Published in final edited form as:
Psychiatr Clin North Am. 2010 September ; 33(3): 497–509. doi:10.1016/j.psc.2010.04.001.

Current Status of Cognitive Behavioral Therapy for Adult Attention-Deficit Hyperactivity Disorder

Laura E. Knouse and **Steven A. Safren**
Massachusetts General Hospital and Harvard Medical School

Synopsis

Attention-deficit / hyperactivity disorder (ADHD) is a valid and impairing psychological disorder that persists into adulthood in a majority of cases and is associated with chronic functional impairment and increased rates of comorbidity. Cognitive-behavioral therapy (CBT) approaches for this disorder have emerged relatively recently, and available evidence from open and randomized controlled trials suggests that these approaches are promising in producing significant symptom reduction. A conceptual model of how CBT may work for ADHD is reviewed along with existing efficacy studies. A preliminary comparison of effect sizes across intervention packages suggests that targeted learning and practice of specific behavioral compensatory strategies may be a critical "active ingredient" in CBT for adult ADHD. The article concludes with a discussion of future directions and critical questions that must be addressed in this area of clinical research.

Keywords

Attention-deficit/hyperactivity disorder (CBT); ADHD; psychosocial treatment; cognitive-behavioral therapy (CBT); adults; treatment outcome

Attention-deficit/hyperactivity disorder (ADHD) is a valid psychiatric disorder characterized by severe and impairing levels of inattention, hyperactivity, and impulsivity [1]. As a developmental disorder, it appears in childhood and is associated with lags in the development of sustained attention and behavioral inhibition relative to same-aged peers, contributing to functional impairment across academic, behavioral, and social domains [2] [3]. Once believed to be a childhood-limited disorder, longitudinal and cross-sectional data demonstrate that the disorder persists into adulthood in a majority of cases, causing disruption in multiple areas of adult functioning, including employment, intimate relationships, and motor vehicle driving [4][5]. In addition, adults with ADHD are at a significantly elevated risk for comorbid disorders including depression, anxiety, substance use, and personality disorders [6][7]. Recent prevalence studies suggest that 4.4% of American adults may suffer from ADHD [8] and cross-national prevalence estimates are reasonably comparable (3.4% [9]).

Correspondence concerning this article should be addressed to Laura E. Knouse, MGH Behavioral Medicine Service, One Bowdoin Square, 7th Floor, Boston, MA 02114. lknouse@partners.org. Steven A. Safren can be contacted at MGH Behavioral Medicine Service, One Bowdoin Square, 7th Floor, Boston, MA 02114. ssafren@partners.org.

Because ADHD has only been well-characterized and widely recognized, diagnosed, and treated within approximately the past 20 years, many adults with ADHD present for diagnosis and treatment after having suffered with the disorder, untreated, for the majority of their lives. In addition, adults with ADHD continue to be faced with skepticism from those around them, fueled by persistent and scientifically uninformed media-driven perceptions that ADHD is not a “real” disorder with “real” consequences and costs. On the contrary, the available data overwhelmingly support the validity of this condition and the chronic, multi-domain impairments that it confers upon its sufferers [4][10].

Fortunately, researchers interested in ADHD in adults have been able to begin to develop and test effective treatments for this condition. This article addresses the current status of evidence for cognitive-behavioral (CBT) interventions for adults with ADHD. While stimulant medications are considered first-line treatments for ADHD, many adults with ADHD cannot or will not take medication and, of those that do, many continue to experience significant residual symptoms [11]. Depending upon baseline symptom severity, even those considered responders by the standards of most medication trials (i.e., 30% or more reduction in symptoms [12]) may continue to experience significant and impairing symptoms. Thus, there has been an increasing demand for psychosocial approaches targeting ADHD-related behavioral deficits, though the supply of empirically-based strategies appears to be accumulating more slowly than that of recommendations based only upon clinical experience.

We first briefly present a conceptual rationale for the use of CBT for adults with this neurobiologically-based disorder followed by a review of existing empirical evidence for these approaches. Integrating the reviewed studies, we then make preliminary comparisons across treatment packages and discuss possible “active ingredients” common to the most effective CBT approaches. Finally, we discuss challenges in psychosocial treatment research with this population awaiting resolution.

CBT for Adult ADHD: Conceptual Basis

Given that prior research supports a strong neurobiological basis for ADHD, what is the conceptual basis for applying cognitive-behavioral therapy to the disorder in adults? Consistent with current theories of ADHD, the treatment model proposed by Safren and colleagues [13] (see Figure 1) begins with the premise that neuropsychological impairments are at the core of the disorder. Deficits in sustained attention, inhibitory control, working memory, and motivation underlie ADHD's cardinal symptoms of inattention, hyperactivity, and impulsivity [3][14]. These deficits contribute to functional impairment and produce disruption in adaptive behavior, including use of higher-level organization and planning strategies that might ameliorate symptom-related difficulties. Thus, these underlying neuropsychological impairments hinder individuals with ADHD from acquiring and using the very compensatory strategies that might support their areas of need—resulting in symptom maintenance and exacerbation and further contributions to functional impairment.

