matched | 1.720 | 1.719 | 0.1 | | 0.02 | 0.99 |
| spcr_motivstoffn | Unmatched | 0.016 | 0.010 | 4.0 | -45.3 | 0.65 | 0.52 |
| | Matched | 0.016 | 0.007 | 5.8 | | 0.69 | 0.49 |
| spcr_motivhlpstoffy | Unmatched | 1.346 | 1.085 | 33.8 | 83.6 | 4.98 | 0.00 |
| | Matched | 1.346 | 1.304 | 5.5 | | 0.65 | 0.52 |
| spcr_motivhlpstoffn | Unmatched | 0.097 | 0.164 | -16.6 | 85.0 | -2.34 | 0.02 |
| | Matched | 0.097 | 0.107 | -2.5 | | -0.31 | 0.76 |
| spcr_attg | Unmatched | 58.131 | 57.962 | 2.3 | 51.8 | 0.33 | 0.74 |
| | Matched | 58.131 | 58.212 | -1.1 | | -0.12 | 0.91 |
| spcr_atta | Unmatched | 18.393 | 18.516 | -5.0 | -25.7 | -0.73 | 0.47 |
| | Matched | 18.393 | 18.547 | -6.3 | | -0.68 | 0.50 |
| spcr_attv | Unmatched | 11.825 | 10.907 | 32.1 | 84.3 | 4.54 | 0.00 |
| | Matched | 11.825 | 11.681 | 5.0 | | 0.61 | 0.54 |
| spcr_atte | Unmatched | 13.996 | 13.809 | 6.0 | 33.1 | 0.92 | 0.36 |
| | Matched | 13.996 | 13.871 | 4.0 | | 0.45 | 0.66 |
| spcr_drug4wka | Unmatched | 0.381 | 0.419 | -7.7 | 28.9 | -1.18 | 0.24 |
| | Matched | 0.381 | 0.408 | -5.5 | | -0.62 | 0.53 |
| spcr_drug4wkbc | Unmatched | 0.494 | 0.499 | -1.0 | -63.7 | -0.15 | 0.88 |
| | Matched | 0.494 | 0.486 | 1.6 | | 0.19 | 0.85 |
| spcr_drug4wkinj | Unmatched | 0.109 | 0.155 | -13.5 | 26.5 | -1.94 | 0.05 |
| | Matched | 0.109 | 0.143 | -9.9 | | -1.14 | 0.25 |
| spcr_accomtrans | Unmatched | 0.054 | 0.052 | 1.2 | -36.0 | 0.19 | 0.85 |
| | Matched | 0.054 | 0.058 | -1.7 | | -0.18 | 0.85 |
| spcr_accomrough | Unmatched | 0.027 | 0.054 | -13.8 | 83.5 | -1.88 | 0.06 |
| | Matched | 0.027 | 0.032 | -2.3 | | -0.30 | 0.76 |
| spcr_edqual | Unmatched | 1.965 | 1.893 | 3.6 | 30.8 | 0.54 | 0.59 |
| | Matched | 1.965 | 1.915 | 2.5 | | 0.28 | 0.78 |
| spcr_job4wk | Unmatched | 0.346 | 0.331 | 3.2 | 1.7 | 0.49 | 0.62 |
| | Matched | 0.346 | 0.331 | 3.2 | | 0.36 | 0.72 |

Distributions of matching variables, by treatment and control groups

Table A4 Need: Sum of OASys Section 11 Thinking and Behaviour scores (OASys), by treatment and control groups

| Summed score | Control | | | Treatment | | |
|--------------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| 0 | 111 | 4.4 | 4.4 | 1 | 0.4 | 0.4 |
| 1 | 89 | 3.5 | 3.5 | 6 | 2.3 | 2.3 |
| 2 | 126 | 5.0 | 5.0 | 11 | 4.3 | 4.3 |
| 3 | 156 | 6.2 | 6.2 | 13 | 5.1 | 5.1 |
| 4 | 219 | 8.7 | 8.7 | 24 | 9.3 | 9.3 |
| 5 | 234 | 9.3 | 9.3 | 19 | 7.4 | 7.4 |
| 6 | 262 | 10.4 | 10.4 | 23 | 8.9 | 8.9 |
| 7 | 281 | 11.2 | 11.2 | 37 | 14.4 | 14.4 |
| 8 | 253 | 10.1 | 10.1 | 30 | 11.7 | 11.7 |
| 9 | 211 | 8.4 | 8.4 | 29 | 11.3 | 11.3 |
| 10 | 184 | 7.3 | 7.3 | 15 | 5.8 | 5.8 |
| 11 | 147 | 5.8 | 5.8 | 18 | 7.0 | 7.0 |
| 12 | 117 | 4.7 | 4.7 | 17 | 6.6 | 6.6 |
| 13 | 62 | 2.5 | 2.5 | 7 | 2.7 | 2.7 |
| 14 | 62 | 2.5 | 2.5 | 7 | 2.7 | 2.7 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Figure A1 Risk: OASys total weighted score (OASys), by treatment and control groups

