

Effectiveness of «Reasoning and rehabilitation» in reducing reoffending

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This article aims to review the effectiveness of the «Reasoning and Rehabilitation» program in reducing recidivism. Nineteen evaluations (involving 32 separate comparisons) were located in which experimental and control groups were compared. A meta-analysis showed that, overall, there was a significant 14% decrease in recidivism for program participants compared to controls. This program was effective in Canada and the United Kingdom but not in the United States. It was effective in community and institutional settings, whether or not it was given on a voluntary basis, and for low-risk and high-risk offenders. However, the program was more effective in older studies than in more recent evaluations.

La eficacia del programa «Razonamiento y Rehabilitación» en la reducción de la reincidencia. Este artículo pretende revisar la efectividad del programa «Razonamiento y Rehabilitación» en la reducción de la reincidencia. Se localizaron 19 evaluaciones (que abarcaban 32 comparaciones diferentes) donde se empleó grupos experimentales y de control. Un meta-análisis efectuado mostró que, en conjunto, había un decremento significativo del 14% en la reincidencia de los participantes en el programa. El programa fue efectivo en Canadá y Reino Unido, pero no en los Estados Unidos. Fue efectivo en la comunidad y en escenarios institucionales, tanto en sujetos que voluntariamente accedieron a participar como en los que fueron obligados, y tanto en sujetos de riesgo bajo como elevado de volver a delinquir. No obstante, el programa fue más efectivo en los estudios más antiguos que en los más recientes.

The «Reasoning and Rehabilitation» (R&R) program is a cognitive skills program which aims to change the criminogenic thinking of offenders (Ross, Fabiano, & Ewles, 1988). The main aim of this article is review existing knowledge on the effectiveness of the R&R programme. It presents a systematic review of R&R evaluations followed by a meta-analysis of their findings. The key questions addressed are:

- 1) Is the R&R program effective in reducing reoffending?
- 2) Does it work better in community or institutional settings?
- 3) Does it work better for high risk or low risk offenders?
- 4) Does it work better in one country than in another?
- 5) Does it work better on a voluntary rather than non-voluntary basis?
- 6) What improvements might be made to the program?

There have been several reviews of evaluations of the R&R program (Allen, Mackenzie, & Hickman, 2001; Pearson, Lipton, Cleland, & Yee, 2002; Robinson & Porporino, 2001; Ross & Ross, 1995c). The first systematic review, using meta-analytic techniques, was published by Tong and Farrington (2006). Unlike narrative reviews, systematic reviews have explicit objectives,

explicit criteria for including or excluding studies, and explicit statements about methods used to search for studies (Farrington & Petrosino, 2001). This article builds on and extends the previous systematic review.

Method

This section summarizes R&R program evaluations that have compared experimental and control groups and have provided recidivism data as an outcome measure. Outcomes other than recidivism are not reviewed. Table 1 summarizes key features of the evaluations and Table 2 summarizes key results.

Published and unpublished studies that were written in English and that specifically mentioned the R&R model were included in this review. A literature search was carried out in Criminal Justice Abstracts, PsycINFO and the National Criminal Justice Reference Service Abstracts using «reasoning and rehabilitation» or «cognitive skills training» as keywords. Literature reviews of the R&R program (e.g., Robinson & Porporino, 2001) were consulted. One of the program developers, Frank Porporino, was also contacted. Studies were excluded if there were less than 40 participants in total in the evaluation (Kownacki, 1995) or if no recidivism outcome was reported (e.g., De Maret, 1991; Garrido, 1992, 1995). We were unable to obtain one evaluation (Robinson, 1994). We are very grateful to Lawrence Bench, Anne Berman, Jenny Cann, Caroline Friendship, Rebecca Murphy, Emma Palmer, Pat van Voorhis and James Wilson for providing information.

For evaluations that included more than one follow-up period, the outcome at or closest to the 12-month follow-up period was used in the meta-analysis. The outcome data for the experimental

R&R participant group is based on initial allocation, including both completers and dropouts from the program. The argument for including dropouts is to maintain the benefits of the original random assignment in equating experimental and control conditions, since completers and dropouts are self-selected groups. It cannot necessarily be concluded that the R&R program worked better for completers; they may have been better than controls to start with (Robinson, 1995).