As a result of these chronic functional impairments persisting since childhood, many adults with ADHD have had multiple failure experiences and chronic underachievement. In addition, many adults have likely received ongoing negative social feedback from parents, teachers, and peers. Such experiences can lead to the development of maladaptive negative cognitions and beliefs that decrease motivation and increase avoidance behavior and mood disturbance, reinforcing this cycle and further decreasing the likelihood that an adult with ADHD will consistently engage in the difficult work of acquiring and using compensatory strategies.

This conceptual model [13] and emerging empirical data described below, support using both behavioral skills training to target the acquisition and especially the maintenance of compensatory skills, in addition to medication treatment targeting core symptoms as key components of optimal treatment of ADHD in adults. Critical to this model is the *consistent* performance of concrete, overlearned compensatory skills because, as Barkley [14] points out, ADHD is characterized not as a disorder of knowledge, but of performance. These compensatory behavioral strategies can lead to decreases in associated functional impairments. Finally, cognitive interventions may target dysfunctional patterns of thought and associated emotions that contribute to avoidance, procrastination, and attentional shifts. Though the primary symptoms of ADHD are most certainly neurobiological in nature, cognitive-behavioral interventions can play an integral role in breaking the link between core symptoms and continued failure and underachievement.

CBT for Adult ADHD: Empirical Basis

As we have discussed elsewhere [15], the current evidence for the use of psychosocial approaches in treating adults with ADHD can best be described as “emerging” and lags behind the evidence base for both medication treatment of adult ADHD [11] and cognitive-behavioral treatment for other adults disorders (e.g., mood and anxiety disorders). Bearing these limitations in mind, we review what is, nonetheless, a promising preliminary evidence base for cognitive-behavioral approaches applied to this population.

Uncontrolled Studies

The first preliminary examination of psychotherapy outcomes in adults with ADHD collected information on treatment history from 60 adults with ADHD presenting to an outpatient practice and engaging in traditional, insight-oriented psychotherapy [16]. Accordingly, traditional, insight-oriented psychotherapy was unsuccessful, pointing to the need for structured, skills-based interventions. Subsequent published evaluations of psychosocial treatments for ADHD in adults all involve some form of skills training in behavioral or cognitive strategies and thus are reviewed here as cognitive-behavioral approaches. The seven studies of six different treatment packages reviewed below are uncontrolled trials that nonetheless demonstrate the feasibility, acceptability, and potential impact of CBT for adults with ADHD.

Chart Review Study of Cognitive Therapy—The first study that evaluated a CBT approach to the treatment of adult ADHD [17] employed a modified cognitive therapy (CT) as described by McDermott [18]. The intervention involved teaching patients to stop, re-evaluate, and modify thoughts contributing to intensifying emotions and maladaptive behavior. Patients learned about in negative biases in thinking, and were taught to monitor and systematically re-evaluate their thoughts. The therapy also included psychoeducation and environmental modification strategies (i.e., organization, scheduling of activities, and problem solving). In this retrospective independent chart review study, 26 patients had received modified CT and medication treatment on an outpatient basis. All patients were treated by the same clinician. As this study involved reviewing charts of clinic patients, the number of sessions was variable, with a mean of 36 sessions (SD = 24; range 10-103 sessions) of CT, delivered over 11.7 (SD 8; range 13-30) months. Clinician-rated Clinical Global Impression (CGI) scores were assigned for ADHD symptoms, anxiety symptoms, and depression symptoms at baseline, at medication stabilization, and at post-CT treatment.

All CGI scores decreased significantly from baseline to the time of medication stabilization, as well as well as from medication stabilization to the endpoint of CT, providing preliminary evidence for the impact of CT above and beyond medication treatment. Sixty nine percent of patients were classified as “much improved” or “very much improved”. Prospective baseline

and endpoint self-report measures were also available for 12 individuals. On the self-report measures, participants showed significant improvement in core ADHD symptoms (33% reduction), as well as associated anxiety and depressive symptoms. Limitations include challenges to internal validity and a variable and generally long course of treatment but also provided promising evidence that the combination of medication and structured, skills-based treatment could have a significant impact for adults with ADHD.

Dialectical Behavioral Therapy—A group of investigators in Germany have adapted Linehan's Dialectical Behavior Therapy (DBT) skills training group treatment [19] for the treatment of ADHD in adults and have studied its efficacy in a small, non-randomized controlled trial (*N* = 15) [20] and in a larger, multisite open trial (N = 72) [21]. DBT is a cognitive-behavioral approach developed for the treatment of borderline personality disorder that blends traditional change-oriented CBT skills with acceptance- and mindfulness-based skills. The authors adapted DBT skills training based on the premise that ADHD and borderline personality disorder share overlapping features including problems with affect regulation, impulse control, self-esteem, and interpersonal relationships. The modified DBT treatment for ADHD was delivered in 13 group-formatted sessions with educational and discussion topics including: psychoeducation about ADHD, neurobiology and mindfulness training (2 sessions), “Chaos and Control”: A discussion of disorganized behavior followed by concrete advice about how to plan and organize aspects of participants lives, dysfunctional behavior/behavior analysis (2 sessions), emotion regulation, psychoeducation about depression, psychoeducation about impulse control, psychoeducation about stress, psychoeducation about substance dependency, discussion of relationships and self-respect, and summary discussion and next steps.