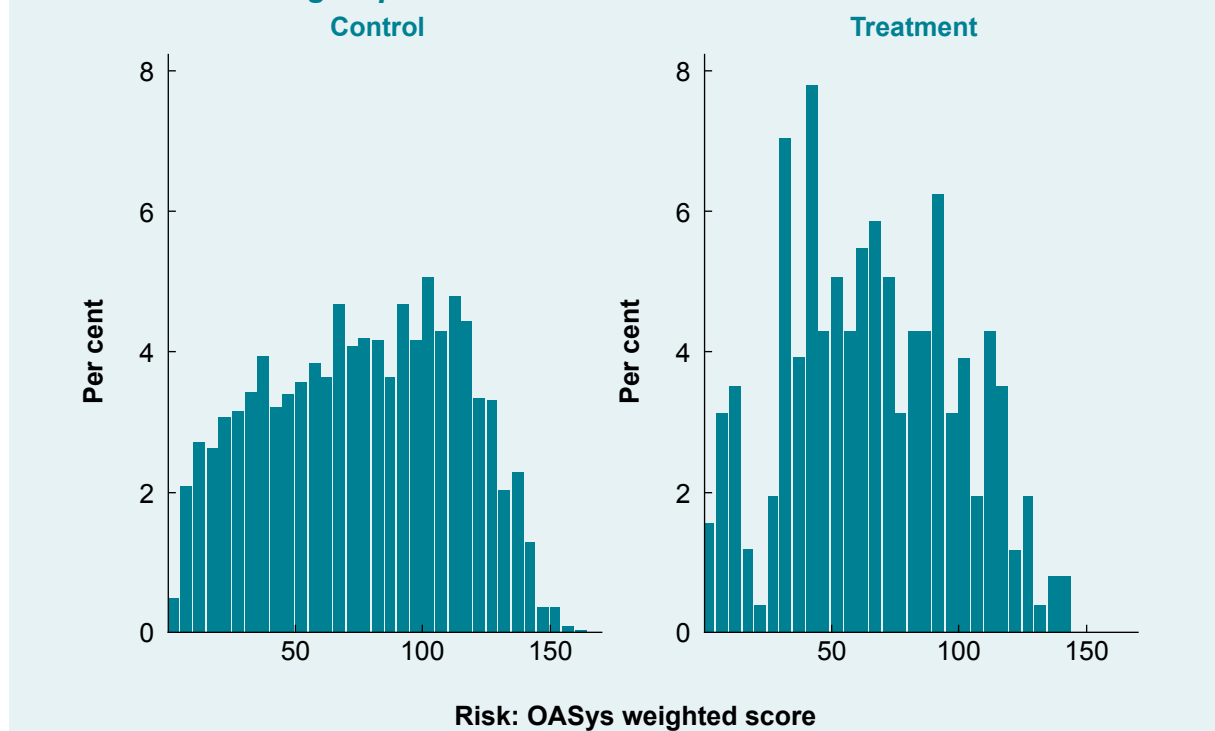


Table A5 Motivation to change behaviour (OASys), by treatment and control groups

| Rating | Control | | | Treatment | | |
|-----------------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| Not at all | 367 | 14.6 | 14.6 | 28 | 10.9 | 10.9 |
| Quite motivated | 1,426 | 56.7 | 56.7 | 147 | 57.2 | 57.2 |
| Very motivated | 721 | 28.7 | 28.7 | 82 | 31.9 | 31.9 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A6 Problems with reading/writing/numeracy (OASys), by treatment and control groups

| Extent | Control | | | Treatment | | |
|----------------------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| No problems | 1,735 | 69.0 | 69.0 | 187 | 72.8 | 72.8 |
| Some problems | 512 | 20.4 | 20.4 | 50 | 19.5 | 19.5 |
| Significant problems | 267 | 10.6 | 10.6 | 20 | 7.8 | 7.8 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A7 Problems with learning difficulties (OASys), by treatment and control groups

| Extent | Control | | | Treatment | | |
|----------------------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| No problems | 2,185 | 86.9 | 86.9 | 226 | 87.9 | 87.9 |
| Some problems | 195 | 7.8 | 7.8 | 14 | 5.4 | 5.4 |
| Significant problems | 134 | 5.3 | 5.3 | 17 | 6.6 | 6.6 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A8 Problems with current psychological problems/depression (OASys), by treatment and control groups

| Extent | Control | | | Treatment | | |
|----------------------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| No problems | 1,693 | 67.3 | 67.3 | 162 | 63.0 | 63.0 |
| Some problems | 572 | 22.8 | 22.8 | 65 | 25.3 | 25.3 |
| Significant problems | 249 | 9.9 | 9.9 | 30 | 11.7 | 11.7 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A9 Problems with current psychiatric problems (OASys), by treatment and control groups

| Extent | Control | | | Treatment | | |
|----------------------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| No problems | 2,244 | 89.3 | 89.3 | 211 | 82.1 | 82.1 |
| Some problems | 184 | 7.3 | 7.3 | 31 | 12.1 | 12.1 |
| Significant problems | 86 | 3.4 | 3.4 | 15 | 5.8 | 5.8 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A10 Gender (SPCR), by treatment and control groups

| Gender | Control | | | Treatment | | |
|---------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| Male | 2,203 | 87.6 | 87.6 | 202 | 78.6 | 78.6 |
| Female | 311 | 12.4 | 12.4 | 55 | 21.4 | 21.4 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Figure A2 Age (SPCR), by treatment and control groups