The alternative argument is that dropouts should be excluded on the grounds that they have not completed the full «dosage» of training stipulated by the program, making them similar to controls in this respect. From this perspective, the inclusion of dropouts in comparisons with controls would underestimate the program effect (Robinson, 1995). As we are most concerned with internal validity and the comparability of experimental and control groups, we have compared participants (completers and dropouts) with controls in our meta-analysis.

The sample size shown in Table 1 refers to the numbers followed up and included in the meta-analysis, not the numbers initially allocated to experimental or control groups. Recidivism of participants is shown in Table 2. Where studies reported more than one recidivism outcome, rearrest or reconviction was analyzed as the most important outcome, since decisions about revocation, violation and return to prison may be biased by the knowledge of what treatment an offender received.

Studies included in this research

R&R in Canada

The Pickering Project

High risk male probationers were randomly assigned to one of three groups: regular probation (n= 23), regular probation with life skills training (n= 17), or regular probation with cognitive skills (R&R) training (n= 22) (Ross, Fabiano, & Ewles, 1988). In our evaluation, we compared R&R with regular probation. The outcome was the percentage reconvicted during a 9-month follow-up period (Table 2). Statistically significant differences were found between the R&R group and the regular probation group (Ross, Fabiano, & Diemer-Ewles, 1995).

Pilot Implementation, Correctional Services Canada

Male prisoners in the experimental groups (n= 50) and the waiting list control group (n= 26) were selected based on their high risk and needs levels (Porporino, Fabiano & Robinson, 1991). They were comparable in age, IQ and sentence length and the program non-completion rate was 4%. Readmission to prison with or without a new conviction was used as the outcome measure. The results reported here are based on 63 conditionally released offenders, who had been followed up for at least six months with an average period of 19.7 months in the community (Porporino et al., 1991, Table 2). One-fifth of the experimental group had been reconvicted compared to 30% of controls. The statistical significance of these differences was not reported.

Canadian Federal Offenders

Male offenders were selected after assessment by staff to determine that they had the targeted cognitive deficits and that they were motivated to participate in the program (Porporino & Robinson, 1995; Robinson, 1995). They were randomly assigned

to either the R&R program (n= 3,531) or the waiting list control group (n= 541); 14.2% of participants did not complete the R&R program. The previous criminal histories of the experimental and control groups were comparable.

Robinson's (1995) study focussed on offenders who had been released for at least one year (1,673 offenders in the R&R group and 369 offenders in the control group). Recidivism was measured by reconviction and by readmission to prison for a technical violation. Overall, more controls were reconvicted (24.8%) compared to program participants (21.3%) and program completers (19.7%). Only the difference between controls and program completers was statistically significant, although there were significant results for low risk compared with high risk offenders.

R&R in the United States

Colorado Specialized Drug Offender Program; SDOP

The SDOP is an intensive supervision program for drug offenders on probation. Johnson and Hunter (1995) evaluated the usefulness of intensive supervision when combined with the R&R program. Drug offenders, who scored at least 5 on the 9-point Addiction Severity Index, were randomly assigned to three conditions: SDOP with R&R (n= 47), SDOP without R&R (n= 51), or regular probation (n= 36). In the interests of disentangling the effect of R&R from the effect of SDOP, SDOP with R&R is compared with SDOP without R&R in Table 1.

The outcome measure was revocation of probation and offenders were followed up for eight months (Table 2; this was the only recidivism measure not based on reconviction or rearrest). For probationers with severe drug addictions, SDOP with R&R probationers were least likely to be revoked (18%), compared to SDOP without R&R (43%) or regular probationers (60%). For high risk probationers, SDOP with R&R probationers were least likely to be revoked (33%), compared to SDOP without R&R (34%) or regular probationers (75%). Johnson and Hunter (1995) did not report the statistical significance of these differences.

Colorado Juvenile Intensive Supervision Probation; JISP

Male probationers under JISP were randomly assigned either to R&R (n= 20) or control conditions (n= 20; Pullen, 1996). Compared to the medium risk control group, the experimental group was high risk and contained fewer violent offenders. Recidivism was measured by arrest for a new crime or a technical violation up to six months after termination of JISP (Table 2). More program participants (50%) were rearrested compared to controls (35%) during JISP. The follow-up six months after JISP had ended showed that fewer program participants (20%) were rearrested compared to controls (25%). Neither of these differences was statistically significant.

