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Cognitive-Behavioural Therapies for Young People in Outpatient Treatment for Non-Opioid Drug Use: A Systematic Review

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Executive summary/Abstract

BACKGROUND

Youth drug use is a severe problem worldwide. This review focuses on Cognitive-Behavioural Therapy (CBT) as a treatment for young people who misuse non-opioid drugs, such as cannabis, amphetamines, ecstasy and cocaine, which are strongly associated with a range of health and social problems. CBT is an individualized and multicomponent intervention that combines behavioural and cognitive therapy. While *behavioural therapy* mainly focuses on external settings and observable behaviour, *cognitive therapy* is concerned with internal cognitive processes. The primary focus of CBT is to reduce users' positive expectations about drug use, to enhance their self-confidence to resist drugs, and to improve their skills for problem-solving and for coping with daily life stressors.

OBJECTIVES

The objective of this review is to assess the effectiveness of CBT for young people (aged 13-21) in outpatient treatment for non-opioid drug use and to explore any factors that may moderate outcomes.

SEARCH STRATEGY

An extensive search strategy was used to identify qualifying studies. A wide range of electronic bibliographic databases were searched along with government and policy databanks, grey literature databases, citations in other reviews and in the included primary studies, hand searches of relevant journals, and Internet searches using Google. We also corresponded with researchers in the CBT field. No language or date restrictions were applied to the searches.

SELECTION CRITERIA

Studies were required to meet several criteria to be eligible for inclusion. Studies must:

- have involved CBT treatment for young people aged 13-21 years enrolled in outpatient treatment for non-opioid drug use;
- have used experimental, quasi-randomised or non-randomised controlled designs;
- not have focused exclusively on treating mental disorders; and
- have had CBT as the primary intervention.

DATA COLLECTION AND ANALYSIS

The literature search yielded a total of 18,514 references, of which 394 were deemed potentially relevant and retrieved for eligibility determination. Of these, 360 did not fulfil the screening criteria and were excluded. Four records were unobtainable. A total of seven unique studies, reported in 17 papers, were included in the review.

Meta-analysis was used to examine the effects of CBT on drug use reduction, social and family functioning, school problems, treatment retention and criminal activity compared to a group of other interventions (Adolescent Community Reinforcement Approach (ACRA), Chestnut Bloomington Outpatient (CBOP) (+Assertive Continuing Care (ACC)), Drugs Harm Psychoeducation curriculum (DHPE), Functional Family Therapy (FFT), Interactional Therapy (IT), Multidimensional Family Therapy (MDFT), and Psychoeducational Therapy (PET)).

RESULTS

Our main objective was to evaluate the current evidence on the effect of CBT on abstinence and drug use reduction for young people in outpatient treatment for non-opioid drug use. Seven randomised trials, involving 953 participants, were included in this review. Each of the seven included studies compared CBT to another intervention. We analysed the effects in the short term (from the start of treatment to up to 6 months thereafter), medium term (from 6 months to less than 12 months after the start of treatment), and long term (12 months or more after the start of treatment).

We analysed CBT that was delivered with an add-on component such as motivational interviewing (four studies) separately from CBT that was delivered without an add-on component (three studies).

Based on meta-analysis of data from the four included studies analysing CBT with an add-on component, there was no evidence of a relative effect of CBT for the reduction of youth drug use frequency compared to other interventions (ACRA, CBOP (+ACC), DHPE, FFT and MDFT). The random effects standardized mean difference was -0.14 (95% CI -0.64, 0.36) for the short term based on four studies, -0.06 (95% CI -0.44, 0.32) for the medium term based on four studies and -0.15 (95% CI -0.36, 0.06) for the long term based on two studies.

Based on meta-analysis of data from the four included studies analysing CBT without an add-on component, there was no evidence of a relative effect of CBT for the reduction of youth drug use frequency compared to other interventions (IT, MDFT, and PET). The random effects standardized mean difference was -0.13 (95% CI -0.68, 0.42) for the short term based on two studies, -0.08 (95% CI -0.48, 0.31) for the medium term based on three studies and 0.02 (95% CI -0.48, 0.52) for the long term based on two studies.

Thus, the available data does not support the hypothesis that there is a drug use reduction effect from using CBT with young drug users compared to other interventions (ACRA, CBOP (+ACC), DHPE, FFT, IT, MDFT, and PET).

Statistically significant heterogeneity was present in the short term. In the medium term statistically significant heterogeneity was present between studies analysing CBT with an add-on component. In the analysis of studies without an add-on component there was no statistically significant heterogeneity in the medium term. Due to the low power of detecting heterogeneity with only two studies included in the analysis, this result should be interpreted with caution. There was no heterogeneity between studies in the long term; however, with only two studies included in the analyses the power to detect heterogeneity was low.

The primary outcome measured as recovery could only be analysed in the long term. The meta-analysis of CBT with an add-on component was inconclusive as the eight different comparison combinations analysed showed different results. Only one study analysing CBT without an add-on component provided data on recovery status. The reported effect was not statistically significant.

Several sensitivity analyses were performed with respect to analysis method, risk of bias, and intervention characteristics. None of the results from these sensitivity analyses changed the overall conclusions.

No statistically significant differences between CBT, with or without an add-on component, and the comparison interventions (ACRA, CBOP (+ACC), DHPE, FFT, IT, MDFT, and PET) were found for the secondary outcomes of psychological problems, family problems, school problems, risk behaviour (related to crime) and retention. No studies reported on other adverse effects, such as suicide or overdoses.

AUTHORS' CONCLUSIONS

Based on the seven studies included in this review, there was no evidence that CBT interventions perform better or worse than the comparison interventions (ACRA, CBOP (+ACC), DHPE, FFT, IT, MDFT, and PET) with respect to reduction in young people's drug use.

The evidence drawn from this systematic review is based on seven included studies analysed in two separate analyses, depending on whether the intervention was CBT with an add-on component such as motivational interviewing (four studies) or CBT without an add-on component (three studies). The seven studies are very different in terms of their findings regarding the effects of CBT interventions compared to other interventions (ACRA, CBOP (+ACC), DHPE, FFT, IT, MDFT, and PET) on young people's drug use. Therefore, the overall conclusion regarding the effect of CBT interventions compared to these other interventions on drug use reduction for young people aged 13 to 21 years should be interpreted with caution. The conclusions that can be drawn would be more convincing if more studies were available.

1 Background

1.1 DESCRIPTION OF THE CONDITION

Youth drug use[1] that persists beyond curious experimentation is a severe problem worldwide (United Nations Office of Drugs and Crime [UNODC], 2010). Drugs such as cannabis, amphetamines, ecstasy and cocaine, referred to in this review as non-opioids[2], are widely available and used among young people in western countries (European Monitoring Centre for Drugs and Drug Addition [EMCDDA], 2010; Substance Abuse and Mental Health Services Administration [SAMHSA], 2010). Non-opiates such as amphetamines, cocaine, ecstasy and cannabis, characterised by young people as social drugs, are often taken in recreational settings such as dance clubs and at music events. For young people, these non-opiates are often associated with "pleasure" and experimental drug taking (Østergaard & Bastholm Andrade, 2011; Järvinen & Ravn, 2011). However, non-opioid drug use, like the use of other drugs, is strongly associated with a broad range of health and social problems including delinquency, poor scholastic attainment and suicide (Deas & Thomas, 2001; Essau, 2006; Rowe & Liddle, 2006; Shelton, Taylor, Bonner & van den Bree, 2009).

The 2009 US National Survey on Drug Use estimated that 21.8 million (8.7 percent) people in the US aged 12 or older had used drugs during the past month. The most commonly used drug was marijuana: in 2009, 16.7 million people aged 12 or older (6.6 percent) used marijuana in the past year. In the same year, 1.6 million people aged 12 or older (0.7 percent) used cocaine, 760,000 (0.3 percent) used ecstasy, and 502,000 (0.2 percent) used methamphetamine. The highest rate of drug use in the US was found among persons aged 18 to 20 years. In this age group, 22.2 percent used drugs, while the rate was 10 percent among 12 to 17 year olds (SAMHSA, 2010)[3].

The European Monitoring Report estimated that 19.5 million (30.9 percent) of Europeans aged 15-24 years have used cannabis at some point in their life, with the highest prevalence in the Czech Republic, France, Denmark and Germany

[1]The terms use, abuse and dependence are used interchangeably throughout the review and refer to an addiction stage of non-medical usage.
[2]Use of ketamine, nitrous oxide and inhalants, e.g. glue and petrol will not be considered in this review.
[3]Statistics on drug use are mainly based upon subjective measures such as self-reported survey data and surrogate indices.

(EMCDDA, 2010). Within the month preceding the survey, 5.5 million (8.4 percent) young people in Europe aged 15-24 years had used cannabis. Synthetic drugs were the second-most used drug (EMCDDA, 2010). In 2009, 2.5 million (1.7 percent) of European 15-34 year-olds used ecstasy, 1.5 million (1.2 percent) used amphetamines, and 3 million (2.3 percent) used cocaine (EMCDDA, 2010).

Non-opioid substances are associated with varying patterns of behaviour and the potential for addiction (Kosten, Sofuoglu, & Gardner, 2008; Rawson & Ling, 2008; Weaver & Schnoll, 2008). While for some young people drug use is controlled and part of developmental experimentation that will not constitute a clinical problem, a proportion of these users will advance to more serious levels of drug use that will require treatment at some point in the future (Järvinen & Ravn, 2011; Labouvie & White, 2002; Shelder & Block, 1990; Yamaguchi & Kandel, 1984).

The treatment needs of young people differ from those of adults because of their unique stage of psychological and physical development, and researchers thus advocate distinct interventions for this population (Holmbeck, O'Mahar, Abad, Colder & Updegrove, 2006; Knudsen, 2009). Kendall (2006) argues that it is not enough to encourage young people to gain insight into their drug taking and ask them to consider changes to address their occasional problematic drug use without providing them with opportunities to practice new coping skills intended to compensate for cognitive limitations and distortions closely linked to their developmental stage. Other researchers concur with the need for practice-oriented and targeted treatment interventions that are developmentally appropriate for this population (Weisz & Hawley, 2002; Holmbeck et al., 2006, Shirk & Karver, 2006). Cognitive-Behavioural Therapy (CBT) interventions include a variety of such practical elements. As a structured yet flexible, individualized and multicomponent intervention, CBT is adaptable and can be tailored to deal with the challenges associated with specific substances and the individual needs of young people.

The focus of this review is on young people enrolled in treatment for drug use, regardless of how their problems are labelled. Enrolment of a young person in treatment denotes that the degree of drug use has caused that person or a significant other close to him/her (parent, teacher, social worker, etc.) to seek out treatment. This review will focus on CBT delivered as an outpatient treatment[4]. In order to avoid duplication of effort, this review will focus primarily on non-opioid drug use[5].

[4]A Cochrane review in progress will evaluate CBT for substance abuse in young offenders (Campbell, Macdonald, Minozzi, Gardner, & Taylor, 2010).
[5]A Cochrane review evaluated psychosocial treatments for opiate abuse and dependence (Mayet, Farrell, Ferri, Amato, & Davoli, 2010), another will evaluate psychosocial treatments for drug and alcohol abusing adolescents (Minozzi, Amato, Vecchi, & Davoli, 2011), and another psychosocial interventions for benzodiazepine harmful use, abuse or dependence (Darker, Sweeney, Barry, & Farrell, 2012).

1.2 DESCRIPTION OF THE INTERVENTION

In CBT interventions, drug use is perceived as a complex, multi-determined, cognitive and behavioural pattern influenced by several domains, including family history, environmental genetic factors, and comorbid psychopathologies that all play a contributing role in the development of and/or perpetuation of drug use (Carroll, 2008). The primary focus of CBT is on reducing users' positive expectations about drug use, enhancing their self-confidence to resist drugs, and improving their problem-solving skills and skills for coping with daily life stressors (Moos, 2007; Kaminer, Burleson, Blitz, Sussman & Rounsaville, 1998a).

CBT aims to address the learned association between drug-related cues or stimuli and drug use by understanding and changing undesirable cognitive and behavioural patterns (Carroll, 2008; Shirk & Karver, 2006). CBT combines behavioural and cognitive therapy; while *behavioural therapy* mainly focuses on external settings and observable behaviour, *cognitive therapy* is concerned with internal cognitive processes.

Behavioural therapy

Behavioural therapy was developed from the ideas of classical and operant conditioning (Poulsen, 2006; McGuire, 2000). In classical conditioning, behaviour is believed to be affected by stimulus-response mechanisms in the immediate surroundings of the individual; for instance, urges and cravings for drugs can be perceived as responses to external stimuli cues (Sherman, Jorenby & Baker, 1988). Identifying external stimuli cues would enable the individual to avoid settings that work as triggers to drug taking (Carroll, 2008). Operant conditioning is based on associations within a context of events (such as an antecedent stimulus) between a given behaviour and its consequences (Skinner, 1988). Rewards (that is, responses perceived as pleasurable in some way) work as positive reinforcers of a particular behaviour. If the psychological effect of a drug is experienced as pleasurable, this will work as a positive reinforcement of drug-using behaviour (Waldron & Kaminer, 2004). Likewise, if drug use relieves anxiety, for example, this will work as a negative reinforcement of drug-using behaviour, assuming that anxiety is aversive. In a treatment context, non-drug using behaviour is rewarded and thus reinforced.

Cognitive therapy

The hypothesis behind cognitive therapy is that thoughts shape feelings and thereby behaviour, so that by changing thought patterns, behaviour can be changed as well (Beck, Wright, Newman & Liese, 1993; Kendall, 2006; Nielsen & Thomsen, 2005). Cognitive therapy was first used in the 1960s to treat depression, and has since been extensively modified and adapted to deal with a wide range of clinical problems and populations, including people with issues relating to drug use (Beck, 2008; Holmbeck et al., 2006; Weisz & Hawley, 2002).

Cognitive and behavioural therapy

The foundation and premise of CBT for drug use is that cognitive techniques and skills training can tackle drug-related beliefs and the automatic thoughts that lead to urges and cravings, while additional behavioural techniques can address actions that interact with the individual's cognitive processes that trigger and maintain drug using behaviour (Beck et al., 1993). Irrational and erroneous assumptions can cause and/or maintain undesirable behaviour (Beck et al., 1993). CBT calls specific attention to the propensity among substance users to mistakenly believe that the perceived advantages of using drugs (such as pleasure and relief from anxiety) are greater than the disadvantages (e.g. financial, interpersonal), as such misconceptions help sustain the avoidance of a realistic assessment of the disadvantages (Beck et al., 1993; Carroll, 2008; Nielsen & Thomsen, 2005). Thus, it is believed that the users' assessment of the potential for ceasing to use drugs might be based on cognitive distortions. In CBT, clients are helped to identify and challenge dysfunctional beliefs (such as, 'I cannot be happy unless I am using,' or, 'the withdrawal will be too painful,') because thinking that one is incapable of controlling the urge to use drugs will create a self-fulfilling prophecy, as users who believe they are incapable of ending their drug use will not even try (Beck et al., 1993). The common denominator in all CBT interventions is to make, create and support continuous positive change in the client's feelings and behaviour by examining and reframing the basic maladaptive assumptions and thoughts underlying drug use (Beck, 2008; Carroll, 2008; Moos, 2007; McGuire, 2000).

CBT outlines a pattern and series of phases of drug use, from the first stimulating cue to the actual act of drug using specific to the client. The activating stimulus can be external (such as a gathering of friends using cocaine) or internal (such as anxiety or boredom) (Beck et al., 1993; Beck, 2008; McGuire, 2000; Nielsen & Thomsen, 2005; Carroll, 2008). These stimuli can trigger basic assumptions (e.g. 'I am socially isolated,') that trigger automatic thoughts (e.g. 'a little cocaine will make me feel better,') which in turn trigger cravings and permissive beliefs that make it easier for the person to engage in the behaviour (e.g. 'it's okay as long as I don't inject,'). The individual would then form a mental strategy for obtaining the drugs and the actual drug using act could then take place. CBT addresses this pattern of drug use by enlisting a number of techniques and strategies. The therapist can use training in problem solving, coping strategies, rehearsal, social skills and communication, as well as helping to respond to criticism and refuse drugs, to help the young person identify stimulating cues, discuss how to cope, and avoid drug taking behaviour. However, some stimulating cues (such as emotional states) may be unavoidable, and in such cases modifying the maladaptive beliefs and automatic thought patterns that maintain drug using behaviour would be equally important (Beck et al., 1993; Beck, 2008; McGuire, 2000).

CBT components and therapy sessions

CBT is a highly structured intervention and is organised closely around well-specified and individualized treatment goals (Carroll, 2008). Each CBT session is structured by an articulated agenda and discussions remain focused around issues directly related to substance use. In some cases, the therapist may lead the therapy session with 'motivational interviews'[6] (Carroll, 2008; Nielsen & Thomsen, 2005). CBT interventions may include permutations of various components such as thought diaries, social skills training, problem solving strategies, coping strategies, self-control and stress management techniques, and relapse prevention training. CBT has different modalities and can be implemented in an individual and/or group setting (Moos, 2007).

Typical Therapy Sessions

A therapy session typically (but not invariably) includes the following three parts:

First, a client's substance use and general functioning would be assessed (and would vary according to the degree of dependency and individual conditions). A specific cognitive technique that can help identify and modify drug-related beliefs is an 'advantages-disadvantages' analysis (Beck et al., 1993). In this, the therapist guides the client through the process of listing and re-evaluating the advantages and disadvantages of drug use, and so helps the young person gain a more accurate, objective and balanced view of drug use.

The second part of the therapy session is typically didactic in structure and devoted to skills training, coping and problem-solving strategies, and practice. One technique for examining beliefs and considering their validity in a more systematic way is 'The Daily Thought Record'. Clients are asked to record their thoughts and feelings and then re-evaluate their validity, identify possible patterns of cognitive distortions, and develop strategies for change (Beck et al., 1993; Nielsen & Thomsen, 2005; Carroll, 2008). The therapist may also encourage the client to try new behaviour patterns through role playing. This aims to teach the client new effective interpersonal skills, such as how to handle interpersonal conflicts without taking drugs and how to develop effective repertoires of social behaviour to reduce undesirable drug use and deal with relapse if it occurs (Beck et al., 1993; Kaminer & Waldron, 2006).

The third part of the therapy session is usually dedicated to planning for the week ahead and discussing how new skills and strategies could be implemented (Carroll, 2008). This kind of collaborative empiricism characterises CBT and is particularly important when dealing with young substance users in order to assist them in

[6] Motivational interviewing (MI) is sometimes referred to as an independent treatment form but can also function as a component of other treatment forms including CBT. CBT interventions can use MI as a means to motivate clients for change. The aim of MI is to activate and capitalize on the client's motivation and commitment to change and MI seeks to help clients resolve their ambivalence about change (Moos, 2007; Miller & Rollnick, 2002).

learning self-regulation and to exert self-control. However, this kind of collaboration may also be a point of concern for the intervention's effectiveness, as participation in CBT demands a certain (above average) level of verbal articulation and self-awareness (Nielsen & Thomsen, 2005).

CBT interventions can range from 5 to 24 weeks in duration. Delivery can take place in the home or in community facilities, and can be delivered to individuals, groups or families, or a combination of these (Dennis et al., 2004; Carroll, 2008). Approaches that are purely behavioural (such as a stand-alone contingency intervention) will not be considered in this review.

1.3 HOW THE INTERVENTION MIGHT WORK

Existing research

Along with a handful of other interventions, CBT is one of the most researched treatment forms in existence (Becker & Curry, 2008; Carroll, 2008). CBT has shown promising potential for young drug users in a number of primary studies (Kaminer et al., 1998a; Kaminer & Burleson, 1999; Waldron, Slesnick, Brody, Peterson & Turner, 2001; Kaminer, Burleson, & Goldberger 2002; Dennis et al., 2004; Liddle, Dakof, Turner, Henderson & Greenbaum, 2008; Latimer, Winters, D'Zurilla & Nichols, 2003).

Several reviews (that for the most part lack pre-published protocols)[7] on CBT interventions targeting young drug users already exist (Waldron & Kaminer, 2004; Vaughn & Howard, 2004; Becker & Curry 2008; Waldron & Turner 2008; Tanner-Smith, Wilson & Lipsey, 2013). However, with only one exception (Waldron & Kaminer, 2004), all of the above focus broadly on psychosocial therapies in general, rather than CBT specifically. Generally, the most recent reviews conclude that CBT is associated with reduced drug use in young people (Waldron & Kaminer, 2004; Waldron & Turner, 2008; Tanner-Smith et al., 2013).

The findings of the aforementioned studies and reviews indicate that CBT can reduce drug use in young people receiving treatment. However, closer interpretation of findings reveals a complex picture that is far from clear-cut: the reduction in young people's drug use following CBT is relative to the comparison interventions used in the individual studies (Tanner-Smith et al., 2013) and dependent on the types of CBT interventions and modalities used in those studies.

[7]Although two Cochrane reviews have evaluated psychosocial/psychotherapeutic interventions for substance users, these reviews have focused on treatments for adult cannabis users (Denis, Lavie, Fatseas, & Auriacombe, 2006) and adult substance users with severe mental illness (Cleary, Hunt, Matheson, Siegfried, & Walter, 2008) respectively. Moreover, the Cochrane reviews focus broadly on psychosocial/psychotherapeutic interventions for adults and not on CBT as a specific intervention for young people. In contrast, in our review we are only interested in CBT interventions that specifically target treating young people for non-opioid drug use.

CBT Mechanisms

Lack of research on the mechanisms of change specifically underpinning CBT (Waldron & Kaminer, 2004) make any identification of key mechanisms speculative. Nevertheless, problem solving and coping strategy skills may be a key to change. Myers and Brown (1990) found that young drug abstainers and minor relapsers had higher levels of these skills than major relapsers and non-abstainers. The particular focus of CBT for substance abuse on problem solving, coping strategies, communication and social skills may support younger people positively in abstaining and dealing with possible relapse.

Moderators

Whether certain population characteristics moderate CBT outcomes for non-opiates remains largely unknown (Morgenstern & McKay, 2007). In a study including 13 to 18 year olds, Kaminer et al. (2002) found that only older males in the CBT group experienced a significant reduction in drug use in comparison to the psychoeducational therapy group. This could indicate that CBT is more appropriate for the older males in the study (i.e. 16 to 18 year olds). Alternatively, the group delivery aspect may provide an additional explanation: study findings suggest that group CBT has a greater effect in reducing drug use than does individual CBT (Waldron et al., 2001; Liddle, Rowe, Dakof, Ungaro & Henderson, 2004). A group setting may be one that is more conducive and realistic for practicing new skills and strategies with peers in the same situation. The group environment may also contribute to the support and promotion of cognitive and behavioural change among participants (Waldron & Kaminer, 2004).

Finally, the clients' motivation also plays an important role, as increased motivation for change has been shown to lead to increased engagement, improved attendance and better outcomes from the therapy (Waldron & Turner, 2008), although this finding seems to apply to all drug treatment therapies. The duration of therapy may also moderate treatment outcomes, and several studies have found that shorter CBT interventions can be just as effective, if not more effective, than those of longer duration (Dennis et al., 2004; Kaminer, 2008).

1.4 WHY IT IS IMPORTANT TO DO THIS REVIEW

Drug use among young people is strongly associated with delinquency, poor scholastic attainment, mental and physical health problems, suicide and other individual or public calamities (Lynskey & Hall, 2000; Tims et al., 2002; Essau, 2006; Rowe & Liddle, 2006; Knudsen, 2009). Yet research has documented a significant gap between young people in need of treatment and young people actually receiving treatment[8]. McLellan (2006) linked this *treatment gap* to a

[8]For example, 8.4 percent of 18 to 25 year olds in the US are classified as needing drug use treatment (based on the criteria specified in the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorder, version DSM-IV), but less than one tenth of these young people actually receive treatment (NSDUH, 2009).

public concern regarding the effectiveness of the available treatments for young people and suggests that the public feeling is that *nothing works* for substance use among young people. There is a need for identifying effective interventions for young drug users to inform treatment policy and practitioners' decisions. Current evidence suggests that CBT for the treatment of young people's drug use is a promising intervention. Research also points to the need for more solid and specific knowledge on what moderates CBT treatment effects, and for whom (Moos, 2007; Kaminer & Waldron 2006; Kaminer, 2008; Waldron & Turner, 2008). A protocol-led systematic review on CBT for non-opioid drug use in young people has the potential to provide this knowledge and inform policy and practice.

Likewise, among youth aged 12 to 17, 4.5 per cent were estimated to be in need of treatment for a drug use problem, but only one tenth of this group actually received any (SAMSHA, 2008).

2 Objective of the review

The objective of this review is to assess the effectiveness of CBT for young people (aged 13-21) in outpatient treatment for non-opioid drug use and to explore any factors that may moderate outcomes.

3 Methodology

3.1 TITLE REGISTRATION AND REVIEW PROTOCOL

The title for this systematic review was approved in The Campbell Collaboration on 28 April, 2010. The review protocol was approved on 31 August 2012. Title and protocol are available at: http://campbellcollaboration.org/lib/project/170/.

3.2 CRITERIA FOR CONSIDERING STUDIES FOR THIS REVIEW

3.2.1 Types of studies

The study designs included in the review were:

- RCTs - randomised controlled trials.
- QRCTs - quasi-randomised controlled trials (where participants are allocated by means such as alternate allocation, person's birth date, the date of the week or month, case number or alphabetical order).
- NRCTs - non-randomised controlled trials (where participants are allocated by other actions controlled by the researcher).

3.2.2 Types of participants

The population included in this review comprised young people aged 13-21 years who were enrolled in a CBT outpatient drug treatment for non-opioid drug use (e.g., cannabis, amphetamine, ecstasy, or cocaine).

Definitions of young people and the age at which someone is considered a young person, and so may be entitled to special services such as drug treatment, varies internationally (United Nations, 2011). Age group distinctions for young people are unclear, as the boundaries are fluid and culturally specific (Weller, 2006). Furthermore, young people start experimenting with illegal drugs at different ages in different countries (Hibell et al., 2009). Similarly, patterns of independence from parents and of independent living vary internationally for young people. In order to encapsulate these international differences, we set the age range from 13 to 21 years (Hibell et al., 2009; United Nations, 2011; SAMSHA, 2010; Danish Youth Council,

2011). Any study involving age groups extending well beyond the 13 to 21 age threshold (one of 13 to 65 year olds, for example) was only included if the trial investigators reported findings by age group for the intervention and control group.

No universal international consensus exists on the categories that should be used when classifying drug users, and different assessment tools and ways of classifying the severity of drug use are applied in different research studies (American Psychiatric Association, 2000; World Health Organization, 2011; Nordegren, 2002). We chose to include participants regardless of formal drug use diagnosis: the main criterion for inclusion was that the young person had been enrolled in treatment for drug use (i.e. intervention or comparison intervention). Referral to and enrolment in treatment required a level of drug use to the extent that the young person, his/her parent or significant other, or a representative of a statutory authority, had found it necessary to solicit or require treatment. We therefore defined the population as young people referred to treatment, or in treatment, for using non-opioid drugs.

As psychosocial interventions for the treatment of youth opioid use have already been evaluated in Cochrane reviews (Amato et al., 2011; Minozzi et al., 2010), the focus of this review is on non-opioid use. We included participants with poly-drug use as long as the majority of the study participants were users of non-opioid drugs. Study populations with severe mental illnesses (such as schizophrenia or psychotic illness) were excluded. We expected that some study populations might include young people with 'common' non-severe comorbid conditions (such as behavioural, emotional, mental health issues) (Hawkins, 2009). These studies were not excluded as long as the focus of the CBT intervention was on treating drug use. Studies where the primary focus of the intervention was to treat a comorbid condition (e.g. depression) in young people who also used drugs were excluded.

3.2.3 Types of interventions

The review focused on outpatient CBT interventions (as defined in section 1.2) of any duration delivered to young people individually or in groups (e.g. peers or families), and described by the authors as CBT. We only included studies with CBT interventions specifically directed at treating *young people* for non-opioid drug use.

CBT interventions were included if they were delivered in outpatient settings and did not involve overnight stays in a hospital or other treatment facility. To be eligible, the intervention should have taken place in the home, at a community centre, in a therapist's office or at an outpatient facility, and should have been delivered to individuals, groups or families, or a combination of these.

CBT interventions were considered ineligible if they were conducted by non-professionals such as lay volunteers, were delivered in restrictive environments such as prisons or other locked institutions (such as detention centres or institutions for

sentence-serving juvenile delinquents), or if focused exclusively on treating mental disorders.

Studies where CBT was delivered in combination with add-on components (such as motivational interviewing) were eligible providing CBT was the primary intervention.

Eligible comparison conditions were no intervention, wait list controls and alternative interventions. Due to ethical considerations and the nature of the problem (i.e. young peoples' drug use) the likelihood of a no-treatment control group was anticipated to be small. We expected that the comparison would be an alternative intervention (Tanner-Smith et al., 2013).

3.2.4 Types of outcomes

We considered the following outcomes:

Primary outcomes

Abstinence or reduction of drug use as measured by:

- Biochemical test (e.g. urine screen measures for drug use).
- Self-reported estimates on abstinence or drug use (e.g., Time-Line Follow-Back interview; Fals-Stewart, O'Farrell, Freitas, McFarlin & Rutigliano, 2000).
- Psychometric scales (e.g., Addiction Severity Index; McLellan, Luborsky, Woody & O'Brien, 1980).

Secondary outcomes

- Social functioning and family functioning (e.g. as measured by the Beavers Interactional Competence Scale; Beavers & Hampson, 2000).
- Education or vocational involvement (e.g. as measured by grade point average, attendance, self-reported or reported by authorities, files, registers or employment record).
- Retention (e.g. as measured by days in treatment, completion rates and/or attrition rates).
- Risk behaviour such as crime rates (e.g. as measured by self-reports or reported by authorities, administrative files or registers).
- Other adverse effects (e.g. as measured by rates of suicide and overdoses).

Outcomes were considered in the following intervals:

- Short term (beginning of treatment to less than 6 months after beginning of treatment).
- Medium term (6 months to less than 12 months after beginning of treatment).
- Long term (12 months or more after beginning of treatment).

3.3 SEARCH METHODS FOR IDENTIFICATION OF STUDIES

3.3.1 Electronic searches

Relevant studies were identified through electronic searches of the following bibliographic databases and government policy databanks. No language or date restrictions were applied to the searches.

International bibliographic databases

CINAHL searched until September, 2012
Cochrane Controlled Trial Register (CENTRAL) searched until September, 2012
Criminal Justice Abstracts searched until September, 2012
EMBASE searched until September, 2012
ERIC searched until September, 2012
MEDLINE searched until September, 2012
PsycINFO searched until September, 2012
Social Care Online searched until September, 2012
SocIndex searched until September, 2012
Web of Science (SCI, SSCI) searched until September, 2012

Nordic databases

Bibliography of Nordic Criminology (up to summer 2008[9])
Bibliotek.dk searched until September, 2012
LIBRIS searched until September, 2012
BIBSYS searched until September, 2012

3.3.2 Search terms

An example of the search strategy for MEDLINE on the OVID platform is listed in section 14. The strategy was modified for the different databases (see Appendices, section 14.1 for details).

3.3.3 Searching other resources

The review authors checked the reference lists of other relevant reviews and each of the included primary studies in an attempt to identify new leads. We also contacted international experts in an attempt to identify unpublished and ongoing studies.

3.3.4 Grey literature

We used Google and Google Scholar search engines and the advanced search options to search the web to identify potential unpublished and/or studies in progress. We checked the first 150 hits. OpenGrey (http://www.opengrey.eu/) was used to search

[9]This database has not been updated since summer 2008.

for European grey literature. Sites such as NCJRS (National Criminal Justice Reference Service) were searched. Copies of relevant documents were stored and we recorded the exact URL and date of access.

We also searched the following websites:

- National Institute on Drug Abuse (NIDA), http://www.drugabuse.gov/
- The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), http://www.emcdda.europa.eu/index.cfm
- Substance Abuse and Mental Health Services Administration (SAMHSA), http://www.samhsa.gov/

3.3.5 Hand searching journals

The following journals that we considered most likely to include relevant primary studies were hand searched for the years 2011 and 2012:

- *Addiction*
- *Journal of Consulting and Clinical Psychology*
- *Journal of Substance Abuse Treatment*
- *Journal of Clinical Child and Adolescent Psychology*
- *Research on Social Work Practice*

3.4 DATA COLLECTION AND ANALYSIS

3.4.1 Selection of studies

Two members of the review team independently screened titles and abstracts to exclude studies that were clearly irrelevant, under the supervision of one of the review authors. Studies considered eligible by at least one of the reviewers were retrieved in full text. The full texts were then screened by two members of the review team to determine study eligibility based on the inclusion criteria. Any disagreements about eligibility were resolved by discussion. We checked for multiple publications of studies (i.e. whether several studies were based on the same data source).
Reasons for exclusion were documented for each study that was retrieved in full text. The study inclusion coding sheet was piloted and adjusted when required by the review authors and used throughout the screening (see Appendices, section 14.2). The overall search and screening process is illustrated in a flowchart (see section 13).

3.4.2 Data extraction and management

Two review authors independently coded and extracted data from the included studies. A data extraction sheet was piloted on several studies and revised when necessary (see Appendices, section 14.3). Extracted data was stored electronically. Any disagreements were resolved by discussion. Data and information were extracted on: characteristics of participants (e.g. age, gender, drug use severity, and history), intervention characteristics and control/comparison interventions, research design, sample size, outcomes and results.

