

## **The positive effects of cognitive–behavioral programs for offenders: A meta-analysis of factors associated with effective treatment**

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**Abstract.** A meta-analysis of 58 experimental and quasi-experimental studies of the effects of cognitive-behavioral therapy (CBT) on the recidivism of adult and juvenile offenders confirmed prior positive findings and explored a range of potential moderators to identify factors associated with variation in treatment effects. With method variables controlled, the factors independently associated with larger recidivism reductions were treatment of higher risk offenders, high quality treatment implementation, and a CBT program that included anger control and interpersonal problem solving but not victim impact or behavior modification components. With these factors accounted for, there was no difference in the effectiveness of different brand name CBT programs or generic forms of CBT.

**Key words:** CBT, cognitive-behavioral therapy, cognitive-behavioral treatment, criminal rehabilitation, evaluation, meta-analysis, offenders, recidivism, treatment effectiveness

Several well-conducted meta-analyses have identified cognitive-behavioral therapy (CBT) as a particularly effective intervention for reducing the recidivism of juvenile and adult offenders. Pearson et al. (2002), for instance, conducted a meta-analysis of 69 research studies covering both behavioral (e.g., contingency contracting, token economy) and cognitive-behavioral programs. They found that the cognitive–behavioral programs were more effective in reducing recidivism than the behavioral ones, with a mean recidivism reduction for treated groups of about 30%. Similarly, a meta-analysis by Wilson et al. (2005) examined 20 studies of group-oriented cognitive behavioral programs for offenders and found that CBT was very effective for reducing their criminal behavior. In their analysis, representative CBT programs showed recidivism reductions of 20–30% compared to control groups.

Although these meta-analyses provide strong indications of the effectiveness of cognitive–behavioral treatment for offenders, they encompassed considerable diversity within the range of offender types, outcome variables, quality of study design, and (especially in Pearson et al. 2002) variations in what was counted as a cognitive–behavioral treatment. A more circumscribed meta-analysis conducted by Lipsey et al. (2001) examined 14 experimental and quasi-experimental studies that emphasized cognitive change as the defining condition of CBT, considered only effects for general offender samples, and focused on reoffense recidivism as the treatment outcome. The results showed that the odds of recidivating for offenders receiving CBT were only about 55% of that for offenders in control groups. Lipsey

and Landenberger (2005) then focused further on an updated and overlapping set of 14 randomized experiments and found that the mean recidivism for the treatment groups in those studies was 27% lower than that of the control groups.

### **Variation in effectiveness**

Meta-analysis has thus consistently indicated that CBT, on average, has significant positive effects on recidivism. However, there is also significant variation across studies in the effect sizes that contribute to those mean values that must be acknowledged. Identification of the moderator variables that describe the study characteristics associated with larger and smaller effects is another kind of contribution meta-analysis can make to understanding the effectiveness of CBT with offenders. Of particular importance is the role such moderator analysis can play in ascertaining which variants of CBT are most effective and for which offenders.

Lipsey and Landenberger (2005) identified a few factors that were related to variation in recidivism effects. They found that treatment of high risk offenders, greater levels of CBT training for treatment providers, and CBT programs set up for research or demonstration purposes (in contrast to 'real world' routine practice programs) were associated with larger effects. What most characterized the research and demonstration programs, in turn, was smaller sample sizes, greater monitoring of offender attendance and adherence to the intervention plan (treatment fidelity checks), and providers with mental health backgrounds. These factors suggest that treatment effectiveness is mainly a function of the quality of the CBT provided.

That meta-analysis involved only a small number of studies, however, and did not permit much exploration of potential moderator variables. Wilson et al. (2005) computed mean effect sizes separately for Moral Reconciliation Therapy (MRT), Reasoning and Rehabilitation (R&R), and 'other' CBT programs. They found that R&R showed somewhat smaller mean effects, but did not examine any other moderator variables. Pearson et al. (2002), as noted above, compared the effects of behavioral and cognitive-behavioral programs and also reported larger effects for better designed studies, but did not pursue further moderator analysis.

There has thus been only limited meta-analytic investigation of factors identifiable in the body of research on CBT that are associated with variation in its effects on offender recidivism. The most likely candidates for such factors fall into categories relating to the specific type of CBT program applied, the nature and extent of its implementation, the characteristics of the offenders to whom it is provided, and the study methods used to investigate its effects.

The type of CBT program, for instance, relates, first, to the 'brand name' curriculum used, such as MRT and R&R as examined by Wilson et al. (2005). CBT programs also differ in the nature and mix of treatment elements included, e.g., whether oriented mainly toward cognitive restructuring exercises or cognitive skills training and whether such topics as anger management, relapse prevention, interpersonal problem solving and moral reasoning are covered. Another potentially important distinction is whether CBT constitutes virtually the full program

offered or is combined with other services, e.g., educational classes, vocational training, or mental health counseling.

Factors related to program implementation that might influence the effects of CBT include, most centrally, how much treatment is provided. The duration of CBT programs in correctional settings, for instance, varies from weeks to years and may involve many meetings per week or less than one. The fidelity of the implementation to the curriculum specifications may also be important along with the degree of expertise possessed by the personnel providing the program. As mentioned earlier, Lipsey and Landenberger (2005) found that programs implemented principally for research or demonstration purposes showed larger effects than routine practice programs. In these programs, the researchers themselves generally exercise control over the various phases and facets of implementation. The treatment provided to offenders in those circumstances almost certainly differs in important ways from that provided when the program under everyday conditions in criminal justice settings.