A shortcoming of this study was that the follow-up period was divided into two discrete time periods, which raised the problem of when to start measuring recidivism. We chose only to measure arrests in the follow-up period after completion of the R&R program, but this could give a misleading impression of its effectiveness.

Georgia Cognitive Skills Training Program

Juvenile prisoners were selected for the program if they had committed a violent crime, were between ages 13 and 17, were economically disadvantaged and had a sentence long enough to

Table 1
Key features of the evaluations

Study authors (year)	Sample size	Mean age	Treatment setting	Design
Canada				
1. Ross et al. (1988)	E:22 C: 23	E: 24.1 C: 24.1	Probation	Experimental-control, random assignment
2. Porporino et al. (1991)	E: 40 C: 23		Institutional	Waiting list control
3. Robinson (1995)	E: 838 C: 173	E:29.0 C:28.9	Community, institutional	Experimental-control, random assignment, waiting list control
– low risk	E: 835 C: 196			
– high risk				
United States				
4. Johnson & Hunter (1995)	E: 47 C: 51		Probation	Experimental-control, random assignment
5. Pullen (1996)	E:20 C:20	E:16.3 C:16.5	Probation	Experimental-control, random assignment
6. Murphy & Bauer (1996)	E:33 C:16	E:36.1 C:36.7	Institutional	Experimental-control, random assignment
7. Austin et al. (1997)	E:71 C:65		Probation, Parole	Experimental-control, random assignment
8. van Voorhis et al. (2001)	E:163 C:149	E:30.1 C:30.5	Parole	Experimental-control, random assignment
– low risk				
– high risk	E:66 C:83			
9. van Voorhis et al. (2002)	E:102 C: 94	E:31.9 C:31.9	Parole	Experimental-control, random assignment
– low risk				
– high risk	E: 351 C: 375			
10. Bench (2002)	E:63 C:70		Institutional	Either random assignment or retrospective quasi-experimental control
11. Wilson & Davis (2006)	E: 343 C: 277	E: 33.6 C: 33.4	Institutional	Experimental-control, sequential assignment
United Kingdom				
12. Raynor & Vanstone (1994)	E:107 C:100	E:22.9 C:22.7	Probation	Quasi-experimental
13. Friendship et al. (2003)	E:101 C:586		Prison	Retrospective quasi-experimental
– low risk				
– medium-low risk	E:147 C:390			
– medium-high risk	E:166 C:424			
– high risk	E: 253 C:401			
14. Falshaw et al. (2003)	E:310 C:930		Prison	Retrospective quasi-experimental
– low risk				
– high risk	E: 339 C:1017			
15. Cann et al. (2003)	E: 1039 C: 1039		Prison (Adults)	Retrospective quasi-experimental
– low-risk adults				
– high risk adults	E: 1156 C: 1156			
– medium-low risk youth	E:189 C:189		Prison (Young Offenders)	
– high risk youth	E:1345 C:1345			

Table 1 (continued)
Key features of the evaluations

Study authors (year)	Sample size	Mean age	Treatment setting	Design
16. Mitchell & Palmer (2005)	E:31 C:31	E:17.5 C:17.8	Prison	Retrospective quasi-experimental
17. Wilkinson (2005)	E: 105 C: 98		Probation	Quasi-experimental
18. Cann (2006)	E: 65		Prison	Retrospective quasi-experimental
– low risk	C: 195			
– medium-low risk	E: 57 C: 171			
– medium-high risk	E: 37 C:111			
– high risk	E: 21 C: 63			
Sweden				
19. Berman (2004)	E:276 C:451		Prison and Probation	Retrospective quasi-experimental

Note: E= Experimental group; C= Control group

complete the program (Murphy & Bauer, 1996; Murphy, Jones, & Bauer, 1997). A shortened version of the R&R program was used to adapt to the time frame of the juveniles' sentences. They were randomly assigned to the experimental (n= 175) or control (n= 56) groups. Compared to the control group, the experimental group had a higher number of prior arrests and a higher incidence of substance abuse, and thus were at higher risk to start with.

