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Effects of Cognitive-Behavioral Programs for Criminal Offenders

Mark W. Lipsey, Nana A. Landenberger, Sandra J. Wilson



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Effects of Cognitive-Behavioral Programs for Criminal Offenders

August, 2007

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Background for the Review

Cognitive-behavioral therapy (CBT) is among the more promising rehabilitative treatments for criminal offenders. Reviews of the comparative effectiveness of different treatment approaches have generally ranked it in the top tier with regard to effects on recidivism (e.g., Andrews et al., 1990; Lipsey & Wilson, 1998). It has a well-developed theoretical basis that explicitly targets “criminal thinking” as a contributing factor to deviant behavior (Beck, 1999; Walters, 1990; Yochelson & Samenow, 1976). And, it can be adapted to a range of juvenile and adult offenders, delivered in institutional or community settings by mental health specialists or paraprofessionals, and administered as part of a multifaceted program or as a stand-alone intervention. Meta-analysis has consistently indicated that CBT, on average, has significant positive effects on recidivism. However, there is also significant variation across studies in the size of those treatment effects. Identification of the moderator variables that describe the study characteristics associated with larger and smaller effects can further develop our understanding of 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. The objective of this systematic review is to examine the relationships of selected moderator variables to the effects of CBT on the recidivism of general offender populations.

Criminal Thinking

One of the most notable characteristics of criminal offenders is distorted cognition-- self-justificatory thinking, misinterpretation of social cues, displacement of blame, deficient moral reasoning, schemas of dominance and entitlement, and the like (Beck, 1999; Dodge, 1993; Walters & White, 1989; Yochelson & Samenow, 1976). Offenders with such distorted thinking may misperceive benign situations as threats (e.g., be predisposed to perceive harmless remarks as disrespectful or deliberately provocative), demand instant gratification, and confuse wants with needs.

Criminal thinking is often tied to a “victim stance” with offenders viewing themselves as unfairly blamed, if not hated, and cast out from society (“everyone is against me,” or “society doesn’t give me a chance”) while failing to see how their antisocial behavior may have contributed to their problems. These thinking patterns may also be supported by offenders’ entrenchment in an antisocial subculture (e.g., street or prison codes) where otherwise dysfunctional assumptions about how one should behave may in fact be adaptive (e.g., “you have to punish people for messing with you or they won’t respect you”).

Cognitive-Behavioral Therapy

Cognitive-behavior therapy is based on the assumption that cognitive deficits and distortions characteristic of offenders are learned rather than inherent. Programs for offenders, therefore, emphasize individual accountability and attempt to teach offenders to understand the thinking processes and choices that immediately preceded their criminal behavior. Learning to self-monitor thinking is typically the first step, after which the therapeutic techniques seek to help offenders identify and correct biased, risky, or deficient thinking patterns. All cognitive-behavioral interventions, therefore, employ a set of structured techniques aimed at building cognitive skills in areas where offenders show deficits and restructuring cognition in areas where offenders’ thinking is biased or distorted. These techniques typically involve cognitive skills training, anger management, and various supplementary components related to social skills, moral development, and relapse prevention.

Cognitive skills training. Cognitive skills training aims to teach such thinking skills as interpersonal problem-solving (with information gathering, developing alternative solutions, and evaluating outcomes as crucial steps), abstract thinking, critical reasoning, causal thinking, goal setting, long-term planning, and perspective taking. Often role-play or practice in real situations is used to help consolidate new ways of coping with situations that tend to prompt maladaptive habits and aggressive or criminal behavior.

Anger management. Anger management training typically focuses on teaching offenders to monitor their patterns of automatic thoughts to situations in which they tend to react with anger or violence. Various strategies are then rehearsed for assessing the validity of those “hot” or “trigger” thoughts. Learning to substitute accurate interpretations for biased ones and to consider non-hostile explanations of others’ behavior are the key parts of most anger management programs.

Supplementary components. CBT programs differ in their emphasis. Some are geared mainly toward anger control and building conflict resolution skills. Others center on assuming personal responsibility for crimes (e.g., challenging offenders’ tendency to justify their behavior by blaming the victim), and on developing victim empathy (e.g., by correcting their minimization of the harm they caused). Along with these primary emphases, CBT programs often add selected supplementary components such as social skills training, moral reasoning exercises, or relapse prevention planning. Relapse prevention is increasingly popular and is aimed at developing cognitive risk-management strategies along with a set of behavioral contracts for avoiding or deescalating the precursors to offending behavior (e.g., high-risk situations, places, associates, or maladaptive coping responses).