Among the characteristics of the offenders participating in CBT that may influence the outcome are age, gender, and ethnic background as well as criminal history and other such risk indicators. The 'risk principle' of Andrews et al. (1990), for instance, posits that effective treatment will have greater impact on higher-risk offenders because they have more room for improvement than lower-risk offenders.

Finally, there is good reason to believe that the methods and procedures used in the research will influence the magnitude of the observed effects. Random assignment studies are expected to yield unbiased results while findings from nonrandomized comparisons may over or understate effects. Weisburd et al. (2001), for example, found larger effects in nonrandomized studies of criminal justice programs though, for CBT, Pearson et al. (2002) reported larger effects for studies of higher methodological quality. After assignment to conditions, attrition from outcome measurement can also bias effect estimates if, as is likely, it is not randomly distributed across conditions. The operationalization of the outcome measure is another potential source of difference. Even when the focus is on recidivism, some studies index it with the rate of rearrest, others by assessing reconvictions, incarcerations, probation or parole violations, and the like. Moreover, the timing of recidivism measurement varies, ranging from a period close to the end of treatment to months or years later.

### **Purpose of this meta-analysis**

The objective of this meta-analysis is to examine the relationships of selected moderator variables to the effects of CBT on the recidivism of adult and juvenile offenders. In order to have a sufficient number of studies to permit examination of between-study differences, an especially thorough search was made of the available research. To assist in expanding the number of studies, and to ensure

methodological diversity so that variation in methods could be investigated, quasi-experimental studies were included as well as randomized field experiments. Though not all potentially interesting moderator variables are reported well enough in the source studies to allow systematic comparison, a detailed coding protocol was applied to extract as much relevant information for analysis as possible from each study report.

## **Methods**

### *Criteria for inclusion of studies*

Studies were assessed and selected for this meta-analysis if they met the following criteria:

### *Intervention*

The treatment under investigation was a variant of cognitive-behavioral therapy representing or substantially similar to such recognized 'brand name' CBT programs as Reasoning and Rehabilitation (Ross and Fabiano 1985), Moral Reconciliation Therapy (Little and Robinson 1986), Aggression Replacement Training (Goldstein and Glick 1987), the Thinking for a Change curriculum (Bush et al. 1997), and the Cognitive Interventions Program (NIC, 1996). In particular, it was directed toward changing distorted or dysfunctional cognitions (cognitive restructuring) or teaching new cognitive skills and involved therapeutic techniques typically associated with CBT, i.e., structured learning experiences designed to affect such cognitive processes as interpreting social cues, monitoring one's own thought processes, identifying and compensating for distortions and errors in thinking, reasoning about right and wrong behavior, generating alternative solutions, and making decisions about appropriate behavior. If CBT was offered in the context of a multimodal program that simultaneously provided other services, the CBT must have been provided to all participants and constitute a major component of the program.

### *Participants*

The recipients of the intervention were criminal offenders, either juveniles or adults, treated while on probation, incarcerated/institutionalized, or during aftercare/parole. Offenders were drawn from a general offender population and not selected for, or restricted to, those committing specific types of offenses (e.g., sex offenses, DUI, drug offenses, status offenses).

### *Outcome measures*

The study reported criminal offending subsequent to treatment as an outcome variable. Outcome results were presented in a quantitative form that permitted computation or reasonable estimation of an effect size statistic representing the difference in recidivism rates between treated and untreated offenders.

*Research methods*

The study used a randomized or quasi-experimental design that compared a CBT treatment condition with a control condition that did not include CBT treatment. Quasi-experimental designs were eligible only if subjects in the treatment and control conditions were matched or statistically controlled on pre-treatment risk-related variables (e.g., relevant personal, demographic, and criminal background characteristics) or if pre-treatment measures of criminal or antisocial behavior or significant risk factors for such behavior were reported in a form that permitted assessment of the initial equivalence of the treatment and control groups. To eliminate explicit self-selection as a biasing factor in group assignment, however, studies were not included if the control groups were created with individuals who began CBT but dropped out prior to completing treatment or who were offered CBT and refused. Control groups could represent placebo, wait-list, no treatment, or 'treatment as usual' conditions, with the latter restricted to cases of clearly routine probation, institutional, or aftercare/parole practices.

*Source*

Both published and unpublished studies were eligible for inclusion, conducted in any country, and reported in any language.

*Search strategy*

An initial set of eligible studies came from those assembled and analyzed for the Lipsey et al. (2001) and Lipsey and Landenberger (2005) meta-analyses. This number was expanded through a comprehensive search using the following procedures.

*Meta-analysis databases*

The second author has constructed a meta-analysis database of coded studies for interventions with juvenile offenders based on a comprehensive search for studies reported in 2002 or earlier. All the studies in that database were reviewed for eligibility and an independent search was conducted for studies published after 2002. In addition, the studies in a database of interventions with adult offenders that is nearing completion were reviewed for eligibility.

*Database searches*

Computerized bibliography searches were conducted for studies reported from 1965 through 2005. To the best of our knowledge, the first systematic applications of CBT to offenders were developed and published in the mid-1970s (e.g., Yochelson and Samenow 1976); searching back to 1965 was aimed at ensuring that none were missed. The keywords for searching were concatenations of words describing the population (e.g., inmates, offenders), CBT treatment (e.g., cognitive, CBT, criminal thinking), and effectiveness research (e.g., outcomes, evaluation, effectiveness). The databases searched included the Campbell Collaboration Social, Psychological, Educational and Criminological Trials Register (C2-

SPECTR), Dissertation Abstracts Online, ERIC, MEDLINE, The National Criminal Justice Reference Service (NCJRS), PsychInfo/PsychLit, Sociological Abstracts, and a number of others.