Only a small fraction of the original sample (33 participants and 16 controls) who were released were followed up. Participants were followed up for at least 9 months, while controls were followed up for at least 14 months. Recidivism was measured by reconvictions (Table 2). The difference between controls and program participants was statistically significant. However, this difference in recidivism could have been caused (at least in part) by the difference in follow-up periods.

California Probation

This evaluation compared the effectiveness of the R&R program with the Drug Aftercare program (DAC) for drug offenders on probation, parole or supervised release (Austin, Robinson, Elms, & Chan, 1997). Male drug offenders who were sentenced to probation or released from prison to community supervision were eligible to participate in the R&R or DAC program after screening by probation staff. They were randomly assigned to R&R (n= 71) or DAC (n= 65; control) and were followed up for one year. Offenders in both groups had similar demographic characteristics, but 44.6% of R&R participants and 39.7% of DAC participants dropped out from the study. Rearrest was used as the outcome measure (Table 2). Differences between the DAC and R&R participants were not statistically significant.

Georgia, Phase I

Male parolees were selected if they were identified as problematic by their parole officers, had an IQ of 80 and above, and did not have a history of severe substance abuse or sex offenses. They were randomly assigned to the experimental (n= 232) or control (n= 236) groups (van Voorhis, Spruance, Listwan,

Ritchey, Pealer, & Seabrook, 2001). Parolees from both groups had similar criminal histories and demographic characteristics.

Recidivism was measured by return to prison or rearrest/revocation. Return to prison data were gathered up to 30 months after program completion but the outcome measure at 12 months is reported here, because almost all offenders (229 experimentals and 232 controls) were at risk for at least 12 months (Table 2). Program completers were least likely to return to prison (15.8%). Data for rearrests/revocations were available up to nine months after program completion. Completers were least likely to be rearrested/revoked (28.7%). Table 2 shows that there was a greater treatment effect for high risk offenders (see also van Voorhis, Spruance, Ritchey, Listwan, & Seabrook, 2004).

Georgia, Phase II

Male parolees were selected if they had a relatively high risk of reoffending, an IQ of 60 and above, no severe substance abuse and no history of sex offenses (van Voorhis, Spruance, Ritchey, Listwan, Seabrook, & Pealer, 2002). They were randomly assigned to the treatment group (n= 609) or control group (n= 581). However, 5.7% of the experimental group did not start R&R. Participants were followed up for 33 months, but recidivism data from the 12-month follow-up is presented here, because many offenders were not at risk for more than 12 months. Recidivism was based on two measures: return to prison and rearrest/revocation. Differences between participants and controls on return to prison and rearrest/revocation were not statistically significant, but higher risk participants did better (Table 2).

Utah

Program delivery took place via two-way interactive videoconferencing in this evaluation of the R&R program (Bench, 2002). All program participants (n= 63) voluntarily participated in the program while controls (n= 70) were either on a waiting list for the program or were matched to participants on demographic variables. Arrest after one year was the outcome measure (Table 2). There were no statistically significant differences between participants and controls on all measures of arrests.

New York (Project Greenlight Reentry Program)

The R&R program was delivered as part of an intensive transitional services program, where participants (n = 343) were given intensive programming during their incarceration and were given links to community-based resources after their release (Wilson & Davis, 2006). Identified program candidates were sequentially assigned to the experimental or control group on a two to one basis. Controls (n = 277) received the standard

Department of Corrections transitional services. Arrest after one year was the outcome measure. There was a statistically significant difference between experimental and control groups, with the experimental group faring worse than the control group (Table 2).

R&R in the United Kingdom

Mid-Glamorgan, Wales (Straight Thinking on Probation, STOP)

In this evaluation, the experimental group consisted of 133 high-risk male probationers who were given STOP orders as an alternative to a custodial sentence (Lucas, Raynor, & Vanstone, 1992); 38% of STOP participants did not complete the program. Reconviction was used as the outcome measure and the results of the follow-up at 12 months, using regular probationers as the control group (n= 100), are reported here. The results have been adjusted for «false positives» (pseudo-reconvictions), which are convictions for offenses committed before the sentence was imposed. More STOP participants were reconvicted (44%), compared to STOP completers (35%) and regular probationers (40%; Raynor & Vanstone, 1994).