Representative CBT Programs

Prototypical examples of CBT programs for offenders include the following:

- The Reasoning and Rehabilitation program (Ross & Fabiano, 1985) is organized around exercises (e.g., Critical Thinking, Social Perspective-Taking) that focus on “modifying the impulsive, egocentric, illogical and rigid thinking of the offenders and teaching them to stop and think before acting, to consider the consequences of their behavior, to conceptualize alternative ways of responding to interpersonal problems and to consider the impact of their behavior on other people, particularly their victims” (Ross et al., 1988: 31).
- Moral Reconciliation Therapy (Little & Robinson, 1986) is based on Kohlberg’s stages of moral development and uses a series of group and workbook exercises designed to raise the moral reasoning level of offenders stepwise through 16 graded moral and cognitive stages.
- Aggression Replacement Training (Goldstein & Glick, 1987; 1994) is comprised of three components—Skillstreaming, Anger Control Training, and Moral Education. Skillstreaming teaches prosocial behaviors through modeling and role-playing. Anger Control Training instructs offenders in self-control by having them record anger-arousing experiences, identify “trigger” thoughts, and apply anger control techniques. Moral Education exposes offenders to moral dilemmas in a discussion format aimed at advancing the level of moral reasoning.
- Thinking for a Change (Bush et al., 1997) consists of 22 sessions of group exercises and homework organized around: (a) understanding that thinking controls behavior; (b) understanding and responding to feelings of self and others; and (c) problem-solving skills.
- Cognitive Interventions Program (National Institute of Corrections, 1996) is a 15 lesson cognitive restructuring curriculum that guides offenders to see their behaviors as the direct result of choices they make. The program leads participants to recognize how distortions and errors in thinking (e.g., victim stance, super-optimism, failure to consider injury to

others) and antisocial attitudes influence these choices. Alternative thinking styles are introduced and practiced to create more options from which to choose.

- Relapse prevention approaches to substance abuse (Marlatt & Gordon, 1985) have been adapted for treating aggression and violence (e.g., Cullen & Freeman-Longo, 2001). These programs incorporate cognitive skills and cognitive restructuring elements into a curriculum that builds behavioral strategies to cope with high-risk situations and halt the relapse cycle before lapses turn into a full relapse.

Prior Research on CBT for Offenders

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, Lipton, Cleland, and Yee (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, Bouffard, and MacKenzie (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, Chapman, and Landenberger (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. Landenberger and Lipsey (2005; Lipsey & Landenberger, 2006) then focused further on an updated and overlapping set of studies and again found that the mean recidivism for the treatment groups was significantly lower than that of the control groups.

These prior meta-analytic reviews clearly identify positive effects of CBT on the recidivism of offenders although, in some cases, they define CBT rather broadly and include variants targeted on different types of offenders. These meta-analyses also provide comparisons between the effects of studies with higher and lower ratings of global methodological quality and make some limited comparisons between different CBT interventions (e.g., different named programs). However, they provide little detailed analysis of the many factors that might differentiate studies showing larger effects from those showing smaller ones.

Objectives of this Review

Meta-analysis has 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 effect size values. The purpose of this systematic review is to focus on a clearly specified domain of CBT treatment with offenders and, within that domain, examine the role of various moderator variables in the variation in treatment effects. For this purpose, the relevant interventions are restricted to those that apply treatment strategies explicitly directed toward cognitive change and take an unambiguously cognitive-behavioral approach to bringing

about that change. In addition, only the effects on general offender samples are considered. CBT interventions for specialized offender groups (e.g., sex offenders, batterers, and substance abusers) typically involve distinctive features tailored to those offenders and both the effects of these interventions and the moderators of those effects may also be distinctive. The main issues for this review, therefore, are the effects of primary, explicit CBT on the recidivism of general offenders and the moderators of those effects. Within this domain there are numerous variants of CBT, including the different named CBT programs listed above and different optional supplementary components. Whether these variants have differential effects on recidivism is of particular interest.