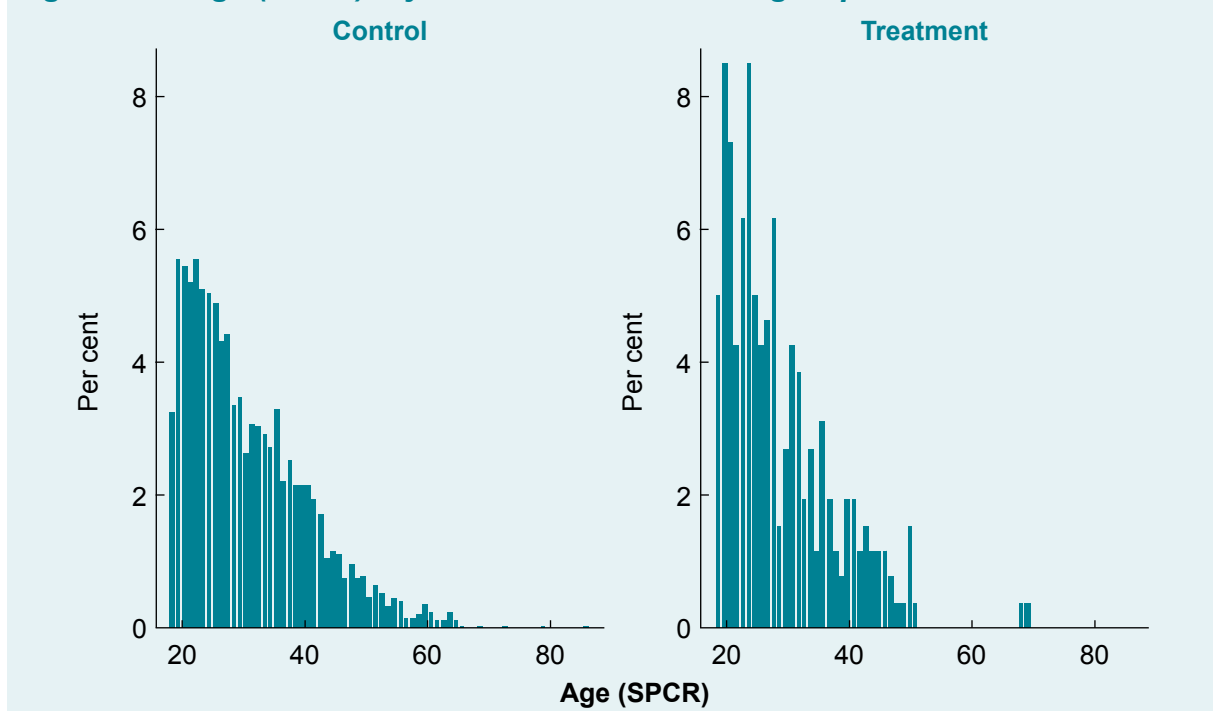


Table A11 Marital status (SPCR), by treatment and control groups

| Status | Control | | | Treatment | | |
|---------------------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| Married | 234 | 9.3 | 9.3 | 18 | 7.0 | 7.0 |
| Living with partner | 642 | 25.5 | 25.6 | 76 | 29.6 | 29.6 |
| Other | 1,636 | 65.1 | 65.1 | 163 | 63.4 | 63.4 |
| Missing | 2 | 0.1 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A12 Ethnicity (SPCR), by treatment and control groups

| Ethnic group | Control | | | Treatment | | |
|----------------------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| Any White background | 2,142 | 85.2 | 85.2 | 220 | 85.6 | 85.6 |
| Any Mixed background | 96 | 3.8 | 3.8 | 16 | 6.2 | 6.2 |
| Any Asian background | 103 | 4.1 | 4.1 | 12 | 4.7 | 4.7 |
| Any Black background | 163 | 6.5 | 6.5 | 9 | 3.5 | 3.5 |
| Any Other background | 10 | 0.4 | 0.4 | 0 | 0.0 | 0.0 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Figure A3 Copas rate, on release (PNC), by treatment and control groups