#### *Cross-referencing of bibliographies*

Relevant review articles, meta-analyses, and primary studies reviewed for eligibility were scanned for citations to potentially eligible studies.

#### *Internet searches*

Relevant government websites (e.g., NIJ, NIC, OJJDP, Home Office) as well as foundation, professional associations and policy research firm websites were searched. In addition, keyword searches were conducted using search engines such as *google.com*.

#### *Journals*

Vanderbilt University subscribes to a large number of electronic journals and the full text of those judged relevant was searched with selected keywords. Major journals publishing empirical studies related to crime and delinquency were also hand searched for eligible studies.

#### *Informal sources*

Unpublished results from evaluations of two CBT programs were available from the first author, and several colleagues alerted us to eligible studies that were not accessible through the above channels.

The search for CBT studies on adult offenders produced 2,947 study citations with 771 reports judged promising enough to retrieve for closer examination. The search for juvenile offender studies produced 1,487 study citations with 299 reports retrieved. Review of the retrieved studies ultimately identified 58 studies meeting the criteria for inclusion in the present meta-analysis.

#### *Data management and extraction*

Descriptive and outcome data were coded for each of the 58 eligible studies using a coding protocol developed specifically for this purpose. Table 1, presented later, shows the major coding categories used for descriptive information. Recidivism outcomes were reported in several different forms but, in virtually all instances, either the proportions of offenders in each research condition that recidivated were specified or information was provided from which the proportions could be estimated. When more than one recidivism outcome was reported, only one was selected for analysis using criteria that maximized cross-study similarity on the variables and times of measurement. This procedure favored rearrest recidivism, then reconviction and incarceration in that order, and the measure taken closest to 12 months post-treatment.

Table 1. Characteristics of the studies included in the meta-analysis.

	<i>N</i>	%
<i>Publication type</i>		
Journal	19	33
Chapter	7	12
Technical report	25	43
Thesis	7	12
<i>Year of publication</i>		
1980–1990	10	17
1991–2000	31	53
2001–2004	17	29
<i>Country</i>		
USA	42	72
Canada	10	17
UK	5	9
New Zealand	1	2
<i>Design</i>		
Randomized	19	33
Matched	23	40
Neither	16	28
<i>Design problem</i>		
Yes, favors control	13	22
No or not noted	41	71
Yes, favors treatment	4	7
<i>Attrition from posttest</i>		
0.00	37	64
0.01–0.10	7	12
0.11–0.30	8	14
>0.30	6	10
<i>Intent to treat</i>		
Yes, Tx dropouts included	49	84
Cannot tell	4	7
No, Tx dropouts not included	5	9
<i>Type of recidivism</i>		
Rearrest	29	50
Reconviction	20	34
Incarceration	8	14
Other	1	2
<i>Recidivism interval</i>		
1–5 mo	2	3
6 mo	9	16
7–11 mo	5	9
12 mo	29	50
13–24 mo	9	16
25–36 mo	4	7

Table 1. Continued.

	<i>N</i>	%
<i>Sample size</i>		
14-50	10	17
51-100	8	14
101-200	14	24
201-500	11	19
501-3,000	15	26
<i>Sample age</i>		
Juvenile	17	29
Adult	41	71
<i>Percent male</i>		
0	3	5
50	2	3
70-98	11	19
100	36	62
Not reported	6	10
<i>Percent minority</i>		
0-25	12	21
26-50	9	16
51-75	12	21
76-100	4	7
Not reported	21	36
<i>Recidivism risk rating</i>		
Low	18	31
Low-medium	9	16
Medium	18	31
Medium-high	7	12
High	6	10
<i>Program studied</i>		
Practice	31	53
Demonstration	18	31
Research	9	16
<i>Treatment setting</i>		
Correctional institution	27	47
Community	31	53
<i>Treatment sessions/week</i>		
1	18	31
2	17	29
3	8	14
4-5	10	17
6-10	5	9
<i>Treatment length</i>		
5-10 wks	12	21
11-20 wks	26	45
21-40 wks	13	22
41-104 wks	7	12



Table 1. Continued

	<i>N</i>	%
<i>Proportion of treatment dropouts</i>		
0.00	13	22
0.01–0.10	6	10
0.11–0.20	18	31
0.21–0.30	8	14
> 0.30	13	22
<i>CBT treatment type</i>		
Reasoning & Rehabilitation	15	26
Moral Reconciliation Therapy	11	19
Aggression Replacement Therapy	6	10
Interpersonal Problem Solving Therapy	4	7
Thinking for a Change	5	9
Substance abuse focus	5	9
Other manualized	9	16
All other	3	5
<i>CBT emphasis</i>		
CBT with other services	11	19
CBT with some other Tx elements	11	19
CBT only	36	62
<i>CBT treatment elements indicated*</i>		
Cognitive skills	45	78
Interpersonal problem solving	45	78
Social skills	43	74
Cognitive restructuring	37	64
Anger control	20	35
Substance abuse	19	33
Moral reasoning	17	29
Relapse prevention	15	26
Behavior modification	11	19
Individual attention	10	17
Victim impact	7	12
<i>Implementation monitoring</i>		
None indicated	17	29
Minimal	20	35
Good	17	29
Very good	4	7
<i>CBT training for providers</i>		
Minimal	31	53
Moderate	14	24
Extensive	13	22
<i>Mental health background of providers</i>		
None or minimal	40	69
Moderate	7	12
Extensive	11	19

\*Multiple elements, not mutually exclusive.