Methods of the Review

Criteria for Including Studies in the Review

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, quasi-experimental studies were included as well as randomized field experiments. 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 & Fabiano, 1985), Moral Reconciliation Therapy (Little & Robinson, 1986), Aggression Replacement Training (Goldstein & Glick, 1987), the Thinking for a Change curriculum (Bush, Glick & Taymans, 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, e.g., 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; offender samples that were selected for, or restricted to, persons committing specific types of offenses (e.g., sex offenses, DUI, drug offenses, status offenses) were not included.

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, statistically controlled, or compared on one or more of the following pretreatment risk-related variables: prior offense history, recidivism risk, gender, race, or age. Group equivalence was coded for any of these variables that were reported and that information was used to create

a moderator variable (“design problem”) that was examined in the meta-analysis. To eliminate explicit self-selection as a biasing factor in group assignment, 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 for Identification of Studies

An initial set of eligible studies came from those assembled and analyzed for the Lipsey, Chapman, and Landenberger (2001) and Lipsey and Landenberger (2006) meta-analyses. This number was expanded through a comprehensive search using the following procedures.

Meta-analysis databases. The first author (Lipsey) 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. In addition, the studies in a second 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 & 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 the journals 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 N. Landenberger, and several colleagues alerted us to eligible studies that were not accessible through the above channels.

Selection of Studies

Abstracts of the studies found through the search procedures were screened for relevance by one of the authors. Documents that were not obviously ineligible or irrelevant (based on the abstract review) were retrieved for final eligibility screening from the Vanderbilt University Libraries, Interlibrary Loan, ERIC, University Microfilms, and government documents sources. Final determination of eligibility for all studies irrespective of source was made by one of the authors using the full study report document(s). Any ambiguities or questions about eligibility were resolved through discussion.

Although some research suggests that two reviewers might increase accuracy in identifying potentially eligible studies from abstracts obtained through bibliographic searches (Edwards, et al., 2002), our experience is that most abstracts do not provide enough detail to allow reviewers to make reliable judgments about whether a study meets the review criteria. Thus, we reviewed abstracts mainly to eliminate those clearly irrelevant and deferred the final determination until the entire study report was screened. While this required retrieving more documents than eventually ended up in the review, it allowed us to make eligibility decisions based on the most complete information about a study that was available.

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 by one or more of the authors ultimately identified 58 studies meeting the criteria for inclusion in the present systematic review.

Data Management and Extraction

Though not all potentially interesting moderator variables were 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 report on the 58 eligible studies. The second author (Landenberger) coded all studies with the results reviewed by a second coder and all questionable entries decided through discussion. 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 who 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. The remaining differences in the form of the recidivism outcomes were identified in coded variables and included in the moderator analysis to examine and control for any variation from those sources.

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, Rindskopf, & Shadish, 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. Random effects analysis was used throughout to properly represent between-study sampling error and the associated assumption that results from the sampled studies were expected to generalize beyond these particular studies.

Otherwise, as described in more detail below, the statistical analysis was conducted using conventional meta-analysis techniques as presented in Lipsey and Wilson (2001) with each effect size weighted by its inverse random effects variance. All analyses were done with SPSS software and SPSS macros for meta-analysis, also described in Lipsey and Wilson (2001).

Findings

Description of Eligible Studies

Table 1 summarizes the characteristics of the 58 studies included in the meta-analysis. Several features of this body of 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.

Table 1: Characteristics of the Studies Included in the Meta-Analysis

	N	%		N	%
Publication type			Program studied		
Journal	19	33	Practice	31	53
Chapter	7	12	Demonstration	18	31
Technical report	25	43	Research	9	16
Thesis	7	12	Treatment setting		
Year of publication			Correctional institution	27	47
1980-1990	10	17	Community	31	53
1991-2000	31	53	Treatment sessions/week		
2001-2004	17	29	1	18	31
Country			2	17	29
USA	42	72	3	8	14
Canada	10	17	4-5	10	17
UK	5	9	6-10	5	9
New Zealand	1	2	Treatment length		
Design			5-10 wks	12	21
Randomized	19	33	11-20 wks	26	45
Matched	23	40	21-40 wks	13	22
Neither	16	28	41-104 wks	7	12