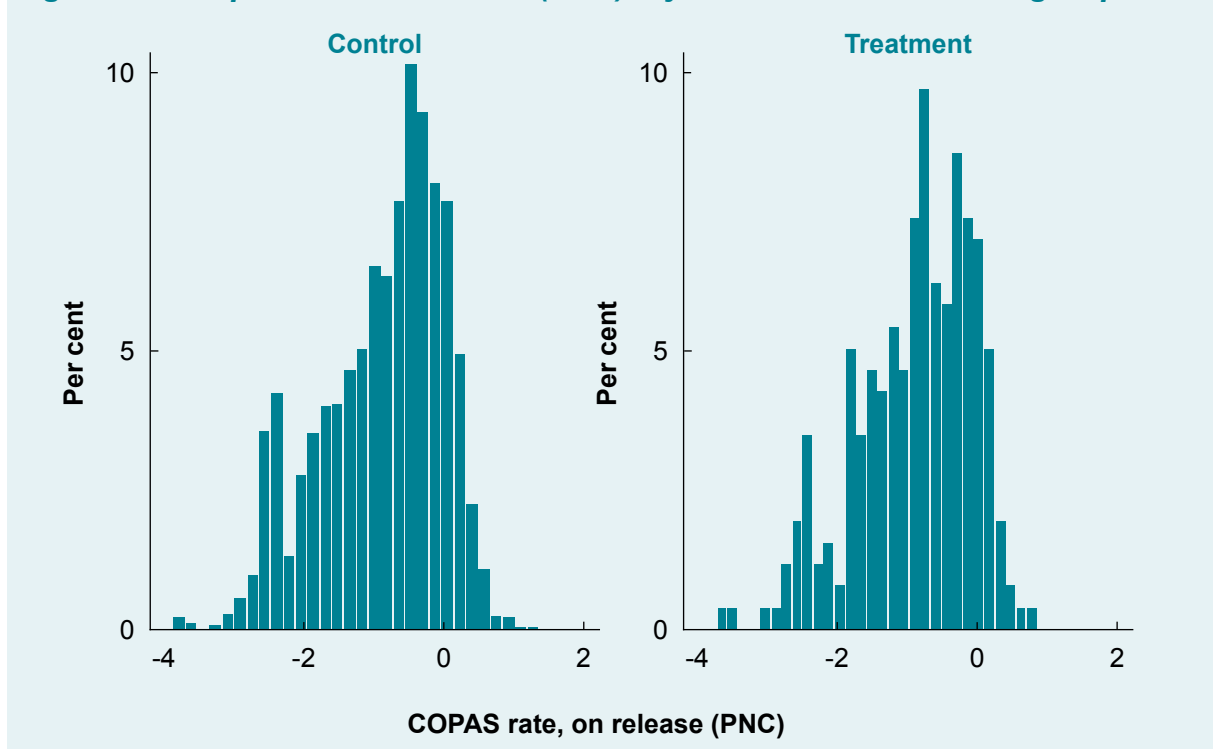


Figure A4 Total previous convictions (PNC), by treatment and control groups

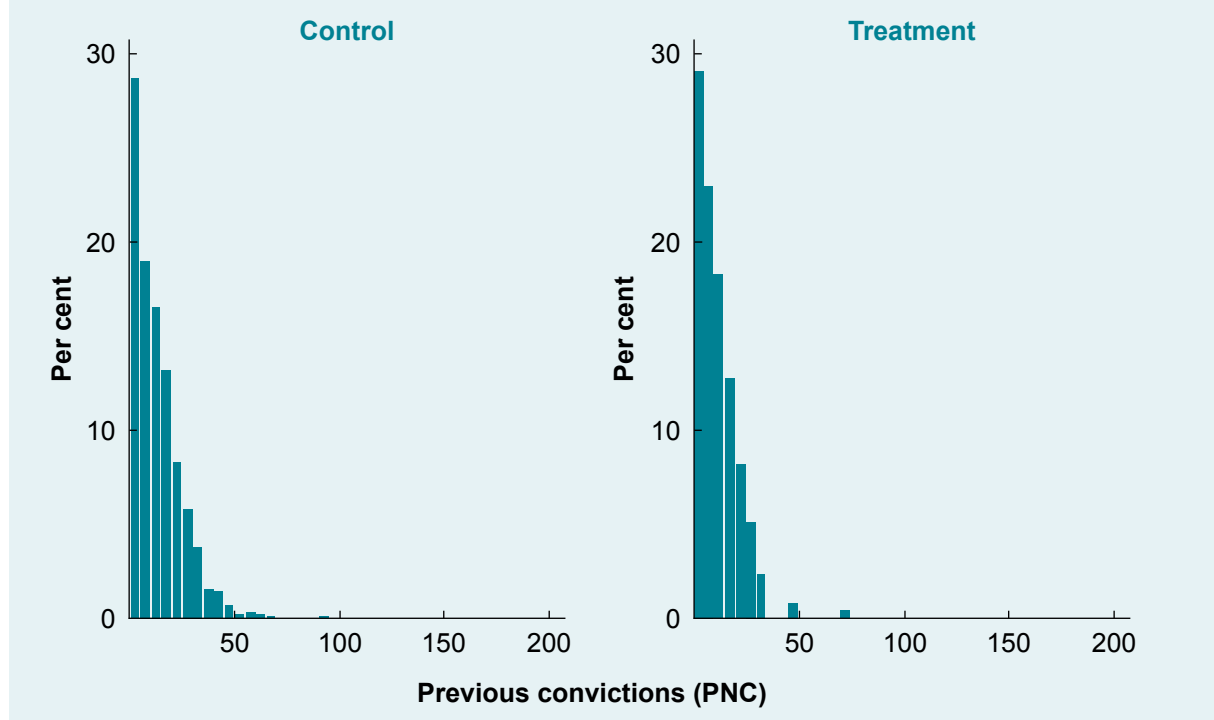


Table A13 Previous severe convictions (PNC), by treatment and control groups

| Number | Control | | | Treatment | | |
|---------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| 0 | 2,205 | 87.7 | 87.7 | 227 | 88.3 | 88.3 |
| 1 | 265 | 10.5 | 10.5 | 26 | 10.1 | 10.1 |
| 2 | 34 | 1.4 | 1.4 | 4 | 1.6 | 1.6 |
| 3 | 5 | 0.2 | 0.2 | 0 | 0.0 | 0.0 |
| 4 | 5 | 0.2 | 0.2 | 0 | 0.0 | 0.0 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A14 Grouped index offence type (PNC), by treatment and control groups

