USE OF A BRIEF COGNITIVE BEHAVIORAL INTERVENTION TO ADDRESS ATTENTION-DEFICIT/HYPERACTIVITY-RELATED DIFFICULTIES OF COLLEGE STUDENTS

A Thesis
by
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Submitted to the Graduate School
at Appalachian State University
in partial fulfillment of the requirements for the degree of
MASTER OF ARTS

May 2013
Department of Psychology

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Abstract

USE OF A BRIEF COGNITIVE BEHAVIORAL INTERVENTION TO ADDRESS ATTENTION-DEFICIT/HYPERACTIVITY-RELATED DIFFICULTIES OF COLLEGE STUDENTS

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Attention-Deficit Hyperactivity Disorder (ADHD) is often diagnosed in childhood but persists into adulthood in many cases. This disorder, which is defined by the core symptoms of inattention, hyperactivity and impulsivity, is also associated with impairment in academic settings, interpersonal relationships, and behavioral risk taking. While ADHD is most often treated with medication (e.g., stimulants), brief psychosocial treatments have also been shown to produce improvement in adults with ADHD, although these have not been adequately tested in college-aged populations. The current study tested a brief, eight-session cognitive-behavioral protocol in a case-series design with four college students with ADHD. Participants completed measures tapping ADHD symptoms as well as symptoms of anxiety and depression, and others which tapped general impairment in academic, social and employment domains. The findings indicate that the protocol may be an effective, short-term treatment option for college students with ADHD.

Acknowledgments

I would like to express my gratitude to my thesis committee members for their guidance and advice and my thesis chair, Dr. Will Canu, for his patience, direction and assistance in this study. I would also like to thank the Psychology Clinic for the use of their facilities to conduct my study.

Dedication

This manuscript is dedicated to those of my family and friends who live with ADHD, and to the many others who live with ADHD as a part of their lives.

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Difficulties of College Students

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurological disorder which is characterized by three core symptoms: Inattention (IA), hyperactivity, and impulsivity (HI; American Psychiatric Association [APA], 2000). While ADHD was previously considered a childhood-limited disorder, studies now show that symptoms persist into adulthood in nearly 80% of cases (Biederman et al., 2010; Faraone & Biederman, 2005; Fischer, Barkley, Smallish & Fletcher, 2005; Kessler et al., 2005). As these individuals enter adulthood, symptoms of HI tend to decline at a higher rate than IA (Biederman, Mick, & Faraone, 2000; Mick, Faraone, & Biederman, 2004),but the core symptoms of ADHD can still cause considerable distractibility, disorganization, and difficulty finishing tasks (Fischer et al., 2005; Safren, 2006). Across development such tendencies can lead to inadequate time management, planning, judgment, and coping; these, in turn can result in underachievement in several life domains, especially when the condition is undiagnosed until adulthood (Safren, 2006; Solanto, Marks, Mitchell, Wasserstein, & Kofman, 2008). Areas of impairment related to ADHD in adulthood include educational and occupational attainment, social success, and emotional well-being (Manuzza, Klein, Bessler, Malloy, & LaPadula, 1998; Sobanski et al., 2007). Given the wide range of impairment observed in adults with ADHD, targeting core symptoms alone may not be a sufficient goal for intervention.

ADHD-Related Impairment in Adulthood

In a longitudinal study following a group of hyperactive boys into young adulthood, Barkley, Fischer, Smallish and Fletcher (2006) found that adolescent boys with elevated hyperactivity in childhood, as compared to non-diagnosed peers, are less likely to finish high school, perform worse vocationally, have fewer friends and more trouble keeping them, and more social problems (as reported by their parents). Moreover, not only do adults with ADHD attain less education and professional training as compared to non-diagnosed peers (Sobanksi et al., 2007), they also consistently lag behind in education and occupational attainment when compared to what is expected given their intellectual abilities (Biederman et al., 2008). Adults with ADHD report also more impairment in important tasks critical to day-to-day functioning in adulthood, such as driving (e.g., higher rate of arrests, speeding tickets, accidents, as compared to those without ADHD (Antshel et al., 2009). Research has also indicated that a childhood diagnosis of ADHD is associated with risky sexual behavior in adulthood, such as higher numbers of sexual partners, more incidences of sexual encounters with someone they do not know or have just met, and more unplanned partner pregnancies (Flory, Molina, Pelham, Gnagy, & Smith, 2006).

Perhaps understandably given this host of common difficulties, but still of distinct concern, adults with ADHD report less satisfaction with their lives (Safren, Sprich, Cooper-Vince, Knouse, & Lerner, 2010); furthermore, impairment in interpersonal relationships and occupational functioning shows a strong positive correlation with ADHD symptom severity. Since lower levels of life satisfaction are associated with higher levels of depression and anxiety symptoms (Safren, Sprich, Cooper-Vince et al., 2010), it follows that ADHD symptom severity may serve as a risk factor for the development of depression and anxiety.

Adult ADHD and Comorbidity with Axis I Disorders

Research has shown that individuals diagnosed with ADHD are more likely than the general population to have another Axis I disorder, with an estimated comorbidity prevalence of 77-87% (McGough et al., 2005; Sobanski et al., 2007). Rates of mood disorders such as major depression, dysthymia and bipolar disorder are reported to be between 38% and 50% among adults with ADHD; and rates of anxiety disorders between 10% and 47% (Biederman, Faraone, Spencer, & Wilens, 1993; Kessler, Chiu, Demler & Walters, 2005; Kessler et al., 2006; McGough et al., 2005; Young, Toone, & Tyson, 2003). Although much of the existent research focuses on the male ADHD population, studies have found that girls with ADHD also show heightened risk for other psychiatric disorders, including major depression, bipolar disorder, agoraphobia, social phobia, panic disorder, generalized anxiety disorder, oppositional defiant disorder, conduct disorder, and language disorders (Biederman et al., 2010). The co-occurrence of these conditions with ADHD makes treatment more complicated, as clinicians have to consider whether sequential or concurrent (i.e., targeting both disorders at once) intervention is called for and whether modifications must be made to manualized or other "established" interventions designed for specific Axis I disorders. In addition, symptoms of ADHD may be overlooked in individuals who have already been diagnosed with another disorder. For example, individuals with bipolar disorder show higher rates of ADHD than what is seen in the general population, but it often takes longer for their ADHD to be diagnosed (Klassen, Katzman & Chokka, 2009). Since the presence of both disorders is associated with a poorer long-term prognosis and more severe levels of symptoms and lower functioning overall, early diagnosis is an important component of effective treatment (Klassen et al., 2009).

Prevalence of substance abuse disorders (including both alcohol and drugs) is also substantially higher among adults with ADHD than the general population, with rates between 30% and 47% (Kessler et al., 2006; Lambert, 2005; McGough et al., 2005, Sobanski et al., 2007). To wit, boys diagnosed with elevated HI are at a higher risk for developing a substance use disorder later in life, with one study reporting that a diagnosis of ADHD in childhood resulted in a risk for substance abuse disorders that was seven times higher than in the general population (Manuzza et al., 1998; Sobanksi et al., 2007). ADHD has also been associated with cigarette consumption, with the severity of ADHD symptoms correlating positively with the odds of dependence on tobacco (Lambert, 2005). The latter pattern has also been shown to hold true for cocaine (Lambert, 2005).