Table continued on next page

	N	%		N	%
Design problem			Proportion of treatment dropouts		
Yes, favors control	13	22	.00	13	22
No or not noted	41	71	.01-.10	6	10
Yes, favors treatment	4	7	.11-.20	18	31
Attrition from Posttest			.21-.30	8	14
.00	37	64	> .30	13	22
.01-.10	7	12	CBT treatment type		
.11-.30	8	14	Reasoning & Rehabilitation	15	26
> .30	6	10	Moral Reconciliation Therapy	11	19
Intent to treat			Aggression Replacement Therapy	6	10
Yes, Tx dropouts included	49	84	Interpersonal Problem Solving Therapy	4	7
Cannot tell	4	7	Thinking for a Change	5	9
No, Tx dropouts not included	5	9	Substance abuse focus	5	9
Type of recidivism			Other manualized	9	16
Rearrest	29	50	All other	3	5
Reconviction	20	34	CBT Emphasis		
Incarceration	8	14	CBT with other services	11	19
Other	1	2	CBT with some other Tx elements	11	19
Recidivism interval			CBT only	36	62
1-5 mo	2	3	CBT treatment elements indicated*		
6 mo	9	16	Cognitive skills	45	78
7-11 mo	5	9	Interpersonal problem solving	45	78
12 mo	29	50	Social skills	43	74
13-24 mo	9	16	Cognitive restructuring	37	64
25-36 mo	4	7	Anger control	20	35
Sample size			Substance abuse	19	33
14-50	10	17	Moral reasoning	17	29
51-100	8	14	Relapse prevention	15	26
101-200	14	24	Behavior modification	11	19
201-500	11	19	Individual attention	10	17
501-3000	15	26	Victim impact	7	12
Sample age			<i>* multiple elements, not mutually exclusive</i>		
Juvenile	17	29	Implementation monitoring		
Adult	41	71	None indicated	17	29
Percent male			Minimal	20	35
0	3	5	Good	17	29
50	2	3	Very good	4	7
70-98	11	19	CBT training for providers		
100	36	62	Minimal	31	53
Not reported	6	10	Moderate	14	24
			Extensive	13	22

Table continued on next page

	N	%		N	%
Percent minority			Mental health background of providers		
0-25	12	21	None or minimal	40	69
26-50	9	16	Moderate	7	12
51-75	12	21	Extensive	11	19
76-100	4	7			
Not reported	21	36			
Recidivism risk rating					
Low	18	31			
Low-medium	9	16			
Medium	18	31			
Medium-high	7	12			
High	6	10			

Mean Effect of CBT on Recidivism

The mean odds ratio representing the average effect of intervention was 1.53 ($p < .001$), indicating that the odds of success (i.e., 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 .40, this odds ratio indicates a recidivism reduction of 25% to a mean of .30. Figure 1 shows the forest plot for the effect size distribution, using random effects estimates. There was also significant variation across studies in the odds ratio for intervention effects ($Q=214.02$, $df=57$, $p < .001$). We turn now to an examination of the study characteristics associated with that variation.

The Relationship of Method to Effect Size

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: Randomized, matched, or neither; each dummy coded to produce three design variables.
- (b) Design problem: Indications of initial nonequivalence between groups on pretreatment 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 3-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) 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: Rearrests, reconvictions, incarcerations, or other with each dummy coded to produce four recidivism variables.
- (f) Recidivism interval: 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 examined in the analysis.