| Offence type grouping | Control | | | Treatment | | |
|-----------------------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| Other | 384 | 15.3 | 15.3 | 15 | 5.8 | 5.8 |
| Violent | 616 | 24.5 | 24.5 | 84 | 32.7 | 32.7 |
| Robbery | 163 | 6.5 | 6.5 | 37 | 14.4 | 14.4 |
| Sexual | 100 | 4.0 | 4.0 | 20 | 7.8 | 7.8 |
| Acquisitive | 761 | 30.3 | 30.3 | 45 | 17.5 | 17.5 |
| Drug | 490 | 19.5 | 19.5 | 56 | 21.8 | 21.8 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A15 Family member has been convicted of a non-motoring offence (SPCR), by treatment and control groups

| Response | Control | | | Treatment | | |
|----------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| No | 1,486 | 59.1 | 59.7 | 137 | 53.3 | 53.7 |
| Yes | 1,003 | 39.9 | 40.3 | 118 | 45.9 | 46.3 |
| Missing | 25 | 1.0 | | 2 | 0.8 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A16 Family member has been in prison (SPCR), by treatment and control groups

| Response | Control | | | Treatment | | |
|----------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| No | 1,658 | 66.0 | 66.6 | 154 | 59.9 | 60.4 |
| Yes | 831 | 33.1 | 33.4 | 101 | 39.3 | 39.6 |
| Missing | 25 | 1.0 | | 2 | 0.8 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A17 Agree: Want to stop offending (SPCR), by treatment and control groups

| Response | Control | | | Treatment | | |
|----------------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| Other | 101 | 4.0 | 4.0 | 9 | 3.5 | 3.5 |
| Agree | 627 | 24.9 | 24.9 | 54 | 21.0 | 21.0 |
| Strongly agree | 1,786 | 71.0 | 71.0 | 194 | 75.5 | 75.5 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A18 Disagree: Want to stop offending (SPCR), by treatment and control groups

| Response | Control | | | Treatment | | |
|-------------------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| Other | 2,498 | 99.4 | 99.4 | 254 | 98.8 | 98.8 |
| Disagree | 7 | 0.3 | 0.3 | 2 | 0.8 | 0.8 |
| Strongly disagree | 9 | 0.4 | 0.4 | 1 | 0.4 | 0.4 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A19 Agree: Want to get help to stop offending (SPCR), by treatment and control groups

| Response | Control | | | Treatment | | |
|----------------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| Other | 725 | 28.8 | 28.8 | 40 | 15.6 | 15.6 |
| Agree | 851 | 33.9 | 33.9 | 88 | 34.2 | 34.2 |
| Strongly agree | 938 | 37.3 | 37.3 | 129 | 50.2 | 50.2 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A20 Disagree: Want to get help to stop offending (SPCR), by treatment and control groups

| Response | Control | | | Treatment | | |
|-------------------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| Other | 2,174 | 86.5 | 86.5 | 237 | 92.2 | 92.2 |
| Disagree | 268 | 10.7 | 10.7 | 15 | 5.8 | 5.8 |
| Strongly disagree | 72 | 2.9 | 2.9 | 5 | 1.9 | 1.9 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Figure A5 General attitude to offending, CRIME-PICS (SPCR), by treatment and control groups