In the first trial of this intervention [20], eight patients were assigned to the group treatment and seven patients acted as a waitlist control without random assignment. Base on pre-to-post analyses, participants in the DBT skills group showed significant improvements on self-report on measures of depression, a checklist of ADHD symptoms, and other measures of psychopathology and impairment. The control group did not achieve any significant differences, though four of these seven patients were lost to follow-up.

In the larger, multisite open trial (N = 72) [21], 66 participants completed the study and showed significant reductions from pre-to-post-treatment in self-reported ADHD symptoms on two measures with medium and small effect sizes. Self-reported depressive symptoms decreased significantly with a medium effect size. Participants reported that they felt better educated and able to cope with their ADHD symptoms. The authors report that they are currently undertaking a large, multi-site randomized controlled trial comparing medication to group skills training with the combination of these treatment modalities.

Group Metacognitive Therapy—Solanto and colleagues [22] developed a group treatment for adults with ADHD targeting problems in time management, organization, and planning. They describe Metacognitive Therapy as a cognitive-behavioral intervention intended to “enhance the development of an overarching set of executive self-management skills,” emphasizing repeated practice of skills to make them more habitual and automatic [22] (p. 2). Skill modules included time management, behavioral activation, procrastination, organization, and planning. During each weekly 2-hour session, groups of 5-8 participants first discussed at-home application of skills, received feedback from group members, and were given new skill information and homework assignments from group leaders. Thirty adults diagnosed with ADHD participated in either an 8- or 12- session version of the treatment. Seventy percent of participants were receiving ongoing medication treatment for their ADHD symptoms. At post-treatment assessment, participants showed significant reductions in inattentive symptoms as measured by the Conners' Adult ADHD Rating Scale

(CAARS) and the Brown ADD Scales. Forty-seven percent of the sample fell below the clinical cutoff for inattentive symptoms on the CAARS post-treatment and participants reported significant improvements in targeted skills. Solanto and colleagues [23] then conducted a randomized controlled trial of Metacognitive Therapy, the initial results of which are summarized in the section below that reviews the existing RCTs.

Combined Medication and Cognitive-Behavior Therapy—In an open study of 43 adults diagnosed with ADHD, Rostain and Ramsay [24] examined the effects of 6 months of combined medication and cognitive-behavior therapy (CBT). Participants received 16 50-minute individual CBT sessions and Adderall titrated to the participant's optimal dose, up to 20 mg b.i.d. CBT focused on teaching individualized coping strategies and identifying and modifying maladaptive patterns of thinking that could interfere with effective coping. Content included psychoeducation about ADHD, helping the client to conceptualize their difficulties from a CBT perspective, training coping strategies, working on treatment-interfering behavior both behaviorally and cognitively, and building on strengths. At post-treatment, adults receiving combined medication treatment and CBT showed significant reductions in clinician-rated ADHD symptoms with a large effect size and in Clinical Global Impression (CGI) of ADHD (reduced from 5.28 to 3.40). Significant reductions in comorbid anxiety and depression symptoms were also observed. Due to the use of a combined treatment approach, it is unclear the extent to which improvements were differentially associated with medication versus CBT. However, the results demonstrate the potential efficacy of a combined treatment package.

Cognitive-Behaviorally Oriented Group Rehabilitation—Virta and colleagues [25] in Finland tested their group intervention, described as cognitive-behaviorally oriented group rehabilitation. Twenty-nine adults with ADHD completed weekly group sessions covering a range of topics including a substantial psychoeducation and social support component. Topics for the 10-11 sessions included two psychoeducation sessions, motivation and initiation, organization, attention, emotion regulation, memory, communication, impulsivity and comorbidity, self-esteem, and conclusion. Skills relevant to each area were discussed and assigned for homework. Participants were assessed at two time points prior to group participation with no significant differences in study measures between the two pre-treatment time periods. At post-treatment, 31% of group members showed at least 20% improvement on a self-report adult ADHD rating scale; however, there were no changes in observed symptom ratings made by patients' significant others. Follow-up data were later reported [26] for 25 of the 29 participants at 3 and 6 months post-treatment. The 11 group members who had showed at least 20% reduction in self-reported symptoms maintained their reductions in ADHD symptoms at 3 and 6 months. The 14 remaining participants showed no effect on their ADHD symptoms at any time during the trial.

Mindfulness Meditation Training—CBT approaches have, in recent years, been successfully incorporating mindfulness-based skills to address mood and anxiety symptoms. Zylowska and colleagues [27] conducted an open trial of modified mindfulness meditation training with 24 adults and 8 adolescents with ADHD. Their hypothesis was that the attention control cultivated during mindfulness exercises would improve sustained attention and emotion regulation for patients with ADHD. Eight weekly sessions provided education about and practice of mindfulness skills, including weekly out-of-session practice assignments. As a group, treatment completers self-reported significant decreases in inattentive and hyperactive-impulsive symptoms, with 30% of participants showing a treatment response of 30% symptom reduction or more. Completers also showed pre-to-post improvements on neuropsychological attention conflict and set-shifting. It is unclear to what extent improvements in performance on these tests correspond to improved performance in

real-life situations that place demands on executive functions [28] and practice effects must be ruled out in subsequent investigations. This approach is unique compared to the other interventions described here, in that it proposes to change cognitive processing directly rather than to train skills that compensate for symptom-related deficits.