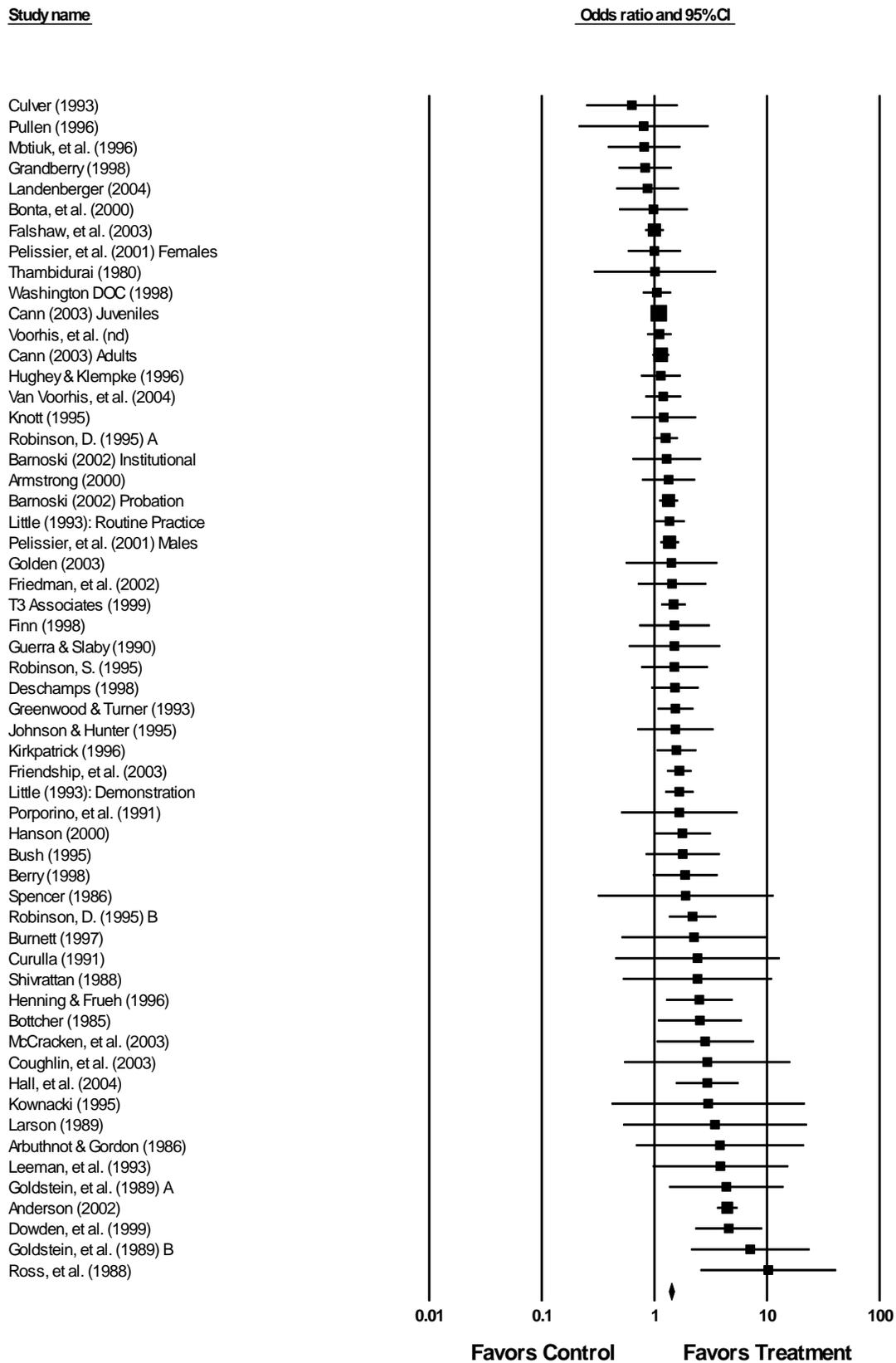


Figure 1. Odds Ratio and 95% Confidence Interval for Recidivism Outcomes

Table 2 shows the zero-order correlation between each method variables and 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).

Table 2: Correlations between Study Method Characteristics and Recidivism Effect Sizes (N=58)

Method Variable	Correlation	p
Design		
Randomized (no/yes)	.04	.77
Matched (no/yes)	-.03	.80
Neither (no/yes)	.00	.98
Design problem (favors control/no/favors Tx)	.19	.14
Attrition proportion	.12	.35
Intent to treat (yes/no)	-.24*	.06
Type of recidivism		
Rearrest (no/yes)	.10	.44
Reconviction (no/yes)	-.04	.77
Incarceration (no/yes)	-.08	.57
Other (no/yes)	-.02	.90
Recidivism interval		
Linear	-.01	.93
Log	-.04	.74

Note: Weighted random effects analysis * $p < .10$ ** $p < .05$

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 even a marginally significant ($p < .10$) relationship with the effect size was whether the study presented the treatment-control contrast as an intent-to-treat analysis. When 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 .10 or greater were also included as method controls (design problem, attrition proportion, and rearrest recidivism).