The selected recidivism outcomes were coded as odds ratios representing the odds of 'success' (not recidivating) for treatment group participants relative to the odds for control participants. For binary outcomes, the odds ratio provides an effect size statistic that has favorable properties and yields readily interpretable results (Haddock et al. 1998). Statistical analysis with odds ratios is facilitated if they are represented by their log, so the logged odds ratios were used in all analyses. Otherwise, the statistical analysis was conducted using conventional meta-analysis techniques (Lipsey and Wilson 2001) with each effect size weighted by its inverse variance in random effects analyses.

## Results

Table 1 summarizes the characteristics of the 58 studies included in the meta-analysis. Several features of this research are notable. Randomized designs, matched designs, and group comparisons using neither of these procedures are represented in roughly equal numbers and involve a wide range of sample sizes. Attrition from outcome measurement is virtually zero in a majority of the studies but ranges over 30% in some of the remaining ones. About half the programs studied were implemented as routine practice with the other half set up and implemented by researchers as either demonstration or research programs, with demonstration programs defined as those mounted mainly for research purposes but at a scale and in a manner somewhat more representative of actual practice than those categorized as research programs. More studies were conducted with adult than juvenile offenders and most used only or predominately male offenders. Treatment was administered while the offenders were incarcerated in a correctional institution in nearly half the studies and generally lasted less than 20 weeks. In most instances, the treatment providers had little or no evident mental health background and had received relatively minimal training in cognitive behavioral therapy. The treatment was typically one of the 'brand name' manualized CBT programs and incorporated multiple treatment elements.

### *Effect size variation associated with study methods*

The mean odds ratio representing the average effect of intervention was 1.53 ( $p < 0.001$ ), indicating that the odds of success (no recidivism in the post-intervention interval of approximately 12 months) for individuals in the treatment group were more than one and a half times as great as those for individuals in the control group. In relation to the mean recidivism rate for the control groups of about 0.40, this odds ratio indicates a recidivism reduction of 25% to 0.30. There was also significant variation across studies in the odds ratio for intervention effects ( $Q = 214.02$ ,  $df = 57$ ,  $p < 0.001$ ). We turn now to an examination of the study characteristics associated with that variation.

The recidivism effects observed in the studies in this meta-analysis are potentially influenced by both the methodological characteristics of the studies

and the substantive attributes of the treatments and the recipients. One of the first steps in the analysis, therefore, was to determine which methodological features were correlated with the effect sizes so they could be controlled while examining relationships with substantive attributes. The method variables available from the study coding and considered relevant for this purpose were as follows:

- (a) Design, categorized as randomized, matched, or neither, each dummy coded to produce three design variables.
- (b) Design problem—indications of initial nonequivalence between groups on pre-treatment variables, or problems during or after the intervention that could have led to nonequivalence of the treatment and control group, rated by the coder on a three-point scale (1 = favors control group; 2 = favors neither or insufficient evidence; 3 = favors treatment group).
- (c) Attrition proportion – the proportion of the total initial sample (treatment plus control group) for which recidivism outcome data were not available.
- (d) Intent to treat, coded yes/no for whether treatment dropouts were retained in the treatment group for the recidivism outcome data reported in the study.
- (e) Type of recidivism, categorized as rearrests, reconvictions, incarcerations, or other with each dummy coded to produce four recidivism variables.
- (f) Recidivism interval represented by the number of months posttreatment over which recidivism was measured. Because of the possibility of more frequent recidivism in early months than later ones, the log of this variable was also used in the analysis.

Table 2. Correlations between study method characteristics and recidivism effect sizes ( $N = 58$ ).

<i>Method variable</i>	<i>Correlation</i>	<i>p</i>
<i>Design</i>		
Randomized (no/yes)	0.04	0.77
Matched (no/yes)	-0.03	0.80
Neither (no/yes)	0.00	0.98
Design problem (favors control/no/favors Tx)	0.19	0.14
Attrition proportion	0.12	0.35
Intent to treat (yes/no)	-0.24*	0.06
<i>Type of recidivism</i>		
Rearrest (no/yes)	0.10	0.44
Reconviction (no/yes)	-0.04	0.77
Incarceration (no/yes)	-0.08	0.57
Other (no/yes)	-0.02	0.90
<i>Recidivism interval</i>		
Linear	-0.01	0.93
Log	-0.04	0.74

Note: weighted random effects analysis.

\* $p < 0.10$

Table 2 shows the zero-order correlation of each of the method variables with the recidivism effect sizes (represented as logged odds ratios). These are inverse-variance weighted, random effects analyses with the random effects component estimated using maximum likelihood techniques (Raudenbush 1994).

As Table 2 reports, there was no significant relationship overall between the effect sizes and the study design. In particular, the effects observed in randomized studies did not differ significantly from those observed in matched studies or those with comparison groups that were neither matched nor randomly assigned. Nor was a significant relationship observed for the coder's rating of whether there was an evident design problem favoring the control or treatment group, that is, indications of nonequivalence that might affect recidivism outcomes. Similarly, there were no significant correlations with the attrition proportion, the way recidivism was measured, or the interval over which it was measured.