Randomized Controlled Trials

There are three published randomized trials of psychosocial interventions for adult ADHD and one recently completed trial.

Cognitive Remediation Program—An Australian research group examined both a therapist-delivered [29] and self-directed [30] psychosocial treatment for adults with ADHD. Their cognitive remediation program consisted of 8 two-hour group sessions led by a clinical psychologist, the provision of a support person or coach, and a participant workbook for use in completing homework assignments. The researchers' three-pronged approach involved retraining cognitive functions, helping participants develop internal and external coping strategies, and work on restructuring the environment to support success for adults with ADHD. Individual sessions targeted motivation, concentration, listening, impulsivity, organization, anger management, and self-esteem. Each session involved review of prior skills and homework assignments, introduction of a new skill, and assignment of new homework. The support person—either someone known to the participant or an assigned coach—worked with the participant to remind them of sessions, take notes in session, and have at least weekly supportive telephone contacts with the participant between sessions.

Twenty-two individuals were randomly assigned to the treatment group and twenty-one to the waiting list control [29]. Some of the patients were on medications (stabilized) and others were not. Self-report assessments occurred pretreatment, and post-treatment for both groups. Participants in the cognitive remediation program also completed measures at 2-month and one-year follow-ups. At post-treatment, individuals assigned to the treatment condition reported reduced ADHD symptoms, better organizational skills, and reduced anger problems than individuals assigned to the control group. Compared to their baseline reports, adults in the Cognitive Remediation Program maintained lower ADHD symptoms and better organization at both follow-up assessments. However, data were not available to compare these treatment effects to those in the control condition. Although the conclusions that can be drawn from this study were perhaps limited by the use of self-report measures as the only outcome measures, this randomized controlled trial provided evidence of symptom reduction associated with psychosocial treatment while beginning to control for threats to validity, such as regression to the mean.

The more self-directed version [30] utilized a self-help book that included the following topics: 1) education about ADHD, 2) how to overcome attention and motivational difficulties, 3) listening skills, 4) organizational skills, 5) impulse control techniques, 6) cognitive strategies for anger management, and 7) cognitive strategies for self-esteem. Three therapist-led sessions (beginning, middle, and end of treatment) were included which were geared toward review and monitoring of progress. Support people—in this study, trained undergraduate and graduate students—were again assigned to aid participants.

Seventeen individuals (stable on medications or unmedicated) were assigned to the treatment group and eighteen were assigned to the control group. Statistically significant differences emerged between the two groups self-report outcome measures of ADHD symptoms, organizational skills, and self-esteem at post-treatment. Compared to baseline, CRP participants also had improved ratings at 2-month follow-up. These findings further strengthen the evidence for the effects of skills-based, psychosocial intervention for adults

with ADHD. In addition, the study illustrates a novel, potentially cost-effective method of combining self-help with the use of a non-professional supportive person to promote change.

Cognitive-Behavioral Therapy for ADHD in Medication-Treated Adults with Residual Symptoms—Our clinical research group completed a randomized controlled trial of cognitive behavioral therapy for adults with ADHD already receiving medication treatment but experiencing significant residual symptoms [31]. The three core modules of the treatment were 1) organizing and planning, 2) reducing distractibility, and 3) cognitive restructuring (adaptive thinking). Twelve to fifteen individual sessions each began by therapist and patient setting an agenda. Symptom severity and medication adherence from the previous week were reviewed via rating scale and discussed. During each session, skills-based homework was assigned to be completed over the course of the week and the next session included review of homework and all previously learned skills. Sessions focused on organization and planning skills began with psychoeducation, the conceptual model of ADHD and rationale for compensatory skill use, and motivational exercises. Major foundational skills established and reinforced during this module included use of a simple calendar and task-list system, prioritization strategies, breaking down overwhelming tasks in to manageable pieces, and training of problem-solving skills. Skills in the distractibility module included increasing awareness of attention span, breaking down tasks to fit within this span, use of visual and auditory reminders to cue assessment of on-task behavior, and reducing distractions in the physical environment. The last core module, focusing on adaptive thinking, included cognitive restructuring skills from those outlined by Beck [32], including use of thought records, identification of cognitive errors, and formulation of rational responses, adapted for adults with ADHD.

Three additional modules were optional depending on participants' needs and preferences, including 1) application of skills to procrastination, 2) anger and frustration management, and 3) communication skills. However, as we delivered the treatment, we found that the core modules alone involve a great deal of behavioral change and that adding these additional modules became overwhelming for patients. Hence, in the revised treatment [33], we dropped the modules on communication skills and anger/frustration management as these were not observed to be relevant for most patients but retained the procrastination module as many participants found it helpful.

A randomized controlled trial (N=31) found the cognitive behavioral treatment described above to be superior to continued medications alone [31]. Participants completed a battery of self-report measures and an independent evaluation with an assessor who was blind to treatment assignment. At the outcome assessment, those randomized to CBT (n=16) had lower independent assessor-rated ADHD symptoms and global severity (CGI-S) as well as self-reported ADHD symptoms than those randomized to continued psychopharmacology alone (n=15). Those in the CBT group also had lower independent-assessor rated and self-reported anxiety, lower independent assessor-rated depression, and a trend toward lower self-reported depression. We also examined the number of treatment responders in each condition, using a conservative outcome of a CGI score reduction in 2 points or more. Following this method, there were significantly more treatment responders among patients who received CBT (56%) compared to those who did not (13%). Our group has recently completed a larger-scale, randomized controlled trial of CBT vs. applied relaxation training for adults receiving medication treatment for ADHD, for which final data analyses are pending.