HM Prison Service (program delivery between 1992 and 1996)

Program participants volunteered to participate in either the R&R or Enhanced Thinking Skills (ETS) program (n= 667) while controls did not participate in any treatment program (n= 1801; Friendship, Blud, Erikson, & Travers, 2002; Friendship, Blud, Erikson, Travers, & Thornton, 2003). All offenders were serving custodial sentences of two years or more. Controls were retrospectively matched to program participants on a reconviction prediction score (three controls matched to each experimental); 10% of program participants did not complete the treatment.

The ETS program is based on the same cognitive model as the R&R program and the same techniques were used. However, the ETS program had 21 sessions compared to 38 sessions for the R&R program. Unlike the R&R program, the ETS program did not have a critical reasoning module and perspective taking was taught as a separate module (Blud & Travers, 2001). Participants and controls were divided into four risk categories using the Offender Group Reconviction Scale (Copas & Marshall, 1998). Reconvictions after two years were used as the outcome measure and these were compared within each risk category (Table 2). Differences between medium-low risk participants and controls, and medium-high risk participants and controls, were statistically significant.

HM Prison Service (program delivery between 1996 and 1998)

Program participants volunteered to participate in either the R&R or ETS program (n= 649) while controls did not take part in any cognitive skills program during their custodial sentence (n= 1947) (Falshaw, Friendship, Travers, & Nugent, 2003). All offenders were serving custodial sentences of more than six months. Controls were retrospectively matched to program participants on a reconviction prediction score (three controls matched to each experimental); 10% of participants did not complete the program.

The aim was to compare the effectiveness of R&R for low versus high risk offenders. Reconvictions after two years were used as the outcome measure and these were compared within low

Table 2
Key results of the evaluations

Study authors (year)	Follow-up period (months)	% Recidivism (OR)
Canada		
1. Ross et al. (1988)	9	E:18.1%; C:69.6% (10.29*)
2. Porporino et al. (1991)	6	E:20%; C:30.4% (1.75)
3. Robinson (1995) - low risk	12	E:14.2%; C:20.2% (1.53*)
Robinson (1995) - high risk		E:30.2%; C:30.3% (1.00)
United States		
4. Johnson & Hunter (1995)	8	E:25.5%; C:29.4% (1.22)
5. Pullen (1996)	6	E:20%; C:25% (1.33)
6. Murphy & Bauer (1996)	9	E:39.4%; C:75% (4.62*)
7. Austin et al. (1997)	12	E:25.4%; C:32.3% (1.41)
8. van Voorhis et al. (2001) - low risk	12	E:34.4%; C:36.2% (1.09)
van Voorhis et al. (2001) - high risk		E:40.9%; C:51.8% (1.55)
9. van Voorhis et al. (2002) - low risk	12	E:17.6%; C:14.8% (0.82)
van Voorhis et al. (2002) - high risk		E:39.9%; C:43.2% (1.15)
10. Bench (2002)	12	E:17.5%; C:25.4% (1.40)
11. Wilson & Davis (2006)	12	E:31.5%; C: 22.0% (0.61*)
United Kingdom		
12. Raynor & Vanstone (1994)	12	E:43.9%; C: 40% (0.85)
13. Friendship et al. (2003) - low risk	24	E:5%; C:7.8% (1.64)
Friendship et al. (2003) - medium-low risk		E:17.7%; C:32.3% (2.22*)
Friendship et al. (2003) - medium-high risk		E:43.4%; C:54% (1.53*)
Friendship et al (2003) - high risk		E:74.7%; C:79.6% (1.32)
14. Falshaw et al. (2003) - low risk	24	E:13.5%; C:15.2% (1.14)
Falshaw et al. (2003) - high risk		E:63.1%; C:61.2% (0.92)
15. Cann et al. (2003) - low risk (adults)	12	E:5.4%; C:5.4% (1.00)
Cann et al. (2003) - high risk (adults)		E:29.5%; C:32.9% (1.17)
Cann et al (2003) - low risk (youth)		E:5.8%; C:9.0% (1.60)
Cann et al (2003) - high risk (youth)		E:37.5%; C:39.3% (1.08)
16. Mitchell & Palmer (2005)	18	E:80.6%; C:83.9% (1.25)
17. Wilkinson (2005)	24	E: 67.6%; C:68.4% (1.04)
18. Cann (2006) - low risk	12	E: 9.2%; C:1.5% (0.32)
Cann (2006) -medium-low risk		E: 17.5%; C: 9.4% (0.49)
Cann (2006) - medium-high risk		E: 29.7%; C: 25.2% (0.80)
Cann (2006) - high risk		E: 42.9%; C: 54.0% (1.56)
Sweden		
19. Berman (2004)	36	E:54.0%; C:60.3% (1.30)
Notes: OR= odds ratio; E= experimental group; C= control group. * p<.05 Recidivism based on reconviction/rearrest except for Johnson & Hunter (revocation)		