3.4.3 Assessment of risk of bias in included studies

We assessed the risk of bias using a model developed by Prof. Barnaby Reeves in association with the Cochrane Non-Randomised Studies Methods Group (Reeves, Deeks, Higgins & Wells, 2011)[10]. This model, an unpublished extension of the existing Cochrane Collaboration's risk of bias tool (Higgins & Green, 2008), covers risk of bias in RCTs, quasi-randomised trials and non-randomised studies that have a well-defined control group. The extended model is organized and follows the same steps as the existing Risk of Bias model according to chapter 8 of the Cochrane Handbook (Higgins and Green, 2008). The extension to the model is explained in Appendices, section 14.4.

Risk of bias judgement items and assessment
The risk of bias model used in this review is based on nine items (for guidelines and coding sheets, see Appendices, section 14.4).

The nine items refer to:

- **sequence generation** (judged on a low/high risk/unclear scale – NRCTs will automatically have high risk of bias)
- **allocation concealment** (judged on a low/high risk/unclear scale)
- **confounders** (judged on a 5-point scale/unclear, only relevant for non-randomised studies i.e. NRCTs)
- **blinding** (judged on a 5-point scale/unclear)
- **incomplete outcome data** (judged on a 5-point scale/unclear)
- **selective outcome reporting** (judged on a 5-point scale/unclear)
- **other potential threats to validity** (judged on a 5-point scale/unclear)
- ***a priori* protocol** (judged on a yes/no/unclear scale)
- ***a priori* analysis plan** (judged on a yes/no/unclear scale).

The assessment was based on pre-specified questions (see Appendices, section 14.4). "Yes" indicates a low risk, "No" indicates a high risk of bias, "and "Unclear" indicates an unclear or unknown risk of bias. In the 5-point scale, 1 corresponds to No/Low

[10]This risk of bias model was introduced to the review authors by Prof. Reeves at a workshop on risk of bias in non-randomised studies at SFI Campbell, February 2011. This model is developed by the Cochrane Non-Randomised Studies Method Group (NRSMG).

risk of bias (e.g. 1 = a high quality RCT) and 5 corresponds to Yes/High risk of bias (e.g. 5= too risky, too much bias, i.e. a poor quality study). A score of five points on any of the items assessed translates to a risk of bias so high that the findings will not be considered in the data synthesis (because they are more likely to mislead than inform). In this systematic review, none of the included studies or parts thereof was judged as 5 on the risk of bias scale.

Confounding
Confounding was not relevant in this review since we did not find any non-randomised studies meeting the inclusion criteria.

Assessment
Review authors independently assessed the risk of bias for each included study as described in the previous sections. Any disagreements were resolved by discussion. The risk of bias assessments were reported in risk of bias tables for each included study (see Appendices, section 14.5) and were used to inform the data synthesis.

3.4.4 Measures of treatment effect

For dichotomous outcomes, for example "recovery" and "retention", we calculated odds ratios with 95 percent confidence intervals and p-values for the meta-analysis (Higgins & Green, 2008). Computations of effect sizes were carried out with the natural logarithm of the odds ratio.

For continuous outcomes, effect sizes were calculated when means and standard deviations were available. When this information was not available, as was the case in two studies, the review authors requested means and standard deviations from the principal trial investigators. Hedges *g* was used for estimating SMDs.

3.4.5 Unit of analysis issues

We planned to take into account the unit of analysis of the studies to determine whether there were multiple intervention groups, whether outcomes were measured at multiple time points, and whether individuals were randomised in groups (i.e. cluster randomised trials).

Multiple intervention groups
Multiple intervention groups (with different individuals) within a study with one control group were not pooled, nor were multiple controls. All possible comparisons from studies with multiple intervention/control groups were analysed. Data was rigorously checked to avoid overlapping samples in the meta-analyses.

Multiple time points

When results were measured at multiple time points, they were pooled and analysed in the following groups: short-term (beginning of treatment to less than 6 months after the beginning of treatment), medium term (6 months to less than 12 months after the beginning of treatment), and long term (12 months or more after the beginning of treatment) (see section 4.2.1). When conducting analyses separately by time point, there were no remaining dependencies within each of those time points.

Cluster randomised trials
No cluster randomised trials were identified.

3.4.6 Dealing with missing and incomplete data

In cases where data was missing (e.g. valid Ns, means and standard deviations), we contacted the primary study authors to request this[11]. We recorded attrition rates and (when possible) reasons for attrition from included studies.

Information on intention to treat analysis (ITT) was also recorded. We performed sensitivity analysis to examine influences on effects in studies using ITT analysis vs. studies not using ITT analysis (see section 4.4.4).

3.4.7 Assessment of heterogeneity

Statistically significant heterogeneity among primary outcome studies was assessed with Chi-squared (*Q*) test, tau-squared and *I*-squared statistics (Higgins & Green, 2008). A significant *Q* or tau-squared ($p < .05$) and *I*-squared value of at least 50 percent were considered as evidence of statistical heterogeneity.

3.4.8 Assessment of publication bias

Reporting bias refers to both publication bias and selective reporting of outcome data and results. Selective reporting was dealt with in the risk of bias assessment and any concerns were reported in section 4.3.5. As stated in the protocol (Kowalski et al., 2012), we used funnel plots to provide information about possible publication bias (Higgins & Green, 2008).

3.5 DATA SYNTHESIS

No studies were excluded for scoring 5 on a risk of bias item.

Analysis of the absolute effects of CBT was not possible since no study compared CBT to no treatment or to untreated wait list controls. Examination of the relative effects of CBT (versus other interventions) was conducted on studies that compared CBT to alternative interventions and/or treatment as usual (TAU). Studies of CBT

[11]Authors were contacted for missing data in October 2011, January 2012 and May 2013.

interventions that included an add-on component such as motivational interviewing or a pharmacological treatment were analysed separately. All follow-up durations reported in the primary studies were recorded and we conducted separate analyses for short-term (beginning of treatment to less than 6 months after beginning of treatment), medium-term (6 months to less than 12 months after beginning of treatment), and long-term (12 months or more after beginning of treatment) outcomes.

We pooled the results from primary studies based on outcomes and performed meta-analysis. All analyses were inverse variance weighted using random effects statistical models that incorporated both the sampling variance and between-study variance components into the study level weights. A random effects model was chosen to represent the overall effect, as we expected the studies to deal with diverse populations of participants. We reported the 95 percent confidence intervals and have provided graphical displays (forest plots) of effect sizes in section 4.4.

3.5.1 Analysis of heterogeneity

We planned, where possible, to investigate the following study-level covariates with the aim of explaining observed heterogeneity: intervention characteristics (e.g., treatment duration, treatment intensity), participants' characteristics (e.g., gender, age, family composition, ethnicity, co-morbidity, and history of drug use) and comparison intervention characteristics.
If the number of included studies had been sufficient (dependent on the spread of the study means of the covariates and study sizes, see Borenstein, Hedges, Higgins & Rothstein, 2009 and Simmonds & Higgins, 2007), we planned to perform moderator analyses (meta-regression) to explore how observed variables were related to heterogeneity using a mixed model. Otherwise, single factor subgroup analysis was planned to be performed. We did not, however, identify sufficient studies to allow any moderator analysis to be conducted.

3.5.2 Sensitivity analysis

Sensitivity analysis was used to evaluate whether the pooled effect sizes were robust across analysis method (intention-to-treat) and components of risk of bias. We conducted sensitivity analysis for two components of the risk of bias checklists ('blinding' and 'incomplete outcome data') by removing studies scoring 3 or 4 (see section 3.4.3 for a definition).

Developer bias can occur in studies conducted by developers, who may unconsciously influence the success of an intervention (Petrosino & Soydan, 2005; Eisner, 2009; Sherman & Strang, 2009). Risk of developer bias was present in one of the included studies. To check for the possible influence of developer bias on effect sizes, we ran sensitivity analyses by removing that study.

We also ran sensitivity analysis to examine for effects of program fidelity (i.e. compliance with the program manual and requirements for therapist training).

4 Results

4.1 RESULTS OF THE SEARCH

The initial search was performed between December 2010 and January 2011. An updated search was executed in September 2012.

The results of the searches are summarised in Figure 13.1. The total number of potential relevant records was 18,514 after excluding duplicates (database: 13,733, grey: 2,610, hand search, snowballing and other resources: 2,171). All 18,514 records were screened based on title and abstract and 394 records were ordered for retrieval and screening in full text. Of these, 360 did not fulfil the screening criteria and were excluded. Two records were unobtainable, and two unpublished manuscripts could not be located.

A total of seven unique studies, reported in 17 papers, were included in the review. See section 4.2 for further details of the included and excluded studies.

4.2 DESCRIPTION OF THE STUDIES

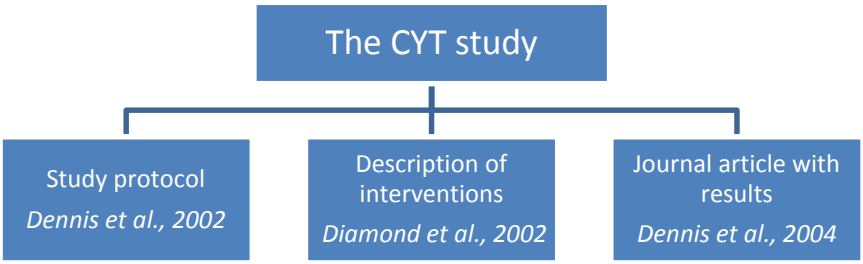
4.2.1 Included studies

Seven studies met our inclusion criteria, of which four were reported in a number of full text papers. No NRCTs were identified for inclusion. None of the studies simply named the intervention they assessed as CBT without providing further information to suggest that the intervention was CBT as defined in section 2.1. We did not find any studies comparing CBT to no treatment or to untreated wait list controls, and we were therefore unable to draw any conclusions about the absolute effects of CBT.

Dennis et al. (2004)
This study, named The Cannabis Youth Treatment (CYT) Study, is an RCT that includes two separate experiments (Dennis et al., 2004). The first experiment is a three-armed trial where CBT is a major component in all three groups and so cannot be included in this systematic review. The second experiment is a three-armed trial comparing Motivational Enhancement Treatment/Cognitive-Behavioural Therapy (MET/CBT5), The Adolescent Community Reinforcement Approach (ACRA), and

Multidimensional Family Therapy (MDFT). This second experiment is included in this review. All possible combinations of comparisons from this study were analysed. The trial investigators also published a study protocol describing all major issues linked to realizing the experiment (Dennis et al., 2002), and all five interventions are described in a separate paper (Diamond et al., 2002). In the following paragraphs, this (CYT) study is cited as Dennis et al. (2004). Figure 4.1 gives an overview of the publications linked to the CYT study.

Figure 4.1: The CYT study

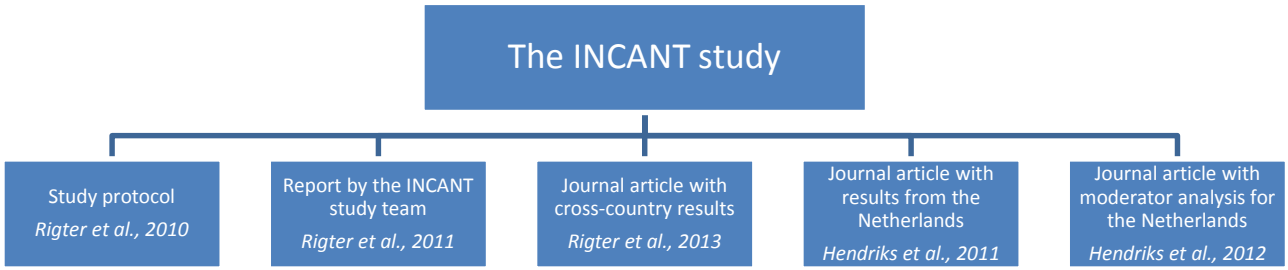


Godley et al., (2010)
This study is a four-armed RCT which compares Motivational Enhancement Therapy/Cognitive-Behavioural Treatment (MET/CBT7) and Chestnut Bloomington Outpatient (CBOP) as main interventions with and without Assertive Continuing Care (ACC) as an add-on. All possible combinations of comparisons from this study were analysed. The study authors registered the trial at ClinicalTrials.gov with the identifier number NCT01381133 and reported the results in a journal article by Godley et al. (2010). In the following paragraphs, this study is cited as Godley et al. (2010).

Hendriks et al. (2011)
This is a cross-country experiment, the International Cannabis Need of Treatment (INCANT), conducted in five European countries – Belgium, France, Germany, the Netherlands and Switzerland – that has been reported in a number of articles. The study compares Multidimensional Family Therapy (MDFT) and active treatment as usual (TAU) in a two-armed RCT. It is described in a protocol (Rigter et al., 2010) and reported upon in a report (Rigter et al., 2011) and a journal article (Rigter et al., 2013). The active treatment as usual component differs between countries, and it is only in Belgium and the Netherlands that CBT is identified as the dominant ingredient in the control condition (Rigter et al., 2011). Due to missing information and unobtainable background literature, we were unable to determine whether CBT was given to all participants in Belgium as a main ingredient or whether only a part of the comparison group was given CBT. Therefore we have not included the Belgium trial in this systematic review. However, the study from the Netherlands is included, because the TAU condition in this country consisted of full CBT (Rigter et al., 2013). This study is reported upon in a separate article by Hendriks, van der

Schee, & Blanken (2011) and is cited in the following paragraphs as Hendriks et al. (2011). The same authors have also published a moderator study linked to the trial in the Netherlands (Hendriks, van der Schee, & Blanken, 2012). Figure 4.2 gives an overview of the publications linked to the INCANT study.

Figure 4.2: The INCANT study



Kaminer et al. (1998a, 1999)
This is a two-armed RCT which compares Cognitive-Behavioural Therapy (CBT) and Interactional Therapy (IT). The study is reported in two articles: Kaminer, Burleson, Blitz, Sussman & Rounsaville (1998a) report on the pilot study with a 3-month follow-up period post-intervention, whereas Kaminer & Burleson (1999) report on a 15-month follow-up. The trial investigators also report on the treatment process in a separate article (Kaminer, Blitz, Burleson, Kadden, & Rounsaville, 1998b). In the following paragraphs, this study is cited as Kaminer et al. (1998a, 1999).

Kaminer et al. (2002)
This study compared Cognitive-Behavioural Therapy (CBT) and Psychoeducational Therapy (PET) in a two-armed RCT. The results of the trial are reported in Kaminer, Burleson, & Goldberger (2002) and this study is cited in the following paragraphs as Kaminer et al. (2002).

Latimer et al. (2003)
This is a two-armed RCT comparing Integrated Family and Cognitive-Behavioural Therapy (IFCBT) and Drugs Harm Psychoeducational curriculum (DHPE). This combined CBT intervention is included because the main component in the youth treatment is CBT. The results are reported in Latimer, Winters, D'Zurilla & Nichols (2003) and this study is cited in the following paragraphs as Latimer et al. (2003).

Waldron et al. (2001)
This is a four-armed RCT in which participants were allocated to Cognitive-Behavioural Therapy (CBT), Functional Family Therapy (FFT), joint intervention combining CBT and FFT, and a psychoeducational group intervention. The study is reported in an article by Waldron, Slesnick, Brody, Turner & Peterson (2001) and in a cost-effectiveness study by French et al. (2008). The cost-effectiveness study is included in this review as it provides results on outcomes different from those

reported in the main article. Only data from the CBT and FFT groups is included in this review because the joint intervention and the psychoeducational group intervention both used CBT as a main ingredient. In the following paragraphs, this study is referred to as Waldron et al. (2001).

4.2.2 Setting

Of the seven studies included, six were conducted in the US and one was conducted in the Netherlands (Hendriks et al., 2011).

Dennis et al. (2004) stated that one of the two sites set up clinical facilities, whereas the other site used multiple facilities. In Hendriks et al., 2011[12] the authors stated that MDFT sessions could take place at the office of the therapist, the family's home, or at any other location. For the TAU condition, it was mandatory that sessions were conducted in the treatment centre, such as the therapist's office, and not in the home or other community setting, as was possible with MDFT.

Most studies did not provide sufficient information to determine treatment setting (Godley et al., 2010; Kaminer et al., 1998a, 1999; Kaminer et al., 2002; Latimer et al., 2003; Waldron et al., 2001).

4.2.3 Design

All included studies were described by the trial investigators as RCTs. Five studies used the individual adolescent as the unit of allocation during the randomization procedure (Dennis et al., 2004; Godley et al., 2010; Hendriks et al., 2011; Kaminer et al., 1998a, 1999; Kaminer et al., 2002;), whereas two studies used the family as the unit of allocation (Latimer et al., 2003; Waldron et al., 2001).

4.2.4 Sample size

Table 4.1 shows the number of participants allocated in each included study as well as the valid sample sizes used in the meta-analysis.

The Kaminer study (Kaminer et al., 1998a, 1999) reported different sample sizes in their separate publications. We have used the sample size from the publication which included the relevant outcome; N=23 for medium term outcomes and N=12 for long term outcomes.

Table 4.1: Sample sizes for included studies

Study	Randomly allocated	Valid sample size used in data synthesis
Dennis et al., 2004	300	300 (MET/CBT5: 100, MDFT: 100, ACRA: 100)
Godley et al., 2010	320	320 (MET/CBT7: 79, MET/CBT7+ACC: 81, CBOP: 80, CBOP+ACC: 80)

[12] Reported in Rigter et al. (2011) and Rigter et al. (2013)

Hendriks et al., 2011	109	109 (CBT: 54, MDFT: 55)
Kaminer et al., 1998a & 1999	32	23 (CBT: 13, IT: 10)
Kaminer et al., 2002	88	88 (CBT: 51, PET: 37)
Latimer et al., 2003	43	42 (IFCBT: 21, DHPE: 21)
Waldron et al., 20011	61	61 (MET/CBT: 31, FFT: 30)
Total N	**953**	**853**

Note: [1]This number of randomly allocated participants is for CBT and FFT. The study is a four-armed RCT where only these two groups are included in this review. The full sample size for all four groups is 120 participants.

4.2.5 Participants

The majority of participants across all the studies were male. Dennis et al. (2004) had the lowest proportion of females across groups (15-21 percent). In contrast, Kaminer et al. (1998a, 1999) had the highest proportion of females across groups (-40 percent).

Three studies included youths between 12 and 18 years of age (Dennis et al., 2004; Godley et al., 2010; Latimer et al., 2003). However, in the study by Latimer et al. (2003) the final sample consisted of youths between 14 and 18 years of age, and in Dennis et al. (2004) and Godley et al. (2010) the final samples consisted of youths between 13 and 18 years of age. Three studies included youths between 13 and 18 years of age (Kaminer et al., 1998a, 1999; Kaminer et al., 2002; Hendriks et al., 2011). Waldron et al. (2001) included youths aged 13 to 17 years.

With respect to ethnicity, the majority of participants were white in five studies (Godley et al., 2010; Hendriks et al., 2011; Kaminer et al., 1998a, 1999; Kaminer et al., 2002; Latimer et al., 2003). In one study, nearly half of the participants were Hispanic and nearly one half African American (Waldron et al., 2001). In Dennis et al. (2004), around half of the participants were white and around half were African Americans.

Three studies reported the proportion of young people living in a single-parent household. In one of these studies, the proportion was well above 50 percent (Dennis et al., 2004). In Hendriks et al. (2011) it was 24-46 percent across groups, and in Waldron et al. (2001) it was 32-53 percent across groups. In two of the included studies, some of the youths were mandated to treatment. Hendriks et al., 2011[13] stated that 83-95 percent of the participants in the Netherlands were externally coerced. Waldron et al. (2001) did not state the proportion of participants mandated to treatment.

[13] Reported in Rigter et al. (2011, 2013)

Further information on the participants' characteristics (such as severity of drug use, inclusion criteria, and exclusion criteria) is given in section 10.1: Characteristics of included studies.

4.2.6 Experimental interventions

Three studies allocated participants to CBT without any further add-on treatment (Hendriks et al., 2011; Kaminer et al., 1998a, 1999; Kaminer et al., 2002). In one of these three studies, CBT was delivered individually (Hendriks et al., 2011), whereas CBT was delivered as group therapy in Kaminer et al. (1998a, 1999) and Kaminer et al. (2002).

Three studies delivered Motivational Enhancement Therapy (MET) as part of the treatment process (Dennis et al., 2004; Godley et al., 2010; Waldron et al., 2001). All three studies included two individual MET sessions at the beginning of the treatment process.

Two studies included the family during the treatment process. Latimer et al. (2003) included individual family sessions and peer group cognitive-behavioural sessions, which took place simultaneously. Godley et al. (2010) supplemented the MET/CBT sessions with two family sessions, one at the beginning of the treatment process and one at the end.

In the four-armed RCT reported by Godley et al. (2010), two of the arms included an additional add-on named Assertive Continuing Care (ACC), which is a home-based continuing care approach.

More information on experimental conditions is given in section 10.1: Characteristics of included studies.

4.2.7 Control conditions

All the included studies compared CBT with another intervention. One study included three control conditions, namely FFT, psychoeducational group intervention, and joint FFT and CBT (Waldron et al., 2001). However, as described in section 4.2.1, only one of these control conditions can be included in the review. Two studies included two control conditions, ACRA and MDFT (Dennis et al., 2004) and CBOP and CBOP+ACC (Godley et al., 2010). Four studies included only one control condition: MDFT (Hendriks et al., 2011); IT (Kaminer et al., 1998a, 1999), PET (Kaminer et al., 2002) and DHPE (Latimer et al., 2003).

4.2.8 Time points for measurements

Table 4.2 shows the measurement time points for each included study. The table shows both the study's own measure of time points and the calculated time points measured from the beginning of treatment.

Table 4.2: Time points for measurements

Study	Time points as described in study	Treatment duration	Calculated time points measured from beginning of treatment
Dennis et al., 2004	3 months 6 months 9 months 12 months	6-7 weeks (MET/CBT5), 12-14 weeks (MDFT and ACRA)	3 months 6 months 9 months 12 months
Godley et al., 2010	3 months 6 months 9 months 12 months	12 weeks (MET/CBT7), 12-14 weeks (ACC), NA (CBOP)	3 months 6 months 9 months 12 months
Hendriks et al., 2011	3 months 6 months 9 months 12 months	5-6 months[1] (CBT), 5-6 months (MDFT)	3 months 6 months 9 months 12 months
Kaminer et al., 1998a, 1999	3 months 15 months	12 weeks (CBT), 12 weeks (IT)	6 months 18 months
Kaminer et al., 2002	3 months 9 months	8 weeks (CBT), 8 weeks (PET)	5 months 11 months
Latimer et al., 2003	1 month 3 months 6 months	16 weeks (IFCBT), 16 weeks (DHPE)	5 months 7 months 10 months
Waldron et al., 2001	4 months 7 months	12 weeks (MET/CBT), 12 weeks (FFT)	4 months 7 months

Notes: [1]In the meta-regression we use the mean number of weeks (22 weeks). [2]As this duration is clearly included in our short term category we do not make any further assumptions regarding this duration. However, in the meta-regression we use the mean number of weeks (14 weeks). [3]As this duration interval overlaps both our short and medium term category we make the assumption that the duration is 5 months and use this assumption in the meta-regression.

Short term

As table 4.2 shows, six of the seven studies included measurements in the 'short term' follow-up category. Only the study by Kaminer et al. (1998a, 1999) did not include measurements in this category.

Medium term

All seven studies included measurements in the 'medium term' category. Four studies provided outcome measures for two time points which could be included in the medium term category (Dennis et al., 2004; Godley et al., 2010; Latimer et al., 2003; Hendriks et al., 2011). We chose to pool the outcomes as close to 6 months from beginning of treatment as possible.

Long term
Four of the seven studies included measurements in the 'long term' category (Hendriks et al., 2011; Kaminer et al., 1998a, 1999; Godley et al., 2010; Dennis et al., 2004).

4.2.9 Primary outcomes
Primary outcomes are listed in table 11.1 (see section 11). The table indicates whether the outcome measurements used in the respective studies were discrete or continuous, whether a high score was positive or negative (the direction of the measurements), and at what time-points the different outcome measurements were made.

Abstinence or reduction of drug use – biochemical test
Several of the included studies reported conducting urine screening tests. However, none of the included studies reported detailed outcome measurements in terms of means and standard deviations derived from biochemical tests.

Abstinence or reduction of drug use – self reported estimates
Except for the studies by Kaminer et al. (1998a, 1999) and Kaminer et al. (2002), all of the included studies used self-reported estimates on drug use frequency as a measure of abstinence or reduction of drug use.

Two of the included studies (Hendriks et al., 2011; Waldron et al., 2001) used the Time-Line Follow-Back (TLFB) to measure abstinence or reduction of drug use. The TLFB is a self-reported measure which obtains retrospective reports of cannabis use for the period prior to each assessment using a calendar and/or other memory prompts to stimulate recall. Similar self-reporting methods were used to estimate drug use frequency in the remaining studies. Godley et al. (2010) and Dennis et al. (2004) used The Global Appraisal of Individual Needs (GAIN), which measured the percentage or total number of days of abstinence out of e.g. the past 90 days or 12 months. Latimer et al. (2003) and Hendriks et al., 2011[14] used the Adolescent Diagnostic Interview (ADI), which measures the average number of days per month that marijuana was used during the specified post-treatment period.

The outcome measure "Recovery" was used in three of the included studies (Godley et al., 2010; Dennis et al., 2004, Hendriks et al., 2011[15]). Recovery was defined as "living in the community (vs. incarceration, inpatient treatment or other controlled environment) and reporting no past month substance use, abuse or dependence problems at the 12 month interview" (Dennis et al., 2004).

Abstinence or reduction of drug use – psychometric scales

[14] Reported in Rigter et al., 2013
[15] Reported in Rigter et al., 2011

Five of the included studies (Dennis et al., 2004; Godley et al., 2010; Kaminer et al., 1998a, 1999; Kaminer et al., 2002; Hendriks et al., 2011[16]) used psychometric scales to measure abstinence or reduction of drug use.

In Hendriks et al., 2011, the Personal Involvement with Chemicals Scale was used, which is a subscale from the Personal Experience Inventory (PEI). The Personal Involvement with Chemicals Scale is a 29-item measure that focuses on the psychological and behavioural depth of substance use and related consequences (Liddle et al., 2002).

Two of the included studies, Kaminer et al. (1998a, 1999) and Kaminer et al. (2002), used the T-ASI Chemical Scale from The Teen Addiction Severity Index, which measures the severity of adolescents' substance abuse problems. The T-ASI Chemical Scale was composed of the two subscales; alcohol and drugs[17].

In Dennis et al. (2004) and Godley et al. (2010), reduction of drug use was measured with the Substance Problems Scale (SPS), which is a subscale from The Global Appraisal of Individual Needs (GAIN), and based upon ratings of 16 symptoms related to drug use. In the study by Dennis et al. (2004), the Substance Frequency Scale (SFS) (also from GAIN) was used as an additional outcome measurement. This subscale is based upon the average percentage of days during a 90-day period that an adolescent reports on substance use.

4.2.10 Secondary outcomes

The different secondary outcomes are listed in table 11.2 (see section 11). The table indicates whether the outcome measurements used in the respective studies were discrete or continuous, whether a high score was positive or negative (the direction of the measurements), and at what time-points the different outcome measurements were made.

Social functioning and family functioning

Four of the included studies (Kaminer et al., 1998a, 1999; Kaminer et al., 2002; Latimer et al., 2003; Hendriks et al., 2011[18]) reported on outcome measures that were categorized as measures of social functioning and family functioning.

In the two included studies by Kaminer et al. (1998a, 1999) and Kaminer et al. (2002), social functioning and family functioning were measured by three different outcomes (Family Problems, Peer Problems and Psychological Problems), which were all measured by subscales from the Teen Addiction Severity Index (T-ASI).

[16] Reported in Rigter et al., 2011

[17] In the follow-up study by Kaminer (1999), drug use was measured by the combined T-ASI Chemical Scale and the separate subscales, drugs and alcohol.

[18] Reported in Rigter et al., 2011

Measures more specifically related to social functioning were included in Hendriks et al., 2011, who used “Internalizing disorders/symptoms” and “Internalized distress”. These measures were derived from the Youth-Self-Report (YSR) and included the following subscales: “Withdrawn”, “Somatic complaints” and “Anxiety/depression”.
Finally, the study by Latimer et al. (2003) included 14 different measurements of social functioning and family functioning. Two of these outcome measurements, “Rational beliefs” and “Irrational beliefs” were derived from The Rational Thinking Questionnaire, which assesses rational and irrational beliefs in relation to drug-related and general life issues. An additional five measurements, “Positive problem orientation”, “Negative problem orientation”, “Rational problem solving”, “Impulsive problem solving” and “Problem avoidance” were derived from The Social Problem Solving Inventory (SPSI). The remaining seven measurements, “Task accomplishment”, “Role performance”, “Communication”, “Affective expression”, “Involvement”, “Control” and “Values and norms” were derived from The Family Assessment Measure (FAM), which is a self-report tool administered to both children and parents.

Education or vocational involvement
Measurements of education or vocational involvement were used in three of the included studies (Kaminer et al., 1998a, 1999; Kaminer et al., 2002; Latimer et al., 2003). In the studies by Kaminer et al. (1998a, 1999) and Kaminer et al. (2002), education or vocational involvement was measured by the subscale “School problems”, which was derived from The Addiction Severity Index. Additional measurements of education were used in the study by Latimer et al. (2003), which included the outcomes “Motivation to learn” and “Learning strategies”. Both of these measurements were derived from The Motivated Strategies for Learning Questionnaire (MSLQ), which is used to assess an adolescent’s motivation to learn in school and his or her use of effective learning strategies.

Retention
According to the protocol, examples of measurements of “retention” to be considered in this review included number of days in treatment, completion rates and/or attrition rates. On the basis of this description, we identified six of the included studies (Dennis et al., 2004; Godley et al., 2010; Hendriks et al., 2011; Kaminer et al., 2002; Kaminer et al., 1998a, 1999, Latimer et al., 2003) that reported on outcomes related to retention.

In four of the above mentioned studies (Dennis et al., 2004; Hendriks et al., 2011; Kaminer et al., 2002; Kaminer et al., 1998a, 1999), retention was measured in terms of the number and/or percentage of young people who completed the treatment. However, the definition of 'treatment completers' varied from study to study. In Hendriks et al. (2011), adolescents were considered as treatment completers if they attended a treatment session in at least 75 percent of the planned number of

treatment weeks. In the studies by Kaminer et al. (1998a, 1999) and Kaminer et al. (2002), treatment completion was defined as having completed a valid Baseline and End-of-Treatment assessment and being present at the final therapy session (Kaminer et al., 1999: 115). In the study by Dennis et al. (2004), completion was defined as having completed 75 percent of the planned course of a given treatment (i.e. at least 200 minutes of therapy for MET/CBT5, at least 400 minutes of therapy for MET/CBT12, ACRA and MDFT, and at least 800 minutes for FSN).

Additional measurements of retention were reported in the Godley et al. (2010) Latimer et al. (2003) and Hendriks et al., 2011[19] respectively. Hendriks et al., 2011, used the outcome measure "At least 3 months in treatment", which measured the ability of interventions to retain adolescents in treatment for at least 3 months. In Godley et al. (2010), retention was measured in terms of both "Retention days" measured as the mean number of days in treatment and "Attended sessions" measured as the number of patients that attended more than 4 sessions, 1-3 sessions or no sessions (p. 46) respectively. Finally, Latimer et al. (2003) reported on retention in terms of "Retention-weeks" (i.e. the number of treatment weeks attended[20]) and "Retention- sessions" (i.e. the number of sessions attended during treatment).

Risk behaviour

Measures of risk behaviour such as crime rates were used in four of the included studies (Waldron et al., 2001[21]; Hendriks et al., 2011; Kaminer et al, 2002; Kaminer et al., 1998a, 1999).

In the study by Hendriks et al. (2011), risk behaviour was measured by the "Number of property and violent crimes committed", which was based on The Self-Report Delinquency Scale. An additional outcome measurement was "Externalizing disorder/symptoms"[22]. This measurement was derived from The National Youth Self Report's delinquent acts and aggressive behaviour subscales.

Measurements of risk behaviour were also included in the studies by Kaminer et al. (1998a, 1999) and Kaminer et al. (2002), who reported on the outcome variable "Legal problems". This measurement was based on The Teen Addiction Severity Index and measured the severity of the adolescent's legal problems (Kaminer et al., 1991).

Waldron et al., 2001, used the variables "Delinquency"/"Any delinquency", which were based on The Youth Self-Report delinquency subscales.

[19] Reported in Rigter et al. (2011)

[20] Youths attending the IFCBT condition were considered present for a given treatment week if at least two out of three sessions were attended during that week. For youths attending the control condition, the values for treatment duration in weeks and number of treatment sessions were identical because sessions met once weekly. (Latimer et al, 2003: 310).

[21] Reported in French et al., 2008

[22] Reported in Rigter et al., 2011

Other adverse effects
None of the included studies reported on any measures of other adverse effects, such as rates of suicide and overdose.

4.2.11 Excluded studies

Several studies which initially appeared to be eligible did not ultimately meet our inclusion criteria. Primary reasons for exclusion of these studies are listed below.

The study examined an intervention that is not CBT
Two studies were excluded due to the analysis of irrelevant interventions. A study by Goti et al. (2010) evaluated the relative effectiveness of a brief motivational enhancement intervention compared to treatment as usual which comprised diagnostic evaluation according to the presenting problem, and an initial therapeutic approach, either pharmacological *and/or* cognitive-behavioural therapy. Furthermore, the participants' age range was 12-17 years. A study by Azrin et al. (2001) compared Family Behaviour Therapy (FBT) and Individual Cognitive Problem-Solving (ICPS), which was described as a relatively "pure" cognitive version of problem-solving training where behavioural features were not utilized. Furthermore, the participants' age range was 12-17 years.