Effect Size Variation Associated with 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 series 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 potentially important relationships with effect size were identified despite whatever correlations each descriptive variable might have with other variables in the set. To further ensure that no potentially important variables were screened out at this point as a result of the limited statistical power associated with the modest number of studies in these analyses and the broad confidence intervals associated with random effects analysis, $\alpha=.10$ was set as the threshold for statistical significance. Table 3 presents the results.

Table 3: Relationships of Participant and Intervention Characteristics to Effect Size with Selected Method Variables Controlled

Study Characteristic	Beta with Method Controls ^a
General Study Characteristics	
Country: U.S.(1) vs. Canada/UK/NZ(2)	-.03
Publication type: report/thesis (1) vs. journal/chapter (2)	.13
Year of publication	-.11
Participant Characteristics	
Juveniles(1) /adults(2)	-.03
% male	-.07
% minority	.16
Recidivism risk rating	.27**
CBT Amount	
Sessions per week	.34**
Hours per week (logged)	.23*
Total hours of treatment (logged)	.38**
Length in weeks (logged)	-.03
Sessions per week x Length in weeks (logged)	-.08
Quality of CBT Implementation	
Proportion of Tx dropouts	-.28**
Implementation monitoring	.20
CBT training for providers	.21
Mental health background of providers	-.07
Practice(1)/demonstration(2)/research(3) program	.31**
Composite implementation factor	.40**
Other Program Characteristics	
Treatment setting: prison(1) /community(2)	.20
CBT emphasis: with other components (1)/ CBT alone (3)	-.30**

Table 3 continued on next page

Specific CBT Program	
Reasoning & Rehabilitation	-.21
Moral Reconciliation Therapy	.04
Aggression Replacement Therapy	.16
Interpersonal Problem Solving Therapy	-.09
Thinking for a Change	.12
Substance abuse focus	.00
Other manualized	.02
All other	.01
CBT Treatment Elements	
Cognitive skills	.02
Cognitive restructuring	.27**
Interpersonal problem solving	.04
Social skills	.02
Anger control	.32**
Moral reasoning	.11
Victim impact	-.14
Substance abuse	.11
Behavior modification	.03
Relapse prevention	.12
Individual attention (in addition to group sessions)	.39**

Note: Beta values (standardized regression coefficients) from random effects multiple regression.

* $p < .10$ ** $p < .05$

(a) controlling for design problems, attrition proportion, intent-to-treat comparison, and arrest recidivism.

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) are presented first; none of them showed 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 the participants, the amount of treatment received, the quality of the treatment implementation, and the specific type of treatment. With the information in Table 3, we further examined the following factors as potentially influential moderators of intervention effects.

Publication bias. Type of publication was dichotomized between those formally “published” (journal articles and book chapters) and those “unpublished” (technical reports and theses). Table 1, presented earlier, reports the proportions in each of the four categories that were divided to produce this dichotomy. Special efforts were made during the literature search to retrieve unpublished studies with the result that 55% of the final set of studies eligible for analysis fell into that category. The unadjusted odds ratio for the unpublished studies was 1.40 compared to 1.73 for the published studies, a marginally significant difference ($p = .08$). Publication type, however, is confounded with other study characteristics, including study methods. As Table 3 shows, when the methodological differences are controlled, the adjusted difference between published and unpublished studies is no longer even marginally significant ($p = .31$). There is thus no indication that publication bias influences the analyses presented here.

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 size. 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 ($r=.51$) as were the number of sessions per week ($r=.58$) and number of hours per week ($r=.75$), with the latter two being highly correlated with each other ($r=.81$).

From this pattern of relationships we concluded that the best overall 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 included the practice-research dimension that distinguishes 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 that are 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 reported in Table 3, that composite implementation factor is more strongly related to the effect sizes than any of the component variables.

Table 4: Correlations between Potential Moderator Variables Related to the Quality of CBT Implementation (N=58)

	Proportion of treatment dropouts	Implementation monitoring	CBT training for providers	Mental health background of providers
Implementation monitoring	-.17			
CBT training for providers	-.17	.40**		
Mental health background of providers	.08	-.07	.13	
Practice- demonstration- research program	-.29**	.44*	.23*	.24*

* p<.10 ** p<.05

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 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 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.