The only methodological variable that showed a significant ( $p < 0.10$ ) relationship with the effect size was whether the study presented the treatment-control contrast as an intent-to-treat analysis. When the treatment dropouts were included in the outcome recidivism, the effect sizes were smaller than when they were excluded, as would be expected. In light of this indication that the intent-to-treat variable might influence effect sizes, it was carried forward as a control variable for the analysis of the relationships between effect sizes and substantive factors relating to the treatment and recipients. As a further precaution against confounds with methodological characteristics, the other three method variables with zero-order correlations of 0.10 or greater were also included as method controls (design problem, attrition proportion, and rearrest recidivism).

#### *Effect size variation associated with the treatment and its recipients*

The relationship between the recidivism effect sizes and each of the descriptive variables for CBT treatment and its recipients (see listing in Table 1) was next examined with the four selected method variables included as controls. These analyses were conducted with a set of random effects multiple regressions that included a descriptive variable and the four control variables. These were run separately for each descriptive variable in this initial analysis to ensure that any having potentially important relationships with effect size were identified despite whatever correlations they had with other variables in the set. Because of the modest number of studies and the broad confidence intervals associated with random effects analysis,  $\alpha = 0.10$  was set as the threshold for statistical significance. Table 3 presents the results.

The variables in Table 3 are grouped into categories that represent different aspects of the studies and the nature of the CBT treatment studied. The most general study characteristics (country, type of publication, and date of publication) showed no significant relationships with effect size. The other candidate moderator variables are grouped according to a simple model that assumes that, with method variables controlled, treatment effects will be a function of the characteristics of

Table 3. Relationships of participant and intervention characteristics to effect size with selected method variables controlled.

<i>Study characteristic</i>	<i>Beta with method controls<sup>a</sup></i>
<i>General study characteristics</i>	
Country: U.S.(1) vs Canada/UK/NZ(2)	-0.03
Publication type: Report/thesis (1) vs journal/chapter (2)	0.13
Year of publication	-0.11
<i>Participant characteristics</i>	
Juveniles(1)/adults(2)	-0.03
% male	-0.07
% minority	0.16
Recidivism risk rating	0.27**
<i>CBT Amount</i>	
Sessions per week	0.34**
Hours per week (logged)	0.23*
Total hours of treatment (logged)	0.38**
Length in weeks (logged)	-0.03
Sessions per week × length in weeks (logged)	-0.08
<i>Quality of CBT implementation</i>	
Proportion of Tx dropouts	-0.28**
Implementation monitoring	0.20
CBT training for providers	0.21
Mental health background of providers	-0.07
Practice(1)/demonstration(2)/research(3) program	0.31**
Composite implementation factor	0.40**
<i>Other program characteristics</i>	
Treatment setting: prison(1)/community(2)	0.20
CBT emphasis: with other components (1)/CBT alone (3)	-0.30**
<i>Specific CBT program</i>	
Reasoning & Rehabilitation	-0.21
Moral Reconciliation Therapy	0.04
Aggression Replacement Therapy	0.16
Interpersonal Problem Solving Therapy	-0.09
Thinking for a Change	0.12
Substance abuse focus	0.00
Other manualized	0.02
All other	0.01
<i>CBT treatment elements</i>	
Cognitive skills	0.02
Cognitive restructuring	0.27**
Interpersonal problem solving	0.04
Social skills	0.02
Anger control	0.32**
Moral reasoning	0.11
Victim impact	-0.14
Substance abuse	0.11

Table 3. Continued

<i>Study characteristic</i>	<i>Beta with method controls<sup>a</sup></i>
Behavior modification	0.03
Relapse prevention	0.12
Individual attention (in addition to group sessions)	0.39**

Note: Beta values from random effects multiple regression.

<sup>a</sup>Controlling for design problems, attrition proportion, intent-to-treat comparison, and arrest recidivism.

\* $p < 0.10$ ; \*\* $p < 0.05$ .

the participants, the amount of treatment received, the quality of the treatment implementation, and the specific type of treatment.

#### *Participant characteristics*

Of the characteristics of the treatment recipients that could be coded from most studies, only the recidivism risk rating was significantly related to the effect sizes. This rating was made by the coder on the basis of the description in the study of the criminal history of the treated offenders and the recidivism rate of the control group. That rating, in turn, was not significantly correlated with any of the other variables describing the participants shown in Table 3. It is worth noting that there was no relationship between effect size and whether the treated offenders were juveniles or adults. The gender mix of the CBT recipients also showed no relationship to effect size but, as Table 1 shows, most of the samples were all male or predominately male so there was little variation on this measure.

#### *Amount of CBT*

Dosage variables were coded as the number of sessions per week, the number of hours of treatment per week, the total hours of treatment, and the number of weeks of treatment from beginning to end (see Table 1). The distributions for the latter three had long tails and the logged values of these variables were used in the analysis (and showed stronger relationships to effect size than the unlogged versions). As Table 3 shows, all these variables except length of treatment were significantly related to effect size. Total hours, which showed the largest relationship, however, is a function of both the number of hours per week and the number of weeks. The study-level correlations among these variables showed that length of treatment was significantly related to total hours ( $r = 0.51$ ) as were the number of sessions per week ( $r = 0.58$ ) and number of hours per week ( $r = 0.75$ ), with the latter two being highly correlated with each other ( $r = 0.81$ ).

From this pattern of relationships we concluded that the best representation of the amount of treatment should distinguish the number of sessions or hours per week from the length of the treatment. That approach allows further examination of the finding in Table 3 that number of sessions and hours per week are related to the effect size but, apparently, the duration of treatment is not. Between the number of sessions per week and the number of hours, sessions showed the

stronger relationship to effect size. Table 3 also shows the interaction between number of sessions and length of treatment, but it was not significantly related to effect size.