The study did not include participants aged 13 to 21 years
Six studies were excluded due to the inappropriate age groups considered in the studies. The study by Carroll et al. (1994) had no age limit on included participants and mean age was 28.8 years. The study by Carroll et al. (2006) included participants between 18 and 25 years of age, with a mean age around 21 years of age. Another study by Carroll et al. (2012) included participants aged 18 years and above, with a mean age ranging from 24.3 to 27.6 across groups. None of the studies by Carroll and colleagues reported results divided between age groups. The study by Hunter et al. (2012a) did not focus on young people, with the mean age being 37.4 years in the intervention group and 31.1 years in the control condition. Two trials reported in three papers (Liddle et al., 2004 and 2009; Liddle et al., 2008) included participants younger than 13 years of age and did not explicitly report results on the age range 13-21 years.

The study design did not allow the effect of CBT to be quantified
Three studies were excluded as they all included CBT in both the intervention and comparison intervention. A study by Ramchand, Griffin, Suttorp, Harris & Morral (2011) compared Motivational Enhancement Therapy/Cognitive-Behavioural Therapy 5 (MET/CBT5) and the Adolescent Treatment Model (ATM). The comparison interventions included in ATM were based on cognitive-behavioural theories and thus cannot be used to identify the effect of CBT. Another study, conducted by Hunter et al. (2012b), represented the same problem, in that it too

compared MET/CBT5 and ATM. The third study, by Godley, Jones, Funk, Ives & Passetti (2004), compared Chestnut Health System's outpatient treatment (CHS) and the interventions included in the CYT study, which included CBT. However, this study did not separate the interventions in the CYT study and therefore, did not identify any effect of CBT.

For a list of excluded studies, please see section 10.2: Characteristics of excluded studies.

4.2.12 Studies awaiting classification

No studies are awaiting classification

4.2.13 Unobtainable studies

Four potentially relevant studies were unobtainable: A reference by Bean, White, Gabbert & Lake (2005) was not identified in the journal article linked to this reference and it could not be identified anywhere else. In addition, three references were identified as possible relevant studies when we conducted a snowball search from previously published reviews. These three unpublished papers (Hops et al., 2007; Stanton, Rempala & Conway, 2007; Waldron et al., 2007) could not be located.

4.3 RISK OF BIAS IN INCLUDED STUDIES

None of the included studies were coded with a very high risk of bias (5 on the risk of bias scale) on any item, and the results from all studies were included in the data synthesis where possible. The ratings of each study in relation to the nine domains in the risk of bias tool are described below (see also risk of bias tables in section 11 and in Appendices, section 14.5). The risk of bias judgements are based on pre-specified questions and a 5-point scale with ratings of 1=low risk and 5=high risk (see Appendices, section 14.4).

In the ratings listed below, we report the risk of bias judgements for the primary outcomes of interest, abstinence or reduction of drug use. Further details on risk of bias, including judgements for secondary outcomes, are provided in section 11 and in Appendices, section 14.5.

4.3.1 Sequence generation

All seven included studies were described by trial investigators as randomised; however, the description of the randomisation procedure was insufficient for a judgement to be made in the studies by Kaminer et al. (1998a, 1999), Kaminer et al. (2002), and Latimer et al. (2003), and these studies were therefore judged as having

an unclear risk of bias for sequence generation. The remaining four studies (Dennis et al., 2004; Godley et al., 2010; Hendriks et al., 2011; Waldron et al., 2001) were all judged as having a low risk of bias for sequence generation, as the randomization procedure was adequate.

4.3.2 Allocation

Only three of the included studies (Dennis et al., 2004; Godley et al., 2010; Hendriks et al., 2011) reported on procedures for allocation concealment, and were judged as having a low risk of allocation concealment bias. The remaining five studies did not report on how allocation was handled, and were therefore judged as having an unclear risk of bias in this category.

4.3.3 Blinding of outcome assessors

Since blinding of participants and personnel was not possible in the trials examined in this review, we chose to make judgements of the risk of bias emerging from lack of blinding of outcome assessors only.

Abstinence or reduction of drug use
Three of the included studies (Dennis et al., 2004; Kaminer et al., 2002; Waldron et al., 2001) did not report on procedures of blinding outcome assessors and were therefore judged as having an unclear risk of bias. An additional two studies (Godley et al., 2010; Latimer et al., 2003) reported that follow-up data was collected by a separate group of staff that had no treatment delivery duties. However, this procedure was not judged to be sufficient blinding of the outcome assessors and the self-reported outcomes of drug use in these studies were therefore rated 3 on the 5-point risk of bias scale. Kaminer et al. (1998a, 1999) was rated 2 on the 5–point scale, as this study reported that data was collected by a research assistant who was not informed of the matching hypothesis being studied, but who was not blinded in regard to group allocation. In the study by Hendriks et al. (2011), outcome assessors were reported to be blinded and the study was therefore rated 1 on the 5-point risk of bias scale.

4.3.4 Incomplete outcome data

Abstinence or reduction of drug use
Three of the included studies (Godley et al., 2010; Latimer et al., 2003; Waldron et al., 2001) reported low or no missing data for their measurements of reduction of drug use and were therefore rated 1 for risk of bias caused by incomplete outcome data. Two studies (Dennis et al., 2004; Hendriks et al., 2011) were rated 2 on the risk of bias scale because these studies reported on low attrition, although some uncertainty existed as to whether these attrition rates applied to all measurements. One study (Kaminer et al, 1998a, 1999) was rated 3 for risk of attrition bias, since

the study reported high rates of missing data. The study by Kaminer et al. (2002) was rated 4 on the 5-point scale, as this study not only reported high rates of missing data but also omitted to address the method used to fill in the missing data.

4.3.5 Selective reporting

Abstinence or reduction of drug use
Six of the included studies (Dennis et al., 2004; Godley et al., 2010; Kaminer et al., 2002 Latimer et al., 2003; Hendriks et al., 2011; Waldron et al., 2001) were rated 1 for selective reporting, since all planned outcomes were reported. Kaminer et al. (1998a, 1999) was rated 2 for selective reporting bias, as the primary outcome in the follow-up study was reported differently from the outcome reported in the first study.

4.3.6 Other potential sources of bias

In Godley et al., 2010, some adolescents participated in other mental health treatment (e.g. counselling and/or medication management) and the study was rated 2. The remaining studies were all rated 1.

4.3.7 A priori protocol

Only three of the included studies (Dennis et al., 2004; Godley et al., 2010; Hendriks et al., 2011) stated whether an a priori protocol had been complied with. The remaining four studies (Kaminer et al., 1998a, 1999; Kaminer et al., 2002; Latimer et al., 2003; Waldron et al., 2001) either failed to report whether an a priori protocol had been produced or if they did, whether it had been followed, and the studies were therefore denoted as unclear on this topic.

4.3.8 A priori analysis

Only Dennis et al. (2004) and Hendriks et al. (2011) reported that an a priori analysis plan had been produced and followed. The additional five studies (Godley et al., 2010; Kaminer et al., 1998a, 1999; Kaminer et al., 2002; Latimer et al., 2003; Waldron et al., 2001) did not report whether an a priori analysis plan had been produced and followed, and these studies were therefore judged as having an unclear risk of bias on this topic.

4.4 EFFECTS OF THE INTERVENTIONS

In the protocol for this review the following comparisons were planned:

- *Absolute effects*, comparing CBT to no treatment and untreated waitlist controls.

- *Relative effects*, comparing CBT to other interventions and/or treatment as usual (TAU).

We were unable to examine absolute effects of CBT, since the only available comparisons were against other interventions.

Four studies evaluated CBT with an add-on component and three studies evaluated CBT without an add-on component. Those studies that evaluated CBT plus an add-on component were analysed separately from those without an add-on component.

In the following sections, a number of forest plots are shown. In each case, the results have been presented in a way that favours CBT (below 0 for SMD or below 1 for OR results). This has been chosen because the main primary outcome is drug use frequency, for which a reduction is favourable.

Outcomes were considered in the following intervals:

- Short term (beginning of treatment to less than 6 months after beginning of treatment).
- Medium term (6 months to less than 12 months after beginning of treatment).
- Long term (12 months or more after beginning of treatment).

4.4.1 Primary outcomes results

We identified two subgroups of primary outcomes, namely 'drug use' and 'recovery'.

Drug use

Drug use was measured by drug use scales and drug use frequency. Meta-analyses were performed based on the following study outcomes: cannabis use measured with TLFB from Hendriks et al. (2011), substance use problems measured with T-ASI from Kaminer et al. (1998a, 1999), substance abuse problems measured with T-ASI from Kaminer et al. (2002), percentage of days abstinent from alcohol and other drugs measured with GAIN from Godley et al. (2010), marijuana use measured with ADI-R from Latimer et al. (2003), substance use frequency measured with SFS from Dennis et al. (2004) and percentage of days marijuana was used measured with TLFB from Waldron et al. (2001).

As mentioned, the primary outcome in Godley et al. (2010) was measured as days abstinent from alcohol and other drugs. This outcome measure was reversed before entry into meta-analysis so that it represents days of use.

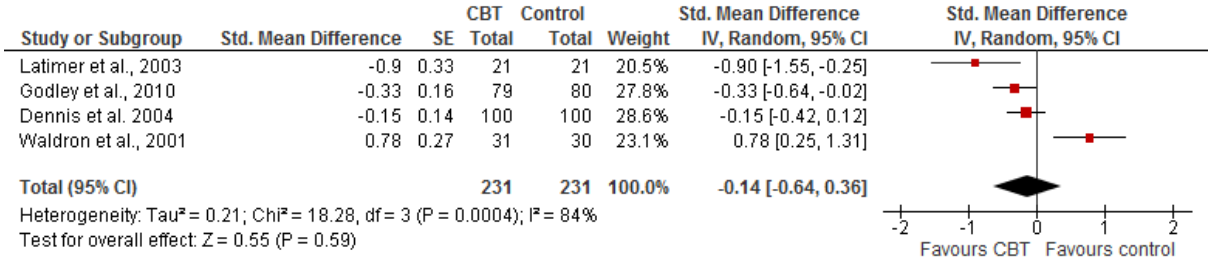
The study by Dennis et al. (2004) included two comparison interventions (MDFT and ACRA) and the study by Godley et al. (2010) included two experimental conditions (MET/CBT7 and MET/CBT7+ACC) and two comparison interventions

(CBOP and CBOP+ACC). We performed analyses for all usable combinations (eight in all), repeating the analysis for each time interval. However, the forest plot below shows the results for just one of these combinations, namely MDFT as the control condition in Dennis et al. (2004) and MET/CBT7 as the experimental condition, and CBOP as the control condition in Godley et al. (2010). In only one case (recovery in the long term) did these repeated analyses change the overall conclusion. For this outcome, all repeated analyses are reported in this section. Otherwise, the repeated analyses for all other outcomes can be found in section 12.1.

Short term

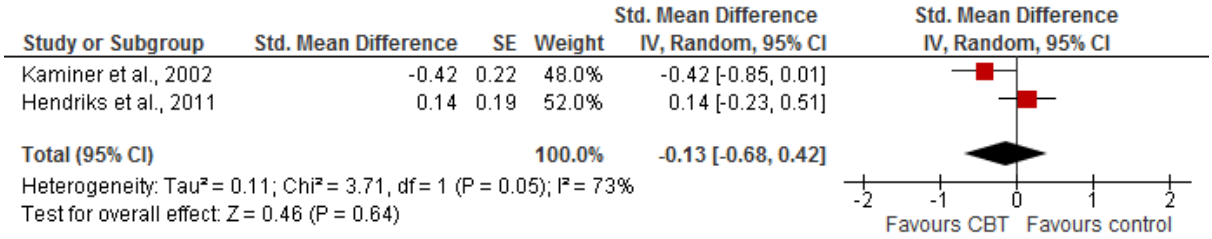
Four studies with CBT plus an add-on component and two studies without an add-on treatment provided data that enabled calculation of effect estimates on this outcome in the short term. Figures 4.3a and 4.3b show the forest plots. Pooled results did not reveal a statistically significant relative effect of CBT with an add-on component on drug use frequency in the short term. The pooled estimate SMD was -0.14 (95% CI -0.64, 0.36) with statistically significant heterogeneity between studies (p=0.0004 and I^2=84%). Nor was there a statistically significant relative effect of CBT without an add-on component on drug use frequency in the short term. The pooled estimate SMD was -0.13 (95% CI -0.68, 0.42) with statistically significant heterogeneity between studies (p=0.05 and I^2=73%).

Figure 4.3a: Drug use, short term, CBT with add-on, forest plot



Note: Dennis et al., 2004: MDFT used as comparison group. Godley et al., 2010: MET/CBT7 used as experimental condition and CBOP as comparison intervention. This analysis was also performed with the comparison intervention in Dennis et al., (2004) being ACRA, the experimental condition in Godley et al., (2010) being MET/CBT7+ACC and the comparison intervention in Godley et al. (2010) being CBOP+ACC. None of these seven additional analyses changed the overall conclusion (see table 12.1).

Figure 4.3b: Drug use, short term, CBT without add-on, forest plot

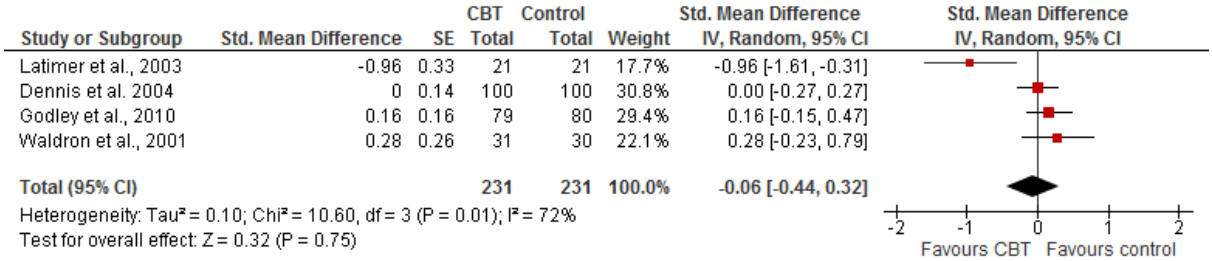


Medium term

Four studies with CBT plus an add-on component and three studies without an add-on provided data that enabled calculation of effect estimates in the medium term. Three studies with CBT plus an add-on component provided outcome measures for two time points which could be included in the medium term category (Dennis et al., 2004; Godley et al., 2010; Latimer et al., 2003). In the following analysis, we chose to pool the outcomes as close to 6 months from beginning of treatment as possible.

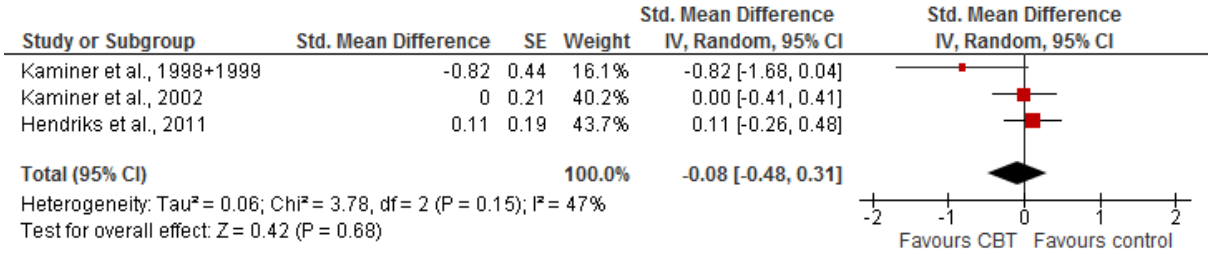
Figures 4.4a and 4.4b show the forest plots. Pooled results revealed a statistically significant relative effect of CBT with an add-on component on drug use frequency in the medium term. The pooled estimate SMD was -0.06 (95% CI -0.44, 0.32) with statistically significant heterogeneity between studies (p=0.01 and I^2=75%). For CBT without an add-on component there was no statistically significant relative effect of CBT on drug use frequency in the medium term. The pooled estimate SMD was -0.08 (95% CI -0.48, 0.31). The estimated between studies variance component, τ^2, was 0.06, but there is no statistically significant heterogeneity between studies (p=0.15 and I^2=47%).

Figure 4.4a: Drug use, medium term, CBT with add-on, forest plot



Note: Dennis et al., 2004: MDFT used as comparison group. Godley et al., 2010: MET/CBT7 used as experimental condition and CBOP as comparison intervention. This analysis was also performed with the comparison intervention in Dennis et al., (2004) being ACRA, the experimental condition in Godley et al., (2010) being MET/CBT7+ACC and the comparison intervention in Godley et al. (2010) being CBOP+ACC. None of these seven additional analyses changed the overall conclusion (see table 12.1).

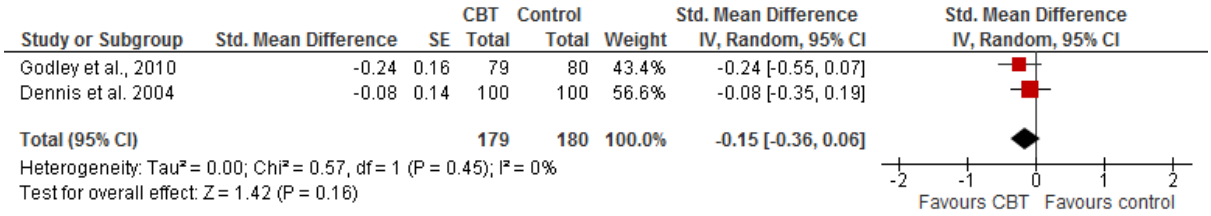
Figure 4.4b: Drug use, medium term, CBT without add-on, forest plot



Long term

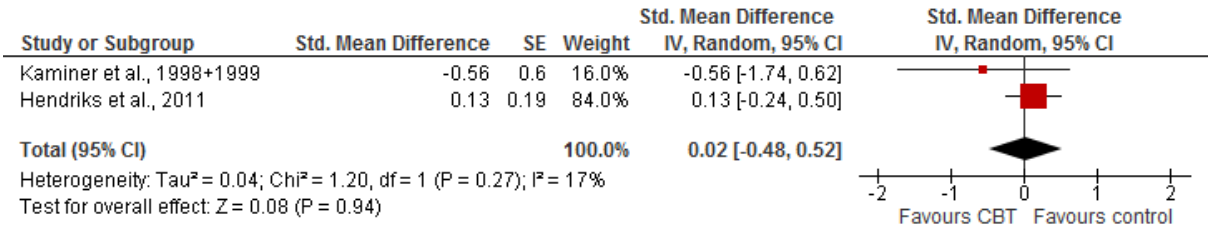
Two studies with CBT plus an add-on component and two studies without an add-on treatment provided data that enabled calculation of effect estimates in the long term. Figures 4.5a and 4.5b show the forest plots. Neither of the analyses revealed a statistically significant relative effect of CBT with or without an add-on component on drug use frequency in the long term. The weighted SMD for the analysis with an add-on was -0.15 (95% CI -0.36, 0.06) with no heterogeneity between studies (p=0.45 and I^2=0%). The weighted SMD for the analysis without an add-on component was 0.02 (95% CI -0.48, 0.52). Although the between studies variance component, τ^2, was 0.04, there was no statistically significant heterogeneity between studies (p=0.27 and I^2=17%).

Figure 4.5a: Drug use, long term, CBT with add-on, forest plot



Note: Dennis et al., 2004: MDFT used as comparison group. Godley et al., 2010: MET/CBT7 used as experimental condition and CBOP as comparison intervention. This analysis was also performed with the comparison intervention in Dennis et al., (2004) being ACRA, the experimental condition in Godley et al., (2010) being MET/CBT7+ACC and the comparison intervention in Godley et al. (2010) being CBOP+ACC. None of these seven additional analyses changed the overall conclusion (see table 12.1).

Figure 4.5b: Drug use, long term, CBT without add-on, forest plot



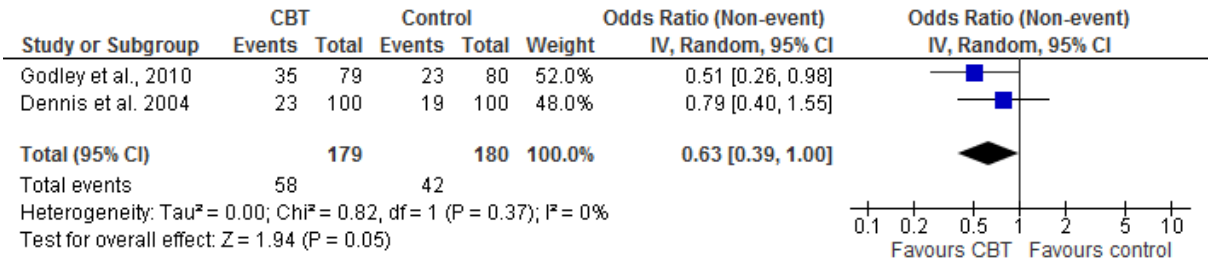
Recovery

Three studies provided data that enabled calculation of effect estimates on recovery status. Hendriks et al. (2011), Godley et al. (2010), and Dennis et al. (2004) reported

on recovery status 12 months from the beginning of treatment. Two of the studies analysed CBT with an add-on component and one study analysed CBT without an add-on.

Pooled results show a statistically significant relative effect of CBT with an add-on component on recovery status in the long term (OR = 0.63 (95% CI 0.39, 1.00) with no statistically significant heterogeneity between studies (p=0.37 and I^2=0%; see Figure 4.6a). This result should be interpreted with considerable caution as the repeated analyses for all other combinations (the comparison intervention in Dennis et al., (2004) being ACRA, the experimental condition in Godley et al., (2010) being MET/CBT7+ACC and the comparison intervention in Godley et al. (2010) being CBOP+ACC.) show different results (see table 4.3). One of the repeated analyses showed a statistically significant result favouring the control group (Dennis et al., 2004: ACRA; Godley et al. 2010: MET/CBT7+ACC, CBOP+ACC); whereas the remaining six analyses did not show any statistically significant result.

Figure 4.6a: Recovery, long term, CBT with add-on, forest plot



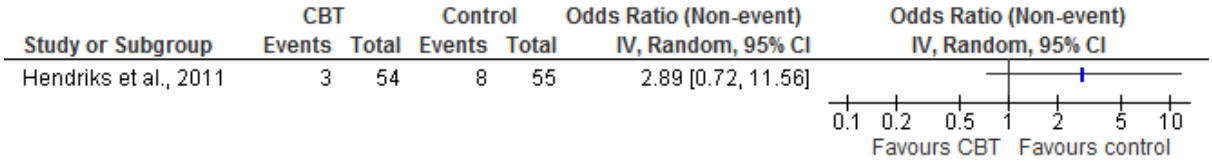
Note: Dennis et al., 2004: MDFT used as comparison group. Godley et al., 2010: MET/CBT7 used as experimental condition and CBOP as comparison intervention.

Table 4.3: Repeated analyses, Recovery, long term, CBT with add-on

Comparison combination	*Recovery, OR [95% CI] Long term*
Dennis et al., 2004: ACRA Godley et al. 2010: MET/CBT7, CBOP	0.94 [0.28, 3.12]
Dennis et al., 2004: MDFT Godley et al. 2010: MET/CBT7, CBOP+ACC	0.77 [0.48, 1.22]
Dennis et al., 2004: ACRA Godley et al. 2010: MET/CBT7, CBOP+ACC	1.14 [0.51, 2.57]
Dennis et al., 2004: MDFT Godley et al. 2010: MET/CBT7+ACC, CBOP+ACC	1.07 [0.59, 1.91]
Dennis et al., 2004: ACRA Godley et al. 2010: MET/CBT7+ACC, CBOP+ACC	1.58 [1.00, 2.48]
Dennis et al., 2004: MDFT Godley et al. 2010: MET/CBT7+ACC, CBOP	0.87 [0.54, 1.41]
Dennis et al., 2004: ACRA Godley et al. 2010: MET/CBT7+ACC, CBOP	1.31 [0.74, 2.32]

The effect estimate for the study analysing CBT without an add-on component is not statistically significant (OR = 2.89 [95% CI 0.72, 11.56]; see figure 4.6b).

Figure 4.6b: Recovery, long term, CBT without add-on, forest plot



Summary of primary outcome results

The primary outcome of drug use was analysed separately in the short term, medium term and long term. The analyses were divided between studies analysing CBT with and without an add-on component. The meta-analyses showed no statistically significant relative effect of CBT with an add-on component for drug use frequency compared to a group of different treatment interventions for youth drug use (see section 10.2).

Statistically significant heterogeneity was present in the short term. In the medium term statistically significant heterogeneity was present between studies analysing CBT with an add-on. In the analysis of studies without an add-on there was no statistically significant heterogeneity in the medium term. Due to the low power of detecting heterogeneity with only two studies included in the analysis this result should be interpreted with caution. The estimated between studies variance

component, τ^2, was 0.06. There was no heterogeneity between studies in the long term although the estimated between studies variance component, τ^2, was 0.04 in the analysis of CBT without an add-on. With only two studies included in the analysis the power to detect heterogeneity was low.

The primary outcome of recovery could only be analysed in the long term.
The meta-analysis of CBT with an add-on component is inconclusive, as the eight different comparison combinations analysed show different results. Only one study analysing CBT without an add-on component provided data on recovery status, and here, the reported effect was not statistically significant.

4.4.2 Secondary outcomes

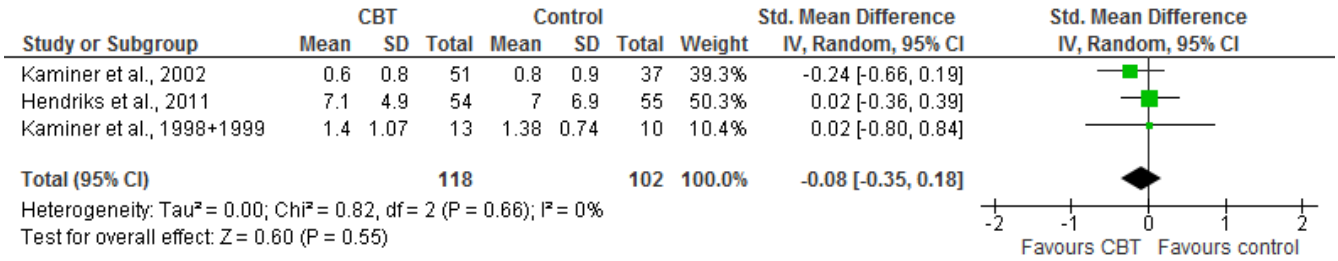
The protocol for this systematic review arranged the secondary outcomes into five groups. All studies that reported on secondary outcomes corresponded to at least one of these five groups.

Social functioning and family functioning
For this group of secondary outcomes, it was possible to identify two meaningful areas of analysis based upon the included studies, namely psychological problems and family problems.

With respect to psychological problems, three studies analysing CBT without an add-on component provided data that enabled calculation of effect estimates on this outcome. Hendriks et al. (2011) reported on internalizing disorder/symptoms and Kaminer et al. (2002) and Kaminer et al. (1998a, 1999) both reported on psychological problems. Three studies reported outcomes measured at the medium term and two studies at the long term follow-up.

Pooled results did not reveal a statistically significant relative effect of CBT without an add-on component on psychological problems in the medium term. The pooled estimate SMD was -0.08 (95% CI -0.35, 0.18) with no heterogeneity between studies (p=0.66 and I^2=0%).

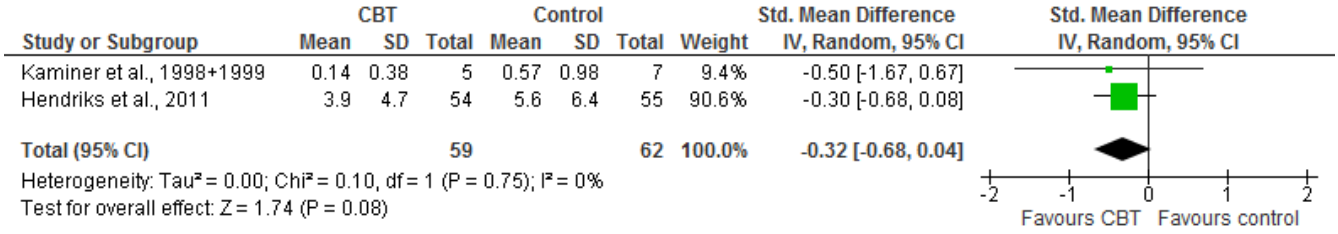
Figure 4.7: Psychological problems, medium term, CBT without an add-on, forest plot



Pooled results did not reveal a statistically significant relative effect of CBT without an add-on component on psychological problems in the long term. The pooled

estimate SMD was -0.32 (95% CI -0.68, 0.04) with no heterogeneity between studies (p=0.75 and I^2=0%).

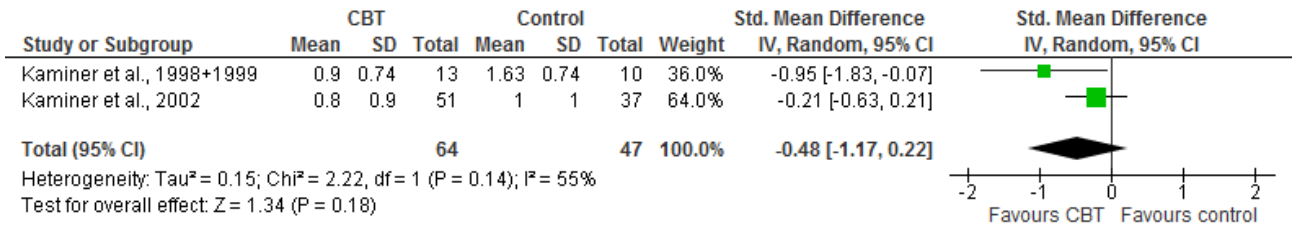
Figure 4.8: Psychological problems, long term, CBT without an add-on, forest plot



With respect to family problems, two studies analysing CBT without an add-on component provided data that enabled calculation of effect estimates on this outcome. Kaminer et al. (2002) and Kaminer et al. (1998a, 1999) both reported numeric outcome on family problems. The outcomes for family problems were not pooled to reflect the short, medium or long term categories. In order to exploit the available data, the outcomes were pooled as close to 6 months from the beginning of treatment as possible. This also made them more comparable with respect to time point measurement. In Kaminer et al. (1998a, 1999) the outcome was measured 5 months from the beginning of treatment and in Kaminer et al. (2002) the outcome was measured 6 months from the beginning of treatment.

Pooled results did not reveal a statistically significant relative effect of CBT without an add-on component on family problems. The pooled estimate SMD was -0.48 (95% CI -1.17, 0.22) with no statistically significant heterogeneity between studies (p=0. 14 and I^2=55%). Note that this result concerning heterogeneity should be interpreted with caution, due to the low power of detecting statistically significant heterogeneity with only two studies. The estimated between-study variance component, τ^2, was 0.15.

Figure 4.9: Family problems, CBT without an add-on, forest plot



Education or vocational involvement

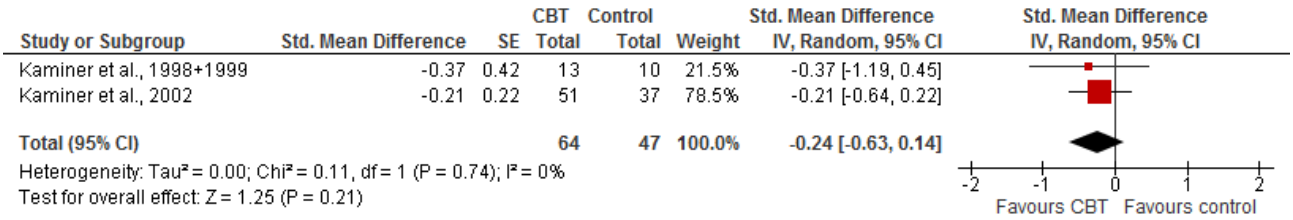
For this group of secondary outcomes, it was possible to identify one meaningful area of analysis based upon the included studies, namely school problems. Two studies analysing CBT without an add-on component included outcome measures in

this area. Kaminer et al. (2002) and Kaminer et al. (1998a, 1999) both included school problems measured using the T-ASI scale.

The outcomes for school problems were not pooled to reflect the short, medium or long term categories. Instead, the outcomes were pooled as close to 6 months from the beginning of treatment as possible so as to make them comparable. In Kaminer et al. (1998a, 1999), the outcome was measured 5 months from the beginning of treatment, while in Kaminer et al. (2002) the outcome was measured 6 months from the beginning of treatment.

Pooled results did not reveal a statistically significant relative effect of CBT on school problems. The pooled estimate SMD was -0.24 (95% CI -0.63, 0.14) with no heterogeneity between studies (p=0.74 and I^2=0%).

Figure 4.10: School problems, CBT without an add-on, forest plot



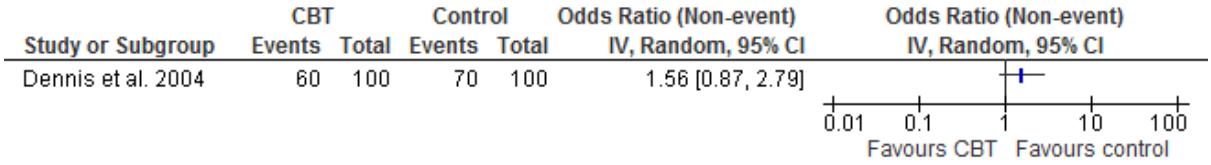
Retention

Four studies reported data that enabled calculation of effect estimates on treatment retention. One of the studies analysed CBT with an add-on component (Dennis et al. (2004) and three studies analysed CBT without an add-on component (Hendriks et al. (2011); Kaminer et al. (2002) and Kaminer et al. (1998a, 1999). All four studies reported numeric outcomes for treatment completers. Despite the fact that these studies used different ways to define when an individual had completed treatment, in the following analysis we used the outcome as denoted by the investigators to refer to completion of treatment.