Pharmacological Treatment

The neurobiological nature of ADHD lends itself to pharmacological treatment, and substantial research has shown that medication (in particular, stimulants) reduces the core symptoms of IA and HI. However, while strong treatment effects have been consistently noted in children treated with stimulants (average of 70% response rate), the response rate in adults is noticeably lower (average of 53%; Wilens, Biederman & Spencer, 1998; Wilens, Spencer & Biederman, 2002), with equivocal symptom reduction among responders. While one meta-analysis found an extremely large average effect size (d = .9) for the most commonly used stimulant medication, methylphenidate, as a treatment for ADHD in adults (Faraone, Spencer, Aleardi, Pagano, & Biederman, 2004) a more recent meta-analysis suggests that this was an overestimate, and reports an average effect size which is about half as large (d = .42; Koesters, Becker, Kilian, Fegert, & Weinmann, 2009). The deleterious and

not uncommon side effects of stimulants, including nausea, lowered appetite and insomnia, give one further pause when considering this intervention option.

Psychosocial Treatment

Patients with undiagnosed ADHD who present to outpatient psychiatric clinics typically do not show a high response rate to traditional psychotherapeutic methods. As Ratey, Greenberg, Bemporad, and Lindem (1992) point out, "because the neurological basis of their disorder was not identified, many symptoms remained recalcitrant to psychotherapeutic intervention. . . .After the diagnosis of ADHD was confirmed, these individuals responded well to psychoeducation and appropriate drug treatment" (pp. 269-270). Ramsay (2010) suggests that the typical behavior patterns associated with ADHD adults (such as being late for or forgetting appointments) may be misinterpreted by psychodynamically or eclectically-oriented therapists as "resistance" or passive aggression. Moreover, traditional psychotherapy does not usually address specific strategies that adults with ADHD lack, such as planning and organizational skills.

"ADHD coaching" offers another option to affected individuals pursuing psychosocial intervention. This treatment requires the involvement of a "coach" who works closely with the client to provide psychoeducation and skill-building. However, coaches are often not trained mental health care professionals, but instead have attended workshops or received coaching-specific supervision as preparation. Brown (2009) notes that "the quality and effectiveness of the client-coach relationship depend heavily on the competence of the coach, the motivation of the client, and the quality of the personality fit between the two" (p. 560). One obvious and noteworthy limitation of coaching is that the coaches who are not mental health care professionals are not able to treat comorbid conditions, and serious

psychological or functional disturbance may pose challenges that a coach is ill-prepared to handle. Hence, ADHD coaching is viable mainly as a supplement to other forms of treatment.

Recent research has investigated the efficacy of psychosocial treatments for adult ADHD, including cognitive behavioral therapy (CBT), dialectical behavior therapy (DBT), mindfulness meditation training, and group metacognitive therapy. In a review of the current studies on psychosocial treatments for ADHD, Knouse and Safren (2010) found that the strongest outcomes (in terms of symptom reduction and decreased impairment) were achieved with treatment designs with some commonalities in design and content. These approaches are short-term (ten sessions on average); utilize a manual, handouts or a workbook, and emphasize homework assignments. In terms of content, these treatments focus on compensatory skill building, (in particular, organization and planning skills) and address problems in self-motivation.

While results from these studies are promising, most participants were over the age of 40 (average ages by study are listed in Table 1). The relative lack of typical-college-aged adult participants (ages 18-23 years) is noteworthy, as there is some research to suggest that undergraduate pursuits may be particularly challenging for students with ADHD. College students with ADHD report lower grade point averages (Norwalk, Norvilitis, & MacLean, 2009), more academic problems and higher rates of academic probation (Heiligenstein, Guenther, Levy, Savino, & Fulwiler, 1999); as well as lower self esteem and social skills (Shaw-Zirt, Popali-Lehane, Chaplin, & Bergman, 2005). Furthermore, as Ramsay and Rostain (2006) point out in a review of CBT therapy for college students with ADHD, many young adults are diagnosed with ADHD for the first time in college. The authors suggest

that, prior to college, home and school environments may have helped these individuals function at an acceptable level, but once this immediate support network is removed, these students have a much harder time meeting the academic demands of a college or university (Ramsay & Rostain, 2006).

Cognitive Behavioral Model

The current study will utilize an abbreviated format of the CBT protocol published by Safren, Perlman, Sprich and Otto (2005) to treat ADHD in a small group of college students. The rationale of this intervention is based on a cognitive behavioral model of ADHD proposed by Safren, Otto, et al. (2005), which postulates that the core neurological deficits that result in IA, HI, problems with inhibition, and problems with self-regulation often result in (a) a history of failure, underachievement and relationship problems, and (b) an overarching lack of compensatory strategies such as organization, planning skills, and management of distractibility. The lack of or failure to use such strategies leads to impairment in daily functioning and reinforces the negative cognitions associated with the individual's personal history of failures and disappointments. The result is a cycle of maladaptive thoughts and beliefs that may lead to mood disturbances such as anxiety and depression (Safren, Otto, et al., 2005). This model may explain why many adults who take medication for ADHD continue to experience impairment in functioning, in that medication treats the core symptoms of ADHD, but does nothing to address the secondary impairment that is the result of a lifelong struggle with the impact of the disorder.

Working from this model, Safren, Otto, et al. (2005) predicted that the application of a cognitive behavioral treatment (CBT) which explicitly teaches appropriate compensatory strategies (i.e., organizational skills, planning skills and management of distractibility) in a

structured format while simultaneously targeting the core negative beliefs of adults with ADHD would produce improvement above and beyond that which can be achieved by medication only. In a controlled trial of their treatment protocol, Safren and colleagues compared ADHD post-treatment symptom severity (measured by both an independent evaluator and self-report) in a group of 31 adults with ADHD who were randomized to either CBT with continuing pharmacological treatment or continuing pharmacological treatment alone. After fifteen weeks and the completion of the treatment protocol, the CBT group showed a mean reduction in symptoms of nearly 50% (from 29.37 to 15.19) as assessed by an independent evaluator using the ADHD rating scale (Barkley & Murphy, 1998). In comparison, participants in the group which received pharmacological treatment alone displayed a mean reduction in symptoms of around 20% (from 26 to 20.80) on the same measure. Participants in the CBT group reported similarly striking results (29.69 to 14.75) on the self-reported Current Symptoms Scale (CSS; Barkley & Murphy, 1998), as compared to those achieved by the pharmacological treatment group (26.40 to 23.87). The CGI Severity scale was used as a categorical measure of treatment response in this study. Participant scores at post treatment were subtracted from their baseline scores, and a reduction of two points or more was considered treatment response. At post-treatment, 9 of 16 participants (56%) in the CBT group were classified as responders, as well as 2 of 15 (13%) in the pharmacological treatment group, with the effect size (*d*) for this outcome calculated as 1.2. All of these differences were statistically significant and clinically meaningful, with between effect sizes (*d*) between 1.2 and 1.7 and consistently more favorable outcomes for the CBT plus medication group. In addition to these primary outcome measures, participants in the CBT group also had significantly lower anxiety (measured via independent evaluator on the

Hamilton Anxiety Scale as well as the Beck Anxiety Inventory Self-Report), and depressive symptoms (tapped by the Hamilton Depression Scale and Beck Depression Inventory; Safren, Otto, et al., 2005).