To further differentiate the character of the CBT programs, the other way we coded the nature of the 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 at 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 size. 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 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 or take into account their correlations with each other. To examine the independent relationships of these variables to effect size 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 previously designated for that purpose—sessions per week, length in weeks, and (to give a complete representation) their interaction. The quality of 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 demonstrated 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 5: Regression Model for Effect Size Moderators Using Specific Type of CBT Program

Variables in the Model^a	B	z	p	Beta
Method Controls				
Design problem	.11	1.02	.31	.14
Attrition proportion	-.13	-.21	.83	-.03
Intent to treat	-.13	-1.21	.23	-.19
Arrest recidivism	.13	1.04	.30	.15
Participant Characteristics				
Recidivism risk rating	.19**	1.99	.05	.26
CBT Amount				
Sessions per week	.05	1.21	.23	.22
Length in weeks (logged)	.04	.36	.72	.06
Sessions x length	.03	.73	.46	.12
Quality of Implementation				
Composite implementation factor	.26**	2.93	.00	.45
Other Program Characteristics				
CBT emphasis	-.10	-.90	.37	-.19
Specific CBT Program				
Reasoning & Rehabilitation	-.01	-.10	.92	-.02
Moral Reconciliation Therapy	.16	.99	.32	.15
Aggression Replacement Therapy	-.09	-.35	.73	-.05
Interpersonal Problem Solving	-.31	-.82	.41	-.10
Thinking for Change	.00	.02	.99	.00
Substance abuse focus	-.19	-.93	.35	-.15

a. Weighted, random effects multiple regression analysis with inverse-variance weights.

* $p < .10$ ** $p < .05$

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 .40 (the overall mean), this represents a decrease to a recidivism rate of .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.

Table 6: Regression Model for Effect Size Moderators Using CBT Treatment Elements

Variables in the Model^a	B	z	p	Beta
Method Controls				
Design problem	-.02	-.27	.79	-.03
Attrition proportion	.08	.12	.90	.01
Intent to treat	.03	.30	.77	.05
Arrest recidivism	.01	.08	.94	.01
Participant Characteristics				
Recidivism risk rating	.20**	2.83	.00	.27
CBT Amount				
Sessions per week	.01	.37	.71	.07
Length in weeks (logged)	-.03	-.35	.72	-.05
Sessions x length	.04	.74	.46	.13
Quality of Implementation				
Composite implementation factor	.14*	1.82	.07	.23
Other Program Characteristics				
CBT emphasis	-.20*	-1.84	.07	-.41
CBT Treatment Elements				
Cognitive skills	-.26	-1.23	.22	-.26
Cognitive restructuring	.13	.84	.40	.16
Interpersonal problem solving	.28**	2.16	.03	.32
Social skills	.19	1.23	.22	.19
Anger control	.32**	2.23	.03	.36
Moral reasoning	-.03	-.17	.87	-.03
Victim impact	-.45**	-2.36	.02	-.31
Substance abuse	.13	.87	.39	.16
Behavior modification	-.29*	-1.70	.09	-.31
Relapse prevention	-.19	-1.32	.19	-.19
Individual attention	.07	.37	.71	.06

a. Weighted, random effects multiple regression analysis with inverse-variance weights.

* $p < .10$ ** $p < .05$

Conclusions

This meta-analysis confirmed the findings of positive CBT effects on the recidivism of offenders that have been reported in other recent meta-analyses (Landenberger & Lipsey, 2005; Lipsey, Chapman, & Landenberger, 2001; Lipsey & Landenberger, 2006; Pearson et al., 2002; Wilson, Bouffard, & MacKenzie, 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 .40 mean recidivism rate of the control groups to a mean rate of .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 .19 in the treatment groups, more than a 50% decrease from the .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 correlated with each other across studies. This confounding of moderator variables 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 effect size 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 designs. 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 enhances 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 likely to occur in research and demonstration programs than in programs implemented in routine criminal justice 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 & 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 projects. 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.

Plans for Updating

The author will take responsibility for updating this review to include new studies reported subsequent to the initial review and earlier studies missed in the search that are identified and located. These updates will be planned for approximately every three years.

Conflict of Interest

None.

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