The effect estimate for the study analysing CBT with an add-on component was not statistically significant (OR = 1.56; 95% CI 0.87, 2.79).

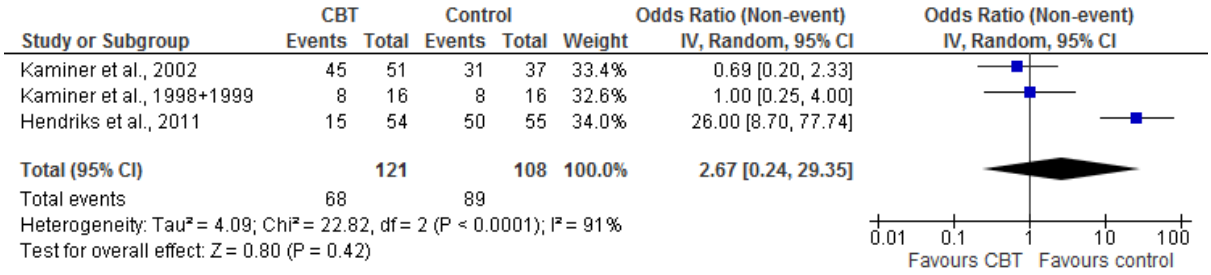
For CBT without an add-on component, the weighted OR was not statistically significant (OR = 2.67; 95% CI 0.24, 29.35) with statistically significant heterogeneity between studies (p<0.00001 and I^2=91%). Note that the result reported in Hendriks et al. (2011) differed considerably from the results reported in the two other studies and has a very wide confidence interval. When Hendriks et al. (2011) is excluded, no heterogeneity is detected (p=0.69 and I^2=0%) and this result does not support any change in the overall conclusion; the weighted OR is not statistically significant (OR = 0.81; 95% CI 0.32, 2.03).

Figure 4.11a: Retention, CBT with an add-on, forest plot



Note: Dennis et al., 2004: MDFT used as comparison group. With the control condition in Dennis et al., (2004) being ACRA , this did not support any change in the overall conclusion.

Figure 4.11b: Retention, CBT without an add-on, forest plot



Risk behaviour

Four studies included an outcome that could be categorized as risk behaviour. One of the studies analysed CBT with an add-on component (Waldron et al. (2001) and three studies analysed CBT without an add-on component (Hendriks et al., 2011; Kaminer et al., 2002; Kaminer et al., 1998a, 1999). Waldron et al. (2001) included delinquency, Hendriks et al. (2011) included the number of property and violent crimes committed and Kaminer et al. (2002) as well as Kaminer et al. (1998, 1999) reported on legal problems.

Three of these studies reported outcomes in the short term interval, all four in the medium term interval, and two in the long term interval.

The study analysing CBT with an add-on component reported a statistically significant SMD in the short term favouring the control group (SMD = 0.55; 95% CI 0.04, 1.06).

For CBT without an add-on, the weighted SMD was not statistically significant in the short term. The pooled estimate SMD is 0.11 (95% CI -0.17, 0.39) with no statistically significant heterogeneity between studies (p=0.95 and I^2=0%).

Figure 4.12a: Crime, short term, CBT with an add-on, forest plot

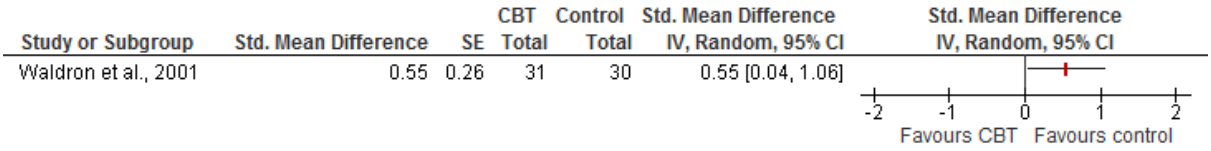
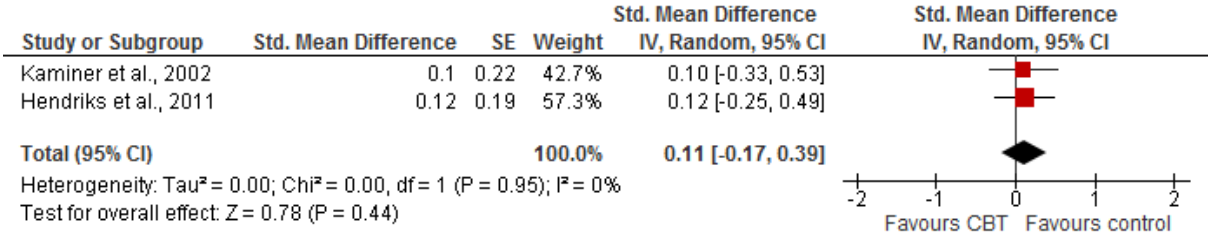


Figure 4.12b: Crime, short term, CBT without an add-on, forest plot



The effect estimate for the study analysing CBT with an add-on component was not statistically significant in the medium term (SMD=0.28; 95% CI -0.23, 0.79).

Nor was the weighted SMD for CBT without an add-on component statistically significant. The pooled estimate SMD was -0.02 (95% CI -0.28, 0.25) with no statistically significant heterogeneity between studies (p=0.56 and I^2=0%).

Figure 4.13a: Crime, medium term, CBT with an add-on, forest plot

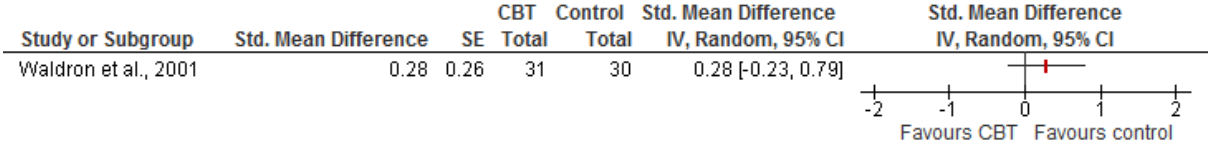
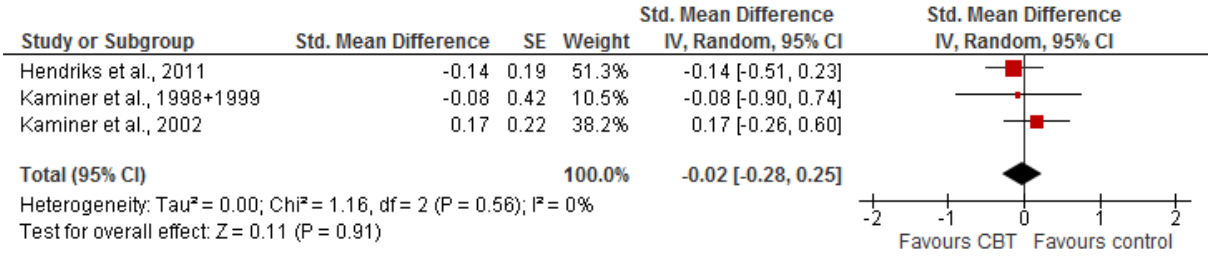
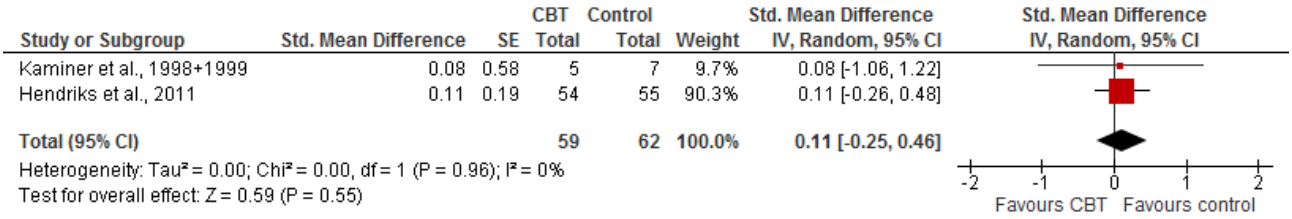


Figure 4.13b: Crime, medium term, CBT without an add-on, forest plot



Pooled results did not reveal a statistically significant relative effect of CBT without an add-on component on risk behaviour in term of crime in the long term. The pooled estimate SMD was 0.11 (95% CI -0. 25, 0.46) with no heterogeneity between studies (p=0.96 and I^2=0%).

Figure 4.14: Crime, long term, CBT without an add-on, forest plot



Other adverse effects

No study reported adverse effects.

Summary of secondary outcome results

The secondary outcomes, psychological problems and crime, were analysed separately in the short term, medium term and long term. The secondary outcomes of family problems and school problems could not be divided to reflect the short, medium or long term categories. In order to exploit the available data, those outcomes reported as closest to 6 months from the beginning of treatment were used. Retention was measured as completion of treatment as denoted by the investigators of the primary studies.

All analyses were divided between studies analysing CBT with and without an add-on component. In conclusion, none of the meta-analyses showed a statistically significant relative effect of CBT either with an add-on or without an add-on component for any of the secondary outcomes compared to a group of different treatment interventions for youth drug use (see section 10.2). There was one exception, however; the one study that reported crime outcomes for the relative effect of CBT with an add-on component compared to Functional Family Therapy (FFT) reported a statistically significant outcome in the short term, favouring FFT.

4.4.3 Sensitivity analysis

The sensitivity analyses were only performed for the short and medium term follow-up as too few studies provided data for the long term. We examined the robustness of our conclusions by removing from the analyses studies with certain characteristics as displayed in table 4.4. The results of these sensitivity analyses did not support any change in the overall conclusions. Forest plots can be found in section 12.3.

Table 4.4: Sensitivity analyses

SMD [CI 95%] (Number of studies included)	**Short term With add-on**	**Medium term With add-on**	**Medium term Without add-on**
All studies	-0.14 [-0.64, 0.36] (4)	-0.06 [-0.44, 0.32] (4)	-0.08 [-0.48, 0.31] (3)

Characteristics of studies removed from the analysis			
Did not present results from a true intention-to-treat analysis[1]	*	*	0.11[-0.26, 0.48] (1)
Blinding: score 3 or 4[1]	0.29 [-0.62, 1.20] (2)	0.06 [-0.18, 0.30] (2)	*
Did not report on treatment fidelity	0.78[0.25, 1.31] (1)	0.28[-0.23, 0.79] (1)	-0.82[-1.68, 0.04] (1)
Incomplete outcome data: score 3 or 4[1]	*	*	0.11[-0.26, 0.48] (1)
Risk of developer bias present[1]	-0.14 [-0.99, 0.71] (3)	-0.13 [-0.76, 0.51] (3)	*

Note 1: * No studies removed

4.4.4 Publication bias

For the analyses of CBT with an add-on component, we assessed the possibility of publication bias for the short term and medium term follow-up time intervals. As only two studies provided data for the long term interval, we did not assess publication bias for the long term. For the analyses of CBT without an add-on component, we assessed the possibility of publication bias for the medium term interval. Because only two studies analysed CBT without an add-on component in the short term and the long term, we did not assess publication bias for those intervals.

As stated in the protocol (Kowalski et al., 2012), we assessed the possibility of publication bias visually by examining funnel plots. The three funnel plots are displayed in section 12.4.
The figures reveal approximately symmetrical, inverted funnels giving no indication of bias. We cannot, however, draw any firm conclusions on publication bias based on such a small number of included studies.

5 Discussion

5.1 SUMMARY OF THE MAIN RESULTS

Our main objective was to evaluate the current evidence on the effect of CBT on abstinence and drug use reduction for young people in outpatient treatment for non-opioid drug use.

Seven randomised trials involving 953 participants were included in this review. All included studies compared CBT, either with or without an add-on component, to an active intervention. In summary, we found the following:

Abstinence or reduction of drug use
Meta-analysis of data from the four included studies analysing CBT with an add-on component did not show a statistically significant relative effect of CBT for the reduction of youth drug use frequency either in the short term, medium term or long term. Nor did meta-analysis of data from the three included studies analysing CBT without an add-on component show a statistically significant relative effect of CBT for the reduction of youth drug use frequency, either in the short term, medium term or long term.

The primary outcome measured as recovery could only be analysed in the long term. The meta-analysis of CBT with an add-on component was inconclusive, as the eight different comparison combinations analysed showed different results. Only one study analysing CBT without an add-on component provided data on recovery status. The reported effect was not statistically significant.

Thus, the available data did not support the hypothesis that there is a relative reduction in drug use from using CBT (with or without an add-on component) with young drug users compared to other types of treatment (ACRA, CBOP (+ACC), DHPE, FFT, IT, MDFT and PET).

Social functioning and family functioning
Meta-analysis of included studies did not show a statistically significant relative effect for CBT without an add-on component on psychological problems in the medium and long term compared to other interventions (IT, MDFT and PET). Furthermore, a meta-analysis including two studies similarly failed to reveal a statistically significant relative effect for CBT without an add-on component on

family problems approximately six months from the beginning of treatment compared to other interventions (IT, MDFT and PET).

Education or vocational involvement
Meta-analysis of two included studies did not show a statistically significant relative effect for CBT without an add-on on component on school problems approximately six months from the beginning of treatment compared to other interventions (IT and PET).

Retention
One study analysing CBT with an add-on component and all three studies analysing CBT without an add-on component reported on treatment retention. The effect estimate for the study analysing CBT with an add-on component was not statistically significant. The meta-analysis of the three studies analysing CBT without an add-on component did not show any statistically significant relative effect of CBT compared to other interventions (IT, MDFT and PET).

Risk behaviour
One study analysing CBT with an add-on component and all three studies analysing CBT without an add-on component reported an outcome which could be categorized as risk behaviour, namely problems related to crime. The effect estimate for the study analysing CBT with an add-on component was not statistically significant (and provided reports for the short term and medium term only). The meta-analysis of the three studies analysing CBT without an add-on component did not show any statistically significant relative effect of CBT on treatment retention compared to other interventions (IT, MDFT and PET).

No studies reported on other adverse effects, such as suicide or overdoses. Sensitivity analyses were only performed for the short and medium term, as too few studies provided data for the long term follow-up period. Sensitivity analyses were performed with respect to analysis method, risk of bias and intervention characteristics. Results of these sensitivity analyses did not support any change in the overall conclusions.

5.2 OVERALL COMPLETENESS AND APPLICABILITY OF EVIDENCE

Several findings across studies are worth mentioning.

A number of studies used urine testing to determine drug use; however, several studies used the urine samples to confirm the quality of self-reported measures and did not explicitly report results from these urine tests. Had such results been

reported, we might have been able to use this outcome in a pooled analysis along with the self-reported measures.

The majority of the included studies used a self-reported outcome assessment to measure the primary outcomes of abstinence and frequency of drug use. In particular, the Time-Line Follow-Back (TLFB) method was widely used across the studies. For the secondary outcomes (such as family life, education and mental health) a wider variety of assessment instruments were used across studies, which meant that we were unable to utilise all the available secondary outcomes in a meta-analysis.

All but one of the studies reported a follow-up measurement approximately one year from the beginning of treatment. This had the advantage of making it possible to document any longer-term effects.

The number of included studies in this systematic review is small; only seven studies met the inclusion criteria. With one exception, all studies originated from the USA. This may limit the applicability of the evidence to a specific social and cultural setting, which in turn may be difficult to translate to other settings. This indicates a need for more well-conducted studies of CBT interventions in countries other than the USA.

5.3 QUALITY OF THE EVIDENCE

All seven included studies were randomised controlled trials. The included studies varied in terms of the risk of bias judgements; no single study can be characterised as a robust RCT with low risk of bias on all assessed risk of bias items.

Four of the included studies provided insufficient information on core issues (such as the method of sequence generation and of allocation concealment) to allow us to assess fully the risk of bias and two of these studies had a significant level of missing data. These methodological weaknesses led us to question the validity of these studies.

Meta-analyses were carried out separately for CBT with an add-on component (such as, for example, motivational interviewing) and CBT without an add-on component, which resulted in there being few studies (four and three, respectively) included in a single analysis. There was no overall consistency in the direction of treatment effect regarding the primary outcome (drug use). Very few studies reported on the secondary outcomes, and there was no overall consistency between studies in the direction of treatment effect regarding secondary outcomes..

5.4 POTENTIAL BIASES IN THE REVIEW PROCESS

The composition of the review team changed during the process of undertaking this review. This change of composition should not cause any bias in the review process because each procedure is documented and stored electronically, and considerable care was taken to ensure the review team members were consistent throughout in their approach.

5.5 AGREEMENTS AND DISAGREEMENTS WITH OTHER REVIEWS

Several reviews have reported on CBT and other outpatient treatment interventions for adolescent substance abuse (Becker & Curry, 2008; Tanner-Smith et al., 2013; Vaughn & Howard, 2004; Waldron & Kaminer, 2004; Waldron & Turner, 2008). Common to all these reviews is the finding that CBT is a promising intervention for reducing adolescent substance use. However, it has been shown that CBT is not necessarily better than other interventions where programs focusing on family therapy in particular perform well (Tanner-Smith et al., 2013; Vaughn & Howard, 2004; Waldron & Kaminer, 2004).

Several of these reviews focus on the quality of the studies in the field of adolescent substance use treatment. In that respect, the CBT studies do perform very well compared to studies investigating other treatment interventions (Becker & Curry, 2008; Vaughn & Howard, 2004). A number of these reviews also make the point that it is necessary to investigate the heterogeneity in treatment effects in order to understand who benefits most from CBT (Vaughn & Howard, 2004; Waldron & Kaminer, 2004; Waldron & Turner, 2008).

The results presented in this systematic review are in line with these earlier reviews in that we did not find any statistically significant effect of CBT compared to other interventions. Moreover, we identified several well-conducted and well-reported RCTs which could contribute to the analysis. However, we did not identify sufficient studies to allow moderator analysis to be performed.

6 Authors' Conclusion

6.1 IMPLICATIONS FOR PRACTICE

Based on the small number of included studies, we are unable to conclude whether CBT interventions perform better or worse than the following alternative interventions: Adolescent Community Reinforcement Approach (ACRA), Chestnut Bloomington Outpatient (CBOP) (+Assertive Continuing Care (ACC)), Drugs Harm Psychoeducational curriculum (DHPE), Functional Family Therapy (FFT), Interactional Therapy (IT), Multidimensional Family Therapy (MDFT) and Psychoeducational Therapy (PET)) with respect to young people's drug use reduction.

This systematic review is based on seven included studies. Data was examined in two separate analyses, depending on whether the intervention was CBT with an add-on component such as motivational interviewing (four studies) or CBT without an add-on component (three studies). The seven studies varied in terms of their findings regarding the effects of CBT interventions compared to other interventions (ACRA, CBOP (+ACC), DHPE, FFT, IT, MDFT and PET) on young people's drug use. Our graphical examination in the forest plots shows that the studies' individual effect estimates are distributed almost equally between effect sizes favouring CBT interventions and effect sizes favouring the comparison interventions. The overall conclusion regarding the effect of CBT interventions on drug use reduction for young people aged 13 to 21 years should therefore be interpreted with caution.

In addition to knowledge of overall positive effects of interventions, practitioners also need to know about any potential differential effects on treatment of highly relevant participant characteristics such as age, gender, minority background, family composition and co-occurring conditions. These characteristics are potential predictors of treatment outcome, and practitioners need to be able to assess and tailor the program to particular types of young drug users. Unfortunately, it is not possible to identify which particular subgroups of youth may be more likely to respond to specific interventions, and subsequently how treatments could be adapted or tailored to the individual needs of a young person until the results of additional CBT outcome studies are available.

6.2 IMPLICATIONS FOR RESEARCH

There is a need for more well-designed, randomised controlled trials of CBT interventions for adolescent substance use treatment. To improve generalisability, the populations studied should not be confined to Northern America. The results of such trials should be reported clearly in accordance with the principles of the CONSORT 2010 statement (Moher et al., 2010). All outcomes should be reported including, for example, the results of any urine testing. There is also a need for studies investigating heterogeneity in treatment effects so as to determine which adolescents are likely to benefit most from this intervention.

7 Deviations from the protocol

In the protocol guiding this systematic review it was stated, that the review "...will include outpatient CBT interventions described by the authors as CBT or judged by the review authors to represent CBT," (Kowalski et al., 2012). To judge whether or not an intervention is CBT can be very subjective and therefore the review authors, in agreement with the Social Welfare Group, changed the inclusion criteria to "...will include outpatient CBT interventions, described by the trial investigators as CBT".

In conducting the review, we became aware that the measure of time points as calculated from end of treatment would cause unequal comparisons[23]. We decided to change the measure of time points as calculated from the beginning of treatment[24]. Furthermore, the grouping of time intervals as described in the protocol would result in very few studies included in the long term interval. Therefore, the intervals used are the following:

- Short term (beginning of treatment to less than 6 months after the beginning of treatment).
- Medium term (6 to less than 12 months after the beginning of treatment).
- Long term (12 months or more after the beginning of treatment).

[23]For example, in Dennis et al. (2004) the duration of the CBT intervention and the control condition was not the same. This would imply that "end of treatment" was measured unequally between groups.
[24]From studies which measure the time points from end of treatment we used the duration of the treatment to measure the "beginning of treatment" time point. In studies which measure the time points from baseline, we assume that this baseline is close to the beginning of treatment. Based on this assumption, we can use the baseline as an indicator for beginning of treatment.

8 Acknowledgements

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Thanks to Head of SFI Campbell, Ph.D. Mette Deding, for continued support and efforts to realize this review. We would like to thank Ditte Andersen and Pernille Skovbo Rasmussen, who appear on the author line of the Title Registration and the Protocol respectively, and who were both involved in earlier stages of the review process. Last but not least, thanks to the review team for their great work, excellent collaborative efforts, and perseverance throughout the entire review process.

The review authors take full responsibility for the content of this publication.

9 References

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None

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10 Characteristics of studies

10.1 CHARACTERISTICS OF INCLUDED STUDIES

Table 10.1: Dennis et al., 2004

Methods	Design: RCT Unit of allocation: Individually
Participants	Sample size: n=300 Age: MET/CBT5: Aged 13-14: 11%, Aged 15-16: 57%, Aged 17-18: 32% ACRA: Aged 13-14: 14%, Aged 15-16: 56%, Aged 17-18: 30% MDFT: Aged 13-14: 13%, Aged 15-16: 48%, Aged 17-18: 39% Gender: MET/CBT5: 21% female ACRA: 20% female MDFT: 15% female Ethnicity: MET/CBT5: Caucasian/white: 47%, African American/black: 50%, Hispanic/Latino: 2%, Other/mixed: 1% ACRA: Caucasian/white: 53%, African American/black: 44%, Hispanic/Latino: 1%, Other/mixed: 2% MDFT: Caucasian/white: 47%, African American/black: 47%, Hispanic/Latino: 1%, Other/mixed: 5% Family status: MET/CBT5: Single parent family: 53% ACRA: Single parent family: 59% MDFT: Single parent family: 52% Main drug of use: Cannabis Severity: Marijuana dependence - MET/CBT5: 47%, ACRA: 47%, MDFT: 52% Marijuana abuse - MET/CBT5: 34%, ACRA: 33%, MDFT: 33% Comorbidity: Alcohol dependence - MET/CBT5: 7%, ACRA: 13%, MDFT: 12% Alcohol abuse - MET/CBT5: 34%, ACRA: 28%, MDFT: 30% Other substance dependence - MET/CBT5: 1%, ACRA: 1%, MDFT: 1% Other substance abuse - MET/CBT5: 12%, ACRA: 8%, MDFT: 12% Major depression - MET/CBT5: 27%, ACRA: 16%, MDFT: 11% Generalized anxiety disorder - MET/CBT5: 34%, ACRA: 21%, MDFT: 25% Suicidal thought or actions - MET/CBT5: 10%, ACRA: 7%, MDFT: 7% Any traumatic distress disorder - MET/CBT5: 17%, ACRA: 14%, MDFT: 12% Conduct disorder - MET/CBT5: 56%, ACRA: 54%, MDFT: 58% Attention deficit-hyperactivity disorder - MET/CBT5: 34%, ACRA: 38%, MDFT: 38% Inclusion criteria:

	The target population of this study was adolescents with cannabis related disorders who would be appropriate for and typically present to publicly funded outpatient treatment. Participants were eligible for CYT if they were aged 12 to 18, self-reported one or more DSM-IV criteria for cannabis abuse or dependence, had used cannabis in the past 90 days or 90 days prior to being sent to a controlled environment, and were appropriate for outpatient treatment. We included adolescents with alcohol and other drug diagnoses and co-occurring psychiatric disorders (as long as they could be managed at the outpatient level), as well as those with only cannabis abuse diagnoses, and/or less than weekly substance use. Exclusion criteria: Adolescents were excluded if they were inappropriate for short-term outpatient treatment or would be unable to participate in the study. The exclusion criteria were: a) reported use of alcohol 45 or more of the 90 days prior to intake; b) reported use of other drugs 13 or more of the 90 days prior to intake; c) reported an acute medical or psychological problem that was likely to prohibit full participation in treatment; d) had insufficient mental capacity to understand and provide informed consent or participate in treatment; e) lived outside of the program's catchment area; f) had a history of repeated, violent behavior or severe conduct disorder that might put other participants at risk; or g) lacked sufficient ability to use English to participate in the consent process, treatment, or research interviews. (p. 200) + more exclusion criteria in the protocol: d) had an acute psychological condition that required immediate treatment and/or was likely to prohibit full participation in treatment and could not be managed in this level of care; i) lacked a parent or significant other who had sufficient ability in English to understand the collateral consent form and participate in research assessments and potentially in treatment; j) had participated previously in the study.
Interventions	Intervention: MET/CBT5 Duration: 6-7 weeks Total of any service hours: 4.8 Total therapy sessions: 3.8 Length of stay (mean days): 41.1 Days of 1+ therapy sessions: 3.4 Days of any contact: 7.8 Location: Clinic, USA Comparisons: 1) ACRA (Adoleescent Community Reinforcement Approach) 2) MDFT (Multidimensional Family Therapy)
Relevant Outcomes	Primary outcomes: Days abstinent, substance problems, substance frequency, recovery Measures: GAIN Secondary outcomes: Retention
Notes	Quality assurance procedures (implementation): "The quality assurance reviews led to the remedial training and, in an extreme case, the removal of one therapist from the trial. The site visits involved seven or more project staff reviewing all aspects implementation and concluded with group problem-solving about how to quickly address any problems. In one case, the site visit resulted in the complete shut-down, redesign and restarting of a site." (Protocol, p. 26) (Note: we cannot conclude on this, as we don't know which site this relates to)

	"After training for the intervention they were to deliver, clinical staff taped their sessions for review. Each treatment clinical coordinator reviewed audio or videotapes of all sessions provided by each therapist until he or she was certified as proficient in that intervention. Weekly supervision continued throughout the study and included review of at least two therapy tapes per month to prevent therapist drift. During tape reviews, the clinical coordinators completed treatment-specific rating forms to monitor adherence and provide feedback to therapists (...)" (p. 204) H. Liddle, the developer of MDFT, was involved in this study and therefore there is a potential risk of developer bias. *This study address treatment fidelity and it is reported that the quality assurance led to remedial training and removal of one therapist. However the study does not explicitly report on results related to treatment fidelity.*

Table 10.2: Godley et al., 2010

Methods	Design: RCT Unit of allocation: Individually
Participants	Sample size: n=320 Age: Average participant age was 15,9 years old (SD = 1,2) Aged 13-14: 13%, Aged 15-16: 56%, Aged 17-18: 31% MET/CBT7 without ACC: Aged 13-14: 11%, Aged 15-16: 58%, Aged 17-18: 30% MET/CBT7 with ACC: Aged 13-14: 20%, Aged 15-16: 63%, Aged 17-18: 17% CBOP without ACC: Aged 13-14: 13%, Aged 15-16: 49%, Aged 17-18: 39% CBOP with ACC: Aged 13-14: 9%, Aged 15-16: 53%, Aged 17-18: 39% Gender: 76 % male. MET/CBT7 without ACC: 73% male. MET/CBT7 with ACC: 70% male. CBOP without ACC: 76% male. CBOP with ACC: 82% male. Ethnicity: 73% Caucasian, 13% African American, 14% Hispanic/Latino/other/mixed. MET/CBT7 without ACC: 73%Caucasian/white, 17% African/American/Black, 10% Hispanic/Latino/other/mixed. MET/CBT7 with ACC: 70% Caucasian/white, 10% African/American/Black, 20% Hispanic/Latino/other/mixed. CBOP without ACC: 75% Caucasian/white, 13% African/American/Black, 12% Hispanic/Latino/other/mixed. CBOP with ACC: 74% Caucasian/white, 11% African/American/Black, 5% Hispanic/Latino/other/mixed. Family status: Not reported. Main drug of use: Cannabis. Severity: Weekly alcohol and other drug use: 49%. Comorbidity: Any co-occurring problems: 56%, Major depressive disorder: 28%, Generalized anxiety: 8%, Traumatic distress: 19%, ADHD: 34%, Conduct

	disorder: 42%, Any prior mental health treatment: 52%, Alcohol abuse: 38%, Other substance abuse: 3% Inclusion criteria: Adolescents met inclusion criteria if they were 12-18 years old, met ASAM's (2001) Patient Placement criteria for Level 1 outpatient treatment based on a substance abuse or dependence diagnosis and six dimensional admission criteria (i.e., severity of intoxication/withdrawal, physical health, emotional/behavioral health, treatment readiness, relapse potential, and recovery environment), and attended an admission appointment. Exclusion criteria: Adolescents were excluded from the study for one or more of the following reasons, they: a)were "stepped-down" from residential treatment and were therefore more severe than adolescents who entered outpatient treatment from the community (n=102); b) were recommended only for individual counseling, as both outpatient treatment conditions had group component (n=21); c) were a ward of the state (n=27); d) did not have a parent/guardian present during admission to outpatient treatment (n=4); e) appeared to have insufficient mental capacity to provide informed consent (n=2); or f) did not speak English with sufficient ability to understand study procedures and instruments 8n=1).
Interventions	Interventions: 1) MET/CBT7 (Motivational Enhancement Therapy/Cognitive Behavior Treatment) without ACC. 2) MET/CBT7 (Motivational Enhancement Therapy/Cognitive Behavior Treatment) with ACC. Duration: MET/CBT7 without ACC: 12 weeks. MET/CBT7 with ACC: MET/CBT: 12 weeks, ACC: 12-14 weeks. Location: Adolescents from rural and urban parts of Central Illinois were enrolled. Comparisons: 1) CBOP without ACC (Chestnut's Bloomington Outpatient Program). 2) CBOP with ACC (Chestnut Bloomigton Outpatient with Assertive Continuing Care).
Relevant Outcomes	Primary outcomes: Days abstinent, substance problems, recover Measures: GAIN Secondary outcome: Retention
Notes	"In general, clinicians provided only one type of treatment; however, due to insurance requirements for specific credentials, one clinician treated three adolescents in each of the outpatient conditions." (p. 48) "Fidelity checks for MET/CBT7 and ACC were conducted based on reviews of taped therapy sessions, while the fidelity of CBOP was conducted using the program's existing methods to avoid changing the intervention." (p. 52) "Outpatient treatment cost for participants were covered either by insurance, grants, public aid or by self-pay. There were no significant differences by funder." (p. 48)

	Although the study addresses treatment fidelity it does not report results that show whether or not CBT was given with high/low fidelity.

Table 10.3: Hendriks et al., 2011

Methods	Design: RCT Unit of allocation: Individually
Participants	Sample size: n= 109 Age: Mean age=16.8 years, aged 13-14: 10.1% CBT: Mean age=16.9, aged 13-14: 9.3% MDFT: Range 13-18: 16.6%, aged 13-14: 10.9% Gender: 79.8% male CBT: 79.6% male MDFT: 80% mal. Ethnicity: Ethnicity Dutch/western: 71.6% CBT: Ethnicity Dutch/western: 70.4% MDFT: Ethnicity Dutch/western: 72.7% Family status: Single parent family: 40.4% CBT: 46.3% MDFT: Single parent family: 23.5% Main drug of use: Cannabis. Severity: Cannabis abuse: 23.9%, cannabis dependence: 76.1%, severity of cannabis use disorder (range 0-11): 6.9 (mean) Comorbidity: Conduct disorder (CD): 28.7%, oppositional defiant disorder (ODD): 17.2% (CD and/or ODD: 37.6%) Inclusion criteria: Eligible participants were boys and girls from 13 through 18 years of age, with a cannabis use disorder (dependence or abuse) established for the past year at baseline, and with at least one parent willing to take part in the treatment. Cannabis use disorder was determined following DSM-IV guidelines, with dependence being diagnosed if at least 3 of 7 dependence criteria had been met, and abuse if at least 1 of 4 abuse criteria had been met. Exclusion criteria: Adolescents were ineligible if they suffered from a current mental disorder or condition (psychosis, advanced eating disorder, suicide ideation) requiring inpatient treatment or had a substance use disorder requiring maintenance treatment with methadone or buprenorphine. Cases were excluded if the adolescent and/or parent were unable to speak and read the local language. Baseline assessment was scheduled in two meetings. In the first, the focus was on need for treatment. When the assessor thought the case might meet INCANT inclusion criteria, she explained the study and allowed the family time to consider giving informed consent. Cases (adolescent plus parent) were excluded if one or both did not show up for the second meeting, not even after prompting.