Group Metacognitive Therapy—Solanto and colleagues [23] recently completed a randomized controlled trial comparing metacognitive therapy (described above) to group supportive psychotherapy. Participants completing group metacognitive therapy (n = 45) had

significantly greater reductions in inattentive ADHD symptoms than those completing group supportive therapy (n = 43) as measured by both self-report and ratings by a clinician blinded to group status. Significant others' ratings of inattentive symptoms also showed significantly greater change for the metacognitive therapy group and a greater number were considered treatment responders as defined by at least 30% change on clinician ratings of inattentive symptoms. This randomized controlled trial, comparing a cognitive-behavioral intervention to active supportive treatment, shows positive results in the context of the most methodologically rigorous test of a psychosocial treatment for adult ADHD to date.

Comparison of CBT-Oriented Approaches

The available data on CBT for adult ADHD suggest that these interventions, as a group, show promise as efficacious interventions—however, more studies of the same treatment and more methodologically rigorous trials are needed. Despite the small overall number of trials, a range of distinct but related approaches have emerged. Can any preliminary conclusions be drawn from existing data regarding the most effective approaches at this stage? If so, common features might suggest promising directions for further treatment development and support for specific clinical recommendations. Caution must be exercised in comparing treatments to one another at this early stage because, 1) most programs have only been tested in a single study, 2) a host of factors could account for differences in effect sizes across studies besides features of the treatment itself, and 3) measures used vary widely across studies. However, this necessary caution does not preclude, at this stage, some well-placed critical thinking about what may work best for adults with ADHD.

To generate hypotheses about the most effective emerging psychosocial treatments, we calculated effect sizes (standardized mean differences; Cohen's *d*) for ADHD symptom measures from pre- to post-treatment as reported in the eight published treatment trials described above representing seven distinct treatment packages (Table 1). All were structured, skills-based programs where statistics necessary to calculate effect sizes were reported. Outcome measures varied considerably across studies and thus we report the most comparable measures—self- or investigator-report of ADHD total and/or inattentive symptoms using either *DSM*-based or other established rating. Because uncontrolled trials using pre-to-post data may overestimate the effect of the intervention compared to controlled trials, we only report pre-to-post effect sizes from the active treatment group from the three randomized controlled trials [20][29][31]. Effect sizes and descriptors for each study are displayed in Table 1, rank ordered by magnitude of effect size on total symptoms.

From this preliminary examination, nearly all treatment packages (with the exception of Virta et al. [25]) resulted in “large” effect sizes (0.8+) [34] on total ADHD symptoms and results were similar for studies that reported inattentive ADHD symptoms. Overall, these data provide support for these skills-based, psychosocial approaches in the treatment of adult ADHD, with a mean effect size for total symptoms of 1.12 and for inattentive symptoms of 0.99. However note that, as discussed above, this conclusion is based on uncontrolled pre-to-post findings from intervention groups, which may overestimate efficacy. In comparing treatment packages, note that neither number of treatment sessions nor format of intervention (group vs. individual) appeared to be associated with treatment effects. The program by Virta et al.[25], which showed small effect sizes on self-reported symptoms, covered a broad range of topics, with a new topic or broad skill area introduced each session. It appears that less emphasis was placed on the acquisition, repeated practice, and reinforcement of specific compensatory skills directly targeting core symptom-related deficits (i.e., 5 of the 11-12 sessions). In contrast, the group intervention developed by Solanto and colleagues [22], showed a much larger effect size and focused each session upon compensatory skills and their repetition. The authors state their belief that, “…

development of new, more adaptive habits and functional routines in adults with ADHD demands a certain degree of unambiguous emphasis and repetition so that desired behaviors (e.g., checking a planner every day) ultimately become automatic and no longer dependent on the individual's active executive or decision-making functions." [22] (p. 4). This type of repetition of adaptive skills to become habits is also at the core of our approach [33] which also has a similar effect size to the Solanto intervention. These preliminary findings raise the hypothesis that the "active ingredient" in successful CBT for adult ADHD is the introduction and, most importantly, repetition and reinforcement of compensatory skills that target core symptoms versus covering too broad a range of topics in a treatment at the sacrifice of enough repetition and practice of newly acquired, core skills. After a more solid base of efficacy trials to attain a designation of CBT as an empirically supported treatment for ADHD, comparative effectiveness studies may be able to more definitively test this hypothesis in the future,

Examination of elements common to the most effective treatments also reveal some important themes. Based on total ADHD symptoms, three treatments showed effect sizes more than ½ of one standard deviation above the others (Table 1) and a closer examination indicates common features that may contribute to treatment effectiveness. They involve teaching of specific skills and strategies and emphasis on practice of those skills outside of session. These are highly structured programs, elements of which include, 1) short-term work, averaging about 10 sessions 2) manualized content, and, 3) inclusion of client handouts or a workbook to guide work outside of session. With respect to the content, the three treatments with the largest effect sizes, 1) focus mostly on learning of compensatory skills to ameliorate ADHD-related difficulties, 2) focus on organization and planning skills, and 3) consider skills to deal with difficulties in motivation. To varying degrees, all three programs also target the role of internal processes (thoughts, feelings) in increasing or decreasing the likelihood of appropriate skill use. For example, Metacognitive Therapy [22] teaches positive and negative visualization of long-term consequences while Safren's program [33] includes a module on adaptive thinking skills. Overall, then, these programs can be described as primarily behavioral, incorporating cognitive elements to the degree that these processes block adaptive behavior and skill use. These preliminary findings suggest that psychoeducation alone—even when it covers the range of topics that might be relevant to adults with ADHD—is not sufficient to have a significant impact on ADHD symptoms and that learning and practice of specific skills is critical.