When considering the efficacy of CBT, it is necessary to consider whether the outcome may be due to "non-specific" treatment effects. Since the reduction of depression and anxiety in CBT treatments is well documented, it might be that the global improvement reflected in outcome measures may be due to a decrease in associated anxiety and depression rather than a decrease in ADHD symptoms. Two studies have undertaken a comparison of CBT to "non-specific" treatments. Solanto et al. (2010) reported the results of a comparison of metacognitive therapy[1] effects to supportive therapy (which did not include any cognitive behavioral techniques) and found that significantly more patients showed greater improvement of ADHD symptom severity in the metacognitive group. Safren, Sprich, Mimiaga, and colleagues (2010) similarly conducted a randomized controlled trial pitting CBT against relaxation therapy with educational support, wherein the CBT group showed greater improvement across several measures of ADHD symptoms as assessed by self- and independent-evaluator-report. These relative improvements were maintained at follow-ups at 6 and 12 months post-treatment. Thus, it seems reasonable to conclude that CBT produces effects above and beyond the "non-specific" effects of therapy.

Most of the published studies on CBT for adult ADHD utilized 10 or more sessions (Knouse & Safren, 2010), except for a randomized, controlled trial of a cognitive remediation program delivered in eight weekly sessions conducted by Stevenson, Whitmont, Bornholt,

[1] The metacognitive protocol used by Solanto and colleagues is based on cognitive behavioral theory and is fairly similar to the protocol designed by Safren et al. (2005) with respect to content.

Livesy, and Stevenson (2002). This treatment used a group format, targeted skill building in motivation, concentration, listening, impulsivity, anger management and self-esteem, and integrated the use of a workbook and weekly homework assignments. In addition, participants were assigned a support person who acted as an informal coach, providing reminders about sessions and homework, and attending sessions with the participants. At the outcome assessment, 36% of participants showed a reduction of 33% or more in ADHD symptoms as measured by the DSM-III-R ADHD checklist. In addition, the percentage of responders increased from 36% to 55% at the two month follow-up assessment. While the efficacy of using a support person as a component of treatment was not assessed objectively, participant reports indicated that support persons encouraged adherence to the program and as such were a valuable addition to the intervention (Stevenson et al., 2002).

Case Series Investigations of CBT for Adults with ADHD

In addition to the aforementioned randomized and controlled trials, there have been several case studies of CBT for adult ADHD. Mitchell, Nelson-Gray and Anastopoulos (2008) reported the results of treating two young men with the *Mastering Your Adult ADHD* protocol (Safren, Perlman et al., 2005). The first case was a 23-year-old, single, Caucasian college student who sought treatment upon his return to a university he had previously withdrawn from due to academic difficulties associated with symptoms of ADHD. This student met criteria for ADHD Combined Type (ADHD-C), generalized anxiety disorder (GAD), and avoidant personality disorder, and also presented with some symptoms of depression and borderline personality disorder. Despite being on a consistent medication regiment for four years, he had experienced ongoing symptoms of ADHD and significant impairment; furthermore, the authors hypothesized that the other clinical features emerged as

a consequence of his ongoing ADHD symptoms and resulting academic and interpersonal difficulties. After eleven hour-long sessions of CBT over a four month span, this student showed dramatic improvement on an ADHD symptoms checklist, going from nine IA and seven HI symptoms to one each at post-treatment assessment. In addition, his anxiety and depression scores dropped by ten points apiece on the BAI and BDI.

The second case reported by Mitchell and colleagues (2008) was a 40-year-old, married, Caucasian male who sought treatment after experiencing significant difficulties in occupational and marital domains. Similar to the previous client, he was currently taking medication to address his ADHD but continued to experience impairment. In addition to experiencing IA and HI symptoms since childhood, he had recently developed secondary depressive symptoms following marital difficulties. In this case, fourteen hour-long sessions of CBT were administered across seven months. At the termination of treatment, this client had reported a modest one-symptom reduction in inattentive symptoms on an ADHD symptom checklist and a two-symptom reduction in hyperactive symptoms. However, some complicating factors were present, including an unexpected separation from his wife, decreased attendance at sessions, and an out-of-state move (at which point treatment was terminated). Although his symptoms did not improve as markedly as for the first client, feedback from this man indicated that he was utilizing cognitive restructuring strategies to help him cope with the end of his marriage and that he was applying organizational and distractibility-reducing techniques and finding them helpful. It is also noteworthy that the client's scores on the BDI and BAI indicated reduced levels of depression and anxiety, in spite of his circumstances (Mitchell et al., 2008).

In another case study, Ramsay and Rostain (2005) present a 19-year-old, female, Caucasian college student with a diagnosis of ADHD Predominantly Inattentive Type (ADHD-IA) and a secondary diagnosis of Anxiety Disorder, Not Otherwise Specified (NOS). The primary outcome measures were the Brown Attention Deficit Disorder Scale for Adults (BADDS), the BDI, BAI, and Beck Hopelessness Scale (BHS). Although a manualized treatment protocol was not used, treatment aims and goals included psychoeducation about ADHD and the impact of the disorder, the development of coping and problem solving strategies as well as modification of maladaptive beliefs and coping strategies. This closely echoes the treatment aims and goals of the Safren, Otto, et al. (2005) protocol. At the outcome of treatment, her self-reported symptoms had improved quite meaningfully, with a 56% reduction on the BADDS, a 66% reduction on the BDI, a 61% reduction on the BAI, and a 85% reduction on the BHS, respectively (Ramsay & Rostain, 2005).

In the case study of a 30-year-old, married, Caucasian man who presented with difficulties in sustaining employment as well as marital problems, Rosenfield, Ramsay, and Rostain (2008) applied a multimodal treatment format including an adjustment to the man's preexisting pharmacotherapy routine, weekly CBT sessions, and marital therapy. This client met criteria for ADHD-C, along with Depressive Disorder (NOS). By the end of a year of treatment, the client had improved functioning in several areas of his life (e.g., holding a full-time job; better relationship with his wife) and experienced dramatically lower depressive symptoms (i.e., reduction of ~40 points on BDI; Rosenfield et al., 2008).