#### *Quality of CBT implementation*

In this category we include the practice-research dimension that distinguishes between CBT treatments implemented on a routine basis in real-world criminal justice contexts, demonstration programs in similar circumstances but with significant influence by the researcher, and research programs implemented by the researchers largely for research purposes. Our assumption is that the progressively greater involvement of researchers translates into better implementation and more fidelity to the treatment protocol.

Table 4 shows that the study-level correlations were all significant between the practice-research variable and the other variables assumed related to implementation quality listed in Table 3 – proportion of dropouts from treatment, extent of implementation monitoring reported, amount of CBT training indicated for providers, and the mental health background of the providers. Table 3 shows relationships in the expected direction with effect size for all these variables except providers' mental health background, though only proportion of treatment dropouts and the practice-research dimension reached statistical significance. To summarize the relationship of these implementation quality variables to effect size, a composite variable was created in the form of a factor score from a principal components analysis. As shown in Table 3, that composite implementation factor is more strongly related to the effect sizes than any of the component variables.

#### *Other program characteristics*

Table 3 also shows the relationship between effect size and two other program characteristics. One is the setting within which CBT was provided, differentiated

Table 4. Correlations between potential moderator variables related to the quality of CBT implementation ( $N = 58$ ).

	<i>Proportion of treatment dropouts</i>	<i>Implementation monitoring</i>	<i>CBT training for providers</i>	<i>Mental health background of providers</i>
Implementation monitoring	-0.17			
CBT training for providers	-0.17	0.40**		
Mental health background of providers	0.08	-0.07	0.13	
Practice-demonstration-research program	-0.29**	0.44*	0.23*	0.24*

\* $p < 0.10$

\*\* $p < 0.05$

between treatment while incarcerated and treatment in the community (e.g., for probationers and parolees); this variable was not significantly related to effect size. The extent to which CBT was emphasized in the treatment program, on the other hand, did show a significant relationship. That variable ranged across categories of CBT supplemented by other services, CBT with some other treatment elements, and CBT alone. As the negative sign on the coefficient in Table 3 shows, the effects are significantly larger when CBT is combined with other services. Examples of such components include mental health counseling, employment and vocational training, and educational programs.

*Specific nature of the CBT treatment*

The last two sections of Table 3 show two alternative ways of representing the specific nature of the CBT treatment provided. One set of dummy-coded items differentiates the various major named types of CBT along with a somewhat more generic category of CBT programs focusing on substance abuse and two residual categories of less common but manualized treatments and a few that do not appear to be manualized. None of these program variables is significantly related to effect size, meaning that no brand of CBT produces effects that stand out from the average of the other brands.

The other way we coded CBT treatment was in terms of the specific treatment elements identified in the descriptions provided in the study reports. Those descriptions varied in detail and extensiveness but when they mentioned a distinct treatment element, we coded it as present using a dummy code. The elements that appeared with sufficient frequency to support analysis are shown in Table 3, defined briefly as follows:

- Cognitive skills: Training on general thinking and decision-making skills such as to stop and think before acting, generate alternative solutions, evaluate consequences, and make decisions about appropriate behavior.
- Cognitive restructuring: Activities and exercises aimed at recognizing and modifying the distortions and errors that characterize criminogenic thinking.
- Interpersonal problem solving: Training in problem-solving skills for dealing with interpersonal conflict and peer pressure.
- Social skills: Training in prosocial behaviors, interpreting social cues, taking other persons' feelings into account, and the like.
- Anger control: Training in techniques for identifying triggers and cues that arouse anger and maintaining self-control.
- Moral reasoning: Activities designed to improve the ability to reason about right and wrong behavior and raise the level of moral development.
- Victim impact: Activities aimed and getting offenders to consider the impact of their behavior on their victims.
- Substance abuse: Application of any of the typical CBT techniques specifically to the issue of substance abuse.
- Behavior modification: Behavioral contracts and/or reward and penalty schemes designed to reinforce appropriate behavior.



- Relapse prevention: Training on strategies to recognize and cope with high-risk situations and halt the relapse cycle before lapses turn into full relapses.
- Individual attention: Any individualized one-on-one treatment element that supplements CBT group sessions, e.g., individual counseling.

As Table 3 shows, the presence of some of these treatment elements in the CBT program was significantly related to effect sizes. The strongest relationship appeared for individual attention, followed by anger control and cognitive restructuring.

#### *The relative influence of different moderator variables*

The results presented in Table 3 identify a number of variables describing the participants and the CBT interventions that are related to treatment effects with key method variables controlled. Each of these moderator variables represents a way to

Table 5. Regression model for effect size moderators using specific type of CBT program.

<i>Variables in the model<sup>a</sup></i>	<i>B</i>	<i>z</i>	<i>p</i>	<i>Beta</i>
<i>Method controls</i>				
Design problem	0.11	1.02	0.31	0.14
Attrition proportion	-0.13	-0.21	0.83	-0.03
Intent to treat	-0.13	-1.21	0.23	-0.19
Arrest recidivism	0.13	1.04	0.30	0.15
<i>Participant characteristics</i>				
Recidivism risk rating**	0.19	1.99	0.05	0.26
<i>CBT amount</i>				
Sessions per week	0.05	1.21	0.23	0.22
Length in weeks (logged)	0.04	0.36	0.72	0.06
Sessions × length	0.03	0.73	0.46	0.12
<i>Quality of implementation</i>				
Composite implementation factor**	0.26	2.93	0.00	0.45
<i>Other program characteristics</i>				
CBT emphasis	-0.10	-0.90	0.37	-0.19
<i>Specific CBT program</i>				
Reasoning & Rehabilitation	-0.01	-0.10	0.92	-0.02
Moral Reconciliation Therapy	0.16	0.99	0.32	0.15
Aggression Replacement Therapy	-0.09	-0.35	0.73	-0.05
Interpersonal Problem Solving	-0.31	-0.82	0.41	-0.10
Thinking for Change	0.00	0.02	0.99	0.00
Substance abuse focus	-0.19	-0.93	0.35	-0.15

<sup>a</sup>Weighted, random effects multiple regression analysis with inverse-variance weights.