Conclusions and Future Directions

The conceptual and empirical basis for CBT approaches in adult ADHD is growing and suggests that targeted, skills-based interventions have a role in effectively treating this disorder. At this stage of development, however, subsequent studies must progress in terms of methodological rigor. Additional randomized controlled trials with active control groups are needed and intervention packages must be tested across multiple trials by more than one research group. Importantly, nearly all published trials to date have only examined acute outcomes and we have virtually no data on the longer-term impact of these interventions on symptoms and functioning. The measurement of treatment outcomes is another topic that requires additional study and, perhaps, additional discussion and debate among researchers. Should the primary outcome measure in studies of CBT for adult ADHD be symptoms, skill use, or functioning? In medication trials, when participants report needing compensatory strategies to manage symptoms this is sometimes considered evidence of a lack of treatment effect. However, for CBT, these reports may instead be indicative of treatment success.

The role of medication, CBT, and the combination of these treatments is another topic that requires further study. While some have speculated that adequate psychopharmacological

control of core symptoms is necessary for effective CBT [13], results from existing trials including medicated and unmedicated participants have not, thus far, supported this idea [21][22][27][29]. Future studies examining this question must take into account other possible correlates including baseline constellation and severity of symptoms and comorbidity. As we discuss previously in this article, preliminary data suggest possible differential treatment effects with regard to a treatments' focus on repeated practice of compensatory skills versus a more broad-based psychoeducational model. This hypothesis will require additional study as more rigorous randomized controlled trials emerge. However, it does not seem too early in this stage of the field's development to begin to define “what works” in CBT for adults with ADHD. Finally, as CBT treatments targeting ADHD symptoms emerge and become more refined, future approaches must begin to address the needs of adults with ADHD who suffer from comorbid disorders. The optimal combination, integration, and timing of known efficacious CBT interventions for mood, anxiety, and substance use disorders with treatment of ADHD is an untouched area of clinical research relevant for the majority of adults with this disorder.

Acknowledgments

Some of the investigator time for preparation of this paper was supported by NIH Grant 5R01MH69812 to Steven A. Safren and by the Kaplen Fellowship on Depression from Harvard Medical School to Laura E. Knouse.

References

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorder-Text Revision. 4. Washington, D.C.: Author; 2000.
2. Barkley, RA. Attention-Deficit Hyperactivity Disorder: A handbook for diagnosis and treatment. 3. New York: Guilford Press; 2006.
3. Nigg, JT. What Causes ADHD?. New York: Guilford Press; 2006.
4. Barkley, RA.; Murphy, KR.; Fischer, M. ADHD in Adults: What the Science Says. New York: Guilford Press; 2008.
5. Biederman J, Faraone SV, Spencer T, et al. Patterns of psychiatric comorbidity, cognitive, and psychosocial functioning in adults with attention-deficit hyperactivity disorder. American Journal of Psychiatry 1993;150:1792. [PubMed: 8238632]
6. McGough JJ, Smalley SL, McCracken JT, et al. Psychiatric Comorbidity in Adult Attention Deficit Hyperactivity Disorder: Findings From Multiplex Families. American Journal of Psychiatry 2005;162:1621. [PubMed: 16135620]
7. Miller TW, Nigg JT, Faraone SV. Axis I and II comorbidity in adults with ADHD. Journal of Abnormal Psychology 2007;116:519. [PubMed: 17696708]
8. Kessler RC, Adler L, Barkley RA, et al. The prevalence and correlates of adult ADHD in the United States: Results from the National Comorbidity Survey Replication. American Journal of Psychiatry 2006;163:716. [PubMed: 16585449]
9. Fayyad J, de Graaf R, Kessler R, et al. Cross-national prevalence and correlates of adult attention-deficit hyperactivity disorder. British Journal of Psychiatry 2007;190:402. [PubMed: 17470954]
10. Barkley RA, Cook EH, Dulcan M, et al. Consensus statement on ADHD. European Child & Adolescent Psychiatry 2002;11:96. [PubMed: 12033751]
11. Prince, J.; Wilens, T.; Spencer, T., et al. Pharmacotherapy of ADHD in adults. In: Barkley, RA., editor. Attention-Deficit Hyperactivity Disorder: A Handbook for Diagnosis and Treatment. 3. New York: Guilford; 2006. p. 704
12. Steele M, Jensen PS, Quinn DMP. Remission versus response as the goal of therapy in ADHD: A new standard for the field? Clinical Therapeutics 2006;28:1892. [PubMed: 17213010]
13. Safren S, Sprich S, Chulvick S, et al. Psychosocial treatments for adults with ADHD. Psychiatric Clinics of North America 2004;27:349. [PubMed: 15064001]
14. Barkley RA. Behavioral inhibition, sustained attention, and executive functions: Constructing a unifying theory of ADHD. Psychological Bulletin 1997;121:65. [PubMed: 9000892]