Aim and Context of the Present Study

As mentioned above, all but two of the controlled trials of CBT used ten or more sessions, with the exception of Stevenson et al. (2002). Thus, more detailed research on the efficacy of a briefer protocol is warranted. Also discussed earlier was the fact that the participants of the controlled trial studies tended to be older than the age range typically seen in a college population. Of the case studies, two involved college students (Mitchell et al., 2008; Ramsay & Rostain, 2005), but only one of these utilized a manualized protocol. A brief, eight session version of a manualized CBT protocol could be completed in one semester at a college or university, making it amenable to use by campus counseling centers, which typically limit the number of appointments each student can make. Moreover, while some research has indicated that longer psychotherapy treatments are associated with more improvement (Kotkit, Daviet, & Gurin, 1996), a longitudinal study examining the effect of treatment intensity and regularity in three different modalities of treatment found that number of sessions was not predictive of outcome in CBT (Kraft, Puschner & Kordy, 2006). This broadly suggests that an abbreviated protocol might be equally as efficacious while also being more cost-effective. The latter is of particular importance on most college campuses, as counseling centers have long had to impose session limitations as a means to cope with increased client loads (Stone & McMichael, 1996). Briefer interventions may be more readily adopted with limited staff availability, and more readily completed within the time constraints of a typical academic term.

Furthermore, contemporary adult learning and development theories suggest that the period of adult life from 19 to 29 years old should be considered a separate stage of

development (Tanner, Arnett, & Leis, 2009). This stage of "emerging adulthood" is characterized by instability, as expressed by Tanner et al. (2009):

> The identity explorations of emerging adulthood contribute to making it the age of instability, because, in the course of their explorations, emerging adults often experience changes in love partners and in educational and occupational paths. They change residences more frequently than in any other part of the life course…the instability of the period adds an element of stress and anxiety for many emerging adults (p. 36).

This time period, with elevated instability, may be especially challenging for emerging adults with ADHD and, therefore, further bolsters the need for examining treatment outcome with a typical-college-aged group.

Another noteworthy feature of emerging adulthood is continued cognitive development. During this time period, the brain finishes developing in regions that govern decision making and emotion regulation, such as the prefrontal cortex and the corpus callosum (Casey, Giedd, & Thomas, 2000; Giedd et al., 1999). Furthermore, changes have been noted in the cingulate gyrus, caudate nuclei, insular cortex, and bilateral claustrum (regions associated with emotion and motivation) in students over the course of their first six months in college (Bennet & Baird, 2006). Such changes are particularly relevant when considering a CBT approach that is heavily dependent upon self-motivation.

A case series study of a brief version of the *Mastering Your Adult ADHD* protocol (Safren, Perlman, et al., 2005) was conducted, with the goal of gathering more detailed information on its efficacy for college students with ADHD. By using such a design, the study was able to document both qualitative and quantitative information about the efficacy

of the treatment, how comorbid conditions such as depression or anxiety appear to influence outcome, and how the use of an assigned "support person" aids in treatment.

Method

Participants

Participants were recruited from the population of students seeking treatment at the Appalachian State University (ASU) Psychology Clinic and other relevant on-campus service providers (e.g., Student Health Services) via direct email advertisement, staff-initiated referrals, and posted descriptions. Four students between the ages of 19 and 25 and classified as full-time at either ASU or Caldwell Community College (CCC) participated. All had a previously documented diagnosis of ADHD-C, ADHD-IA, or ADHD NOS (see details below). This is consistent with the procedures used by Safren, Otto, et al. (2005).[2] Those with symptoms of comorbid anxiety or depression were accepted; however, the presence of current suicidal ideation, self-injurious behavior, psychotic symptoms, or a Global Assessment of Functioning Score below 40 was considered to be reason for exclusion and referral for more appropriate intervention. Participants who were currently taking medication for ADHD were asked to maintain their current dosage during the course of treatment. No compensation was provided to participants, although materials were (e.g., therapy workbook). The Institutional Review Board of ASU approved this study proposal on September 21st, 2011 (see Appendix 1).

[2] Since the protocol does not include strategies for managing hyperactivity, individuals with ADHD-HI, who report clinically significant levels of HI but not IA, were not recruited.

Materials

In addition to demographic questions that were administered in a semi-structured interview or questionnaire format—tapping such data as history of psychological intervention, timing and nature of previous ADHD diagnosis, ethnicity, SES background, educational level, and other pertinent information—the following specific measures were administered.

Conners Adult ADHD Rating Scale- Self Report: Long Version (CAARS). This 66-item measure (Conners et al., 1999) was designed using the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR; APA, 2000) symptom criteria, the Conners ADHD scales for children, current conceptualizations of ADHD in adults, and clinical impressions. Four subscales were utilized herein: problems with self-concept (six items; ["I act okay on the outside, but on the inside I'm unsure of myself"]), DSM-IV inattentive symptoms (nine items, ["I make careless mistakes or have trouble paying close attention to detail"]), DSM-IV hyperactive-impulsive symptoms (nine items, ["I am always on the go"]), and ADHD index (12 items, ["I can't get things done unless there's an absolute deadline"]). Responses are scored on a four point scale (0 = *Not at all, never*; 3 = *Very much, very frequently*). Scores are reported in a *t* format that is indexed against age and gender norms, with higher scores indicating more severe symptoms. The CAARS has demonstrated strong psychometric properties, including coefficient alphas ranging from .86 to .92, median test-retest reliability coefficients of .89, and significant correlations with other measures of ADHD symptoms (Erhardt, Epstein, Conners, Parker, & Sitarenios, 1999).

Current Symptoms Scale. The Current Symptoms Scale (CSS; Barkley & Murphy, 2006) is an 18-item self-report measure which uses a 4 point scale (0 = *not at all*; 3 = *very often*) to assess current DSM-IV-TR (APA, 2000) symptoms of ADHD, Conduct Disorder, and Oppositional Defiant Disorder, as well as current degree of impairment caused by ADHD symptoms, specifically. Impairment is measured on a four point scale across ten domains, which include work, social, community, education, dating/marriage, money, driving, leisure, and daily responsibilities. ADHD symptom scores were used herein and were differentiated across inattention and hyperactivity. The CSS has shown satisfactory psychometric properties, with a Cronbach's alpha of .80 for IA and .73 HI scales, respectively (Fedele, Hartung, Canu, & Wilkowski, 2010).

Adult Interview. The Adult Interview (Barkley & Murphy, 2006) is a semi-structured interview assessing symptoms of ADHD as well as symptoms of disorders which are commonly comorbid with ADHD, including Oppositional Defiant Disorder, Bipolar I Disorder, Major Depressive Disorder (current and past), Generalized Anxiety Disorder, (current and past), Obsessive-Compulsive Disorder, Antisocial Personality Disorder, Learning Disorder, Dysthymic Disorder, Alcohol Abuse and Dependence, and Cocaine Abuse and Dependence. It is designed to be administered by an expert rater, and was done so herein by the author, who had prior training on the administration of structured clinical interviews. Responses are coded as present or absent (0= *not present*, 1= *present*). This measure has been shown to be sensitive to the presence of ADHD in adults (Barkley, Fischer, Edelbrock, & Smallish, 1990). Additional questions will be utilized in this interview to clarify nicotine and alcohol consumption patterns even in the absence of abuse or dependence symptoms.