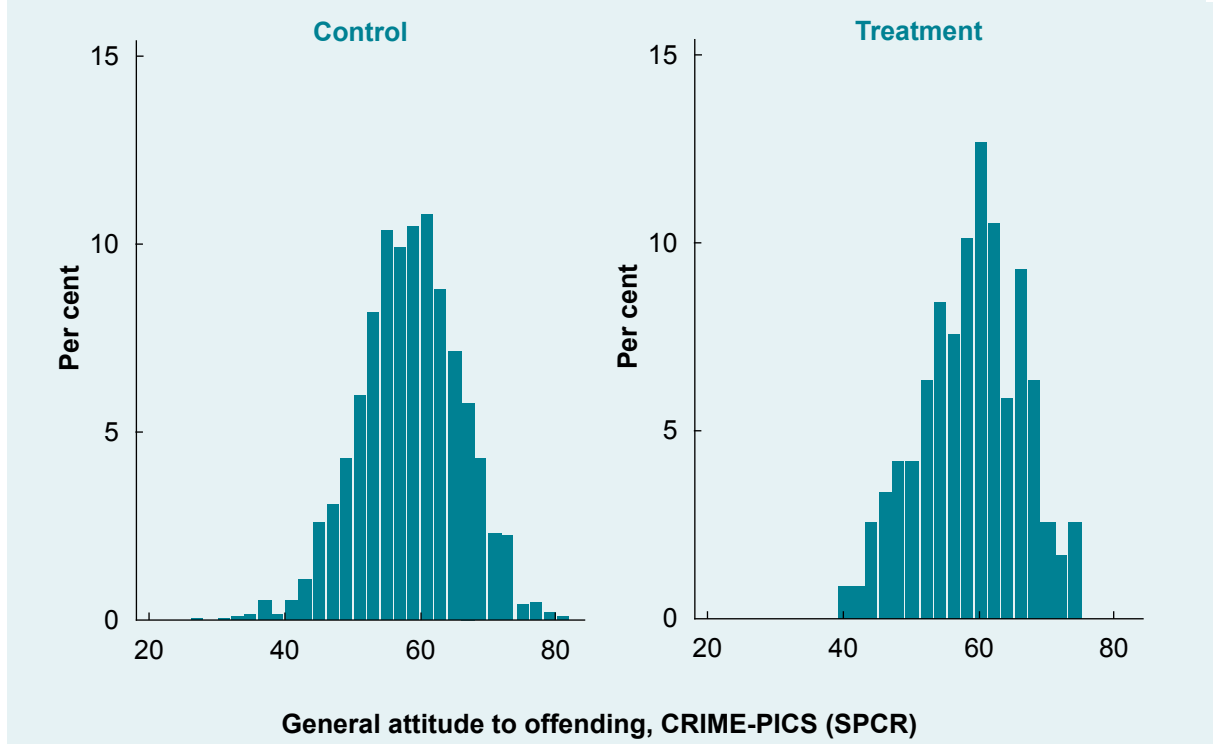


Table A21 Anticipation of reoffending, CRIME-PICS (SPCR), by treatment and control groups

| Score | Control | | | Treatment | | |
|---------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| 8 | 2 | 0.1 | 0.1 | 0 | 0.0 | 0.0 |
| 9 | 1 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| 10 | 3 | 0.1 | 0.1 | 1 | 0.4 | 0.4 |
| 11 | 6 | 0.2 | 0.3 | 0 | 0.0 | 0.0 |
| 12 | 14 | 0.6 | 0.6 | 1 | 0.4 | 0.4 |
| 13 | 27 | 1.1 | 1.1 | 4 | 1.6 | 1.6 |
| 14 | 46 | 1.8 | 1.9 | 8 | 3.1 | 3.3 |
| 15 | 113 | 4.5 | 4.8 | 9 | 3.5 | 3.7 |
| 16 | 201 | 8.0 | 8.5 | 18 | 7.0 | 7.4 |
| 17 | 276 | 11.0 | 11.6 | 30 | 11.7 | 12.3 |
| 18 | 628 | 25.0 | 26.5 | 65 | 25.3 | 26.6 |
| 19 | 371 | 14.8 | 15.6 | 44 | 17.1 | 18.0 |
| 20 | 287 | 11.4 | 12.1 | 30 | 11.7 | 12.3 |
| 21 | 145 | 5.8 | 6.1 | 13 | 5.1 | 5.3 |
| 22 | 106 | 4.2 | 4.5 | 9 | 3.5 | 3.7 |
| 23 | 71 | 2.8 | 3.0 | 5 | 1.9 | 2.0 |
| 24 | 29 | 1.2 | 1.2 | 2 | 0.8 | 0.8 |
| 25 | 17 | 0.7 | 0.7 | 2 | 0.8 | 0.8 |
| 26 | 14 | 0.6 | 0.6 | 2 | 0.8 | 0.8 |
| 27 | 7 | 0.3 | 0.3 | 1 | 0.4 | 0.4 |
| 28 | 3 | 0.1 | 0.1 | 0 | 0.0 | 0.0 |
| 29 | 1 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| 30 | 6 | 0.2 | 0.3 | 0 | 0.0 | 0.0 |
| Missing | 140 | 5.6 | | 13 | 5.1 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A22 Victim hurt denial, CRIME-PICS (SPCR), by treatment and control groups

| Score | Control | | | Treatment | | |
|---------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| 3 | 69 | 2.7 | 2.7 | 2 | 0.8 | 0.8 |
| 4 | 47 | 1.9 | 1.9 | 2 | 0.8 | 0.8 |
| 5 | 59 | 2.3 | 2.3 | 1 | 0.4 | 0.4 |
| 6 | 136 | 5.4 | 5.4 | 6 | 2.3 | 2.3 |
| 7 | 104 | 4.1 | 4.1 | 4 | 1.6 | 1.6 |
| 8 | 155 | 6.2 | 6.2 | 14 | 5.4 | 5.4 |
| 9 | 129 | 5.1 | 5.1 | 20 | 7.8 | 7.8 |
| 10 | 241 | 9.6 | 9.6 | 19 | 7.4 | 7.4 |
| 11 | 133 | 5.3 | 5.3 | 8 | 3.1 | 3.1 |
| 12 | 664 | 26.4 | 26.4 | 77 | 30.0 | 30.0 |
| 13 | 257 | 10.2 | 10.2 | 38 | 14.8 | 14.8 |
| 14 | 196 | 7.8 | 7.8 | 22 | 8.6 | 8.6 |
| 15 | 324 | 12.9 | 12.9 | 44 | 17.1 | 17.1 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A23 Evaluation of crime as worthwhile, CRIME-PICS (SPCR), by treatment and control groups