15. Knouse LE, Cooper-Vince C, Sprich S, et al. Recent developments in the psychosocial treatment of adult ADHD. Expert Review of Neurotherapeutics 2008;8:1537. [PubMed: 18928346]
16. Ratey JJ, Greenberg MS, Bemporad JR, et al. Unrecognized attention-deficit hyperactivity disorder in adults presenting for outpatient psychotherapy. Journal of Child & Adolescent Psychopharmacology 1992;2:582.
17. Wilens TE, McDermott SP, Biederman J, et al. Cognitive therapy in the treatment of adults with ADHD: A systematic chart review of 26 cases. Journal of Cognitive Psychothearpy: An International Quarterly 1999;13:215.
18. McDermott, SP. Cognitive therapy for adults with attention-deficit/hyperactivity disorder. In: T, EB., editor. Attention-deficit disorders and comorbidities in children, adolescents, and adults. Washington, DC: American Psychiatric Press; 2000. p. 569
19. Linehan, MM. Skills Training Manual for Treating Borderline Personality Disorder. New York: Guilford; 1993.
20. Hesslinger B, Tebartz van Elst L, Nyberg E, et al. Psychotherapy of attention deficit hyperactivity disorder in adults: A pilot study using a structured skills training program. European Archives of Psychiatry and Clinical Neuroscience 2002;252:177. [PubMed: 12242579]
21. Philipsen A, Richter H, Peters J, et al. Structured group psychotherapy in adults with attention deficit hyperactivity disorder: Results of an open multicentre study. Journal of Nervous and Mental Disease 2007;195:1013. [PubMed: 18091195]
22. Solanto MV, Marks DJ, Mitchell KJ, et al. Development of a new psychosocial treatment for adult ADHD. Journal of Attention Disorders 2008;11:728. [PubMed: 17712167]
23. Solanto MV, Marks DJ, Wasserstein J, Mitchell K, Abikoff H, Alvir JM, Kofman MD. Efficacy of meta-cognitive therapy (MCT) for adult ADHD American Journal of Psychiatry. in press.
24. Rostain AL, Ramsay JR. A Combined Treatment Approach for Adults With ADHD-- Results of an Open Study of 43 Patients. Journal of Attention Disorders 2006;10:150. [PubMed: 17085625]
25. Virta M, Vedenpää A, Gronroos N, et al. Adults with ADHD benefit from cognitive-behaviorally oriented group rehabilitation: A study of 29 participants. Journal of Attention Disorders 2008;12:218. [PubMed: 18192618]
26. Salakari A, Virta M, Gronroos N, et al. Cognitive-behaviorally-oriented group rehabilitation of adults with ADHD: Results of a 6-month follow-up study. Journal of Attention Disorders Published online ahead of print 2009;1
27. Zylowska L, Ackerman DL, Yang MH, et al. Mindfulness meditation training in adults and adolescents with ADHD: A feasibility study. Journal of Attention Disorders 2008;11:737. [PubMed: 18025249]
28. Burgess, PW. Theory and methodology in executive function research. In: Rabbitt, P., editor. Methodology of Frontal and Executive Function. Hove, U.K.: Psychology Press; 1997. p. 81
29. Stevenson CS, Whitmont S, Bornholt L, et al. A cognitive remediation programme for adults with Attention Deficit Hyperactivity Disorder. Australian and New Zealand Journal of Psychiatry 2002;36:610. [PubMed: 12225443]
30. Stevenson CS, Stevenson RJ, Whitmont S. A self-directed psychosocial intervention with minimal therapist contact for adults with attention deficit hyperactivity disorder. Clinical Psychology & Psychotherapy 2003;10:93.
31. Safren SA, Otto MW, Sprich S, et al. Cognitive-behavioral therapy for ADHD in medication-treated adults with continued symptoms. Behavior Research and Therapy 2005;43:831.
32. Beck, JS. Cognitive therapy: basics and beyond. New York: Guilford Press; 1995.
33. Safren, SA.; Perlman, CA.; Sprich, S., et al. Mastering your adult ADHD: A cognitive-behavioral therapy approach. New York: Oxford Univeristy Press; 2005.
34. Cohen, J. Power Analysis for the Behavioral Sciences. 2. Hillsdale, N.J.: Lawrence Erlbaum; 1988.