Interventions	Intervention: CBT (Cognitive-Behavioural Therapy) Duration: Weekly 60 minutes (plus one monthly treatment session for the adolescent's parents) sessions for 5-6 months Location: MDFT: Sessions could take place at the office of the therapist, the family's home, or any other location. Comparison: MDFT (Multidimensional Family Therapy)
Relevant Outcomes	Primary outcomes: Days of use, recent cannabis dependence, treatment responders, recovered adolescents, preoccupation with and motivation for substance use Measures: TLFB, ADI, PEI Secondary outcomes: Internalizing disorders/symptoms, property and violent crimes, externalizing disorder/symptoms, retention Measure: YSR
Notes	The study from The Netherlands is a part of a cross-country study called INCANT. The primary outcomes regarding recent cannabis dependence and preoccupation with and motivation for substance use are reported in Rigter et al. (2011). The secondary outcomes regarding internalizing and externalizing disorder/symptoms are reported in Rigter et al. (2011). Treatment adherence: "Overall, therapists providing MDFT delivered it according to MDFT parameters (…)" (p. 54) (note: adherence evaluation is not made/reported on the CBT-condition)

Table 10.4: Kaminer et al., 1998a, 1999

Methods	Design: RCT Unit of allocation: Individually
Participants	Sample size: n=32 Age: CBT: Mean age: 15.4 (SD: 1.5) IT: mean age 16.3 (SD 1.1) Gender: CBT: 60% males IT:63% males Ethnicity: CBT: 80% white IT: 100% white Family status: Not reported Main drug of use: Not reported Severity: CBT: 10.0 (4.3) on T-ASI scale IT: 12.4 (3.0) on T-ASI scale Comorbidity: The referred youths were dually-diagnosed (psychoactive substance use disorder). Inclusion criteria: Inclusion criteria were subjects aged 13 to 18 years, and meeting DSM-III-R criteria for psychoactive substance use disorders.

	Exclusion criteria: Patients with any of the following were excluded: required a more intensive treatment setting or treatment menu; current acute psychosis; reading level and comprehension below sixth grade; refusal to consent for either randomization to treatment conditions or for session videotaping; no permanent address; or transportation difficulties for treatment program.
Interventions	Intervention: CBT (Cognitive-Behavioral Therapy) Duration: 12 weeks, weekly, 30 minutes per session Location: Not reported Comparison: IT (Interactional treatment)
Relevant Outcomes	Primary outcomes: Substance use, drug use Measure: T-ASI Secondary outcomes: Family problems, peer problems, psychological problems, school problems, retention Measure: T-ASI
Notes	All therapy sessions were videotaped to assure that the therapists administered the specific treatment within the guidelines (Kaminer, ID. 1101, p. 2). The GSRS (Group Sessions rating Scale) were used to detect the differences between cognitive behavioural therapy and interactional group therapy. (Kaminer, ID. 1101, p. 1) One of the findings from these analyses were: "CBT groups were confirmed to have engaged in didactic skill training, problem solving, and role playing of social skills. It groups devoted more time focusing on interpersonal issues, expressing feelings, and on here-and-now group processes (Kaminer ID 1101, p. 4) *Treatment fidelity is adressed and results from the analyses are reported and shows fidelity.*

Table 10.5: Kaminer et al., 2002

Methods	Design: RCT Unit of allocation: Individually
Participants	Sample size: n=88 Age: 13 to 18 years, Mean: 15.4, SD: 1.3 years Gender: Male: 70%, Female: 30% CBT: 71% males PET: 70% males Ethnicity: White: 90%, Non-white: 10% CBT: White: 90%, Non-white: 10% PET: White: 89%, Non-white: 11% Family status: Not reported Main drug of use: Not reported Severity: 88% having marijuana disorder, 39% met diagnosis of abuse, 61% met diagnosis of dependence Comorbidity:

	Disorders - Externalizing: 55%, Conduct: 39%, ADHD: 18%, Oppositional: 9%, Internalizing: 36%, Depression: 22%, Anxiety: 26% Inclusion criteria: Not reported Exclusion criteria: Exclusion criteria included requirement for a more intensive treatment than offered in this study; current acute psychosis or any other psychiatric or medical condition that could interfere with treatment (e.g., poor compliance with medications for attention deficit hyperactivity disorder (ADHD), suicidal or aggressive behavior in the past 30 days); reading and comprehension level below fifth grade; refusal to consent for either randomization to treatment conditions or for session videotaping; no permanent address; or transportation difficulties for treatment program.
Interventions	Intervention: CBT (Cognitive-Behavioral Therapy) Duration: 8 weeks, weekly, 75- to 90 minutes. Location: Not reported. Comparison: PET (Psychoeducational substance abuse treatment)
Relevant Outcomes	Primary outcome: Substance abuse Measure: T-ASI Secondary outcome: Family problems, Peer problems, Psychological problems, School problems, legal problems, retention Measure: T-ASI
Notes	The first author is a part of the therapist supervision and training. Therapists were trained to adhere to each treatment condition by studying the CBT treatment manual and the guidelines for PET. Supervision was provided throughout the study by the first author. All therapy sessions were videotaped, and weekly feedback was given to the therapists regarding their adherence to their respective treatment protocol. (p. 738) (...) each pair of therapists provided treatment in CBT and PET cycles, minimizing therapist variability (p. 738) *Treatment fidelity is addressed, however the study does not report results.*

Table 10.6: Latimer et al., 2003

Methods	Design: RCT Unit of allocation: Family
Participants	Sample size: n= 43 Age: 14: 9.3%, 15: 23.3%, 16: 25.6%, 17: 34.9%, 18: 7.0%, Mean: 16.07, SD: 1.12 IFCBT: 14: 14.3%, 15: 23.8%, 16: 14.3%, 17: 38.1%, 18: 9.5% Mean: 16.05, SD: 1.28 DHPE: 14: 4.5%, 15: 22.7%, 16: 36.4%, 17: 31.8%, 18: 4.5% Mean: 16.09, SD: 0.97 Gender: Male: 76.7% IFCBT: Male: 76.2%

	DHPE: Male: 77.3% Ethnicity: White: 86.0%, Native American: 7.0%, Hispanic: 4.6%, Asian: 2.3%, African american: 0.0% IFCBT: White: 81.0%, Native american: 9.5%, Hispanic: 9.5%, Asian: 0.0%, African american: 0.0% DHPE: White: 90.9%, Native american: 4.5%, Hispanic: 0.0% , Asian: 4.5%, African american: 0.0% Family status: Not reported. Main drug of use: Alcohol abuse/dependence: 86.0%, Marijuana abuse/dependence: 97.7%, Other drug abuse/dependence: 20.9% Severity: Pretreatment substance use frequency (days during a month) - Alcohol: Mean: 6.33 (SD: 6.63), Marijuana: Mean: 16.21 (SD: 10.83), Other drugs: Mean: 4.46 (SD: 13.04) Comorbidity: Not reported. Inclusion criteria: Youth met inclusion criteria for the randomised treatment study by being between 12 and 18 years of age, meeting DSM-IV criteria for at least one psychoactive substance use disorder, being recommended for outpatient drug abuse treatment following the initial baseline assessment, and providing parental consent and adolescent assent. Exclusion criteria: Excluded from the randomised treatment study were youth who required less or more intensive treatment than the interventions provided (i.e. IFCBT and DHPE), exhibited acute psychosis, exhibited acute suicidal or homicidal behavior, or refused medication despite bipolar mental illness.
Interventions	Intervention: IFCBT (Integrated Family and Cognitive-Behavioral Therapy) Duration: 16 weeks, Family therapy sessions: 16 weekly 60 minutes sessions, CBT sessions: twice-weekly, 32 90 minutes sessions. IFCBT youth attending treatment for 10.14 weeks (SD: 4.87) and 26.67 sessions (SD: 13.31). Location: Youth were referred mainly by agencies throughout the Minneapolis/St. Paul metropolitan region. Comparison: DHPE (Drug Harm Psychoeducation Curriculum)
Relevant Outcomes	Primary outcome: Days of use Measure: ADI-R Secondary outcomes: Rational beliefs, irrational beliefs, positive problem orientation, negative problem orientation, rational problem solving, impulsive problem solving, problem avoidance, task accomplishments, role performance, communication, affective expression, involvement, control, values and norms, motivation to learn, learning strategies, retention Measure: FAM, Rational Thinking Questionnaire, SPSI, MSLQ
Notes	"The IFCBT individual family therapy sessions were delivered by the project PI (WL) with supervision provided by dr. Winters. The IFCBT and DHPE group sessions were delivered by two bachelor-level clinicians with chemical dependency treatment experience. Treatment therapists received an extensive therapist training protocol (...)" (p. 308) "All IFCBT and DHPE sessions were videotaped" (p. 308)

	They use supervision and a training protocol to control the treatment given. The study does however not report results related to treatment fidelity.

Table 10.7: Waldron et al., 2001

Methods	Design: RCT Unit of allocation: Family
Participants	Sample size: n=114 Age: CBT: Mean 15.71, SD: 1.16 FFT: Mean 15.34, SD: 1.01 Gender: CBT: Male 25 (N= 31) FFT: Male 24 (n=30) Ethnicity: CBT: Hispanic: 17, Anglo American: 9, Native American: 3, Mixed/other: 2 FFT: Hispanic: 14, Anglo American: 14, Native American: 2. Mixed/other: 0 Family status: CBT: Adolescent education (years): 9.26, Primary caregiver education: 13.67 (SD: 3.01) Other caregiver education: 13.47 (SD: 2.53), Annual income (per $100): 45.30 (SD: 36.46), Family constitution-single parent: 16, Family constitution - two parent: 15 FFT: Adolescent education (years): 9.37, Primary caregiver education: 14.07 (SD: 2.84), Other caregiver education: 13.61 (SD: 2.31), Annual income (per $100): 40.40 (SD: 25.36), Family constitution-single parent: 10, Family constitution - two parent: 20 Main drug of use: Cannabis. Severity: Not reported Comorbidity: Not reported Inclusion criteria: Youths between the age of 13 and 17 years were eligible for the study if they were living at home with a primary caretaker who was also willing to participate and if they met Diagnostic and Statistical manual of Mental Disorders (4th ed,: DSM-IV; American Psychiatric Association, 1994) diagnostic criteria for a primary substance abuse disorder. Exclusion criteria: The focus of the study was illicit drug use, with youths primarily abusing only alcohol and/or tobacco excluded from participation. As a result, in the final sample, marijuana typified the vast majority of substance abuse. Youths and families were also excluded if the adolescent needed services other than outpatient treatment (e.g., was dangerous to self or others, needed monitored detoxification), if there was evidence of a psychotic or organic state, or if a sibling was participating in the study.
Interventions	Intervention: CBT (Cognitive-Behavioural Therapy) + MET (Motivational Enhancement intervention) Duration: 1 hour per session. 12 weeks. Location: Participants were referred to the University of New Mexico Center for Family and Adolescent Research for drug-abuse treatment

	Comparisons: FFT (Functional Family Therapy),
Relevant Outcomes	Primary outcome: Days of use, Measure: TLFB Secondary outcome: Delinquency Measure: YSR
Notes	The secondary outcome is reported in French et al. (2008) To examine therapist effects, a repeated measures analysis was conducted with the percentage of days substance was used as the dependent measure and therapists as the independent variable with no significant interaction, F(2,28) = 0.96. To evaluate treatment adherence, we rated one therapy session for half of the total sample (n=60), selected random, on a 10 point scale for adherence (1= least adherence, 10 = greatest adherence) to the clinical manuals for the FFT condition (n=11, M=9.09, SD= 1.04), the CBT condition (N=11, M=08.91, SD=1.04), the family therapy sessions in the joint condition (n=9, M=9.33, SD=0.71), the CBT sessions in the joint condition (n=11, M09.09, SD=0.83), and the group condition (n=18, M09.50, SD=0.52). Ratings were based on standardized session checklists. The range of ratings was on a 7-10-point scale. A one-way analysis of variance (ANOVA) was calculated with the five tape sources operating as the independent variable and adherence rating treated as the independent variable. The results indicated that the five sources of tapes were not significantly different in adherence rating, F(4,55) = 1.09, p< 0.37. *This study addresses treatment fidelity and reports that high adherence was achieved.*

10.2 CHARACTERISTICS OF INTERVENTION AND COMPARISON INTERVENTIONS

Table 10.7: Charactetistics of intervention and comparison interventions in included studies

Study	CBT-intervention	Comparison
Dennis et al., 2004	Intervention: Motivational Enhancement + Cognitive Behavior Therapy (MET/CBT5) Duration: 6-7 weeks Total of any service hours: 4.8 Total therapy sessions: 3.8 Length of stay (mean days): 41.1 Days of 1+ therapy sessions: 3.4 Days of any contact: 7.8 Delivery: Individual MET session and group CBT session Location: Clinic, USA	Intervention: The Adolescent Community Reinforcement Approach (ACRA) Duration: 12-14 weeks Total of any service hours: 10.7 Total of therapy sessions: 7,9 Length of stay (mean days): 73.4 Days of 1+ therapy sessions: 7.9 Days of any contact: 13.6 Delivery: ACRA is composed of 10 individual sessions with the adolescent and four sessions with caregivers. Location: Clinic, USA
		Intervention: Multidimensional Family Therapy (MDFT) Duration: 12-14 weeks Total of any service hours: 14.2 Total of therapy sessions: 9.5 Length of stay (mean days): 77.5 Days of 1+ therapy sessions: 9.7 Days of any contact: 24.2 Delivery: Typically six sessions with the adolescent, three with the parents, and six with the whole family. Location: Clinic, USA
Godley et al., 2010	Intervention: Motivational Enhancement Therapy/Cognitive behavior Therapy (MET/CBT5) without Assertive Continuing Care (ACC) Duration: 12 weeks Delivery: Two family sessions, two individual sessions, three group sessions Location: (Adolescents from rural and urban parts of Central Illinois were enrolled)	Intervention: Chestnut's Bloomington Outpatient Program (CBOP) without Assertive Continuing Care (ACC) Duration: Not reported Delivery: The intervention is primarily delivered through skill and therapy groups, combined with a limited number of family and individual sessions for treatment planning and progress reviews. Location: (Adolescents from rural and urban parts of Central Illinois were enrolled)

Study	CBT-intervention	Comparison
	Intervention: Motivational Enhancement Therapy/Cognitive behavior Therapy (MET/CBT5) with Assertive Continuing Care (ACC) Duration: 12-14 weeks Delivery: MET/CBT: Two family sessions, two indivdual sessions, and three group sessions. ACC: Not explicitly reported. However it is stated that the intervention cease "to help adolescents and their caregivers (...) during weekly home visits" (p. 47) Location: (Adolescents from rural and urban parts of Central Illinois were enrolled)	Intervention: Chestnut's Bloomington Outpatient Program (CBOP) with Assertive Continuing (ACC) Duration: CBOP: Not reported; ACC: 12-14 weeks Delivery: CBOP: The intervention is primarily delivered through skill and therapy groups, combined with a limited number of family and individual sessions for treatment planning and progress reviews. ACC: Not explicitly reported. However it is stated that the intervention cease "to help adolescents and their caregivers (...) during weekly home visits" (p. 47) Location: (Adolescents from rural and urban parts of Central Illinois were enrolled)
Hendriks et al., 2011	Intervention: Cognitive-Behavioral Therapy Duration: Weekly, 60 minutes per session (plus one monthly treatment session for the adolescent's parents) for 5-6 months Delivery: Individual Location: TAU sessions were conducted in the treatment centre, such as the therapist's office (i.e., not in the home or other community setting as might be done in MDFT).	Intervention: Multidimensional Family Therapy (MDFT) Duration: Twice a week, 60 minutes per session for 5-6 months Delivery: MDFT-therapists had twice-weekly sessions (2 h total pr. week) with the individual adolescent, parent(s) and/or family, in addition to sessions or contacts with school, courts, and other persons. Location: Sessions could take place at the office of the therapist, the family's home or any other location
Kaminer et al., 1998a, 1999	Intervention: Cognitive-Behavioral-Therapy Duration: Weekly, 30 minutes per session for 12 weeks Delivery: Group Location: Not reported	Intervention: Interactional Treatment (IT) Duration: Weekly, 90 minutes per session for 12 weeks Delivery: Group Location: Not reported
Kaminer et al., 2002	Intervention: Cognitive-Behavioral Therapy Duration: Weekly, 75- to 90 minutes for 8 weeks Delivery: Group Location: Not reported	Intervention: Psychoeducational substance abuse treatment (PET) Delivery: Group Duration: Weekly, 75- to 90 minutes for 8 weeks Location: Not reported

Study	CBT-intervention	Comparison
Latimer et al., 2003	Intervention: Integrated Family and Cognitive-Behavioral Therapy (IFCBT) Duration: 16 weeks (Family therapy: weekly, 16 sessions of 60 minutes; CBT: twice a week, 32 sessions of 90 minutes) Delivery: Individual family therapy sessions and group cognitive-behavioral therapy sessions. Location: (Youth were referred mainly by agencies throughout the Minneapolis/St. Paul metropolitan region)	Intervention: Drug Harm Psychoeducation Curriculum (DHPE) Duration: 16 weeks, weekly 90 minutes sessions Delivery: Group Location: (Youth were referred mainly by agencies throughout the Minneapolis/St. Paul metropolitan region)
Waldron et al., 2001	Intervention: Cognitive-Behavioural Therapy (CBT) + Motivational Enhancement intervention (MET) Duration: 1 hour per session (duration not reported) Delivery: Individual Location: (Participants were referred to the University of New Mexico Center for Family and Adolescent Research for drug-abuse treatment)	Intervention: Functional family Therapy (FFT) Duration: 1 hour per session (duration not reported - 12 weeks?) Delivery: Group (family) Location: (Participants were referred to the University of New Mexico Center for Family and Adolescent Research for drug-abuse treatment)

10.3 CHARACTERISTICS OF EXCLUDED STUDIES AND TRIALS

Table 10.8: List of excluded studies

Study	Reason
Azrin et al., 2001	The intervention was judged not to be CBT as defined by our inclusion criteria; it evaluates the relative effectiveness of a relatively "pure" cognitive version of problem-solving training where behavioural features were not utilized compared to Family Behaviour Therapy. Participants' age range is 12-17.
Carroll et al., 1994	The study focus on the wrong age (has no age limit) - does not explicitly report on the age range 13-21
Carroll et al., 2006	The study focus on the wrong age (18 years or above) - does not explicitly report on the age range 13-21
Carrol et al., 2012	The study focus on the wrong age (18 years or above) - does not explicitly report on the age range 13-21
Godley et al., 2004	The study is not about CBT-effects (the program evaluated included other interventions as well - cannot separate them)

Study	Reason
Goti et al., 2010	The intervention was judged not to be CBT as defined by our inclusion criteria, it evaluates the relative effectiveness of a brief motivational enhancement intervention compared to treatment as usual which comprised diagnostic evaluation according to the presenting problem, and an initial therapeutic approach, either pharmacological *and/or* cognitive-behavioural therapy. Participants' age range is 12-17.
Hunter et al., 2012a	The study focus on the wrong age (18 years or above) - does not explicitly report on the age range 13-21
Hunter et al., 2012b	The study can not identify CBT-effects as the comparison intervention also includes CBT as a main ingredient.
Liddle et al., 2004	The study focus on the wrong age (11-15 years) - does not explicitly report on the age range 13-21
Liddle et al., 2008	The study focus on the wrong age (12-17.5 years) - does not explicitly report on the age range 13-21
Liddle et al., 2009	The study focus on the wrong age (11-15 years) - does not explicitly report on the age range 13-21
Ramchand et al., 2011	The study can not identify CBT-effects as the comparison intervention also includes CBT as a main ingredient.

11 Additional tables

11.1 PRIMARY OUTCOMES

Table 11.1: Primary outcomes - overview

Study	Measurement	Dichotomous	Continuous	Direction	Short term	Medium term	Long term
Dennis et al., 2004	Days abstinent (GAIN)		X	High score is positive	X	X	X
	Recovery (GAIN)	X		High score is positive			X
Godley et al., 2010	Days abstinent (GAIN)		X	High score is positive	X	X	X
	Recovery status	X		High score is positive			X
Hendriks et al., 2011	Days of use (TLFB)		X	High score is negative	X	X	X
	Treatment responders	X		High score is positive	X	X	X
	Recovered adolescents	X		High score is positive	X	X	X

Study	Measurement	Dichotomous	Continuous	Direction	Short term	Medium term	Long term
	Recent cannabis dependence[1] (ADI)	X		High score is negative			X
Latimer et al., 2003	Days of use (ADI-R)		X	High score is negative	X	X	
Waldron et al., 2001	Days of use (TLFB)		X	High score is negative	X	X	

Note: [1] Reported in Rigter et al., 2013

11.2 SECONDARY OUTCOMES

Table 11.2: Secondary outcomes - social functioning and family functioning

Study	Measurement	Dichotomous	Continuous	Direction	Short term	Medium term	Long term
Kaminer et al., 1998a, 1999	Family problems (T-ASI)		X	High score is negative		X	X
	Peer Problems (T-ASI)		X	High score is negative		X	X
	Psychological problems (T-ASI)		X	High score is negative		X	X
Kaminer et al., 2002	Family problems (T-ASI)		X	Highs score is negative		X	X
	Peer problems (T-ASI)		X	High score is negative		X	X
	Psychological problems (T-ASI)		X	High score is negative		X	X

Study	Measurement	Dichotomous	Continuous	Direction	Short term	Medium term	Long term
Latimer et al., 2003	Rational beliefs		X	Unclear	X	X	
	Irrational beliefs		X	Unclear	X	X	
	Positive problem orientation		X	Unclear	X	X	
	Negative problem orientation		X	Unclear	X	X	
	Rational problem solving		X	Unclear	X	X	
	Impulsive problem solving		X	Unclear	X	X	
	Problem avoidance		X	Unclear	X	X	
	Task accomplishments		X	Unclear	X	X	
	Role performance		X	Unclear	X	X	
	Communication		X	Unclear	X	X	
	Affective expression		X	Unclear	X	X	
	Involvement		X	Unclear	X	X	
	Control		X	Unclear	X	X	
	Values and norms		X	Unclear	X	X	
Hendriks et al., 2011	Internalizing disorders/ symptoms[1] (YSR)		X	High score is negative		X	X

Note: [1]Reported in Rigter et al., 2011.

Table 11.3: Secondary outcomes - education or vocational involvement

Study	Measurement	Dichotomous	Continuous	Direction	Short term	Medium term	Long term
Kaminer et al., 1998a	School problems (T-ASI)		X	High score is negative		X	
Kaminer et al.,1999	School problems (T-ASI)		X	High score is negative			X
Kaminer et al., 2002	School problems (T-ASI)		X	High score is negative	X		X
Latimer et al., 2003	Motivation to learn (MSLQ)		X	Unclear		X	
	Learning strategies (MSLQ)		X	Unclear		X	

Table 11.4: Secondary outcomes - retention

Study	Measurement	Dichotomous	Continuous	Direction
Dennis et al, 2004	Completion	X		High score is positive
Godley et al., 2010	Retention (days)		X	High score is positive
	Attended sessions	X		High score is positive
Hendriks et al., 2011	Attended weeks		X	High score is positive
	Completion	X		High score is positive
	At least 3 month treatment[1]	X		High score is positive
Kaminer et al, 1998a, 1999	Completion	X		High score is positive
Kaminer et al., 2002	Completion	X		High score is positive
Latimer et al., 2003	Retention (weeks)		X	High score is positive
	Retention (sessions)	X		High score is positive

Note: [1]Reported in Rigter et al., 2011.

Table 11.5: Secondary outcomes - risk behaviour

Study	Measurement	Dichotomous	Continuous	Direction	Short term	Medium term	Long term
Waldron et al., 2001[1]	Delinquency (YSR)	X		High score is negative	X	X	
Hendriks et al., 2011	Property and violent crimes		X	High score is negtave	X	X	X
	Externalizing disorder/symptom2 (YSR)		X	High score is negative		X	X
Kaminer et al, 1998a, 1999	Legal problems		X	High score is negative		X	X
Kaminer et al., 2002	Legal problems		X	High score is negative	X		X

Note: [1] Note: [1] Reported in French et al., 2008. [2]Reported in Rigter et al., 2011.

11.3 RISK OF BIAS – OVERALL JUDGEMENTS

Table 11.6: Risk of bias - overall judgements

	Dennis et al., 2004	Godley et al., 2010	Hendriks et al., 2011	Kaminer et al., 1998a, 1999	Kaminer et al., 2002	Latimer et al., 2003	Waldron et al., 2001
Sequence generation	Low risk	Low risk	Low risk	Unclear	Unclear	Unclear	Low risk
Allocation concealment	Low risk	Low risk	Low risk	Unclear	Unclear	Unclear	Unclear
Blinding							
Abstinence or reduction of drug use	Unclear	3	1	2	Unclear	3	Unclear
Social functioning and family functioning	Not relevant	Not relevant	1	2	Unclear	3	Not relevant
Education or vocational involvement	Not relevant	Not relevant	Not relevant	2	Unclear	3	Not relevant
Retention	Unclear	4	4	Unclear	Unclear	Unclear	Not relevant
Risk behavior	Not relevant	Not relevant	1	2	Unclear	Not relevant	Unclear
Other adverse effects	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Incomplete outcome data							
Abstinence or reduction of drug use	2	1	2	3	4	1	1

	Dennis et al., 2004	Godley et al., 2010	Hendriks et al., 2011	Kaminer et al., 1998a, 1999	Kaminer et al., 2002	Latimer et al., 2003	Waldron et al., 2001
Social functioning and family functioning	Not relevant	Not relevant	Unclear	3	4	1	Not relevant
Education or vocational involvement	Not relevant	Not relevant	Not relevant	3	4	1	Not relevant
Retention	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	Not relevant
Risk behavior	Not relevant	Not relevant	2	3	4	Not relevant	Unclear
Other adverse effects	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Free of selective reporting							
Abstinence or reduction of drug use	1	1	1	2	1	1	1
Social functioning and family functioning	3	Not relevant	3	1	1	1	3
Education or vocational involvement	3	Not relevant	3	1	1	1	Not relevant
Retention	1	Not relevant	1	1	1	Unclear	Not relevant
Risk behavior	3	3	1	1	1	Not relevant	1
Other adverse effects	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Free of other bias	1	2	1	1	1	1	1

	Dennis et al., 2004	Godley et al., 2010	Hendriks et al., 2011	Kaminer et al., 1998a, 1999	Kaminer et al., 2002	Latimer et al., 2003	Waldron et al., 2001
A priori protocol	Yes	Yes	Yes	Unclear	Unclear	Unclear	Unclear
A priori analysis plan	Yes	Unclear	Yes	Unclear	Unclear	Unclear	Unclear

12 Data and analysis

12.1 ANALYSIS RESULTS

Table 12.1: Drug use frequency and recovery, overall results

	Drug use frequency, SMD [95% CI], (Number of studies included (k))		
	Short term	**Medium term**	**Long term**
Dennis et al., 2004: MDFT Godley et al. 2010: MET/CBT7, CBOP (*as reported in the main text*)	-0.14 [-0.64, 0.36] (k=4)	-0.06 [-0.44, 0.32] (k=4)	-0.15 [-0.36, 0.06] (k=2)
Dennis et al., 2004: ACRA Godley et al. 2010: MET/CBT7, CBOP	-0.07 [-0.59, 0.45] (k=4)	-0.08 [-0.47, 0.30] (k=4)	-0.11 [-0.34, 0.13] (k=2)
Dennis et al., 2004: MDFT Godley et al. 2010: MET/CBT7, CBOP+ACC	-0.03 [-0.51, 0.44] (k=4)	-0.02 [-0.45, 0.41] (k=4)	-0.11 [-0.32, 0.10] (k=2)
Dennis et al., 2004: ACRA Godley et al. 2010: MET/CBT7, CBOP+ACC	0.03 [-0.43, 0.49] (k=4)	-0.04 [-0.48, 0.40] (k=4)	-0.07 [-0.27, 0.14] (k=2)
Dennis et al., 2004: MDFT Godley et al. 2010: MET/CBT7+ACC, CBOP+ACC	-0.02 [-0.50, 0.46] (k=4)	-0.03 [-0.44, 0.39] (k=4)	-0.02 [-0.23, 0.18] (k=2)
Dennis et al., 2004: ACRA Godley et al. 2010: MET/CBT7+ACC, CBOP+ACC	0.05 [-0.41, 0.51] (k=4)	-0.05 [-0.48, 0.38] (k=4)	0.02 [-0.18, 0.23] (k=2)

	Drug use frequency, SMD [95% CI], (Number of studies included (k))		
	Short term	**Medium term**	**Long term**
Dennis et al., 2004: MDFT Godley et al. 2010: MET/CBT7, CBOP (*as reported in the main text*)	-0.14 [-0.64, 0.36] (k=4)	-0.06 [-0.44, 0.32] (k=4)	-0.15 [-0.36, 0.06] (k=2)
Dennis et al., 2004: MDFT Godley et al. 2010: MET/CBT7+ACC, CBOP	-0.17 [-0.70, 0.35] (k=4)	-0.07 [-0.44, 0.30] (k=4)	-0.04 [-0.24, 0.17] (k=2)
Dennis et al., 2004: ACRA Godley et al. 2010: MET/CBT7+ACC, CBOP	-0.11 [-0.67, 0.45] (k=4)	-0.09 [-0.47, 0.28] (k=4)	0.01 [-0.20, 0.21] (k=2)

12.2 SENSITIVITY ANALYSIS

Figures 12.1, 12.2 and 12.3 show the results (effect size and confidence interval) for the analyses including all studies, as presented in section 4.4.1, and the results (effect size and confidence interval) from the analyses with studies with certain characteristics removed.