Beck Depression Inventory-II. The Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) is a commonly-used, 21 item self-report that contains questions concerning the presence and severity of emotional, cognitive, behavioral and physical symptoms of depression. Responses range from 0 to 3 (0 = *not at all present*, 3 = *strongly present*) and are summed to determine an individual's total score. Typically, scores from 0 to 13 indicate minimal depression, 14 to 19 indicate mild depression, scores from 20 to 28 indicate moderate depression and scores from 29 to 63 indicate severe depression. The BDI-II has a coefficient alpha of .90-.91 across scales (Beck et al., 1996)

Beck Anxiety Inventory. The Beck Anxiety Inventory (BAI; Beck & Steer, 1990) is a frequently employed, 21 item self-report measure that was designed to measure the presence and severity of anxiety symptoms. The BAI items assess for the presence of physical symptoms of anxiety, such as dizziness, nausea, and a racing heartbeat; as well as for the cognitive and affective symptoms of anxiety such as a fear of dying or losing control, or feelings of being terrified and unable to relax. Items are completed on a scale from 0 to 3 (0 = *not at all upsetting*, 3 = *severely upsetting*). A total score is derived by summing item responses. Scores of 0-7 indicate minimal anxiety, scores of 8 to 15 indicate mild anxiety, scores of 16 to 25 indicate moderate anxiety, and scores of 26 to 63 indicate severe anxiety. The BAI has demonstrated strong internal consistency (α =.92) and strong test-retest reliability (r = .75; Beck, Epstein, Brown & Steer, 1988).

The Clinical Global Impression Scale. The Clinical Global Impression Scale (CGI; Guy, 1976) has three scales consisting of one item each which are to be completed by an expert rater. The Severity of Illness and Global Improvement items, which are appropriate for use herein (Safren, Otto, et al., 2005), are rated on a 7-point scale. For Severity of Illness,

lower scores indicate better psychological functioning (1 = *not at all ill* ; 2 = *borderline mentally ill*), with higher scores indicating a severe level of illness (6 = *severely ill*; 7 = *among the most extremely ill patients*). For the Global Improvement item, lower numbers indicate an improvement in symptoms and functioning while higher numbers indicate a decline in the same (4 = *no change*). The CGI was completed in consultation with a licensed psychologist (W.C.).

The Weiss Functional Impairment Rating Scale, Self-Report. The Weiss Functional Impairment Rating Scale (WFIRS-S; Weiss et al., 2007) is designed to measure functional impairment associated with ADHD, and assesses adjustment in seven specific domains: family (8 items), work (11 items), school (11 items), life skills (12 items), self-concept (5 items), social (9 items) and risky behavior (14 items). Items are completed using a 4-point Likert format indicating if problems occur *never* (0), *sometimes* (1), *often* (2) or *very often* (3). Scoring is completed by summing the values of responses and dividing by number of items with a value response (1-3) in order to obtain a mean item response for each domain. Impairment is considered to be present in any domain with two items scored 2, or one item scored 3; therefore, mean item scores are reported for each domain in which the threshold for impairment was met. Psychometric properties of the WFIRS are good, with internal consistency coefficients above .80 for each domain and for the measure as a whole (Weiss et al., 2007).

The Structured Clinical Interview for DSM-IV Axis I Disorders. This structured clinical interview (SCID-I; Spitzer, Williams, Gibbon, & First, 1992) consists of nine modules corresponding to the major diagnostic classes of disorders on Axis I of the DSM-IV-TR. The SCID-I assesses for the occurrence of symptoms within the past month, as well as

lifetime occurrence. Independent studies have reported inter-rater reliability for the SCID-I to be generally satisfactory across diagnoses, with kappa coefficients ranging from .61 to .83, and a mean kappa of .71 (Lobbestael, Leurgans, & Arntz, 2010). The screening questionnaire for the SCID-I was employed in this study, with follow-up via verbal administration of indicated modules only (i.e., those with positive screening responses).

Outcome Questionnaire 30.2. The Outcome Questionnaire-30.2 (OQ-30; Lambert et al., 1996) is a brief self-report measure designed to assess progress in a clinical population during the course of treatment. The measure is designed to be sensitive to change over a brief period, and as such it is administered weekly, or multiple times over the course of treatment. The dimensions of functioning measured by the OQ-30 include social role functioning, interpersonal functioning and subjective discomfort. It consists of thirty questions and takes around five minutes to complete. The OQ-30 has demonstrated high internal consistency (α = .93) and satisfactory concurrent validity with other measures, including r = .7 with the Symptom Checklist-90-R and r = .60 with the BDI (Lambert et al., 1996).

Treatment Satisfaction Survey. This measure was created for the purposes of this study, and assessed participant satisfaction and impressions of the treatment. It includes five items : "How satisfied were you with this intervention?"; "How competent or knowledgeable was the therapist?"; "How useful are the techniques you've learned so far?"; "How useful do you anticipate these techniques to be in the long run?"; and "How likely is it that you would recommend this intervention to others you know or meet with similar problems (i.e., ADHD-related difficulties?"). Responses are given on a 5 point scale (0 = *not at all*; 5 = *very*) and the mean item score is calculated from these five items. In addition, qualitative impressions of the treatment are collected using the following questions: "How would you generally

describe your experience with this treatment?"; "What aspects (if any) of the treatment led to improvement of your symptoms or adjustment?"; "What aspects (if any) of the treatment failed to improve your symptoms or adjustment?"; and "Overall, is there anything you would change about this treatment?"

Procedures

Design and assessment. Three students responded to posted recruitment advertisements via email and one was referred to the study by the ASU Psychology Clinic; all were invited to a screening interview (see below), after which they elected to participate in the study.[3] During the week that Participant One began treatment, Participant Two completed baseline assessment measures, consisting of the CSS and OQ-30. Participant Two started treatment exactly one week later. Participants Three and Four were screened three weeks after Participant One began treatment, and these participants began treatment four and five weeks after Participant One began treatment. At the start of the first session for each of the four participants, a study initiation assessment was completed (see details below).

Screening session. Potential participants were asked to bring information that corroborated their ADHD diagnosis (e.g., psychological assessment report). An informed consent document specific to the screening session was completed at the beginning of these appointments, and in the absence of documentation of an ADHD diagnosis, all measures described above were administered to the potential participant to determine whether he or she met criteria for study inclusion. The SCID screener and follow-up modules as indicated by screener responses were administered to all potential participants, regardless of whether or

[3] One pilot participant was recruited and treated in addition to the four study participants. The pilot participant began treatment three weeks prior to Participant 1, and completed all sessions.

not they brought a psychological assessment report. Participants were also required to access and print out their current GPA via the ASU student web service (Appalnet) and were asked to report their SAT or ACT scores. At the end of this session, a current Global Assessment of Functioning (GAF) score was assigned, based on all available information gathered. This process continued until four eligible participants were identified and completed informed consent. All individuals who completed screening were deemed to meet diagnostic criteria, offered admission to the study, and ultimately enrolled for participation.

Study initiation assessment. Prior to the start of the first session of treatment, each participant completed a brief set of measures consisting of the CAARS, CSS, WFIRS-S, BDI, and BAI, and were assessed with the CGI.