and high risk categories (Table 2). Since the fraction of participants was 25% in each of four risk categories used by the authors, the four categories were collapsed to two for our analyses. There were no statistically significant differences in reconvictions between participants and controls.

HM Prison Service (program delivery between 1998 and 2000)

Program participants volunteered to participate in either the R&R or ETS program (2,195 adults, 1,534 young offenders; Cann, Falshaw, Nugent, & Friendship, 2003). Controls were retrospectively matched to program participants on static risk factors and did not participate in any cognitive skills program during their custodial sentence (2,195 adult controls, 1,534 young offender controls). All offenders were serving custodial sentences of more than six months; 9% of adults and 14% of young offenders did not complete the program. Reconviction after one year was used as the outcome measure. Table 2 shows that there were no statistically significant differences in reconviction between program participants and controls for either low or high risk offenders or for adult or young offenders.

North-West England

Male juvenile offenders with convictions for violence, sexual or drug-related crime and/or with educational, employment or relationship difficulties were referred to the R&R program (Mitchell & Palmer, 2005). Program participants (n= 31) voluntarily took part in the programme while controls (n= 31) were retrospectively matched to participants on static risk factors. Reconviction and reincarceration after 18 months were used as outcome measures (see Table 2). There were no statistically significant differences between participants and controls in either measure.

London

Male probationers who were assessed as suitable to participate in the R&R program as part of their sentence were assigned to either the experimental (n= 105) or control (n= 100) groups (Wilkinson, 2005). Reconviction after two years was used as the outcome measure (see Table 2). There were no statistically significant differences between participants and controls in reconviction.

HM Prison Service (program delivery between 1996 and 2000 for female prisoners)

Program participants (n= 180) participated either in the R&R or ETS programs (Cann, 2006). Controls (n= 540) were retrospectively matched to program participants on a reconviction prediction score (three controls matched to each experimental); 8% of participants did not complete the program. Reconviction after one year was used as the outcome measure. No statistically significant differences were found between the experimental and control groups for the ETS program, while statistically significant differences were found between the experimental and control groups for the R&R program, with the experimental group faring worse than the control group.

R&R in Sweden

Berman (2004)

Male offenders from prisons and probation (n= 276) voluntarily participated in the program. Selection for the program

was based on education level, learning capacity, existing mastery of cognitive skills, motivation and interest in the program. Those with psychopathic characteristics and a very high risk of recidivism were excluded. Controls (n= 451) were matched to program participants on criminal characteristics (crime type, sentence length, number of previous adjudications). 23% of program participants did not complete the program. Reconviction up to 36 months was the outcome measure (Table 2). Differences between program completers, dropouts and controls, and between controls and dropouts were statistically significant. However, program participants (including completers and dropouts) did not differ significantly from controls.

Meta-analysis

In order to assess the effectiveness of the R&R program, a meta-analysis was carried out. A meta-analysis requires a comparable effect size for each study. Each effect size is weighted by the inverse of its variance in order to calculate a weighted mean effect size. This is because evaluations with larger samples or smaller confidence intervals provide better estimates of the overall effect size. A fixed effects meta-analysis was used when the effect sizes were not significantly heterogeneous. In cases where effect sizes were significantly heterogeneous, a random effects model was used (Lipset & Wilson, 2001).