Figure 12.1: Sensitivity analyses, Forest plot, short term, CBT with add-on

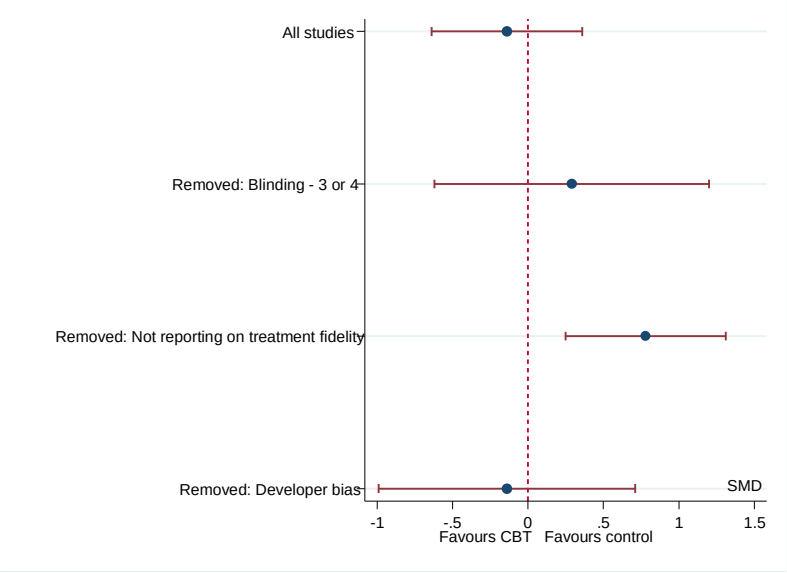


Figure 12.2: Sensitivity analyses, Forest plot, medium term, CBT with add-on

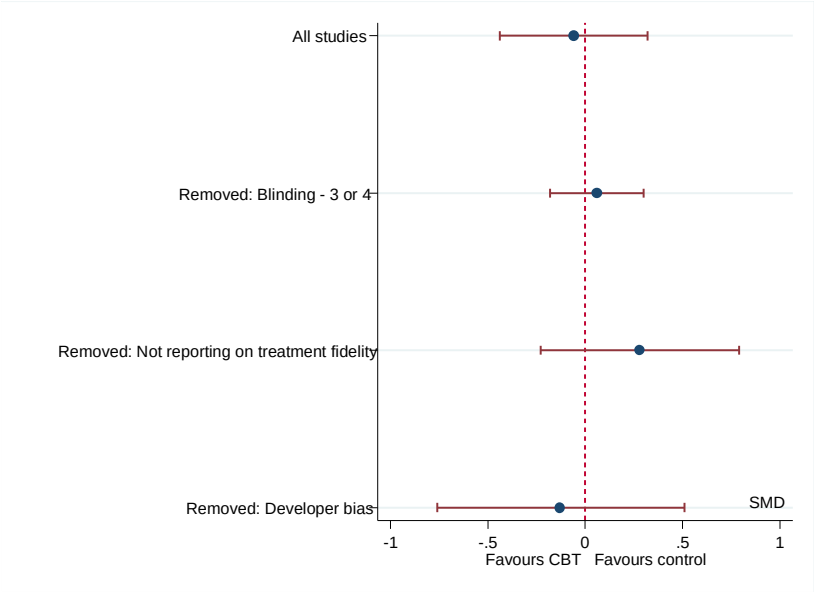
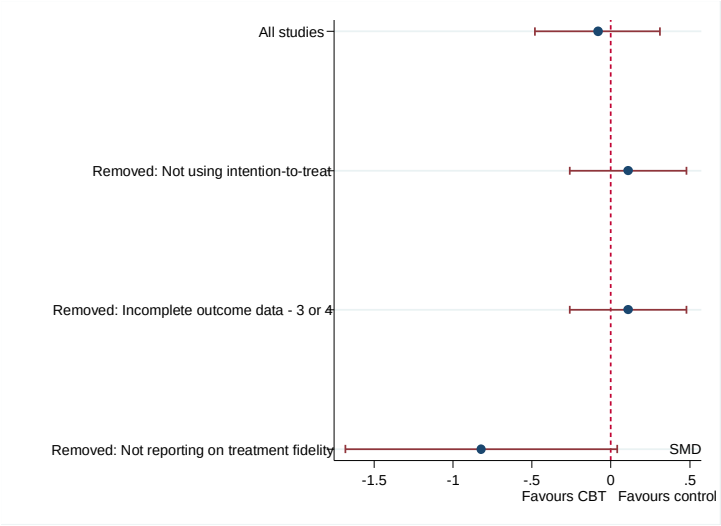


Figure 12.3: Sensitivity analyses, Forest plot, long term, CBT without add-on



12.3 PUBLICATION BIAS

Figure 12.4: Funnel plot, short term, CBT without add-on

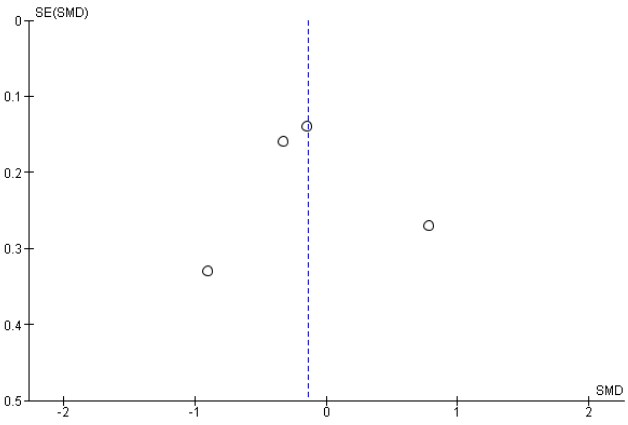


Figure 12.5: Funnel plot, medium term, CBT without add-on

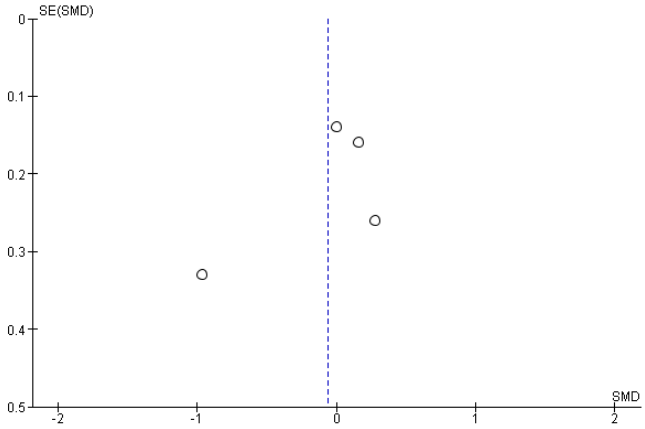
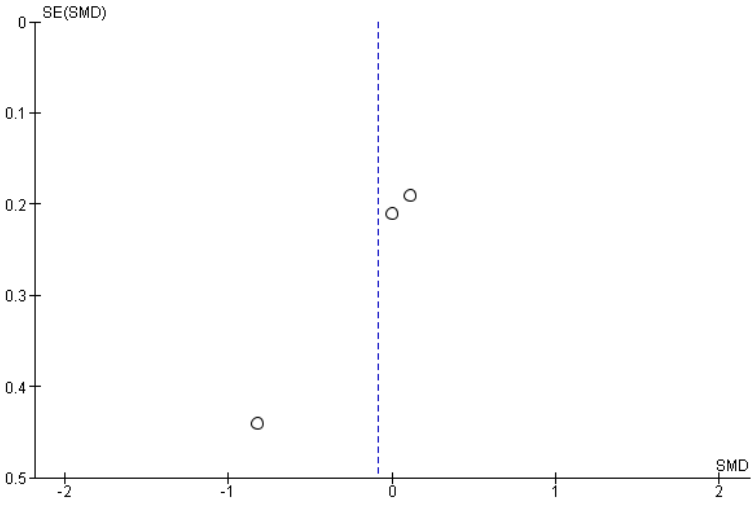


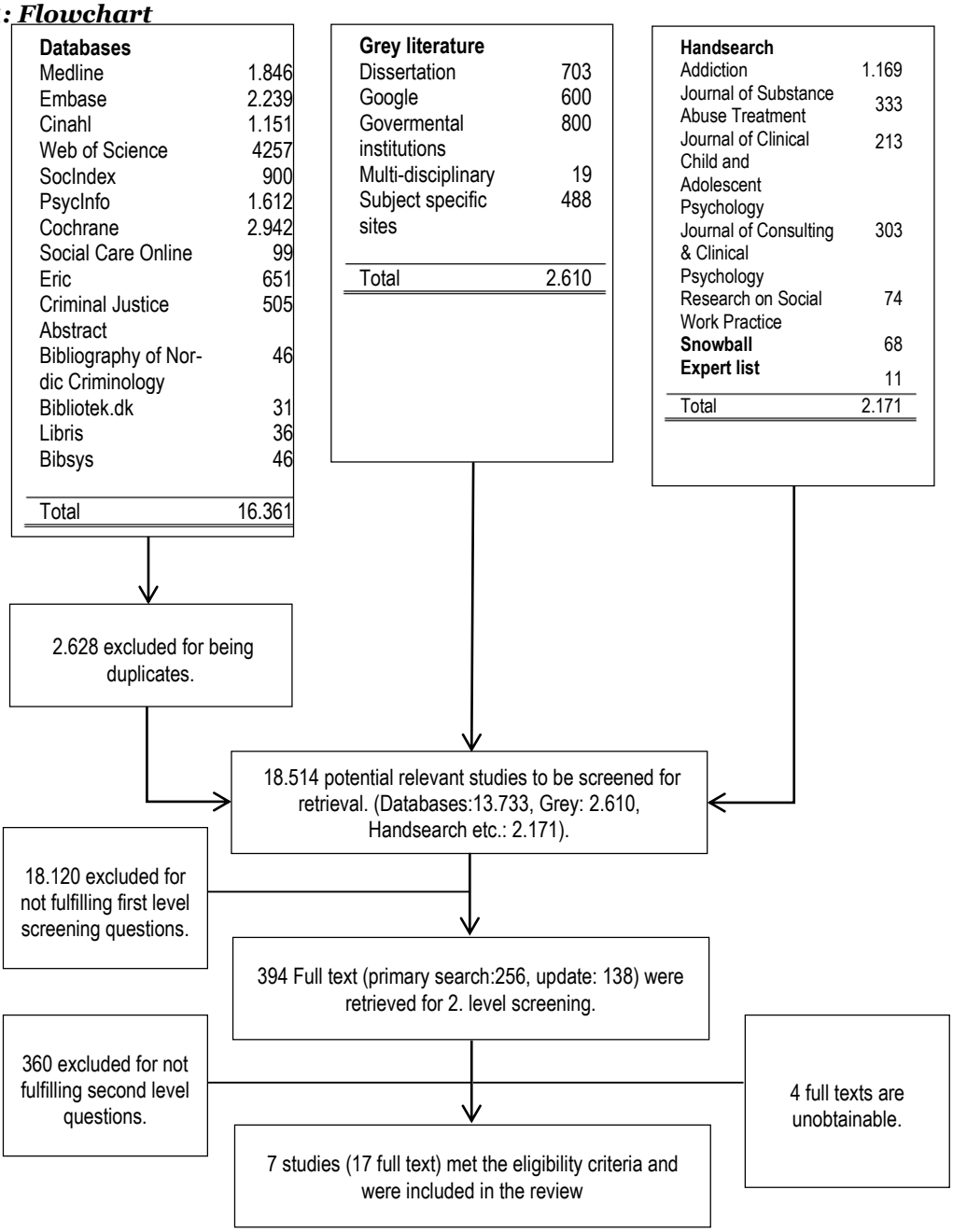
Figure 12.6: Funnel plot, medium term, CBT without add-on



13 Figures

13.1 FLOWCHART

Figure 13.1: Flowchart



14 Appendices

11.1 SEARCH STRATEGY

Search strategy for MEDLINE on the OVID platform

1 Behavior Therapy/
2 Cognitive Therapy/
3 (cognitive adj3 (therap* or train* or techni* or modif* or factor* or question* or approach* or experiment* or assess*)).ab,kw,sh,ti.
4 cbt.ab,kw,sh,ti.
5 ((psycholog* or social or cognitive) adj1 (skill* adj1 train*)).ab,kw,sh,ti.
6 (behavio?r* adj3 (therap* or train* or techni* or modif* or factor* or question* or approach* or experiment* or assess*)).ab,kw,sh,ti.
7 ((cognitive* or mental*) adj3 (map* or model*)).ab,kw,sh,ti.
8 (cognitive behavio?r* adj1 (factor* or therap*)).ab,kw,sh,ti.
9 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8
10 Adolescent/
11 (Adolescen* or youth* or teen* or young* or juvenile*).ab,kw,sh,ti.
12 10 or 11
13 (misuse or abuse* or use or addict* or depend#n$).ab,kw,sh,ti.
14 (drug* or substance*or polydrug*).ab,kw,sh,ti.
15 14 and 15
16 Marijuana Smoking/
17 amphetamine-related disorders/ or cocaine-related disorders/ or marijuana abuse/
18 Narcotic*.ab,kw,sh,ti.
19 Stimulan*.ab,kw,sh,ti.
20 (Cannabis or Marijuana or Hashish).ab,kw,sh,ti.
21 exp Cannabinoids/ or Cannabis/
22 blunts.ab,kw,sh,ti.
23 Designer Drugs/
24 (Designerdrug* or (designer adj1 drug*)).ab,kw,sh,ti.

25 Streetdrug*.ab,kw,sh,ti.
26 N-Methyl-3,4-methylenedioxyamphetamine/
27 Ecstasy.ab,kw,sh,ti.
28 Amphetamine/
29 Methamphetamine/
30 Fantasy.ab,kw,sh,ti.
31 (Methamphetamin* or Amphetamin*).ab,kw,sh,ti.
32 ice.ab,kw,sh,ti.
33 Flatliner*.ab,kw,sh,ti.
34 exp cocaine/
35 (Cocaine or crack).ab,kw,sh,ti.
36 (free adj1 base).ab,kw,sh,ti.
37 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36
38 15 or 37
39 9 and 12 and 38

Cochrane CBT

September 2012, update 2010-2012

Search number	Terms	Totals
S21	S16 and s19	(999)
S20	S16 and S19	(1487)
S19	S17 and S18	(346232)
S18	TI ((free n1 base) or cocaine or crack or flatliner* or ice or Methamphetamine$ or Amphetamin*or Fantasy* or Ecstasy or Streetdrug* or Designerdrug* or (designer adj1 drug*) or blunt* or Cannabis or Marijuana or Hashish or amphetamine-related blunts or Stimulan* or narcotic*) or AB ((free n1 base) or cocaine or crack or flatliner* or ice or Methamphetamine$ or Amphetamin*or Fantasy* or Ecstasy or Streetdrug* or Designerdrug* or (designer adj1 drug*) or blunt* or Cannabis or Marijuana or Hashi ...	(19100)
S17	TI (Polydrug* or Drug* or substance* or Depend#n* or Addict*) or AB (Polydrug* or Drug* or substance* or Depend#n* or Addict*) or SU (Polydrug* or Drug* or substance* or Depend#n* or Addict*)	(339852)
S16	S14 and S15	(5482)

Search number	Terms	Totals
S15	TI (Young n1 men or Young n1 women or Teen* or Juvenile or Adolescen* or youth* or young person* or young adult* or Young people* or Adolescent/) or AB (Young n1 men or Young n1 women or Teen* or Juvenile or Adolescen* or youth* or young person* or young adult* or Young people* or Adolescent/) or SU (Young n1 men or Young n1 women or Teen* or Juvenile or Adolescen* or youth* or young person* or young adult* or Young people* or Adolescent/)	(169968)
S14	S1 or S2 or S3 or S7 or S8 or S9 or S10 or S11 or S12 or S13	(26589)
S13	TI (cognitive behavior* factor* or cognitive behavio* therap*) or AB (cognitive behavior* factor* or cognitive behavio* therap*) or SU (cognitive behavior* factor* or cognitive behavio* therap*)	(2012)
S12	TI ((cognitive* n3 map*) or (cognitive* n3 model*) or (mental* n3 map*) or (mental* n3 model*)) or AB ((cognitive* n3 map*) or (cognitive* n3 model*) or (mental* n3 map*) or (mental* n3 model*)) or SU ((cognitive* n3 map*) or (cognitive* n3 model*) or (mental* n3 map*) or (mental* n3 model*))	(1399)
S11	TI aggression replacement train* or AB aggression replacement train* or SU aggression replacement train*	(0)
S10	TI cbt or AB cbt or SU cbt	(976)
S9	TI ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*)) or AB ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*)) or SU ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*))	(741)
S8	TI ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)) or AB ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)) or SU ((...	(9858)
S7	TI ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*)) or AB ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 as ...	(17963)

Search number	Terms	Totals
S6	TI ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*)) or AB ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 as ...	(13055)
S5	TI ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*)) or AB ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*))	(225)
S4	TI ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)) or AB ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*))	(6472)
S3	TI cbt or AB cbt	(976)
S2	DE "COGNITIVE therapy"	(5384)
S1	DE "BEHAVIOR modification"	(945)

Criminal Justice Abstracts Search history

EBSCO platform, January 2011

Search number	Terms	Totals
S49	(S46 or S47) and (S45 and S48)	419
S48	S46 or S47	46171

Search number	Terms	Totals
S47	TI ((free n1 base) or cocaine or crack or flatliner* or ice or Methamphetamine$ or Amphetamin*or Fantasy* or Ecstasy or Streetdrug* or Designerdrug* or (designer adj1 drug*) or blunt* or Cannabis or Marijuana or Hashish or amphetamine-related blunts or Stimulan* or narcotic*) or AB ((free n1 base) or cocaine or crack or flatliner* or ice or Methamphetamine$ or Amphetamin*or Fantasy* or Ecstasy or Streetdrug* or Designerdrug* or (designer adj1 drug*) or blunt* or Cannabis or Marijuana or Hashish or amphetamine-related blunts or Stimulan* or narcotic*) or SU ((free n1 base) or cocaine or crack or flatliner* or ice or Methamphetamine$ or Amphetamin*or Fantasy* or Ecstasy or Streetdrug* or Designerdrug* or (designer adj1 drug*) or blunt* or Cannabis or Marijuana or Hashish or amphetamine-related blunts or Stimulan* or narcotic*)	8846
S46	TI (Polydrug* or Drug* or substance* or Depend#n* or Addict*) or AB (Polydrug* or Drug* or substance* or Depend#n* or Addict*) or SU (Polydrug* or Drug* or substance* or Depend#n* or Addict*)	44298
S45	S43 and S44	1793
S44	TI (Young n1 men or Young n1 women or Teen* or Juvenile or Adolescen* or youth* or young person* or young adult* or Young people* or Adolescent/) or AB (Young n1 men or Young n1 women or Teen* or Juvenile or Adolescen* or youth* or young person* or young adult* or Young people* or Adolescent/) or SU (Young n1 men or Young n1 women or Teen* or Juvenile or Adolescen* or youth* or young person* or young adult* or Young people* or Adolescent/)	45246
S43	S30 or S31 or S32 or S36 or S37 or S38 or S39 or S40 or S41 or S42	6822
S42	TI (cognitive behavior* factor* or cognitive behavio* therap*) or AB (cognitive behavior* factor* or cognitive behavio* therap*) or SU (cognitive behavior* factor* or cognitive behavio* therap*)	312
S41	TI ((cognitive* n3 map*) or (cognitive* n3 model*) or (mental* n3 map*) or (mental* n3 model*)) or AB ((cognitive* n3 map*) or (cognitive* n3 model*) or (mental* n3 map*) or (mental* n3 model*)) or SU ((cognitive* n3 map*) or (cognitive* n3 model*) or (mental* n3 map*) or (mental* n3 model*))	490
S40	TI aggression replacement train* or AB aggression replacement train* or SU aggression replacement train*	40
S39	TI cbt or AB cbt or SU cbt	120
S38	TI ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*)) or AB ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*)) or SU ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*))	149

Search number	Terms	Totals
S37	TI ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)) or AB ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)) or SU ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*))	1273
S36	TI ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*)) or AB ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*)) or SU ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*))	5548
S35	TI ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*)) or AB ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*))	4555
S34	TI ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*)) or AB ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*))	149
S33	TI ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)) or AB ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*))	1139
S32	TI cbt or AB cbt	120
S31	DE "COGNITIVE therapy"	255
S30	DE "BEHAVIOR modification"	285
S29	(S21 or S24 or S23 or S20)	804

Search number	Terms	Totals
S28	(S23 or S21 or S24 or S20)	804
S27	(S24 or S21 or S23 or S20)	804
S26	(S20 or S21 or S23 or S24)	804
S25	SU "BEHAVIOR modification"	338
S24	KW (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	22
S23	AB (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	725
S22	SU (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	1
S21	TX (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	804
S20	(cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	804
S19	TX (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	804
S18	S16 not S15	0
S17	(S15 or S16)	1313
S16	TX (cognitive n3 therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	1313
S15	(cognitive n3 therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	1313
S14	(cognitive behavio#r* n1 factor*) or (cognitive behavio#r* n1 therap*)	315
S13	TX (cognitive behavio#r* n1 factor*) or (cognitive behavio#r* n1 therap*)	315

Search number	Terms	Totals
S12	(cognitive behavio#r* n1 factor*) or (cognitive behavio#r* n1 therap*)	315
S11	TX (cognitive* n3 map*) or (cognitive* n3 mental*) or (mental* n3 map*) or (mental* n3 model*)	301
S10	(cognitive behavio#r* n1 factor*) or (cognitive behavio#r* n1 therap*)	315
S9	(cognitive behavio#r n1 factor*) or (cognitive behavio#r n1 therap*)	71
S8	(cognitive* n3 map*) or (cognitive* n3 mental*) or (mental* n3 map*) or (mental* n3 model*)	301
S7	TX (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*)	5251
S6	TX social skill* train*	150
S5	TX psycholog* skill* train*	5
S4	TX cbt	132
S3	TX (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	804
S2	DE "COGNITIVE therapy"	255
S1	DE "BEHAVIOR modification"	285

EMBASE 1980 to 2010 Week 50

Ovid platform

Search number	Terms	Totals
1	Behavior Therapy/	32493
2	Cognitive Therapy/	22734
3	(cognitive adj3 (therap$ or train$ or techni$ or modif$ or factor$ or question$ or approach$ or experiment$ or assess$)).ab,kw,sh,ti.	26295
4	cbt.ab,kw,sh,ti.	4252
5	((psycholog$ or social or cognitive) adj1 (skill$ adj1 train$)).ab,kw,sh,ti.	1051
6	(behavio?r$ adj3 (therap$ or train$ or techni$ or modif$ or factor$ or question$ or approach$ or experiment$ or assess$)).ab,kw,sh,ti.	74492

Search number	Terms	Totals
7	((cognitive$ or mental$) adj3 (map$ or model$)).ab,kw,sh,ti.	9968
8	(cognitive behavio?r$ adj1 (factor$ or therap$)).ab,kw,sh,ti.	7363
9	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8	125380
10	Adolescent/	1067149
11	(Adolescen$ or youth$ or teen$ or young$).ab,kw,sh,ti.	1429584
12	10 or 11	1429584
13	9 and 12	20763
14	(misuse or abuse$ or addict$ or depend#n$).ab,kw,sh,ti.	1330823
15	(drug$ or substance$).ab,kw,sh,ti.	3614837
16	14 and 15	385847
17	((polydrug$ or drug$ or substance$) adj2 (misuse or abuse$ or addict$ or depend#n$)).ab,kw,sh,ti.	65325
18	13 and 16	1200
19	13 and 17	752
20	18 or 19	1200
21	Marijuana Smoking/	962
22	amphetamine-related disorders/ or cocaine-related disorders/ or marijuana abuse/	44678
23	Narcotic$.ab,kw,sh,ti.	30070
24	Stimulan$.ab,kw,sh,ti.	17981
25	(Cannabis or Marijuana or Hashish).ab,kw,sh,ti.	21244
26	exp Cannabinoids/ or Cannabis/	29554
27	blunts.ab,kw,sh,ti.	1488
28	Designer Drugs/	486
29	(Designerdrug$ or (designer adj1 drug$)).ab,kw,sh,ti.	565
30	Streetdrug$.ab,kw,sh,ti.	2
31	N-Methyl-3,4-methylenedioxyamphetamine/	5121
32	Ecstasy.ab,kw,sh,ti.	2845
33	Amphetamine/	21872
34	Methamphetamine/	9228

Search number	Terms	Totals
35	Fantasy.ab,kw,sh,ti.	5112
36	(Methamphetamin$ or Amphetamin$).ab,kw,sh,ti.	39365
37	ice.ab,kw,sh,ti.	17646
38	flatliner$.ab,kw,sh,ti.	9
39	exp cocaine/	35000
40	(Cocaine or crack).ab,kw,sh,ti.	42906
41	(free adj1 base).ab,kw,sh,ti.	1718
42	21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41	192579
43	20 or 42	193364
44	19 or 42	193054
45	13 and 43	1862
46	**limit 45 to humans downloaded**	**1676**
47	13 and 44	1552
48	limit 47 to humans	1414

ERIC search history

Ebsco platform, December 2010

Search number	Terms	Totals
S49	(S46 or S47) and (S45 and S48)	589
S48	S46 or S47	48,213
S47	TI ((free n1 base) or cocaine or crack or flatliner* or ice or Methamphetamine$ or Amphetamin*or Fantasy* or Ecstasy or Streetdrug* or Designerdrug* or (designer adj1 drug*) or blunt* or Cannabis or Marijuana or Hashish or amphetamine-related blunts or Stimulan* or narcotic*) or AB ((free n1 base) or cocaine or crack or flatliner* or ice or Methamphetamine$ or Amphetamin*or Fantasy* or Ecstasy or Streetdrug* or Designerdrug* or (designer adj1 drug*) or blunt* or Cannabis or Marijuana or Hashish or amphetamine-related blunts or Stimulan* or narcotic*) or SU ((free n1 base) or cocaine or crack or flatliner* or ice or Methamphetamine$ or Amphetamin*or Fantasy* or Ecstasy or Streetdrug* or Designerdrug* or (designer adj1 drug*) or blunt* or Cannabis or Marijuana or Hashish or amphetamine-related blunts or Stimulan* or narcotic*)	4,753

Search number	Terms	Totals
S46	TI (Polydrug* or Drug* or substance* or Depend#n* or Addict*) or AB (Polydrug* or Drug* or substance* or Depend#n* or Addict*) or SU (Polydrug* or Drug* or substance* or Depend#n* or Addict*)	46,491
S45	S43 and S44	4,660
S44	TI (Young n1 men or Young n1 women or Teen* or Juvenile or Adolescen* or youth* or young person* or young adult* or Young people* or Adolescent/) or AB (Young n1 men or Young n1 women or Teen* or Juvenile or Adolescen* or youth* or young person* or young adult* or Young people* or Adolescent/) or SU (Young n1 men or Young n1 women or Teen* or Juvenile or Adolescen* or youth* or young person* or young adult* or Young people* or Adolescent/)	119,012
S43	S30 or S31 or S32 or S36 or S37 or S38 or S39 or S40 or S41 or S42	32,374
S42	TI (cognitive behavior* factor* or cognitive behavio* therap*) or AB (cognitive behavior* factor* or cognitive behavio* therap*) or SU (cognitive behavior* factor* or cognitive behavio* therap*)	1,074
S41	TI ((cognitive* n3 map*) or (cognitive* n3 model*) or (mental* n3 map*) or (mental* n3 model*)) or AB ((cognitive* n3 map*) or (cognitive* n3 model*) or (mental* n3 map*) or (mental* n3 model*)) or SU ((cognitive* n3 map*) or (cognitive* n3 model*) or (mental* n3 map*) or (mental* n3 model*))	4,312
S40	TI aggression replacement train* or AB aggression replacement train* or SU aggression replacement train*	30
S39	TI cbt or AB cbt or SU cbt	673
S38	TI ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*)) or AB ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*)) or SU ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*))	1,063
S37	TI ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)) or AB ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)) or SU ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*))	7,184

Search number	Terms	Totals
S36	TI ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*)) or AB ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*)) or SU ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*))	22,117
S35	TI ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*)) or AB ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*))	16,440
S34	TI ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*)) or AB ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*))	1,063
S33	TI ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)) or AB ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*))	7,183
S32	TI cbt or AB cbt	673
S31	DE "COGNITIVE therapy"	0
S30	DE "BEHAVIOR modification"	8,326
S29	(S21 or S24 or S23 or S20)	6,287
S28	(S23 or S21 or S24 or S20)	6,287
S27	(S24 or S21 or S23 or S20)	6,287
S26	(S20 or S21 or S23 or S24)	6,287
S25	SU "BEHAVIOR modification"	8,327
S24	KW (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	162

Search number	Terms	Totals
S23	AB (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	5,417
S22	SU (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	2
S21	TX (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	6,287
S20	(cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	6,287
S19	TX (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	6,287
S18	S16 not S15	0
S17	(S15 or S16)	7,262
S16	TX (cognitive n3 therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	7,262
S15	(cognitive n3 therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	7,262
S14	(cognitive behavio#r* n1 factor*) or (cognitive behavio#r* n1 therap*)	951
S13	TX (cognitive behavio#r* n1 factor*) or (cognitive behavio#r* n1 therap*)	951
S12	(cognitive behavio#r* n1 factor*) or (cognitive behavio#r* n1 therap*)	951
S11	TX (cognitive* n3 map*) or (cognitive* n3 mental*) or (mental* n3 map*) or (mental* n3 model*)	2,676
S10	(cognitive behavio#r* n1 factor*) or (cognitive behavio#r* n1 therap*)	951
S9	(cognitive behavio#r n1 factor*) or (cognitive behavio#r n1 therap*)	277
S8	(cognitive* n3 map*) or (cognitive* n3 mental*) or (mental* n3 map*) or (mental* n3 model*)	2,676

Search number	Terms	Totals
S7	TX (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*)	22,567
S6	TX social skill* train*	1,174
S5	TX psycholog* skill* train*	69
S4	TX cbt	675
S3	TX (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	6,287
S2	DE "COGNITIVE therapy"	0
S1	DE "BEHAVIOR modification"	8,326

MEDLINE(R) 1950 to December Week 2 2010

Ovid platform

Search number	Terms	Totals
1	Behavior Therapy/	21452
2	Cognitive Therapy/	11067
3	(cognitive adj3 (therap* or train* or techni* or modif* or factor* or question* or approach* or experiment* or assess*)).ab,kw,sh,ti.	18804
4	cbt.ab,kw,sh,ti.	2778
5	((psycholog$ or social or cognitive) adj1 (skill$ adj1 train$)).ab,kw,sh,ti.	651
6	(behavio?r* adj3 (therap* or train* or techni* or modif* or factor* or question* or approach* or experiment* or assess*)).ab,kw,sh,ti.	51635
7	((cognitive* or mental*) adj3 (map* or model*)).ab,kw,sh,ti.	11550
8	(cognitive behavio?r* adj1 (factor* or therap*)).ab,kw,sh,ti.	4610
9	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8	95090
10	Adolescent/	1383699
11	(Adolescen* or youth* or teen* or young* or juvenile*).ab,kw,sh,ti.	1705917

Search number	Terms	Totals
12	10 or 11	1705917
13	9 and 12	21534
14	(misuse or abuse* or use or addict* or depend#n$).ab,kw,sh,ti.	1189904
15	(drug* or substance*).ab,kw,sh,ti.	1650851
16	14 and 15	208181
17	((polydrug* or drug* or substance*) adj2 (misuse or use or abuse* or addict* or depend#n*)).ab,kw,sh,ti.	47479
18	13 and 16	1010
19	13 and 17	673
20	18 or 19	1010
21	Marijuana Smoking/	1829
22	amphetamine-related disorders/ or cocaine-related disorders/ or marijuana abuse/	9423
23	Narcotic*.ab,kw,sh,ti.	29571
24	Stimulan*.ab,kw,sh,ti.	16596
25	(Cannabis or Marijuana or Hashish).ab,kw,sh,ti.	14435
26	exp Cannabinoids/ or Cannabis/	12797
27	blunts.ab,kw,sh,ti.	1320
28	Designer Drugs/	537
29	(Designerdrug* or (designer adj1 drug*)).ab,kw,sh,ti.	423
30	Streetdrug*.ab,kw,sh,ti.	1
31	N-Methyl-3,4-methylenedioxyamphetamine/	2874
32	Ecstasy.ab,kw,sh,ti.	2308
33	Amphetamine/	10641
34	Methamphetamine/	5706
35	Fantasy.ab,kw,sh,ti.	4787
36	(Methamphetamin* or Amphetamin*).ab,kw,sh,ti.	30627
37	ice.ab,kw,sh,ti.	14205
38	Flatliner*.ab,kw,sh,ti.	9
39	exp cocaine/	20440

Search number	Terms	Totals
40	(Cocaine or crack).ab,kw,sh,ti.	30962
41	(free adj1 base).ab,kw,sh,ti.	1336
42	21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41	137037
43	20 or 42	137819
44	19 or 42	137568
45	13 and 43	1494
46	**limit 45 to humans downloaded**	**1440**
47	13 and 44	1243
48	limit 47 to humans	1204

PsycINFO search history

Ebsco platform, December 2010

Search number	Terms	Totals
S49	(S46 or S47) and (S45 and S48)	1371
S48	S46 or S47	458,655
S47	TI ((free n1 base) or cocaine or crack or flatliner* or ice or Methamphetamine$ or Amphetamin*or Fantasy* or Ecstasy or Streetdrug* or Designerdrug* or (designer adj1 drug*) or blunt* or Cannabis or Marijuana or Hashish or amphetamine-related blunts or Stimulan* or narcotic*) or AB ((free n1 base) or cocaine or crack or flatliner* or ice or Methamphetamine$ or Amphetamin*or Fantasy* or Ecstasy or Streetdrug* or Designerdrug* or (designer adj1 drug*) or blunt* or Cannabis or Marijuana or Hashish or amphetamine-related blunts or Stimulan* or narcotic*) or SU ((free n1 base) or cocaine or crack or flatliner* or ice or Methamphetamine$ or Amphetamin*or Fantasy* or Ecstasy or Streetdrug* or Designerdrug* or (designer adj1 drug*) or blunt* or Cannabis or Marijuana or Hashish or amphetamine-related blunts or Stimulan* or narcotic*)	45,344
S46	TI (Polydrug* or Drug* or substance* or Depend#n* or Addict*) or AB (Polydrug* or Drug* or substance* or Depend#n* or Addict*) or SU (Polydrug* or Drug* or substance* or Depend#n* or Addict*)	448,415
S45	S43 and S44	17,120

Search number	Terms	Totals
S44	TI (Young n1 men or Young n1 women or Teen* or Juvenile or Adolescen* or youth* or young person* or young adult* or Young people* or Adolescent/) or AB (Young n1 men or Young n1 women or Teen* or Juvenile or Adolescen* or youth* or young person* or young adult* or Young people* or Adolescent/) or SU (Young n1 men or Young n1 women or Teen* or Juvenile or Adolescen* or youth* or young person* or young adult* or Young people* or Adolescent/)	271,349
S43	S30 or S31 or S32 or S36 or S37 or S38 or S39 or S40 or S41 or S42	184,698
S42	TI (cognitive behavior* factor* or cognitive behavio* therap*) or AB (cognitive behavior* factor* or cognitive behavio* therap*) or SU (cognitive behavior* factor* or cognitive behavio* therap*)	19,842
S41	TI ((cognitive* n3 map*) or (cognitive* n3 model*) or (mental* n3 map*) or (mental* n3 model*)) or AB ((cognitive* n3 map*) or (cognitive* n3 model*) or (mental* n3 map*) or (mental* n3 model*)) or SU ((cognitive* n3 map*) or (cognitive* n3 model*) or (mental* n3 map*) or (mental* n3 model*))	21,946
S40	TI aggression replacement train* or AB aggression replacement train* or SU aggression replacement train*	61
S39	TI cbt or AB cbt or SU cbt	6,952
S38	TI ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*)) or AB ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*)) or SU ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*))	5,638
S37	TI ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)) or AB ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)) or SU ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*))	63,319

Search number	Terms	Totals
S36	TI ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*)) or AB ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*)) or SU ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*))	124,902
S35	TI ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*)) or AB ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*))	100,511
S34	TI ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*)) or AB ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*))	3,522
S33	TI ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)) or AB ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*))	52,454
S32	TI cbt or AB cbt	6,933
S31	DE "COGNITIVE therapy"	11,416
S30	DE "BEHAVIOR modification"	9,891
S29	(S21 or S24 or S23 or S20)	46,023
S28	(S23 or S21 or S24 or S20)	46,023
S27	(S24 or S21 or S23 or S20)	46,023
S26	(S20 or S21 or S23 or S24)	46,023
S25	SU "BEHAVIOR modification"	12,712
S24	KW (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	9,160

Search number	Terms	Totals
S23	AB (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	32,791
S22	SU (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	12,369
S21	TX (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	46,023
S20	(cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	43,253
S19	TX (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	43,316
S18	S16 not S15	3,959
S17	(S15 or S16)	72,108
S16	TX (cognitive n3 therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	72,108
S15	(cognitive n3 therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	68,149
S14	(cognitive behavio#r* n1 factor*) or (cognitive behavio#r* n1 therap*)	20,091
S13	TX (cognitive behavio#r* n1 factor*) or (cognitive behavio#r* n1 therap*)	21,517
S12	(cognitive behavio#r* n1 factor*) or (cognitive behavio#r* n1 therap*)	20,091
S11	TX (cognitive* n3 map*) or (cognitive* n3 mental*) or (mental* n3 map*) or (mental* n3 model*)	12,818
S10	(cognitive behavio#r* n1 factor*) or (cognitive behavio#r* n1 therap*)	20,091
S9	(cognitive behavio#r n1 factor*) or (cognitive behavio#r n1 therap*)	14,501
S8	(cognitive* n3 map*) or (cognitive* n3 mental*) or (mental* n3 map*) or (mental* n3 model*)	12,363