\* $p < 0.10$

\*\* $p < 0.05$

differentiate the circumstances of CBT treatment that yield larger and smaller effects on recidivism. The variable-by-variable results in Table 3, however, do not tell us about the relative influence of the different moderators. To examine the independent relationships of these variables with the others taken into account, two summary random effects regression analyses were conducted. These were configured to model the treatment effect sizes as a function of participant characteristics, the amount of CBT, the quality of the CBT, and the specific type of CBT, with method differences controlled.

Drawing on the results in Table 3, the relevant participant characteristics were represented by recidivism risk, the only variable in that set significantly related to effect size. The amount of CBT was represented by the combination of variables

Table 6. Regression model for effect size moderators using CBT treatment elements.

<i>Variables in the model</i> <sup>a</sup>	<i>B</i>	<i>z</i>	<i>p</i>	<i>Beta</i>
<i>Method controls</i>				
Design problem	-0.02	-0.27	0.79	-0.03
Attrition proportion	0.08	0.12	0.90	0.01
Intent to treat	0.03	0.30	0.77	0.05
Arrest recidivism	0.01	0.08	0.94	0.01
<i>Participant characteristics</i>				
Recidivism risk rating**	0.20	2.83	0.00	0.27
<i>CBT amount</i>				
Sessions per week	0.01	0.37	0.71	0.07
Length in weeks (logged)	-0.03	-0.35	0.72	-0.05
Sessions × length	0.04	0.74	0.46	0.13
<i>Quality of implementation</i>				
Composite implementation factor*	0.14	1.82	0.07	0.23
<i>Other program characteristics</i>				
CBT emphasis*	-0.20	-1.84	0.07	-0.41
<i>CBT treatment elements</i>				
Cognitive skills	-0.26	-1.23	0.22	-0.26
Cognitive restructuring	0.13	0.84	0.40	0.16
Interpersonal problem solving**	0.28	2.16	0.03	0.32
Social skills	0.19	1.23	0.22	0.19
Anger control**	0.32	2.23	0.03	0.36
Moral reasoning	-0.03	-0.17	0.87	-0.03
Victim impact**	-0.45	-2.36	0.02	-0.31
Substance abuse	0.13	0.87	0.39	0.16
Behavior modification*	-0.29	-1.70	0.09	-0.31
Relapse prevention	-0.19	-1.32	0.19	-0.19
Individual attention	0.07	0.37	0.71	0.06

<sup>a</sup>Weighted, random effects multiple regression analysis with inverse-variance weights.

\* $p < 0.10$

\*\* $p < 0.05$

previously designated for that purpose – sessions per week, length in weeks, and their interaction. The quality of the CBT implementation was represented by the composite implementation factor, also described earlier. The type of CBT was represented in the first analysis as the set of brand name categories (with the two ‘other’ categories omitted as a reference set). In the second it was represented in terms of the specific treatment elements identified as present in the intervention. In both analyses, the CBT emphasis variable was also included to add information about the primacy of CBT in the overall intervention.

Table 5 shows the results when the CBT was represented in brand name categories. Once again, no specific type of CBT program had effects significantly different from the mean of all the other types. Only two moderator variables were individually significant in this analysis – recidivism risk (higher risk was associated with larger effects) and the composite implementation factor (higher quality implementation was associated with larger effects).

Table 6 shows the parallel analysis with the CBT intervention represented in terms of treatment elements. As in the previous analysis, recidivism risk and high quality implementation were associated with better outcomes. In addition, however, four of the individual treatment elements showed significant relationships with effect size. Interpersonal problem solving and anger control were positively related; their presence was associated with larger effects on recidivism. Victim impact and behavior modification were negatively related; they were associated with worse outcomes.

#### *Effects of ‘Best practice’ CBT on recidivism*

We can use the multiple regression analysis in Table 6 to explore optimal CBT treatment circumstances by predicting the effect size expected in a favorable scenario. For this purpose we assumed the best quality study method and measurement characteristics (no design problems, zero attrition, intent-to-treat analysis, and an arrest recidivism outcome). We also assumed the subject sample was comprised of moderately high risk offenders who received the median number of sessions per week (two) with high quality implementation over the median number of weeks (16). The CBT treatment assumed was any one of the brand name programs alone (not supplemented with other services), but with anger control and interpersonal problem-solving components included.

When the corresponding variable values are entered into the prediction equation represented in Table 6, the predicted effect size is a logged odds ratio of 1.05, corresponding to an odds ratio of 2.86. Compared to a control group recidivism of 0.40 (the overall mean), this represents a decrease to a recidivism rate of 0.19 in the treatment group, that is, a 52% decrease overall. This impressive effect is not a mathematical projection beyond what appears in the data. An odds ratio of 2.86 is at the 82nd percentile of the distribution of effects for the 58 studies in this meta-analysis.