Weekly treatment assessment. Immediately prior to each subsequent session, participants completed the CSS and the OQ-30, and were assessed with the CGI.

Post-treatment assessment. The post-treatment outcome assessment immediately followed the last session of CBT and included the CSS, CAARS, CGI, WFIRS-S, BDI, BAI, and the satisfaction survey. At the end of the assessment, participants were assigned a GAF score based on all available clinical outcome data (i.e., clinical impressions, self-reported symptoms and impairment). Participants were also invited to give their subjective impressions of the usefulness of the treatment, and its impact on their daily functioning.

Additional qualitative assessment. In addition to these largely quantitative, planned assessment techniques, therapy sessions were videotaped and reviewed by the author to enhance treatment delivery and also to glean additional qualitative information that can enrich the understanding of how this modified intervention was received by the individual participants. An independent graduate student evaluator watched 25% of the treatment

sessions to assess integrity of treatment delivery, and determined that the administration of the protocol in these sessions was faithful to the design. Specific sessions observed across participants were as follows: Participant One, sessions one and five; Participant Two, two and six; Participant Three, three and seven; Participant Four, four and eight. The independent evaluator also made a CGI rating for each client in each session observed. These ratings were compared to the ratings of the author, to serve as a reliability check.

Treatment protocol. The treatment consisted of eight weekly sessions (one hour each) that were adapted from the protocol published by Safren, Perlman, et al. (2005). The original protocol organizes twelve sessions into four modules (see Table 2). The first module, entitled *Psychoeducation, Organization and Planning*, consists of five sessions. Of these, two were eliminated in the abbreviated version: *Involving a Family Member* (rationale: involving a family member is not feasible for many college students) and *Organizing Papers* (rationale: while developing a sorting system for mail and a filing system for papers might benefit college students, it is almost certainly less critical than for an older adult). As with other abbreviations (see below), it was deemed acceptable to omit these sessions to achieve greater treatment brevity so that the protocol can comfortably be administered in a single "long" academic term.

In the experimental protocol, then, three sessions were dedicated to psychoeducation, organization and planning, including *Psychoeducation and Introduction to Organization and Planning Skills*, *Organization of Multiple Tasks*, and *Problem Solving and Managing Overwhelming Tasks* sessions. The second module, on reducing distractibility, retained the same two sessions as in the original Safren, Perlman, et al. (2005) protocol, entitled *Gauging Attention Span* and *Distractibility Delay and Modifying the Environment*. Two of the three

original sessions from the adaptive thinking module were retained. *Introduction to a Cognitive Model of ADHD* and *Adaptive Thinking* covered the presentation of the cognitive model and taught adaptive thinking techniques. The session entitled, *Rehearsal and Review of Adaptive Thinking Skills Prevention* was omitted, since it was designed as a review of the other two sessions, and instead, a brief review of the client's understanding and experience of adaptive thinking was included in the final session. The fourth module, *Additional Skills*, consists of two sessions in the original protocol. In the abbreviated protocol, *Application of Skills to Procrastination* and *Relapse Prevention* were collapsed into one session. The session was designed to provide time to review the skills presented over the course of the protocol and to bolster the client's ability to apply these new skills in novel circumstances. For more detail about the content of the original Safren, Perlman, et al. (2005) sessions in all four modules, see Table 2.

Participants were supported during their treatment by an assistant—a clinical psychology Master's trainee-- who provided reminders and other intersession assistance, as needed. This was designed to provide support and mentoring regarding application of skills and to ensure standardized procedures in a developmentally appropriate way, as in Stevenson et al. (2002) and Safren, Otto, et al. (2005). The support assistant made weekly phone calls to the individual to remind participants of homework and upcoming sessions, and assisted participants by addressing problems or questions relevant to treatment, such as confusion about the nature of assignments.

Participants were provided with the *Mastering Your Adult ADHD* client workbook for their personal use (Safren, Sprich, Perlman, & Otto, 2005) during treatment. Although several options were prepared in case participants missed or canceled sessions and were not

able to reschedule in the same week (e.g., extend next session, do phone session, eliminate last session), it was only necessary to offer these in one instance (Participant Four). In that case, the next week's session was extended to cover material from the missed session.

Data Analysis

Pre- and post-treatment assessments were examined. In addition, visual analysis was used to examine progress over the course of treatment. Progress was tracked weekly using scores on the CSS, the OQ-30, and the CGI. Pre and post-treatment scores on the CAARS, WFIRS, BDI-II, and BAI were compared as well. Finally, qualitative description of changes, challenges, and experiences written by each participant and in-session discussion regarding symptoms and impairment were considered in gauging treatment success.

Case Descriptions

Case Presentation: Participant One

Presenting problem. Anna[4] was a 19-year-old Caucasian female who volunteered to participate in the study in response to a posted flyer. She presented with complaints related to academic achievement and associated time management and organization problems. She reported that although she was highly motivated to do well in school, she still found it difficult to study effectively, and as a result she often became frustrated and upset. At the time of her participation in the study, Anna was a second semester freshman at ASU, with a GPA of 2.65.

Assessment and treatment history. Anna described herself as a physically active child who was "all over the place," and noted that her parents described her as difficult to manage and control in childhood. She had trouble sitting still, often interrupted others, and

[4] Pseudonyms are utilized throughout this document to protect the confidentiality of participants

had difficulty sustaining her attention in school and at home. She reports often getting in trouble at school for being "mischievous." She also described herself as "bossy" and "hot-tempered." Her parents took her to a psychiatrist in 3rd grade because of symptoms of separation anxiety that arose when her mother was not present. In addition to diagnosing her with separation anxiety, the psychiatrist diagnosed her with ADHD-C (although Anna noted her symptoms long preceded this assessment), and prescribed medication to treat her ADHD symptoms. Anna has continued to take medication to treat these symptoms since this time, and at the time of the study took 54mg of Concerta daily. She also took 50 mg of Zoloft daily to treat symptoms of anxiety; usage of both of these medications was regularly (every 3 months) monitored by her psychiatrist.

Psychosocial history. Anna was raised by her biological parents, and has no siblings. As mentioned previously, Anna described herself as difficult to manage as a child, which she attributed to her symptoms of ADHD. Anna's father also has a diagnosis of ADHD. Anna describes herself as overly excitable and talkative. She has several close friends, but reports that she sometimes has trouble getting along with them because of her tendency to be impulsive in both her actions and her speech. She indicated that she did not often go to parties or other large social gatherings due to her social anxiety; however, this appeared to be subclinical, given the fact that when prompted by and accompanied by friends, Anna could tolerate being in large groups.

Anna reported no significant substance use. She reported drinking alcohol "rarely," once or twice a month, and never using any illicit drugs or tobacco.

Anna noted that she made mostly A's and occasional B's throughout grade and high school. Since beginning classes at ASU, she has struggled to maintain this level of academic

performance, making B's and C's in her first semester classes, which resulted in a GPA of 2.65. Anna described finding it difficult to adjust to the more stringent academic requirements of university-level classes in terms of the amount of time and reading required. In addition to her academic challenges, Anna did not get along well with her assigned roommate during her first semester, and these disagreements resulted in Anna moving into a single-person dorm room.