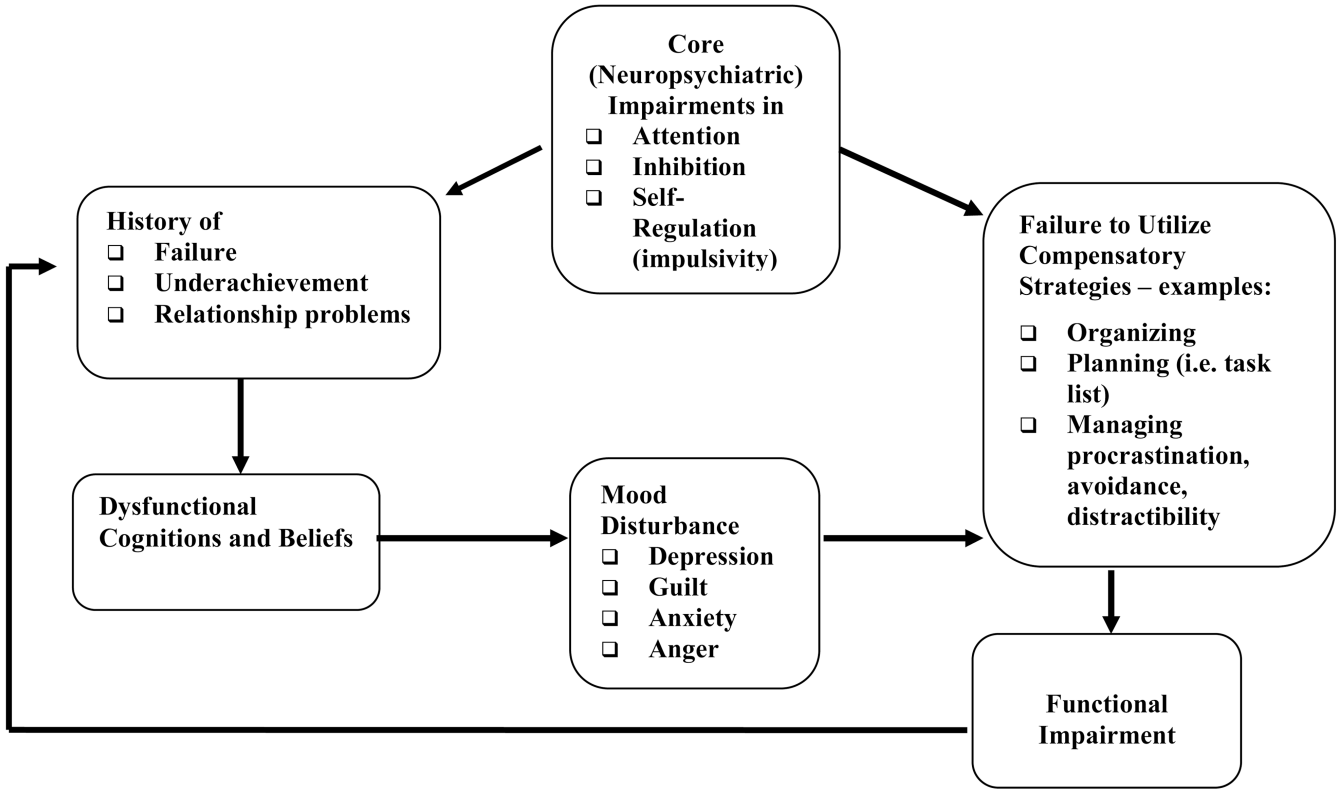

Figure 1.
Illustration of cognitive-behavioral model of ADHD from Safren et al. [13]

Table 1

Effect Sizes and Study Characteristics for Published Trials of Psychosocial Treatments of Adult ADHD Arranged by Magnitude of Effects on Total ADHD Symptom Scores

Treatment	Format	Sessions	n^a	Measure	ES	
					Total ADHD	ADHD Inatt
CBT-Oriented Rehabilitation [25]	Group	10-11	29	BADDS Total	0.38	
				BADDS Attention		0.33
Mindfulness Meditation Training [27]	Group	8	23	ADHD-RS Total	0.80	
				ADHD-RS Inatt.		0.97
Adapted DBT for Adult ADHD [20][21]	Group	13	74	ADHD Checklist	0.91	
Combined medication and CBT [24]	Individual	16	38	BADDS-I Total	1.02	
				BADDS-I Attention		1.25
Metacognitive Therapy [22]	Group	10	30	BADDS Total	1.57	
				BADDS Attention		1.09
				CAARS Inatt.		1.22
Cognitive Remediation Program [29]	Group	8	22	ADHD Checklist[b]	1.65	
CBT for Medication-Treated Adults with Residual Symptoms [31]	Individual	12-15	16	ADHD CSS	1.74	
				ADHD Checklist-I	1.97	
		Total	232	Mean Pooled ES	1.12	0.99

Note. Effect sizes are presented for pre-to-post measurement of current self-reported or investigator-rated ADHD symptoms on established checklists. Separate effects are calculated for overall and inattentive ADHD symptoms when available. ES = Effect size, Cohen's *d*; BADDS = Brown Attention-Deficits Disorder Scales-Self Report; ADHD-RS = ADHD Rating Scale Self Report; BADDS-I = BADDS Investigator Report; CAARS = Conners' Adult ADHD Rating Scale Self Report; ADHD-CSS: ADHD Current Symptoms Scale Self-Report; ADHD Checklist-I = ADHD Checklist – Independent Assessor; CBT=Cognitive Behavioral Therapy.

[a] Sample sizes reflect those used to calculate a pre-to-post effect size for active treatment groups. Thus, for trials with control groups [11,25,31] only the findings from the active treatment group are included to enable appropriate comparisons across studies.

[b] This ADHD self-report checklist was based on symptoms from DSM-III-R. All other ADHD checklists based on symptoms from DSM-IV.