| Score | Control | | | Treatment | | |
|---------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| 4 | 1 | 0.0 | 0.0 | 1 | 0.4 | 0.4 |
| 5 | 5 | 0.2 | 0.2 | 1 | 0.4 | 0.4 |
| 6 | 16 | 0.6 | 0.6 | 2 | 0.8 | 0.8 |
| 7 | 26 | 1.0 | 1.1 | 2 | 0.8 | 0.8 |
| 8 | 68 | 2.7 | 2.8 | 4 | 1.6 | 1.6 |
| 9 | 96 | 3.8 | 3.9 | 9 | 3.5 | 3.5 |
| 10 | 177 | 7.0 | 7.2 | 21 | 8.2 | 8.3 |
| 11 | 197 | 7.8 | 8.0 | 13 | 5.1 | 5.1 |
| 12 | 270 | 10.7 | 10.9 | 31 | 12.1 | 12.2 |
| 13 | 235 | 9.3 | 9.5 | 24 | 9.3 | 9.4 |
| 14 | 328 | 13.0 | 13.3 | 33 | 12.8 | 13.0 |
| 15 | 266 | 10.6 | 10.8 | 24 | 9.3 | 9.4 |
| 16 | 276 | 11.0 | 11.2 | 27 | 10.5 | 10.6 |
| 17 | 229 | 9.1 | 9.3 | 24 | 9.3 | 9.4 |
| 18 | 115 | 4.6 | 4.7 | 20 | 7.8 | 7.9 |
| 19 | 94 | 3.7 | 3.8 | 12 | 4.7 | 4.7 |
| 20 | 70 | 2.8 | 2.8 | 6 | 2.3 | 2.4 |
| Missing | 45 | 1.8 | | 3 | 1.2 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A24 Used class A drugs in the four weeks before custody (SPCR), by treatment and control groups

| Response | Control | | | Treatment | | |
|----------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| No | 1,460 | 58.1 | 58.1 | 159 | 61.9 | 61.9 |
| Yes | 1,054 | 41.9 | 41.9 | 98 | 38.1 | 38.1 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A25: Used class B/C drugs in the four weeks before custody (SPCR), by treatment and control groups

| Response | Control | | | Treatment | | |
|----------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| No | 1,259 | 50.1 | 50.1 | 130 | 50.6 | 50.6 |
| Yes | 1,255 | 49.9 | 49.9 | 127 | 49.4 | 49.4 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A26 Injected illegal drugs in the four weeks before custody (SPCR), by treatment and control groups

| Response | Control | | | Treatment | | |
|----------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| No | 2,121 | 84.4 | 84.5 | 228 | 88.7 | 89.1 |
| Yes | 389 | 15.5 | 15.5 | 28 | 10.9 | 10.9 |
| Missing | 4 | 0.2 | | 1 | 0.4 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A27 Accommodation prior to custody (SPCR), by treatment and control groups

| Type | Control | | | Treatment | | |
|-------------------------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| Stable accommodation | 2,247 | 89.4 | 89.4 | 236 | 91.8 | 91.8 |
| Transient accommodation | 130 | 5.2 | 5.2 | 14 | 5.4 | 5.4 |
| Sleeping rough | 137 | 5.4 | 5.4 | 7 | 2.7 | 2.7 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A28 Educational (qualifications) attainment (SPCR), by treatment and control groups

| Highest qualification attained | Control | | | Treatment | | |
|---|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| No qualifications | 1,099 | 43.7 | 44.1 | 99 | 38.5 | 38.8 |
| Other qualifications (incl overseas) | 66 | 2.6 | 2.6 | 7 | 2.7 | 2.7 |
| O level/GCSE grade D-G (or similar qualification) | 372 | 14.8 | 14.9 | 47 | 18.3 | 18.4 |
| O level/GCSE Grades A*-C (or similar qualification) | 507 | 20.2 | 20.4 | 61 | 23.7 | 23.9 |
| Trade apprenticeships | 87 | 3.5 | 3.5 | 6 | 2.3 | 2.4 |
| A/AS levels | 220 | 8.8 | 8.8 | 21 | 8.2 | 8.2 |
| Higher education diploma | 57 | 2.3 | 2.3 | 11 | 4.3 | 4.3 |
| First degree/postgraduate degree | 70 | 2.8 | 2.8 | 2 | 0.8 | 0.8 |
| Higher degree/postgraduate degree | 13 | 0.5 | 0.5 | 1 | 0.4 | 0.4 |
| Missing | 23 | 0.9 | | 2 | 0.8 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A29 Was in paid work in the four weeks before custody (SPCR), by treatment and control groups

| Response | Control | | | Treatment | | |
|----------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| No | 1,681 | 66.9 | 66.9 | 168 | 65.4 | 65.4 |
| Yes | 832 | 33.1 | 33.1 | 89 | 34.6 | 34.6 |
| Missing | 1 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A30 Reconviction indicator, one-year (PNC), by treatment and control groups