Assessment at recruitment. Anna completed the CAARS, CSS, BDI, BAI, WFIRS, and the OQ-30 at her screening session. The SCID-1 screener and Adult Interview were also conducted with Anna.

On the CAARS, Anna reported elevated levels of Problems with Self-Concept, DSM-IV Inattentive Symptoms, DSM-IV Hyperactive/Impulsive Symptoms, with a similarly high ADHD Index scale score (T = 69, 69, 84, 82, respectively). She reported 3 out of 9 symptoms of IA and 7 out of 9 symptoms of HI on the CSS. On the WFIRS, Anna reported elevated levels of impairment in the domains of Work (item M = .72; 2 items = 2), Life Skills (item M = .58; 1 item =3), Social (item M = 1.2; 3 items = 2, 1item = 3), and Risk (item M = .85; 2 items = 2, 2 items = 3). On the BDI, Anna reported moderate levels of depressive symptoms (23) and on the BAI, she reported moderate levels of anxiety symptoms (26). Clinical interview procedures indicated that, keeping with her anxiety symptom reports, Anna met full criteria for Social Phobia and Generalized Anxiety Disorder, in addition to ADHD. On the OQ-30, Anna scored a 45 (T = 61), which placed her at the 86.4th percentile compared to a normative, non-clinical sample of adults from the ages of 17 to 80 in terms of impairment level. Anna was assigned a GAF score of 54.

Course of Treatment and Assessment of Progress: Participant One

Anna attended all eight sessions of the protocol. Anna began treatment one week after her screening session. At that time, Anna described her goals for treatment as "learning to work more effectively" and "to manage impulsivity." She noted that her concerns were academic, social, and personal. Although she was highly motivated to perform well academically, her performance in the previous semester had caused her some anxiety about her ability to make A's and B's in university-level classes. She found this anxiety to be highly disruptive and overwhelming, both to her ability to study and complete her assignments and in her social life.

At study initiation[5], Anna reported elevated levels of DSM-IV Inattentive Symptoms, DSM-IV Hyperactive/Impulsive Symptoms, and on the ADHD Index scale (T = 65, 84, 68, respectively) via the CAARS.

On the WFIRS, Anna reported elevated levels of impairment in the domains of Work (item M = .73; 2 items = 2), Social (item M = 1; 2 items = 2), and Risk (item M = .5, 2 items = 3). On the CSS, Anna reported 2 out of 9 symptoms of IA and 7 out of 9 symptoms of HI. On the BDI, Anna reported minimal levels of depressive symptoms (8), and on the BAI, she reported moderate levels of anxiety symptoms (16). On the OQ-30, Anna scored a 39 (T = 57; 75.8th percentile). Anna was assigned a CGI-Severity score of 5 at pre-treatment.

Overall, these scores were consistent with the scores Anna reported at her screening session, except for the BDI and BAI scores, which were noticeably lower (see above) and her OQ-30 score, which was slightly lower.

[5] The reader is reminded that assessment at study initiation was a procedure subsequent to assessment at recruitment and, therefore, measure scores may vary between the two.

At post-treatment, Anna reported elevated levels of DSM-IV Hyperactive/Impulsive Symptoms, and on the ADHD Index scale (T = 84, 75 , respectively) on the CAARS. Her score on the DSM-IV Inattentive Symptoms scale was slightly lower than at initiation, and classified as "high average"(T = 63). She reported 2 out of 9 symptoms of IA and 7 out of 9 symptoms of HI on the CSS. On the BDI, Anna reported minimal levels of depressive symptoms (6), and mild levels of anxiety symptoms on the BAI(11). On the WFIRS, Anna reported elevated levels of impairment in the domains of Work (item M = 1.09; 2 items = 2, 1 item = 3), School (item M = .73; 3 items = 2), and Risk (item M = 1; 4 items = 2). Anna no longer reported elevations on the Social domain on the WFIRS. At post-treatment, Anna was assigned a CGI Severity score of 4, and a CGI Improvement score of 2.

Anna scored an 18 (T = 40; 15.9th percentile) on the OQ-30 at post-treatment. Anna's improvement on the OQ-30 seemed to reflect a reduction in her levels of stress and negative emotions. At study initiation, Anna reported on this measure that she sometimes felt irritated, nervous, stressed, and she sometimes blamed herself for things, felt that something was wrong with her mind, and felt stressed at work, school or other daily activities. In contrast, at post-treatment Anna reported that she rarely or never felt irritated, nervous, stressed or blamed herself for things; and she rarely felt stressed at work, school or other daily activities. It was notable that Anna's BDI and BAI scores did not reflect a large decline in depression or anxiety (reductions of two and five points, respectively); this may be due, in part, to Anna's medication regimen, which included a daily dosage of Zoloft. Anna's symptoms of depression and anxiety were low to begin with, and may be considered "stabilized" so that these symptoms were not readily reduced farther. Anna was assigned a GAF score of 71,

reflecting the fact that she reported being able to generally manage her symptoms and to function adaptively, particularly in her academic work.

On the treatment satisfaction survey, Anna endorsed a high level of satisfaction with the treatment overall (item $M = 4$). Anna reported that while she found the strategies for organization, planning and managing distractibility to be helpful, she believed the adaptive thinking module and cognitive strategies were what principally led to her improvement. She noted that using the thought records reduced her stress and anxiety by allowing her to achieve a "healthier perspective." The protocol's structured exercises and her discussions with her therapist allowed her to recognize that thoughts like "it's no use anyways, I'm not going to make a good grade, no matter how much I study" often drove her dysphoria. By challenging these thoughts and others (e.g., "Anything less than an A is not good enough"), Anna was able to use more adaptive thinking and reduce her anxiety. Additionally, by applying strategies to manage distractibility and breaking tasks down into subtasks, Anna was able to work more efficiently, and her confidence in her academic ability increased as a result.

Treatment results summary. Anna presented as a student who was highly motivated to succeed academically. However, she tended to mismanage her time due to residual symptoms of inattention, impulsivity, and distractibility, and her symptoms of anxiety often interfered with her academic work as well as her social interactions. She sought treatment in order to learn strategies which might help her perform at a higher level academically by controlling her distractibility and managing her time more effectively. Post-treatment, Anna felt that the strategies she learned helped increase her sense of competency in terms of her

ability to handle university-level academic work. This in turn, helped mitigate some of her anxiety, leading to a sense of overall improvement in her level of impairment.

Case Presentation: Participant Two

Presenting problem. Zeb was a 25-year-old Caucasian male student at Caldwell Community College who was referred to the study by a staff member at the ASU Psychology Clinic subsequent to a psychological evaluation in which Zeb was diagnosed with ADHD-IA. Zeb's primary complaints at the start of the study were procrastination, difficulties with time management, poor organizational skills and struggles with distractibility and severe inattention. Zeb's current GPA was a 2.3, and Caldwell was the third college he had attended.