The odds ratio (OR) is used here as the measure of effect size. An OR greater than 1 indicates a desirable treatment effect, while an OR less than 1 indicates an undesirable treatment effect. An OR of 1 indicates no relationship between group membership and recidivism and hence no treatment effect. To a reasonable approximation, the OR indicates the proportional change in recidivism in the control group compared to the experimental group.

The ORs in Table 2 show that R&R program participants were less likely to reoffend compared to controls in most evaluations; 23 ORs were greater than 1.0, two were exactly 1.0 and seven were less than 1.0. Where investigators provided data for low risk versus high risk offenders, these were treated as two separate evaluations. The four risk categories of Friendship *et al.* (2002) and Cann (2006) were treated as four separate evaluations. Since all ORs were weighted by the inverse of their variance, this did not mean that the results of large studies such as Friendship *et al.* had a disproportionately large influence on the overall results.

Pooling the 32 ORs, the weighted mean effect size was 1.16 (95% confidence interval= 1.04-1.31; p= .011). Thus, there was roughly a 16% increase in recidivism for controls compared to program participants, or alternatively a 14% decrease in recidivism (1/1.16) for program participants compared to controls. Table 3 summarizes the key results of the meta-analysis.

Further analyses were conducted to determine whether the R&R program was more effective for certain types of offenders or in certain program settings. First, the effectiveness of the R&R program when delivered in community versus institutional settings was investigated. The weighted mean effect size for R&R programs conducted in community settings (n= 12) was 1.22 (p= .023), compared with 1.15 (p= .064) in institutional settings (n= 21). Second, the effectiveness of the R&R program for high and low risk offenders was compared. The effect size for R&R programs for low risk offenders (n= 10) was an OR of 1.18 (not significant), compared with 1.12 (p= .011) for high risk offenders (n= 10).

Table 3
Results of meta-analysis

Description (N)	Weighted mean Odds Ratio	Confidence interval	p	Model
Recidivism (32)	1.16	1.04-1.31	.011	Random
Community settings (12)	1.22	1.03-1.45	.023	Fixed
Institutional settings (21)	1.15	0.99-1.33	.064	Random
Low risk offenders (10)	1.18	0.91-1.54	NS	Random
High risk offenders (10)	1.12	1.03-1.23	.011	Fixed
Canada (4)	1.79	0.91-3.52	.094	Random
United States (10)	1.04	0.87-1.24	NS	Fixed
United Kingdom (17)	1.13	1.03-1.23	.006	Fixed
Randomized (13)	1.24	0.96-1.28	NS	Random
Non-randomized (19)	1.14	1.05-1.24	.002	Fixed
Voluntary (21)	1.14	1.01-1.30	.042	Random
Non-voluntary (11)	1.19	0.99-1.42	.065	Fixed
Small (15)	1.17	0.95-1.46	NS	Fixed
Large (17)	1.15	1.02-1.30	.025	Random
Up to 2002 (14)	1.21	1.04-1.41	.013	Fixed
2003 or later (18)	1.12	0.97-1.29	NS	Random

Note: NS= Not significant. Random effects or fixed effects models were used.

Third, cross-country comparisons were made. The effect size for R&R program delivery in Canada ($n=4$) was an OR of 1.79 ($p=.094$); the effect size for R&R program delivery in the United States ($n=10$) was an OR of 1.04 (not significant); and the effect size for program delivery in the United Kingdom ($n=17$) was an OR of 1.13 ($p=.006$). Fourth, results obtained in randomized designs were compared with those obtained in quasi-experimental designs. In randomized designs, OR= 1.24 (not significant), while in non-randomized designs OR= 1.14 ($p=.002$). The non-randomized designs were significant because of large numbers of offenders.

Fifth, comparisons were made between programs delivered to volunteers and other programs. Table 3 shows that the weighted mean effect size was similar for both types of programs (voluntary, mean OR= 1.14, $p=.042$; non-voluntary, mean OR= 1.19, $p=.065$). Sixth, comparisons were made between smaller and larger evaluation studies, comparing 15 evaluations with less than 250 persons in total with the other 17 evaluations. Table 3 shows that the weighted mean effect size was similar for smaller (OR= 1.17, not significant) and larger (OR= 1.15, $p=.025$) studies. Seventh, older evaluations (up to 2002) were compared with newer evaluations (2003 or later). The older studies had a larger weighted mean effect size (OR= 1.21, $p=.013$) than the newer studies (OR= 1.12, not significant).