| Indicator | Control | | | Treatment | | |
|-----------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| No | 1,584 | 63.0 | 63.0 | 187 | 72.8 | 72.8 |
| Yes | 930 | 37.0 | 37.0 | 70 | 27.2 | 27.2 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A31 Frequency of reoffending, one-year (PNC), by treatment and control groups

| Indicator | Control | | | Treatment | | |
|-----------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| 0 | 1,584 | 63.0 | 63.0 | 187 | 72.8 | 72.8 |
| 1 | 495 | 19.7 | 19.7 | 54 | 21.0 | 21.0 |
| 2 | 203 | 8.1 | 8.1 | 11 | 4.3 | 4.3 |
| 3 | 117 | 4.7 | 4.7 | 3 | 1.2 | 1.2 |
| 4 | 53 | 2.1 | 2.1 | 1 | 0.4 | 0.4 |
| 5 | 33 | 1.3 | 1.3 | 1 | 0.4 | 0.4 |
| 6 | 8 | 0.3 | 0.3 | 0 | 0.0 | 0.0 |
| 7 | 7 | 0.3 | 0.3 | 0 | 0.0 | 0.0 |
| 8 | 6 | 0.2 | 0.2 | 0 | 0.0 | 0.0 |
| 9 | 1 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| 10 | 2 | 0.1 | 0.1 | 0 | 0.0 | 0.0 |
| 11 | 2 | 0.1 | 0.1 | 0 | 0.0 | 0.0 |
| 13 | 0 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| 15 | 1 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| 18 | 1 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| 32 | 1 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A32 Frequency of reoffences, one-year (PNC), by treatment and control groups

| Indicator | Control | | | Treatment | | |
|-----------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| 0 | 1,584 | 63.0 | 63.0 | 187 | 72.8 | 72.8 |
| 1 | 272 | 10.8 | 10.8 | 31 | 12.1 | 12.1 |
| 2 | 181 | 7.2 | 7.2 | 15 | 5.8 | 5.8 |
| 3 | 117 | 4.7 | 4.7 | 15 | 5.8 | 5.8 |
| 4 | 91 | 3.6 | 3.6 | 2 | 0.8 | 0.8 |
| 5 | 65 | 2.6 | 2.6 | 3 | 1.2 | 1.2 |
| 6 | 42 | 1.7 | 1.7 | 2 | 0.8 | 0.8 |
| 7 | 38 | 1.5 | 1.5 | 1 | 0.4 | 0.4 |
| 8 | 32 | 1.3 | 1.3 | 1 | 0.4 | 0.4 |
| 9 | 20 | 0.8 | 0.8 | 0 | 0.0 | 0.0 |
| 10 | 19 | 0.8 | 0.8 | 0 | 0.0 | 0.0 |
| 11 | 15 | 0.6 | 0.6 | 0 | 0.0 | 0.0 |
| 12 | 11 | 0.4 | 0.4 | 0 | 0.0 | 0.0 |
| 13 | 6 | 0.2 | 0.2 | 0 | 0.0 | 0.0 |
| 14 | 6 | 0.2 | 0.2 | 0 | 0.0 | 0.0 |
| 15 | 5 | 0.2 | 0.2 | 0 | 0.0 | 0.0 |
| 16 | 1 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| 17 | 0 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| 18 | 1 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| 19 | 1 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| 20 | 1 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| 21 | 2 | 0.1 | 0.1 | 0 | 0.0 | 0.0 |
| 22 | 2 | 0.1 | 0.1 | 0 | 0.0 | 0.0 |
| 25 | 1 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| 39 | 1 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Table A33 Severe offences conviction indicator, one-year (PNC), by treatment and control groups

| Indicator | Control | | | Treatment | | |
|-----------|---------|-------|---------|-----------|-------|---------|
| | n | % | Valid % | n | % | Valid % |
| No | 2,496 | 99.3 | 99.3 | 255 | 99.2 | 99.2 |
| Yes | 18 | 0.7 | 0.7 | 2 | 0.8 | 0.8 |
| Missing | 0 | 0.0 | | 0 | 0.0 | |
| Total | 2,514 | 100.0 | 100.0 | 257 | 100.0 | 100.0 |

Note: Control group frequencies are unweighted (a weighted average of controls within the radius calliper is used in the matching algorithm).

Ministry of Justice Research Series 19/10

Evaluation of the impact of the HM Prison Service Enhanced Thinking Skills programme on reoffending

This research examined the impact of the Enhanced Thinking Skills (ETS) programme on the one-year reconviction outcomes of 257 prison-based participants between 2006 and 2008. Radius propensity score matching was used to match a comparison group that had no statistically significant difference (at the means) to the treatment group on any matching characteristic. ETS was found to significantly reduce both the reconviction rate (six percentage points) and frequency (60 reoffences per 100 released prisoners) of general reoffending of participants. No statistically significant impact was found on the severe offences reconviction rate. Almost identical impacts were found for completers. A stronger reduction in reconviction was found for participants meeting the suitability criteria. Though the programme has been shown to be effective in practice, the findings suggest that a stricter application of the targeting criteria might have further enhanced the effectiveness of the programme.

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