Search number	Terms	Totals
S7	TX (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*)	120,113
S6	TX social skill* train*	5,381
S5	TX psycholog* skill* train*	499
S4	TX cbt	7,092
S3	TX (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	46,023
S2	DE "COGNITIVE therapy"	11,416
S1	DE "BEHAVIOR modification"	9,891

Social Care Online Search history

January 2011

Search number	Terms	Totals
	(freetext="cognitive* therapy" or freetext="behavior* therap*" or freetext="behaviour therap*" freetext="social skill* train*" or freetext=" psycholog* skill* train*") and (freetext="drug" or freetext="substance*" or freetext="abuse" or freetext="misuse" or freetext=" Dependen*" or freetext="Addict*") and (freetext="teen*" or freetext="juvenile" or freetext="adolescen* or " freetext="youth*" or freetext="young person*" or freetext="young adult*" or freetext="young people*")	

SocINDEX Search History 06-12-2010

Ebsco host

Search number	Terms	Totals
S49	(S46 or S47) and (S45 and S48)	441
S48	S46 or S47	68,396
S47	TI ((free n1 base) or cocaine or crack or flatliner* or ice or Methamphetamine$ or Amphetamin*or Fantasy* or Ecstasy or Streetdrug* or Designerdrug* or (designer adj1 drug*) or blunt* or Cannabis or Marijuana or Hashish or amphetamine-related blunts or Stimulan* or narcotic*) or AB ((free n1 base) or cocaine or crack or flatliner* or ice or Methamphetamine$ or Amphetamin*or Fantasy* or Ecstasy or Streetdrug* or Designerdrug* or (designer adj1 drug*) or blunt* or Cannabis or Marijuana or Hashish or amphetamine-related blunts or Stimulan* or narcotic*) or SU ((free n1 base) or cocaine or crack or flatliner* or ice or Methamphetamine$ or Amphetamin*or Fantasy* or Ecstasy or Streetdrug* or Designerdrug* or (designer adj1 drug*) or blunt* or Cannabis or Marijuana or Hashish or amphetamine-related blunts or Stimulan* or narcotic*)	8,188
S46	TI (Polydrug* or Drug* or substance* or Depend#n* or Addict*) or AB (Polydrug* or Drug* or substance* or Depend#n* or Addict*) or SU (Polydrug* or Drug* or substance* or Depend#n* or Addict*)	66,161
S45	S43 and S44	2,430
S44	TI (Young n1 men or Young n1 women or Teen* or Juvenile or Adolescen* or youth* or young person* or young adult* or Young people* or Adolescent/) or AB (Young n1 men or Young n1 women or Teen* or Juvenile or Adolescen* or youth* or young person* or young adult* or Young people* or Adolescent/) or SU (Young n1 men or Young n1 women or Teen* or Juvenile or Adolescen* or youth* or young person* or young adult* or Young people* or Adolescent/)	82,403
S43	S30 or S31 or S32 or S36 or S37 or S38 or S39 or S40 or S41 or S42	15,454
S42	TI (cognitive behavior* factor* or cognitive behavio* therap*) or AB (cognitive behavior* factor* or cognitive behavio* therap*) or SU (cognitive behavior* factor* or cognitive behavio* therap*)	737
S41	TI ((cognitive* n3 map*) or (cognitive* n3 model*) or (mental* n3 map*) or (mental* n3 model*)) or AB ((cognitive* n3 map*) or (cognitive* n3 model*) or (mental* n3 map*) or (mental* n3 model*)) or SU ((cognitive* n3 map*) or (cognitive* n3 model*) or (mental* n3 map*) or (mental* n3 model*))	1,398
S40	TI aggression replacement train* or AB aggression replacement train* or SU aggression replacement train*	31
S39	TI cbt or AB cbt or SU cbt	257
S38	TI ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*)) or AB ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*)) or SU ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*))	236

Search number	Terms	Totals
S37	TI ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)) or AB ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)) or SU ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*))	3,186
S36	TI ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*)) or AB ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*)) or SU ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*))	11,845
S35	TI ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*)) or AB ((behavio#r* n3 therap*) or (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*))	8,888
S34	TI ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*)) or AB ((psycholog* skill* train*) or (cognitive skill*train*) or (social skill* train*))	236
S33	TI ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)) or AB ((cognitive n3 Therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*))	2,817
S32	TI cbt or AB cbt	257
S31	DE "COGNITIVE therapy"	768
S30	DE "BEHAVIOR modification"	1,061
S29	(S21 or S24 or S23 or S20)	15,767

Search number	Terms	Totals
S28	(S23 or S21 or S24 or S20)	15,767
S27	(S24 or S21 or S23 or S20)	15,767
S26	(S20 or S21 or S23 or S24)	15,767
S25	SU "BEHAVIOR modification"	1,091
S24	KW (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	29
S23	AB (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	1,900
S22	SU (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	5
S21	TX (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	15,767
S20	(cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	2,090
S19	TX (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	3,264
S18	S16 not S15	17,463
S17	(S15 or S16)	20,728
S16	TX (cognitive n3 therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	20,728
S15	(cognitive n3 therap*) or (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	3,265
S14	(cognitive behavio#r* n1 factor*) or (cognitive behavio#r* n1 therap*)	710
S13	TX (cognitive behavio#r* n1 factor*) or (cognitive behavio#r* n1 therap*)	4,860

Search number	Terms	Totals
S12	(cognitive behavio#r* n1 factor*) or (cognitive behavio#r* n1 therap*)	710
S11	TX (cognitive* n3 map*) or (cognitive* n3 mental*) or (mental* n3 map*) or (mental* n3 model*)	8,801
S10	(cognitive behavio#r* n1 factor*) or (cognitive behavio#r* n1 therap*)	710
S9	(cognitive behavio#r n1 factor*) or (cognitive behavio#r n1 therap*)	182
S8	(cognitive* n3 map*) or (cognitive* n3 mental*) or (mental* n3 map*) or (mental* n3 model*)	918
S7	TX (behavio#r* n3 train*) or (behavio#r* n3 techni*) or (behavio#r* n3 modif*) or (behavio#r* n3 factor*) or (behavio#r* n3 question*) or (behavio#r* n3 approach*) or (behavio#r* n3 experiment*) or (behavio#r* n3 assess*)	47,887
S6	TX social skill* train*	2,536
S5	TX psycholog* skill* train*	278
S4	TX cbt	1,463
S3	TX (cognitive n3 train*) or (cognitive n3 techni*) or (cognitive n3 modif*) or (cognitive n3 factor*) or (cognitive n3 question*) or (cognitive n3 approach*) or (cognitive n3 experiment*) or (cognitive n3 assess*)	15,767
S2	DE "COGNITIVE therapy"	768
S1	DE "BEHAVIOR modification"	1,061

Web of Science December 2010

Social Science Citation Index, Science Citation Index

Search number	Terms	Totals
# 19	#18 AND #9 Databases=SCI-EXPANDED, SSCI Timespan=All Years	2,270
# 18	#16 OR #12 Databases=SCI-EXPANDED, SSCI Timespan=All Years	>100,000
# 17	#16 OR #13 Databases=SCI-EXPANDED, SSCI Timespan=All Years	>100,000

Search number	Terms	Totals
# 16	Topic=(Narcotic* or Stimulan* or Cannabis or Marijuana or Hashish or blunts or Designerdrug* or "designer drug*" or Streetdrug* or N-Methyl-3,4-methylenedioxyamphetamine or Ecstasy or Fantasy or Methamphetamin* or Amphetamin* or ice or flatliner* or Cocaine or crack or "free base") Databases=SCI-EXPANDED, SSCI Timespan=All Years	>100,000
# 15	#13 AND #9 Databases=SCI-EXPANDED, SSCI Timespan=All Years	1,215
# 14	#12 AND #9 Databases=SCI-EXPANDED, SSCI Timespan=All Years	1,678
# 13	Topic=((polydrug* or drug* or substance*) same (misuse or abuse* or addict* or dependen* or dependan*)) Databases=SCI-EXPANDED, SSCI Timespan=All Years	71,024
# 12	#11 AND #10 Databases=SCI-EXPANDED, SSCI Timespan=All Years	>100,000
# 11	Topic=(misuse or abuse* or addict* or dependen* or dependan*) Databases=SCI-EXPANDED, SSCI Timespan=All Years	>100,000
# 10	Topic=(polydrug* or drug* or substance*) Databases=SCI-EXPANDED, SSCI Timespan=All Years	>100,000
# 9	#8 AND #7 Databases=SCI-EXPANDED, SSCI Timespan=All Years	22,083
# 8	Topic=(Adolescen* or youth* or teen* or young*or juvenile) Databases=SCI-EXPANDED, SSCI Timespan=All Years	>100,000
# 7	#6 OR #5 OR #4 OR #3 OR #2 OR #1 Databases=SCI-EXPANDED, SSCI Timespan=All Years	>100,000

Search number	Terms	Totals
# 6	Topic=(("cognitive behavior*" or "cognitive behaviour*") same (factor* or therap*)) Databases=SCI-EXPANDED, SSCI Timespan=All Years	9,219
# 5	Topic=(((cognitive* or mental*) same (map* or model*))) Databases=SCI-EXPANDED, SSCI Timespan=All Years	22,947
# 4	Topic=((psycholog* or social or cognitive) same (skill* same train*)) Databases=SCI-EXPANDED, SSCI Timespan=All Years	2,128
# 3	Topic=(cbt) Databases=SCI-EXPANDED, SSCI Timespan=All Years	3,735
# 2	Topic=((cognitive same (therap* or train* or techni* or modif* or factor* or question* or approach* or experiment* or asses*))) Databases=SCI-EXPANDED, SSCI Timespan=All Years	52,514
# 1	Topic=((behavi$r* same (therap* or train* or techni* or modif* or factor* or question* or approach* or experiment* or asses*))) Databases=SCI-EXPANDED, SSCI Timespan=All Years	>100,000

Nordic Databases

Bibliography of Nordic Criminology (up to summer 2008)

Search number	Terms	Totals
	(CBT OR Cognitiv? OR kognitiv?) AND (barn? OR Børn? OR Unge OR Unga OR Teen? OR Tonår?)	46

Bibliotek.dk search history

January 2011

Search number	Terms	Totals
	ma=(ap eller tr eller (fag1 og bå)) OG (KE=Adfærdsterapi)	285

Search number	Terms	Totals
	Ma=(ap eller tr eller (fag1 og bå)) OG KE=Kognitiv terapi	354
	Ma=(ap eller tr eller (fag1 og bå)) OG (kognitiv? OG (terapi? ELLER træning ELLER teknik? ELLER ændring? ELLER spørgsmål ELLER tilgang ELLER eksperiment?))	726
	Ma=(ap eller tr eller (fag1 og bå)) OG CBT	94
	Ma=(ap eller tr eller (fag1 og bå)) OG (træn? OG (psyk? færdighed?))	1
	Ma=(ap eller tr eller (fag1 og bå)) OG (træn? OG (social? færdighed?))	33
	Ma=(ap eller tr eller (fag1 og bå)) OG (træn? OG (kogniv? færdighed?))	0
	Ma=(ap eller tr eller (fag1 og bå)) OG (adfærd? OG (terapi? ELLER træning ELLER teknik? ELLER ændring? ELLER spørgsmål ELLER tilgang ELLER eksperiment?))	885
	Ma=(ap eller tr eller (fag1 og bå)) OG vredeshåndtering	0
	Ma=(ap eller tr eller (fag1 og bå)) OG ((kognitiv? ELLER mental?) OG (map ELLER kort ELLER model))	485
	Ma=(ap eller tr eller (fag1 og bå)) OG (kognitiv adfærdsterapi)	138
	Ma=(ap eller tr eller (fag1 og bå)) OG (kognitiv? adfærdsfaktor?)	0
	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12	*2053*
	Ma=(ap eller tr eller (fag1 og bå)) OG (KE=(ungdom? ELLER pubertet? ELLER teenager? ELLER adolescens))	13025
	Ma=(ap eller tr eller (fag1 og bå)) OG (unge mennesker)	236
	Ma=(ap eller tr eller (fag1 og bå)) OG (unge voksne)	126
	Ma=(ap eller tr eller (fag1 og bå)) OG (unge personer)	20
	Ma=(ap eller tr eller (fag1 og bå)) OG Ungdom?	36582
	Ma=(ap eller tr eller (fag1 og bå)) OG (ung? ELLER pubertet? ELLER teenager?)	84012
	Ma=(ap eller tr eller (fag1 og bå)) OG mindreårig?	86
	Ma=(ap eller tr eller (fag1 og bå)) OG teen?	2351
	Ma=(ap eller tr eller (fag1 og bå)) OG (ung? OG (m#nd ELLER kvinde?))	2909
		84905
		168
	Ma=(ap eller tr eller (fag1 og bå)) OG (afhængig ELLER misbrug? Eller afhængighed)	4054

Search number	Terms	Totals
	Ma=(ap eller tr eller (fag1 og bå)) OG (afhængig?)	1544
	Ma=(ap eller tr eller (fag1 og bå)) OG substans	86
	Ma=(ap eller tr eller (fag1 og bå)) OG (drug? ELLER stof?)	23420
	Ma=(ap eller tr eller (fag1 og bå)) OG (polydrug? ELLER blandingsmisbrug)	18
		23513
	Ma=(ap eller tr eller (fag1 og bå)) OG KE=marijuana	32
	-	
	Ma=(ap eller tr eller (fag1 og bå)) OG narko?	3562
	Ma=(ap eller tr eller (fag1 og bå)) OG (stimulans ELLER nydelsesmiddel)	77
	Ma=(ap eller tr eller (fag1 og bå)) OG (cannabis ELLER marijuana ELLER hash?)	1726
	Ma=(ap eller tr eller (fag1 og bå)) OG (KE=cannabinoids ELLER KE=cannabis)	71
	Ma=(ap eller tr eller (fag1 og bå)) OG (hashish ELLER hash)	432
	Ma=(ap eller tr eller (fag1 og bå)) OG (sløv? mid?)	0
	Ma=(ap eller tr eller (fag1 og bå)) OG KE=designer drugs	24
	Ma=(ap eller tr eller (fag1 og bå)) OG (Designerdrug? ELLER (designer OG drug?))	53
	Ma=(ap eller tr eller (fag1 og bå)) OG (streetdrug ELLER (gade OG (stof? ELLER drug?)))	12
	-	
	Ma=(ap eller tr eller (fag1 og bå)) OG ecstasy	347
	Ma=(ap eller tr eller (fag1 og bå)) OG KE=amfetamin	42
	-	
	Ma=(ap eller tr eller (fag1 og bå)) OG Fantasy	2271
	Ma=(ap eller tr eller (fag1 og bå)) OG (metamfetamin? ELLER amfetamin?)	104
	Ma=(ap eller tr eller (fag1 og bå)) OG (ice ELLER is)	51561
	Ma=(ap eller tr eller (fag1 og bå)) OG flatliner	0
	Ma=(ap eller tr eller (fag1 og bå)) OG KE=kokain	86

Search number	Terms	Totals
	Ma=(ap eller tr eller (fag1 og bå)) OG (cocain ELLER kokain ELLER crack)	461
	Ma=(ap eller tr eller (fag1 og bå)) OG (free OG base)	38
		146
		83345
		24

Bibsys search history
January 2011

Search number	Terms	Totals
	(emne = "atferdsterapi") OR (emne = "atferd terapi") OR (emne = "atferdsbehandling")	739
	emne = "kognitiv terapi" OR emne = "cognitiv therapy"	598
	((bd = "terapi") OR (bd = "metode") OR (bd = "faktor?") OR (bd = "forhold") OR (bd = "spørsmål?") OR (bd = "tilnærm?") OR (bd = "eksperiment") OR (bd = "forsøk") OR (bd = "vurder?")) AND (bd = "kognitiv")	835
	((bd = "terapi") OR (bd = "metode") OR (bd = "faktor?") OR (bd = "forhold") OR (bd = "spørsmål?") OR (bd = "tilnærm?") OR (bd = "eksperiment") OR (bd = "forsøk") OR (bd = "vurder?")) AND (bd = "atferd?")	1033
	(bd = "cognitive behavio?r? therap?") OR (bd = "kognitiv? atferdsterapi?") OR (bd = "kognitiv? atferd terapi") OR (bd = "kognitiv? atferdsbehandling?")	794
	1 or 2 or 3 or 4 or 5	*2465*
	(emne = "adolescen?") OR (emne = "ungdom?")	26365
	(bd = "unge voksne")	419
	(bd = "teen?") OR (bd = "tenåring?")	2361
	((bd = "ung?") AND ((bd = "m?nn") OR (bd = "kvinne?")))	29788
	7 or 8 or 9 or 10	*44087*

Search number	Terms	Totals
	6 and 11	*307*
	(bd = "addict?") OR (bd = "rusmiddelmisbruk?")	3183
	(bd = "avhengig?")	1473
	(bd = "drug?") OR (bd = "stof?")	22596
	14 and 15	*243*
	13 or 15 or 16	*24635*
	6 and 11 and 17	***21***

Librisk search history

January 2011

Search number	Terms	Totals
	WAMK:"Behavio*r Therapy" OR WAMK:"beteendeterapi"	507
	WAMK:"Cognitive Therapy" OR WAMK:"kognitiv terapi"	590
	(kognitiv* SAME (terapi* OR utbilding* OR teknik* OR faktor* OR fråga* OR metod* OR försök OR bedömning))	348
	CBT	82
	utbild* SAME (psycholog* OR psykolog*) SAME färdighet*	0
	(utbild* OR trän*) SAME "social* färdighet*"	3
	(utbild* OR trän*) SAME "kognitiv* färdighet*"	0
	(Behavior?r* SAME therap*) OR (beteende SAME (terapi* OR utbilding* OR teknik* OR faktor* OR fråga* OR metod* OR försök OR bedömning))	52
	Aggression ADJ replacement ADJ train*	17
	((cognitive* OR mental) SAME (map* OR model*)) OR ((kognitiv* OR mental) SAME (model* OR kart*))	638
	(cognitive ADJ behavior?r ADJ therapy) OR (kognitiv* SAME beteendeterapi*)	220

Search number	Terms	Totals
	(cognitive ADJ behavior?r ADJ factor*) OR (kognitiv* SAME beteende SAME factor*)	0
		1727
	(WAMK:"adolescen*" OR WAMK:"ungdom*")	11983
	Ungdom*	80074
	(Unga ADJ vuxna)	420
	Adolescen*	6851
	(Teen* OR tonåring*)	4291
	(ung* ADJ (män OR man* OR kvinn*))	1223
		87666
		154
	(Addict* OR misbruk*)	2149
	Bero*	4005
	(Drug* OR drog*)	25861
		142
		26921
		13
	(WAMK:"Marijuana Smoking")	7
	(WAMK:"amphetamine-related disorders*") OR (WAMK:"cocaine-related disorders*") OR (WAMK:"marijuana abuse")	41
	Narko*	6380
	Stimulan*	664
	(Cannabis OR Marijuana OR Hashish OR hasch)	416
	((WAMK:"canabinoids") OR (WAMK:”cannabis”))	164
	wamk:"designer drug*"	10
	(”Designer Drug*” OR (designer SAME drug*))	18
	Streetdrug*	0
	Ecstasy	269
	(wamk:"amphetamine" OR wamk:"amfetamin*")	36

Search number	Terms	Totals
	(Metaamphetamin OR amfetamin OR metamfetamin)	27
	(wamk:"cocaine" OR wamk:"kokain")	131
	(cocain OR crack)	679
		9945
		14

11.2 STUDY ELIGIBILITY SCREENING (LEVEL ONE & TWO)

Screening level one (on the basis of titles and abstracts)

Reference id.no.
Study id. no.
Reviewer's initials
Year of publication:
Author:

1. **Is the report about a CBT intervention?**
   Yes
   No (if no stop here and exclude)
   Uncertain

2. **Are the participants 13 to 21 years of age?**
   Yes
   No (if no stop here and exclude)
   Uncertain

3. **Are the participants in outpatient drug treatment for non- opioid drug use?**
   Yes
   No (if no stop here and exclude)
   Uncertain

The report reference is excluded if one of the answers to question 1 to 3 are no.
If the answers are yes or uncertain the full report is retrieved for second level screening. All uncertain questions for 1-3 need to be posed again based on the full text. If information is not available or the report is unclear report authors will be contacted to clarify study eligibility.
Additional questions for second level screening, questions 4 - 7

4. **Is the report a ?**
   Primary study (that is a CBT outcome evaluation)
   Review
   Descriptive or case study
   Theoretical or position paper editorial or book review
   Treatment manual or guidelines for practice
   Other

5. **Is the report a RCT study (with a control groups that is TAU, alternative intervention or no intervention)?**
   Yes
   No
   Uncertain

6. **Is the report a non-randomised controlled study (with a control group that is TAU, alternative intervention, or no intervention)?**
   Yes
   No
   Uncertain

7. **Is the study?**
   Included
   Excluded
   Uncertain (state reason)

11.3 DATA EXTRACTION

Study design

1. **How were comparison/control groups formed?**
   Random assignment
   Other (specify)

2. **If random assignment, specify design**
   Simple/systematic (individuals/families)
   Stratified/blocked (identify stratifying variables)
   Yoked pairs (created by timing of enrolment into the study)
   Matched pairs (identify matching variables)
   Cluster (group) randomised
   Other (specify)
   Can't tell

3. **Who performed group assignment**?
   Research staff
   Clinical staff
   Can't tell
   Other (specify)

4. **How was random assignment performed?**
   Computer generated
   Random numbers table
   Coins or dice
   Other (describe)
   Can't tell

5. **How many separate sites were included in the study?**
   One
   Two
   Three
   Specify number

6. **Was random assignment performed in the same way in all sites**
   Yes

No (explain)
Can't tell

7. **How many intervention groups were there? (CBT counts as one)**
   One (CBT)
   Two (CBT plus what?)
   Three (CBT plus what?)

8. **How many intervention groups are relevant for this review?**
   One (CBT)
   More than one (explain)

9. **How many *different* control/comparison groups were there? (i.e., groups that received different treatments, not counting multiple sites)**
   One
   Two or more (explain)

10. **How many control/comparison groups are relevant for this review?**
    One
    More than one (explain)

11. **Study sample size**

N's	CBT1*	COMPARISON1*	TOTAL	Pg. # & NOTES
Referred to study				
Consented				
Completed base line measures				
Randomly assigned Or non randomly allocated				
Started treatment				
Completed treatment				
Completed first measure after baseline				
Completed 1st follow up				
Completed 2nd follow up(add rows for as required for additional follow ups)				

* Add columns for additional intervention and control/comparison groups.

Participant/sample Characteristics:

12. **Was participant inclusion criteria mentioned?**
    No
    Yes (describe & cite pg#)

13. **Was participant exclusion criteria mentioned?**
    No
    Yes (describe & cite pg#)

14. Participant Characteristics

	CBT*	CONTROL*	TOTAL	Pg. # & NOTES
Gender (e.g. % male)				
Youth Ages				
Race/ethnicity				
Socioeconomic status				
Profession				
Family composition				
Other characteristics				

* Add columns for additional intervention and control/comparison groups.

15. Specify and describe type of drug use

Cannabis
Cocaine
Amphetamine
Combination (specify, pg. #)
Other (specify, pg. #)

16. Were there any differences between intervention and comparison groups at baseline (For NRCT only)?

No
Yes (describe differences & cite pg#)
Unclear

17. Was there any analysis of differences between completers and dropouts in the intervention group and/or comparison group?

No
Yes (describe differences & cite pg#)
Unclear

18. Was there any analysis of differences between completers and dropouts in the intervention group and/or comparison group?

No
Yes (pg. # & describe)
Unclear

19. Was intention to treat analysis used?

No
Yes (pg. # & describe)
If yes is this a true ITT analysis
Unclear

Settings

20. Location of interventions (check all that apply)

Urban
Suburban
Rural
Can't tell

21. Location details (city, state, country)

Primary service sector
Mental Health
Child Welfare
Other (specify)

21. A Referred by?

School
Social worker
Juvenile justice system
Family
Other (specify)

22. CBT Characteristics

	Min	Max	Mean	SD	Pg# & Notes
Duration in Days Weeks Months					
Hours of contact Per week Per month Other (explain)					
Total hours of contact					

23. Was the CBT?
Group based
Individual
Combination

24. Other characteristics of CBT

25. Characteristics of treatment staff (education, demographics, etc.)

26. Describe methods used to insure quality of CBT (supervision, training, consultation)

27. Is there any information on adherence (fidelity) to CBT?
Yes (describe)
No
Not sure

28. If multiple sites, were there any implementation differences between sites?
Yes (describe differences)
No (how do we know?)
Can't tell

Services provided to control cases

29. Type of control group
Usual services (treatment as usual)
Alternative service (describe)
No service

30. Describe services provided to control group

31. Characteristics of staff that provided services to control/comparison groups (education, demographics, etc.)

Outcome measures

32. When were data collected? (check all that apply)

Baseline
Post-tx
1st follow-up (when?)
2nd follow-up (when?)
3rd follow-up (when?)
4th follow-up (when?)
5th follow-up (when?)
Other

33. Who conducted interviews?

Research staff
Clinical staff
Both
No interviews

34. Were data collected in the same manner for CBT and control groups?

Yes
No (what were the differences?)
Can't tell

35. Analysis

Describe how the authors deal with ITT?

Did they use ITT and if yes was the approach used adequate (i.e., was it a true ITT) (specify) ?
Yes
No
Can't tell

Outcome measures

Instructions: Please enter outcome measures in the order in which they are described in the report. Note that a single outcome measure can be completed by multiple sources and at multiple points in time (data from specific sources and time-points will be entered later).

#	Outcome & measure	Reliability & Validity	Format	Direction	Source	Mode Admin	Blind (outcome assessors)?	Pg# & notes
		Info from: Other samples This sample Unclear Info provided:	Dichotomy Continuous	High score or event is Positive Negative Can't tell	Youth Parent Teacher Clinician Admin data Other Unclear	Self-admin Interview Other	Yes No Can't tell	

* Repeat as needed

DICHOTOMOUS OUTCOME DATA

OUTCOME	TIME POINT (record exact time taken from baseline	SOURCE	VALID Ns	N W/ EVENT	% WITH EVENT	STATISTICS	Pg. # & NOTES
	•1st measure after baseline •1st follow-up • 2nd follow-up • 3rd follow-up •4th follow-up • other	• youth • parent • teacher • clinician • admin data • other (specify)	CBT Comparison	CBT Comparison	CBT Comparison	Risk ratio OR (odd ratio) 95% CI DF P- value (enter exact p value if available) Chi2 Other Covariates (control variables)	

* Repeat as needed

CONTINUOUS OUTCOME DATA

Enter change and gain scores under Statistics (Other)

OUTCOME	TIME POINT (record exact time taken from baseline	SOURCE (specify)	VALID Ns	Means	SDs	STATISTICS	Pg. # & NOTES
	•1st measure after baseline •1st follow-up • 2nd follow-up • 3rd follow-up •4th follow-up • other	• youth • parent • teacher • clinician •admin data • other (specify)	CBT Comparison 	CBT Comparison 	CBT Comparison 	P t F Df ES Covariates Other	

11.4 RISK OF BIAS TOOL

Item	Judgement[a]	Description (quote from paper, or describekey information)
1. Sequence generation		Automatically high for NRCT
2. Allocation concealment		
3. Confounding[b,]		
4. Blinding?[b]		
5. Incomplete outcome data addressed?[b]		
6. Free of selective reporting?[b]		
7. Free of other bias?		
*8. A priori*protocol?[d]		
9. A priori analysis plan?[e]		

[a] Some items on low/high risk/unclear scale (double-line border), some on 5 point scale/unclear (single line border), some on yes/no/unclear scale (dashed border). For all items, record "unclear" if inadequate reporting prevents a judgement being made.

[b] For each outcome in the study.

[c] This item is based on list of confounders considered important at the outset and defined in the protocol for the review (*assessment against worksheet*).

[d] Did the researchers write a protocol defining the study population, intervention and comparator, primary and other outcomes, data collection methods, etc. in advance of starting the study?

[e] Did the researchers have an analysis plan defining the primary and other outcomes, statistical methods, subgroup analyses, etc. in advance of starting the study?

Risk of bias tool

Studies for which RoB tool is intended

The risk of bias model is developed by Prof. Barnaby Reeves in association with the Cochrane Non-Randomised Studies Methods Group.[25] This model, an extension of the Cochrane Collaboration's risk of bias tool, covers both risk of bias in randomised controlled trials (RCTs and QRCTs), but also risk of bias in non-randomised studies (in this case non-randomised controlled trials NRCTs).

The point of departure for the risk of bias model is the Cochrane Handbook for Systematic Reviews of interventions (Higgins & Green, 2008). The existing Cochrane risk of bias tool needs elaboration when assessing non-randomised studies because, for non-randomised studies, particular attention should be paid to selection bias / risk of confounding.

[25]This risk of bias model was introduced by Prof. Reeves at a workshop on risk of bias in non-randomised studies at SFI Campbell, February 2011. The model is a further development of work carried out in the Cochrane Non-Randomised Studies Method Group (NRSMG).

Assessment of risk of bias

Issues when using modified RoB tool to assess included non-randomised studies:

- Use existing principle: score judgement and provide information (preferably direct quote) to support judgement
- Additional item on confounding used for RCTs and NRCTs.
- 5-point scale for some items (distinguish "unclear" from intermediate risk of bias).
- Keep in mind the general philosophy – assessment is not about whether researchers could have done better but about risk of bias; the assessment tool must be used in a standard way whatever the difficulty / circumstances of investigating the research question of interest and whatever the study design used.
- Anchors: "1/No/low risk" of bias should correspond to a high quality RCT. "5/high risk" of bias should correspond to a risk of bias that means the findings should not be considered (too risky, too much bias, more likely to mislead than inform)

1. Sequence generation

- Low/high/unclear RoB item
- Always high RoB (not random) for a non-randomised study
- Might argue that this item redundant for NRS since always high – but important to include in RoB table ('level playing field' argument)

2. Allocation concealment

- Low/high/unclear RoB item
- Potentially lowRoB for a non-randomised study, e.g. quasi-randomised (so high RoB to sequence generation) but concealed (reviewer judges that the people making decisions about including participants didn't know how allocation was being done, e.g. odd/even date of birth/hospital number)

3. RoB from confounding (assess for each outcome)

- Assumes a pre-specified list of potential confounders defined in the protocol
- Low(1) / 2 / 3 / 4 / high(5) / unclear RoB item
- Judgement needs to factor in:
    - proportion of confounders (from pre-specified list) that were considered
    - whether most important confounders (from pre-specified list) were considered
    - resolution/precision with which confounders were measured
    - extent of imbalance between groups at baseline
    - care with which adjustment was done (typically a judgement about the statistical modeling carried out by authors)
- Low RoB requires that all important confounders are balanced at baseline (not primarily/not only a statistical judgement OR measured 'well' and 'carefully' controlled for in the analysis.

Assess against pre-specified worksheet. Reviewers will make a RoB judgement about each factor first and then 'eyeball' these for the judgement RoB table.

4. RoB from lack of blinding (assess for each outcome, as per existing RoB tool)

- Low(1) / 2 / 3 / 4 / high(5) / unclear RoB item
- Judgement needs to factor in:
    - nature of outcome (subjective / objective; source of information)
    - who was / was not blinded and the risk that those who were not blinded could introduce performance or detection bias
    - see Ch.8

5. RoB from incomplete outcome data (assess for each outcome, as per existing RoB tool)

- Low(1) / 2 / 3 / 4 / high(5) / unclear RoB item
- Judgement needs to factor in:
    - reasons for missing data

- whether amount of missing data balanced across groups, with similar reasons
- see Ch.8

6. RoB from selective reporting (assess for each outcome, NB different to existing Ch.8 recommendation)

- Low(1) / 2 / 3 / 4 / high(5) /unclear RoB item
- Judgement needs to factor in:
  - existing RoB guidance on selective outcome reporting
  - see Ch.8
  - also, extent to which analyses (and potentially other choices) could have been manipulated to bias the findings reported, e.g. choice of method of model fitting, potential confounders considered / included
  - look for evidence that there was a protocol in advance of doing any analysis / obtaining the data (difficult unless explicitly reported); NRS very different from RCTs. RCTs must have a protocol in advance of starting to recruit (for REC/IRB/other regulatory approval); NRS need not (especially older studies)
  - Hence, separate yes/no items asking reviewers whether they think the researchers had a pre-specified protocol and analysis plan.

Confounding Worksheet

Assessment of how researchers dealt with confounding	
Method for *identifying* relevant confounders described by researchers: yes no If yes, describe the method used:	☐ ☐
Relevant confounders described: yes no List confounders described on next page	☐ ☐
Method used for controlling for confounding At design stage (e.g. matching, regression discontinuity, instrument variable): .... At analysis stage (e.g. stratification, multivariate regression, difference-indifference): .... Describe confounders controlled for below	

Confounders described by researchers

Tick (yes[0]/no[1] judgement) if confounder considered by the researchers [Cons'd?]