## Discussion

This meta-analysis confirmed the findings of positive CBT effects on the recidivism of offenders that have been reported in other recent meta-analyses (Lipsey et al. 2001; Lipsey and Landenberger (2005); Pearson et al. 2002; Wilson et al. 2005). The mean odds ratio indicated that the odds of not recidivating in the 12 months after intervention for individuals in the treatment group were 1.53 times as great as those for individuals in the control group. This represents a reduction from the 0.40 mean recidivism rate of the control groups to a mean rate of 0.30 for the treatment groups, a 25% decrease. The most effective configurations of CBT produced odds ratios nearly twice as large as the mean, corresponding to recidivism rates of around 0.19 in the treatment groups, more than a 50% decrease from the 0.40 rate of the average control group.

The main emphasis of this meta-analysis, however, was the search for key moderator variables that would distinguish situations in which CBT produced larger effects from those in which it produced smaller ones. On this issue, there are two themes in the findings. First, a number of variables characterizing the subject samples, amount and implementation of CBT, and the CBT treatment elements were significantly correlated with the effect sizes for recidivism outcomes. In this regard, there are numerous moderators of the treatment effects. These are not all independent relationships, however. Intervention studies tend to come with bundles of co-occurring characteristics that are, therefore, correlated with each other across studies. This confounding of moderator variables with each other makes it difficult to identify those most critical to the outcome (Lipsey 2003).

Application of multiple regression analysis to identify the moderator variables with the strongest independent relationships to effect size led to the second theme in our findings. Of the many study characteristics that showed significant relationships with effect size, relatively few remained significant when the influence of the others was taken into account. The net result was that much of the variation in recidivism effects could be explained by a small number of moderator variables. The only factors independently related to the effect sizes were (a) the risk level of the participating offenders, (b) how well the treatment was implemented, and (c) the presence or absence of a few treatment elements. In the latter category, inclusion of anger control and interpersonal problem solving components in the treatment program were associated with larger effects; inclusion of victim impact and behavior modification were associated with smaller effects. Most striking was that, controlled for other moderators, none of the major CBT brand name programs produced effects on recidivism that were significantly larger than the average effects of the other programs.

Though not informative for purposes of identifying the most effective treatment conditions, the relationships between characteristics of the study methods and the effects sizes were nonetheless interesting. The aspect of method that is usually of greatest concern for intervention studies is whether a randomized design was used. For the studies included in this meta-analysis, however, there were no significant effect size differences between randomized and nonrandomized de-

signs. Only the intent-to-treat variable, indicating whether treatment dropouts were included in the outcome measures, was significantly related to effect size and that relationship dissipated when other moderators were included in the analysis.

#### *Implications for practice*

With the key participant and general implementation characteristics controlled, no significant differences were found in the effectiveness of the different types or 'brand names' of CBT. It thus appears to be the general CBT approach, and not any specific version, that is responsible for the overall positive effects on recidivism. Within that framework, inclusion of distinct anger control and interpersonal problem solving components in the CBT program enhance the effects while victim impact and behavior modification components appear to diminish it.

What seems to most strongly characterize effective CBT programs is high quality implementation as represented by low proportions of treatment dropouts, close monitoring of the quality and fidelity of the treatment implementation, and adequate CBT training for the providers. These characteristics are more closely associated with research and demonstration programs than with those implemented in routine practice. This is an encouraging picture from the standpoint of practice. It suggests that any representative CBT program that is well-implemented might have results in practice that approach the very positive effects on recidivism produced by the most effective programs documented in the available research studies.

It is also encouraging that the effects of CBT were greater for offenders with higher risk of recidivism than those with lower risk, contrary to any presumption that higher risk offenders might be less amenable to treatment. The effectiveness of CBT with higher risk offenders is consistent with the principles of effective correctional treatment developed by Andrews et al. (e.g., Andrews and Bonta 2002; Andrews et al. 1990). They argue that the best results occur when higher-risk offenders receive more intensive services that target criminogenic needs (e.g., criminal thinking patterns) using cognitive behavioral and social learning approaches.

From a practical standpoint, it is also worth highlighting a couple of variables that were not related to treatment effects once other relevant program characteristics were controlled. In particular, CBT was as effective for juveniles as adults, other things equal, and thus should be useful in both juvenile justice and criminal justice settings. The treatment setting was also not related to treatment effects. Offenders treated in prison (generally close to the end of their sentences) showed recidivism decreases comparable to those of offenders treated in the community (e.g., while on probation, parole or in transitional aftercare).

#### *Implications for research*

Of the 58 studies that met the inclusion criteria for this review, only 19 used random assignment designs and, of those, only 13 maintained sufficiently low attrition from outcome measurement to yield results with high internal validity. Moreover, only

six of the random assignment studies were conducted on 'real world' CBT practice; the others were research and demonstration programs. The amount of high quality research on CBT in representative correctional practice is not yet large enough to determine whether the impressive effects on recidivism found in this meta-analysis can be routinely attained under everyday circumstances.

Though generalization to routine practice cannot be assured, the consistency and magnitude of the effects found in the research to date leave little doubt that CBT is capable of producing significant reductions in the recidivism of even high risk offenders under favorable conditions. However, much remains to be learned about the optimal configuration of CBT and the conditions under which it is most effective. In this meta-analysis we coded as much detail as possible about the program characteristics and context from the descriptions provided in the research reports. At best, those descriptions were limited and fell well short of providing full information about critical program details. An important direction for future research is to better differentiate and document the dimensions along which CBT varies in different applications and to identify the characteristics most critical for attaining optimal effects. The central issue for research on CBT with offender populations at this juncture is not to determine if it has positive effects, but to determine when and why it has the most positive effects.

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