Results

Is the R&R program effective in reducing recidivism?

Based on reconvictions, our meta-analysis suggests an overall significant 14% decrease in offending by program participants compared to controls. This is smaller than the effect size (weighted

mean $r=.147$) found in the previous meta-analysis of seven R&R evaluations (Pearson et al., 2002), which they converted to a 26% decrease in recidivism for R&R program participants compared to controls. However, it is clear that newer studies, based on larger samples, have obtained smaller effect sizes. In general, the R&R program seems to be effective.

Does it work better in specific settings?

The meta-analysis suggests that the R&R program is effective in both institutional and community settings. This is surprising considering that previous meta-analyses (e.g., Izzo & Ross, 1990; Lipsey, 1992) have found better treatment outcomes in community settings. Friendship, Falshaw and Beech (2003) further suggested that the institutional regime may not be conducive for treatment by imposing too much time in the cell and providing little time for prisoners to seek support from other participants or staff. It might be suggested that these results could reflect the fact that most evaluations conducted in institutional settings had voluntary participants, while participants in many of the community evaluations had been compulsorily assigned to the R&R program as part of a probation or parole order. However, the R & R program worked equally well with volunteers and non-volunteers.

The R&R program benefited both low and high risk offenders. The effect size was greater with low risk offenders, possibly because of the greater likelihood of high risk offenders dropping out of the program and faring worse than those who had never participated in the program (Porporino & Robinson, 1995; van Voorhis et al., 2002). It is interesting that the R&R program was slightly more effective with low risk offenders, since it was developed for high risk offenders (Ross & Ross, 1995a, 1995b). Only the results with high risk offenders were significant.

The R&R program was most effective in Canadian evaluations and least effective in the United States. It is interesting that the R&R program was effective (in the United Kingdom) when delivered outside its original Canadian context (where it was most effective). Gibbs and Beal (2000) questioned the effectiveness of the R&R program when implemented in different cultural contexts and highlighted the danger of assuming that the program is valid because it has proven to be effective in other countries. The weighted mean effect size was smallest but most significant in the United Kingdom.

Discussion

The effectiveness of cognitive methods in crime intervention has been tested with several offender categories and contexts, including sex offenders, who are specially resistant to therapy of sex offenders (see Schumucker & Lösel, 2008). One of the strengths of this study lies in its use of both published and unpublished reports. However, programs that are being evaluated are likely to have better outcomes since there would be closer monitoring of staff and program delivery as part of the evaluation (Leschied, Bernfeld, & Farrington, 2001). Also, most of the evaluations presented here were either carried out by the program designers (Porporino et al., 1991; Robinson, 1995; Ross et al., 1988), or were funded by a government agency that had a stake in

the effectiveness of the program. Therefore, there could be researcher bias due to the vested interests of the researchers and/or funders.

A shortcoming of the meta-analytic technique is that studies of different methodological quality might be given equal weight (Lipsey & Wilson, 2001). Some of the older and smaller studies were methodologically weak, but they had low weightings in the meta-analysis because of their low sample size. Another way to carry out this study would be to use the Maryland scale of methodological quality as Allen et al. (2002) did (see Sherman, Gottfredson, MacKenzie, Eck, Reuter, & Bushway, 1997 for coding). A major problem is the confounding of the R&R program with other programs such as ETS. Research findings could be weighted by the strength of their methodology to enable conclusions to be drawn about effectiveness whilst taking the methodological strengths and weaknesses of each study into account.

Finally, this meta-analysis used only recidivism to measure the effectiveness of the R&R program. Reduction in recidivism is the main aim of the R&R program. Changes in offender thinking styles and attitudes, which are the intermediate outcomes of the programme, were not reviewed.

Overall, the results of our systematic review and meta-analysis are encouraging. Existing evaluations show that the R & R program is effective in reducing recidivism. However, the fact that effects were lower in more recent studies is worrying.

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