Score (1[good precision] to 5[poor precision]) precision with which confounder measured

Score (1[balanced] to 5[major imbalance]) imbalance between groups

Score (1[very careful] to 5[not at all careful]) care with which adjustment for confounder was carried out

Confounder	Considered	Precision	Imbalance	Adjustment
Gender	☐	☐	☐	☐
Age	☐	☐	☐	☐
History of drug use	☐	☐	☐	☐
Other	☐	☐	☐	☐
Other:	☐	☐	☐	☐
Other:	☐	☐	☐	☐

11.5 RISK OF BIAS JUDGEMENT, INDIVIDUAL STUDIES

Table 14.1: Dennis et al., 2004

Bias	Author's judgement	Support for judgement
Sequence generation	Low risk	"Within each site, eligible adolescents were assigned to one of the three local conditions using a randomly ordered list that was generated by independent research staff at the coordinating center using Microsoft Excel." (p.206) "Within each site, eligible adolescents were assigned randomly (...) based on their sequence of admission using a randomly ordered list of assignments. This was undertaken instead of simple random assignment in order to allow rapid group formation and to counterbalance any temporal shifts in recruitment strategies or casemix." (Protocol, p. 25)
Allocation concealment	Low risk	" Assignment logs were kept in a locked file cabinet and were never accessible to clinical staff." (p. 206)
Blinding – outcome assessors?		"Intake and 3,-6, -9, and 12 month follow-up interviews were conducted by research staff" (p. 206) "The participants characteristics, diagnoses, and primary outcomes were measured with a standardised interview" (p. 204) *The outcomes are given unclear as it is not possible to conclude whether the outcome assessors were blinded or not.*
Abstinence or reduction of drug use – biochemical test	*Unclear*	*
Abstinence or reduction of drug use – self reported estimates	*Unclear*	*
Abstinence or reduction of drug use – psychometric scales	*Unclear*	*
Abstinence or reduction of drug	Unclear	*

use – overall judgement		
Social functioning and family functioning	Not relevant	Not relevant
Education or vocational involvement	Not relevant	Not relevant
Retention	Unclear	*
Risk behaviour	Not relevant	Not relevant
Other adverse effects	Not relevant	Not relevant
Incomplete outcome data addressed?		"Of the 600 adolescents randomised, one or more follow-up interviews were completed on 99% (n=597), including 98% at 3 months, 97% at 6 months, 96% at 9 months, and 94% at 12 months." (p. 206) "(…) Analytical files were then created where the legitimately skipped items were recoded to their implied values. In order to maximize the available data and minimize bias to the mean and variance, the remaining missing items were replaced either within scales where there were sufficient data from the individual or through hot deck imputation." (Protocol, p. 27) Intent-to-treat was design used. (p. 206) "Days of abstinence (from cannabis, alcohol and other drugs) were summed across all four quarterly follow-up waves, using the adolescent's average days abstinent to fill in any missing values." (p. 205) Treatment completion indicated in table 3, p. 205. Trial 2: MET/CBT5: 60%, ACRA: 61%, MDFT: 71%. *The outcomes, other than urinalysis, are given 2 as there is very little missing data but unfortunately we cannot distinguish the missing data between trial 1 and 2.The urinalysis is given 3 as this outcome has around 10 % missing data.*
Abstinence or reduction of drug use – biochemical test	*3*	*"Collateral interviews and urine test data were obtained on over 90% of the adolescents who were not incarcerated." (Protocol, p. 26)*
Abstinence or reduction of drug	*2*	*"Days of abstinence (from cannabis, alcohol and other drugs) were summed across all four quarterly follow-up waves, using the*

use – self reported estimates		*adolescent's average days abstinent to fill in any missing data." (p.205)* *Recovery: "For the 6% of the adolescents who did not complete their 12-month interview, data from their previous follow-up interview was used to determine their recovery status." (p. 206)*
Abstinence or reduction of drug use – psychometric scales	*2*	*
Abstinence or reduction of drug use – overall judgement	2	*
Social functioning and family functioning	Not relevant	Not relevant
Education or vocational involvement	Not relevant	Not relevant
Retention	Unclear	-
Risk behaviour	Not relevant	Not relevant
Other adverse effects	Not relevant	Not relevant
Free of selective reporting?		*The urinalysis outcome is given 3 as the measurement, and thereby data collection is made but the results are reported inappropriately.* *Outcomes for social functioning and family functioning and education or vocational involvement are given 3 as these are mentioned in the protocol but not in the final study (apparently no data collection has been made for these outcomes).* *Other outcomes are given 1 as they are reported carefully.*
Abstinence or reduction of drug use – biochemical test	*3*	*The urinalysis outcomes are not explicitly reported - however selfreportings vs. on-site-tests are (e.g. p. 23-24 in Protocol).*
Abstinence or reduction of drug use – self reported estimates	*1*	*(See p. 207-208 + appendix)*
Abstinence or reduction of drug	*1*	*Only reported in appendix*

use – psychometric scales		
Abstinence or reduction of drug use – overall judgement	1	*
Social functioning and family functioning	3	(See p. 207-208 + appendix) The study protocol mentions emotional problems, behavioural problems, and family problems as outcomes but they are not considered in the final study.
Education or vocational involvement	3	The study protocol mentions school problems as an outcome but this outcome is not considered in the final study.
Retention	1	(See table 3, p. 205)
Risk behaviour	3	The study protocol mentions legal problems and victimization as outcomes but these outcomes are not considered in the final study.
Other adverse effects	Not relevant	Not relevant
Free of other bias?	1	
A priori protocol?	Yes	(Protocol: Dennis ID 853)
A priori analysis plan?	Yes	"Following the Consolidated Standards of Reporting Trials (…), all analyses were conducted with an "intent-to-treat" approach. Thus all adolescents were included in analyses as assigned, including approximately 5% who did not actually receive any treatment." (p. 206) The protocol mentions the outcomes for analysis and the intended design of the analyses.

* Denotes that support for judgement is described in the general risk of bias category field above.

Table 14.2: Godley et al., 2010

Bias	Author's judgement	Support for judgement
Sequence generation	Low risk	"(…) participants were (…) assigned to one of four conditions based on a randomization log, which was generated by the project manager and consisted of alternating blocks of six assignment slots to the MET/CBT7 intervention

		(due to closed groups) or CBOP. A coin was flipped to determine which treatment condition would be the initial outpatient condition. Within each block of a treatment assignment, there were alternating assignments to the continuing care conditions, with the first continuing care condition in each block also determined by a coin toss. Thus each participant was simultaneously assigned to one of the outpatient treatments and one of the continuing care conditions." (p. 48)
Allocation concealment	Low risk	"(…) a randomization log, which was generated by the project manager. (…)The randomization log was stored in a locked file cabinet in the office of research staff." (p. 48)
Blinding – outcome assessors?		"It was not possible to blind staff to condition; however, research staff with no connection to the conditions administered all follow-up interviews." (p. 48) "It was not possible to blind the research staff who collected follow-up data to participants' study condition assignment; however, separate staff were used for research interviews and treatment." (p.52) "Follow-up interviews (...) were administered by research staff with bachelor's or master's degrees. Training in the study assessments included formal training sessions, observation, feedback on audiotaped administrations until certification was achieved, and on-going monitoring with scheduled reviews of additional audiotapes." (p. 48) *The outcomes, other than retention, are given 3 as the study separated the outcome assessors from treatment assistants. However, they were not blinded.*
Abstinence or reduction of drug use – biochemical test	*Unclear*	*Not reported*
Abstinence or reduction of drug use – self reported estimates	*3*	*
Abstinence or reduction of drug use – psychometric scales	*3*	*

Abstinence or reduction of drug use – overall judgement	3	*
Social functioning and family functioning	Not relevant	Not relevant
Education or vocational involvement	Not relevant	Not relevant
Retention	4	"Clinicians recorded which therapy or case management procedure(s) were conducted with which participant, when, and the duration." (p. 49)
Risk behaviour	Not relevant	Not relevant
Other adverse effects	Not relevant	Not relevant
Incomplete outcome data addressed?	-	"There was very little missing data (i.e., less than 10% of the participants missed any given interview wave and less than 4% had missing data on any one variable), and any missing data were addressed with the mixed effects analyses, which generated estimates using restricted (by condition) maximum likelihood (...) When differences from more than one group were analysed, Cohen's effect-size f-index was calculated as the average of the absolute value of the difference between each group mean and the grand mean." (p. 49) "Follow-up rates were 97%, 96%, 93%, and 91% for each respective follow-up wave and were above 90% for each condition by wave." (p. 48) ITT-design used (p. 49) *The outcomes are given 1 as the authors clearly state the number of missing data, which is between 4-10 %. Furthermore, they use an ITT-design where the missing values were addressed properly.*
Abstinence or reduction of drug use – biochemical test	1	*
Abstinence or reduction of drug use – self reported estimates	1	*

Abstinence or reduction of drug use – psychometric scales	1	*
Abstinence or reduction of drug use – overall judgement	1	*
Social functioning and family functioning	Not relevant	Not relevant
Education or vocational involvement	Not relevant	Not relevant
Retention	Unclear	-
Risk behaviour	Not relevant	Not relevant
Other adverse effects	Not relevant	Not relevant
Free of selective reporting?		*The urinalysis outcome is given 3 as the measurement, and thereby data collection is made but the results are reported inappropriately.* *Other outcomes are given 1 as they are reported carefully.*
Abstinence or reduction of drug use – biochemical test	*3*	*"Urine samples were collected (…), and when an adolescent reported being in recovery, but the urine test result suggested a false-negative self-report, data were re-coded to show the adolescent as not being in recovery." (p. 49) (Note: results from urinalysis are however not explicitly reported although the false-negative rates are).*
Abstinence or reduction of drug use – self reported estimates	*1*	*(reported in table 3)* *(recovery status rates for the individual conditions are reported at p. 51)*
Abstinence or reduction of drug use – psychometric scales	*1*	*(reported in table 3)*
Abstinence or reduction of drug use – overall judgement	1	*

Social functioning and family functioning	Not relevant	Not relevant
Education or vocational involvement	Not relevant	Not relevant
Retention	1	(reported in table 2)
Risk behaviour	Not relevant	Not relevant
Other adverse effects	Not relevant	Not relevant
Free of other bias?	2	"(…) some adolescents participated in other mental health treatment (e.g. counseling and/or medication management)." (p. 48)
A priori protocol?	Yes	This study was registered at clinicaltrials.gov with a description of the interventions, the outcomes and the eligible participants (no description of analysis plan).
A priori analysis plan?	Unclear	Intent-to-treat analysis (p. 45). The protocol mentions the outcomes but not the analyses plans.

* Denotes that support for judgement is described in the general risk of bias category field above.

Table 14.3: Hendriks et al., 2011

Bias	Author's judgement	Support for judgement
Sequence generation	Low risk	"(…) eligible patients were randomly allocated (1:1) by our research group to outpatient CBT (control group; n = 54) or MDFT (experimental group; n = 55) by using a computer-generated randomization list. Randomization (…) was prestratified for age, gender, ethnicity and frequency of cannabis use, using blocks of two patients." (p. 65)
Allocation concealment	Low risk	"Randomization was concealed (…)" (p. 65)
Blinding – outcome assessors?		"Study assessments were conducted by trained research assistents who used standardized instruments to minimize information bias." (p. 65) From Rigter et al. (2011): "Questionnaires were self-administered by the adolescent or the parent, or if required completed with the assistance of a researcher, who had been trained by INCANT project staff and was working under the guidance of three instruction manuals." (p. 28)

		"Research staff were unaware of treatment condition when carrying out assessments and analysing outcomes." (p. 4 in journal edition) *The outcome, other than retention, are given 1 as it is clear from the text that outcome assessors were blinded*
Abstinence or reduction of drug use – biochemical test	Unclear	"Questionnaires were self-administered by the adolescent or the parent, or if required completed with the assistance of a researcher, who had been trained by INCANT project staff and was working under the guidance of three instruction manuals." (p. 28) "Research staff were unaware of treatment condition when carrying out assessments and analysing outcomes." (p. 4 in journal edition) *The outcome, other than retention, are given 1 as it is clear from the text that outcome assessors were blinded.*
Abstinence or reduction of drug use – self reported estimates	*1*	*
Abstinence or reduction of drug use – psychometric scales	*1*	*
Abstinence or reduction of drug use – overall judgement	*1*	*
Social functioning and family functioning	1	*
Education or vocational involvement	1	*
Retention	4	For one of the retention measures it is clearly stated: "Treatment completion as defined by therapist" (Table 3, p. 69).
Risk behaviour	1	*
Other adverse effects	Not relevant	Not relevant
Incomplete outcome data addressed?		"Missing data at month 3, 6, and 12 were estimated by means of multiple imputation procedure, using five imputed datasets." (p. 66).

		MDFT: 1 did not start treatment - 3 lost to follow-up at month 12 - 44 completed intervention (26 in planned treatment period). CBT: 7 did not start treatment - 3 lost to follow-up at month 12 - 16 completed treatment (5 in planned treatment period). (p. 66) *The outcomes are given 2 as the number of missing data is small except month 9 where there is dissimilarities between groups.*
Abstinence or reduction of drug use – biochemical test	*2*	*
Abstinence or reduction of drug use – self reported estimates	*2*	*"Efficacy of MDFT vs. CBT in terms of the primary outcome measure was analysed by means of a 2 (treatment: MDFT vs. CBT) x 2 (time: Baseline vs. Month 12) repeated measures MANOVA, using the baseline and imputed month 12 datasets. Difference in percentage treatment responders between the study groups at month 12 was analysed in a logistic regression model, with treatment group as independent variable and response (imputed dataset) as outcome variable. The same approach was used for analyzing the difference in percentage of recovered adolesecnts at month 12" (p. 66).*
Abstinence or reduction of drug use – psychometric scales	*Not relevant*	*Not relevant*
Abstinence or reduction of drug use – overall judgement	2	*
Social functioning and family functioning	2	*
Education or vocational involvement	Not relevant	Not relevant
Retention	Unclear	-
Risk behaviour	2	"Differences in delinquency (property and violent crimes) between the study groups at month 12 were tested using the same analytical approach as described for the primary outcome measure (i.e. repeated measures MANOVA)" (p. 66)

Other adverse effects	Not relevant	Not relevant
Free of selective reporting?		"Outcomes relating to the 9 month follow-up are not reported because of a particular low follow-up rate in CBT" (p. 66) *The urinalysis outcome is given 4 as the measurement, and thereby data collection, is made but no results reported for this outcome. From information in Rigter et al. 2011:Outcomes for self-reported and scales for the primary outcome are given 1, as these outcomes are reported carefully.* *Social functioning and family functioning and education or vocational involvement outcomes are given 3 as these outcomes are mentioned in the protocol but not in the final studies (apparently no data collection for these outcomes).* *Other outcomes (except retention which is a different kind of measure) are given 3 as the results for the 9 month follow-up are not reported.*
Abstinence or reduction of drug use – biochemical test	*4*	*Not reported allthough measurements are made.*
Abstinence or reduction of drug use – self reported estimates	*1*	*(See table 6.1 in Rigter et al., 2011)*
Abstinence or reduction of drug use – psychometric scales	*1*	*(see table 6.2 in Rigter et al., 2011)*
Abstinence or reduction of drug use – overall judgement	1	*
Social functioning and family functioning	3	(see table 7.1 in Rigter et al., 2011) The protocol mentions family dysfunction as an outcome but this outcome is not clearly reported in the final study.
Education or vocational involvement	3	The protocol mentions school problems as an outcome but this outcome is not clearly reported in the final study.
Retention	1	Table 3, p. 69
Risk behaviour	1	(see table 7.2 in Rigter et al., 2011)

Other adverse effects	Not relevant	Not relevant
Free of other bias?	1	
A priori protocol?	Unclear	The study is part of a larger European study for which a priori protocol has been made but the study is considered as an individual study (see Rigter et al., 2011)
A priori analysis plan?	Unclear	"Study data were analysed using an intent-to treat-approach, which included all patients that were notified about their randomised group allocation." (p. 66). The protocol includes description of outcomes and analyses plans

* Denotes that support for judgement is described in the general risk of bias category field above.

Table 14.4: Kaminer et al., 1998a, 1999

Bias	Author's judgement	Support for judgement
Sequence generation	Unclear	"They were then randomly assigned to one of two treatment conditions: CBT or IT." (Kaminer ID. 1085, p. 686)
Allocation concealment	Unclear	Not reported
Blinding – outcome assessors?		"(…) and subjective indicators for substance use and substance use-related problems were elicited from rating scales administered at intake, during treatment, and at follow-up." (p. 685) "Data were collected by a master's level research assistant who was not informed of the matching hypotheses being studied (…)" (Kaminer ID. 1085, p. 686) *The outcomes, other than urinalysis and retention, are given 2 as the outcome assessors were not informed of the hypotheses, but still had the knowledge of group allocation.*
Abstinence or reduction of drug use – biochemical test	*Unclear*	*Not reported* *"Weekly urinalysis procedure employed EZ-screen Test Kit for cannabinoid, cocaine, and opiates." (p. 685)*
Abstinence or reduction of drug use – self reported estimates	*Not relevant*	*Not relevant*

Abstinence or reduction of drug use – psychometric scales	*2*	*
Abstinence or reduction of drug use – overall judgement	2	*
Social functioning and family functioning	2	*
Education or vocational involvement	2	*
Retention	Unclear	-
Risk behaviour	2	*
Other adverse effects	Not relevant	Not relevant
Incomplete outcome data addressed?		"Among the subjects with valid baseline and follow-up measures on the T-ASI (N=23), the CBT and the IT groups did not differ significantly at baseline on the percent male, percent white ethnicity, average age, on any of the T-ASI measures, or on externalising, internalizing, major depressive disorder/dystymia, or conduct disorder/oppositional disorder." (Kaminer ID 1085, p. 687) "(...) Regardless of program completion status, 22 of the 32 original subjects completed 3 months follow-up assessment procedures, while 14 completed the 15 month follow up. Of the 22 that followed up at three month, eight were not interviewed at 15-month follow-up because of incarceration (one), having moved out of state (three), refusal (two), and failure to locate (two). Data of two adoelscents who were interviewed at 15-months are not included in the anlaysis because their baseline data could not be retrieved." (Kaminer ID. 1044, p. 115) Intent-to-treat design used (Kaminer ID 1044, p. 115) - but not used in analysis of follow-up as the N's are measured as CBT=5 and IT=7 (Kaminer ID 1044, p. 117) *The outcomes are given 3 as there is missing data of 20-55 % in the follow-ups.*
Abstinence or reduction of drug	*3*	*

use – biochemical test		
Abstinence or reduction of drug use – self reported estimates	*Not relevant*	*Not relevant*
Abstinence or reduction of drug use – psychometric scales	*3*	*
Abstinence or reduction of drug use – overall judgement	3	*
Social functioning and family functioning	3	*
Education or vocational involvement	3	*
Retention	Unclear	-
Risk behaviour	3	*
Other adverse effects	Not relevant	Not relevant
Free of selective reporting?		*The urinalysis outcome is given 3 as the measurement, and thereby data collection is made, but the results are reported inappropriately. The primary outcome (psychometric scale) is given 2 as the scale is split in the follow-up but not in the first study. Other outcomes are given 1 as they are reported carefully.*
Abstinence or reduction of drug use – biochemical test	*3*	*"Of those subjects with available measures, approximately half (16) tested positive for marijuana (sometime during the course of the treatment), whereas only two tested positive for cocaine and one tested positive for heroin. No significant differences between therapy groups were found." (Kaminer ID 1085, p. 688). (Note: The urinalyses are not numerically reported, furthermore it is stated that one of the shortcomings of the study is "lack of objective measures of urinalysis during the follow-up period.", Kaminer ID 1085, p. 689)*
Abstinence or reduction of drug use – self reported estimates	*Not relevant*	*Not relevant*

Abstinence or reduction of drug use – psychometric scales	*2*	*"From the analyses of each of the seven T-ASI scales, none of the baseline measures were significantly correlated with the respective outcome measure, but the psychiatric subscale showed a trend toward significance (…)" (Kaminer ID. 1085, p. 687)* *"(…) The original T-ASI substance abuse scale was split into an Alcohol and a Drug subscale." (Kaminer 1044, p. 116)* *(Note: this is NOT done in Kaminer ID. 1085)*
Abstinence or reduction of drug use – overall judgement	2	*
Social functioning and family functioning	1	(See table 2) "The rate of change from baseline to follow-up-up in family problems showed a trend toward significance as a function of therapy group (…)" (Kaminer ID. 1085, p. 688)
Education or vocational involvement	1	(See table 2) "There were no significant baseline, main , or interactive effects for T-ASI Drug, School, Legal or Family subscales." (Kaminer ID 1044, p. 116)
Retention	1	"Of the 32 adolescents who were randomlys assigned to the two tretament conditions, 50% of the subjects (8 CBT, (IT) completed the treatment program..." (p. 687) "There were no significant effects or trends for the rate of change difference from baseline to follow-up for those who completed treatment versus those who did not." (Kaminer ID 1085, p. 688)
Risk behaviour	1	(see table 2) "There were no significant baseline, main , or interactive effects for T-ASI Drug, School, Legal or Family subscales." (Kaminer ID 1044, p. 116)
Other adverse effects	Not relevant	Not relevant
Free of other bias?	1	
A priori protocol?	Unclear	-
A priori analysis plan?	Unclear	Intent-to-treat design (Kaminer, ID. 1044, p. 115) *They state it is an ITT-design but they do not use this analysis plan in the actual analysis,*

	where the N's are much lower than the randomised number of participants.

* Denotes that support for judgement is described in the general risk of bias category field above.

Table 14.5: Kaminer et al., 2002

Bias	Author's judgement	Support for judgement
Sequence generation	Unclear	"Participants completed a baseline assessment battery and were then randomised into one of two closed-group conditions: CBT or PET." (p. 738).
Allocation concealment	Unclear	Not reported
Blinding – outcome assessors?		"Subjective indicators for substance use and substance use-related problems were elicited from a rating scale administered by a trained research assistant." (p. 739) *The outcomes are given unclear as it is not possible to conclude whether the outcome assessors were blinded or not.*
Abstinence or reduction of drug use – biochemical test	*Unclear*	*Not reported* *"A trained research assistant used EZ-Screen Test Kit to test for cannabinoid, cocaine, and opiate use." (p. 739)*
Abstinence or reduction of drug use – self reported estimates	*Not relevant*	*Not relevant*
Abstinence or reduction of drug use – psychometric scales	*Unclear*	*"Subjective indicators for substance use and substance use-related problems were elicited from a rating scale administered by a trained research assistant." (p. 739)*
Abstinence or reduction of drug use – overall judgement	Unclear	*
Social functioning and family functioning	Unclear	"Subjective indicators for substance use and substance use-related problems were elicited from a rating scale administered by a trained research assistant." (p. 739)
Education or vocational involvement	Unclear	"Subjective indicators for substance use and substance use-related problems were elicited from a rating scale administered by a trained research assistant." (p. 739)
Retention	Unclear	-

Risk behaviour	Unclear	"Subjective indicators for substance use and substance use-related problems were elicited from a rating scale administered by a trained research assistant." (p. 739)
Other adverse effects	Not relevant	Not relevant
Incomplete outcome data addressed?		"Since some subjects had follow-up data for one but not the other of the two follow-up periods (3 months and 9 months), two sets of regressions were carried out: one for baseline versus 3 month follow-up evaluation, and one for baseline versus 9 month follow-up evaluation." (p.740) "The treatment completion rate was 86%; the 3-month follow-up rate was 80%; and the 9-month follow-up rate was 65%. No significant association between group and completion status." (p. 740) The authors do not explain what they do with missing values for other outcomes than urin tests. The N-value in the outcome table indicates that all subjects were included in the analysis. *The outcomes, other than urinalysis, are given 4 as there is missing outcome data for 20-35 % and because the authors do not mention the method used to fill in any missing values. However, this method is mentioned for urinalysis and therefore this outcome is given 3.*
Abstinence or reduction of drug use – biochemical test	*3*	*"Drug urinalysis data were analysed as intent to treat, with missing values filled in with the last valid value carried forward". (p. 740)*
Abstinence or reduction of drug use – self reported estimates	*Not relevant*	*Not relevant*
Abstinence or reduction of drug use – psychometric scales	*4*	*
Abstinence or reduction of drug use – overall judgement	4	*
Social functioning and family functioning	4	*

Education or vocational involvement	4	*
Retention	Unclear	-
Risk behaviour	4	*
Other adverse effects	Not relevant	Not relevant
Free of selective reporting?		*The urinalysis outcome is given 4 as the measurement, and thereby data collection is made but no results reported for this outcome. Other outcomes are given 1 as they are reported carefully.*
Abstinence or reduction of drug use – biochemical test	*4*	*Outcomes relating to urinalysis are not reported.*
Abstinence or reduction of drug use – self reported estimates	*Not relevant*	*Not relevant*
Abstinence or reduction of drug use – psychometric scales	*1*	*(see table 3)*
Abstinence or reduction of drug use – overall judgement	1	*
Social functioning and family functioning	1	(see table 3)
Education or vocational involvement	1	(see table 3)
Retention	1	(see table 1)
Risk behaviour	1	(see table 3)
Other adverse effects	Not relevant	Not relevant
Free of other bias?	1	
A priori protocol?	Unclear	-
A priori analysis plan?	Unclear	-

* Denotes that support for judgement is described in the general risk of bias category field above.

Table 14.6: Latimer et al., 2003

Bias	Author's judgement	Support for judgement
Sequence generation	Unclear	"(…) 43 youths and families were randomly assigned to IFCBT or DHPE conditions." (p. 306)
Allocation concealment	Unclear	Not reported
Blinding – outcome assessors?		"The youth and parent baseline assessments batteries were administered separately by pre-doctoral graduate research assistants who completed extensive didactic training on the use of DICA, ADI and self-report tools." (p. 307) "Discharge and follow-up assessments were administered by staff who had no treatment delivery duties." (p. 308). *The outcomes, other than retention, are given 3 as the study separated the outcome assessors from treatment assistants. However, they were not blinded.*
Abstinence or reduction of drug use – biochemical test	*Not relevant*	*Not relevant*
Abstinence or reduction of drug use – self reported estimates	*3*	*
Abstinence or reduction of drug use – psychometric scales	*3*	*
Abstinence or reduction of drug use – overall judgement	3	*
Social functioning and family functioning	3	*
Education or vocational involvement	3	*
Retention	Unclear	-
Risk behaviour	Not relevant	Not relevant
Other adverse effects	Not relevant	Not relevant

Incomplete outcome data addressed?		"Out of the 43 youth and parents enrolled, 42 completed the youth neuropsychological assessment battery and posttretatment assessments at 3- and 6-month follow-up points. Thirty-five of these youth also completed the 1-month follow-up assessment." (p. 308) "(...) Data on 1-month follow-up outcomed were derived from their 3-month follow-up assessment." (p. 310) "Intent-to-treat analyses were conducted on data from the 42-of-43 youth who enrolled in the radnomized treatment study and completed the baseline and follow-up assessments." (p. 310) *The outcomes are given 1 as there apparently is no missing data in this study - only one participant is excluded from the analysis.*
Abstinence or reduction of drug use – biochemical test	*1*	*
Abstinence or reduction of drug use – self reported estimates	*1*	*
Abstinence or reduction of drug use – psychometric scales	*Not relevant*	*Not relevant*
Abstinence or reduction of drug use – overall judgement	1	*
Social functioning and family functioning	1	*
Education or vocational involvement	1	*
Retention	Unclear	-
Risk behaviour	Not relevant	Not relevant
Other adverse effects	Not relevant	Not relevant
Free of selective reporting?		*The urinalysis outcome is given 3 as the measurement, and thereby data collection, is made but the results are reported inappropriately.*

		Other outcomes are given 1 as they are reported carefully.
Abstinence or reduction of drug use – biochemical test	*3*	*(Note: results from urinalysis are not explicitly reported. However it is stated that "rates of concordance between youth self-report of substance use during the past month and urinalysis results exceeded 95% at baseline and each follow-up assessment point." (p. 308))*
Abstinence or reduction of drug use – self reported estimates	*1*	*(reported in table 4)*
Abstinence or reduction of drug use – psychometric scales	*Not relevant*	*Not relevant*
Abstinence or reduction of drug use – overall judgement	1	*
Social functioning and family functioning	1	(reported in table 5, 6, 7)
Education or vocational involvement	1	(reported in table 5)
Retention	Unclear	-
Risk behaviour	Not relevant	Not relevant
Other adverse effects	Not relevant	Not relevant
Free of other bias?	1	
A priori protocol?	Unclear	Not reported
A priori analysis plan?	Unclear	"Intent-to-treat analyses were conducted on data from the 42-of-43 youth who were enrolled in the randomised treatment study and completed the baseline and follow-up assessments." (p. 310)

* Denotes that support for judgement is described in the general risk of bias category field above.

Table14. 7: Waldron et al., 2001

Bias	Author's judgement	Support for judgement

Sequence generation	Low risk	"An urn randomization procedure (…) was used to retain random allocation while balancing treatment condition groups on a priori continous and categorical variables. With this procedure, relative probabilities of assignment to treatment groups (urns) are computer adjusted on the basis of previous randomizations to ensure pre-treatment group equivalence. The variables included in this project's urn were gender, age, level of substance use, ethnicity, psychiatric severity, and family constitution." (p. 804)
Allocation concealment	Unclear	Not reported
Blinding – outcome assessors?		*The outcomes are given unclear as it is not possible to conclude whether the outcome assessors were blinded or not.*
Abstinence or reduction of drug use – biochemical test	*Unclear*	*Not reported*
Abstinence or reduction of drug use – self reported estimates	*Unclear*	*Not reported*
Abstinence or reduction of drug use – psychometric scales	*Not relevant*	*Not relevant*
Abstinence or reduction of drug use – overall judgement	Unclear	*
Social functioning and family functioning	Not relevant	Not relevant
Education or vocational involvement	Not relevant	Not relevant
Retention	Not relevant	Not relevant
Risk behaviour	Unclear	Not reported
Other adverse effects	Not relevant	Not relevant
Incomplete outcome data addressed?		"Some of the 120 adolescents failed to complete measures either at the 4-month (n=8) or at the 7-month (n=7) assessment period. Six others missed both follow-up assessments; these 6 were removed from subsequent analysis, leaving 114 families. We assessed whether the values from remaining families

		appeared to be missing, randomly using the missing completely at random (MCAR) statistics (...). This statistic (...) provided evidence that the values were not missing at random. To avoid possible bias from subsequent analyses (i.e., listwise deletion) we created estimates, for the missing scores. The regression plus random residuals MVA module in SPSS provided the estimates....." (p. 807-808) Intent-to-treat sample used (p. 806). *The outcome is given 1 as the study has very little missing data.*
Abstinence or reduction of drug use – biochemical test	*Unclear*	*Not reported*
Abstinence or reduction of drug use – self reported estimates	*1*	*
Abstinence or reduction of drug use – psychometric scales	*Not relevant*	*Not relevant*
Abstinence or reduction of drug use – overall judgement	1	*
Social functioning and family functioning	Not relevant	Not relevant
Education or vocational involvement	Not relevant	Not relevant
Retention	Not relevant	Not relevant
Risk behaviour	Unclear	Not reported
Other adverse effects	Not relevant	Not relevant
Free of selective reporting?		*The urinalysis outcome is given 3 as the measurement, and thereby data collection is made but the results are reported inappropriately.* *Outcomes for social functioning and family functioning is given 3 as these are mentioned in a footnote but not reported explicit in the study.* *Other outcomes are given 1 as they are reported carefully.*

Abstinence or reduction of drug use – biochemical test	*3*	*"Analyses of the differences in urine screen rates over time or between condition differences did not approach statistical significance." (p. 809-810)* *(Note: the numerical outcomes (for the individual conditions) are however not reported)*
Abstinence or reduction of drug use – self reported estimates	*1*	*(see table 3 + French, table 2)*
Abstinence or reduction of drug use – psychometric scales	*Not relevant*	*Not relevant*
Abstinence or reduction of drug use – overall judgement	1	*
Social functioning and family functioning	3	"No statistically significant effects of treatment on either the Internalizing or the Externalizing Scale of the CBCL in the adolescent or primary caregiver family conflict scores were found." (p. 810) (Note: the numerical outcomes (for the individual conditions) are however not reported - se footnote 2, p. 810)
Education or vocational involvement	Not relevant	Not relevant
Retention	Not relevant	Not relevant
Risk behaviour	1	(This measure is reported in French - see Table 2)
Other adverse effects	Not relevant	Not relevant
Free of other bias?	1	
A priori protocol?	Unclear	Not reported
A priori analysis plan?	Unclear	"(…) however, 10 of these completed follow-up assessments, and their data were included in all analyses as part of the full intention-to-treat sample." (p. 806)

* Denotes that support for judgement is described in the general risk of bias category field above.

15 Contribution of authors

Krystyna Kowalski, Ditte Andersen, Lars Benjaminsen and Pernille Skovbo Rasmussen designed the review question and wrote the background of the protocol. Krystyna Kowalski wrote the methods sections with assistance from Trine Filges and Mette Deding. Searches were run by Anne-Marie Klint Jørgensen with assistance from Pia Vang Hansen.

Studies were assessed for eligibility by Simon Helth Filges, Anne-Sofie Due Knudsen, Misja Eiberg, Krystyna Kowalski, and Asta Breinholt Lund, and data was extracted by Anne-Sofie Due Knudsen, Majken Mosegaard Svendsen, Krystyna Kowalski and Trine Filges. Analysis was performed by Trine Filges, Anne-Sofie Due Knudsen and Majken Mosegaard Svendsen .

The review was written by Trine filges, Anne-Sofie Due Knudsen and Majken Mosegaard Svendsen. Mette Deding, Maia Lindstrøm, Krystyna Kowalski, Lars Benjaminsen and Anne-Marie Klint Jørgensen commented and provided insightful editing on the final version of the review.

16 Declarations of interest

The authors have no vested interest in the outcomes of this review, nor any incentive to represent findings in a biased manner.

17 Sources of support

17.1 INTERNAL SOURCES

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17.2 EXTERNAL SOURCES

None