Assessment and treatment history. Zeb was first diagnosed with ADHD when he was 13 years old, after he began to struggle academically. Zeb's parents indicated in a prior report, however, that he began to show clinically significant symptoms of IA since before age seven, and some symptoms of HI. Zeb reported that he had difficulty paying attention in his classes, often forgot assignments and projects, and had difficulty studying. Zeb's parents took him to a pediatrician, and he was prescribed Ritalin for school days only. During high school Zeb began taking Adderall instead of Ritalin, and he is currently prescribed 20 mg daily. However, he reports that he ceased taking his medication regularly after beginning college and instead sometimes takes half his prescribed dosage directly before his classes. Two months prior to beginning treatment, Zeb ceased taking Adderall altogether due to his dislike of the side effects of medication, including loss of appetite, sleep difficulties, and feelings of anxiety. Despite experiencing substantial impairment due to symptoms of ADHD

and elevated substance use (described in more detail below), Zeb has never sought any mental health treatment.

Psychosocial history. Zeb was raised by his biological parents along with his younger brother. Zeb indicated that he met all developmental milestones appropriately and has no chronic medical conditions. While Zeb described himself as a quiet child, he noted that he is currently a friendly and sociable person, who usually makes friends easily. He has several close friends, and reports that he does not often get into arguments. Zeb also reports having a close relationship with his younger brother, with whom he shares an apartment in Boone.

Zeb reported making average grades (B's and C's) in both grade school and high school. He indicated that he felt he was capable of making higher grades, but he often became frustrated and would stop putting forth effort into his classes. He began classes at Appalachian State University in 2005, but withdrew after three semesters due to poor academic performance. At that point, he returned to his parents' home and worked as a server in a restaurant for a year before beginning classes at Wake Technical Community College. He continued to take classes for three semesters, but reported that he would often drop courses when he began to make poor grades, and as a result he has not yet completed enough classes to earn an associate's degree. After three semesters at Wake Technical Community College, Zeb once again withdrew and worked for a time without taking classes. In 2011, Zeb moved back to Boone, NC and began taking courses at Caldwell Community College. Currently, his GPA is 2.3.

Zeb reported that he has consumed alcohol and marijuana since he was 17 years old. When he was living and working in Raleigh at the age of 21, he drank alcohol almost daily,

and often had 10-15 drinks in one night. After he moved back to Boone and began attending Caldwell Community College, his use of alcohol decreased dramatically. Currently, he drinks alcohol on weekends only. He still reports, however, consuming 10 to 15 drinks per drinking occasion. Zeb reports that he smokes marijuana at least once a day on most days. He did not report any tobacco use.

Assessment at recruitment. Zeb provided a copy of his psychological evaluation (from the ASU Psychology Clinic) to validate his diagnosis, and an abbreviated battery of measures was administered at screening. Data from his psychological evaluation, which was conducted three months prior to the time at which Zeb began the treatment, indicates elevations on the ADHD index subscale (T = 68) of the CAARS, as well as on the Attention Problems index of the Behavior Assessment System for Children-2 (BASC-2; T = 75). Zeb endorsed 8 out of 9 symptoms of IA on the CSS, but endorsed less than 5 symptoms of HI. In addition, Zeb's performance on the Connors Performance Task (CPT) was atypical in all domains measured, indicating that there was a 99.9% chance that he had a clinically significant attention problem. At his screening session, Zeb endorsed 8 out of 9 symptoms of IA and 7 out of 9 symptoms of HI on the CSS. He scored a 59 (T = 69; 97.1st percentile) on the OQ-30. Zeb was assigned a GAF score of 51.

Course of treatment and assessment of progress: Participant Two

Zeb began treatment two weeks after his screening session. Zeb's initial goals included managing his procrastination and learning to work more effectively. Zeb noted that he frequently put off school assignments until the last minute, and as a result turned in work that was either incomplete or inferior in quality. This tendency carried over into his personal life, and Zeb often put off doing household chores or routine errands, such as car

maintenance. Moreover, Zeb reported that he regularly forgot about tasks and assignments, thus further inhibiting his ability to work effectively. Although he did keep task lists, he reported that his use of these lists was inconsistent, and he sometimes lost them.

At the study initiation assessment, Zeb reported elevated levels of DSM-IV Inattentive Symptoms and on the ADHD Index subscales on the CAARS (*T* = 90, 71*;* respectively). On the CSS, Zeb reported 8 of 9 symptoms of IA and 5 of 9 symptoms of HI. On the WFIRS, he reported experiencing significant impairment in the areas of Work (item *M* = .86; 2 items = 2), School (item *M* = 1.91; 2 items = 2, 5 items = 3), Life Skills (item *M* = .92; 1 item =2, 1 item = 3), Self-Concept (item *M* = 2; 1 item = 3, 3 items = 2), and Risk (item *M* = 1.2; 2 items = 2). Zeb reported minimal levels of anxiety symptoms on the BAI (3) and borderline levels of depressive symptoms on the BDI (13). He scored a 53 (*T* = 65; 93.3th percentile) on the OQ-30. At pre-treatment, Zeb was assigned a CGI-Severity Score of 5. Overall, these scores are consistent with the data collected at screening.

Zeb attended eight sessions of approximately 60 minutes each. Although he attended each session, and usually showed up on time, he often forgot his workbook, notebook and other materials which he had been asked to bring with him.

At post-treatment, Zeb reported elevated levels on the DSM-IV Inattentive Symptoms subscale and the ADHD Index subscale of the CAARS (*T* = 90, 65; respectively). On the CSS, Zeb reported 9 of 9 symptoms of IA and 2 of 9 symptoms of HI. On the WFIRS, Zeb reported experiencing significant impairment only in the domain of School (item *M* = 1.73; 4 items = 3, 2 items = 2). Zeb again reported minimal levels of anxiety symptoms on the BAI (1) and minimal levels of depressive symptoms on the BDI (7). On the OQ-30, Zeb scored a 30 (*T* = 50; 50th percentile). Zeb's improvement on the OQ-30 was broad—he improved by at

least one point on most items. Some notable changes seem to occur on items assessing self-confidence, such as "I feel that something is wrong with my mind." At the study initiation, Zeb responded to this item *almost always*, and at post-treatment he responded *rarely*. In addition, at the study initiation Zeb responded *frequently* to the items "I feel hopeless about the future" and " I feel that something bad is going to happen"; at post-treatment, he responded *rarely* and *never*, respectively. At post-treatment, Zeb was assigned a CGI-Severity Score of 4, and an improvement score of 2. Zeb was rated with a GAF score of 74, reflecting the fact that while he still reported some ADHD symptoms, he was less impaired and had begun to implement strategies that minimized the impact of such symptoms in his day-to-day life.

On the treatment satisfaction survey, Zeb indicated that he felt satisfied with the treatment and the delivery (item $M = 4.1$). He noted that in his opinion, the structure provided by the treatment and the individual attention he received was important to his improvement. Specifically, Zeb reported that while he sometimes got frustrated with the strategies the first time he tried them, the fact that he was asked about his use of the strategies, and encouraged to continue to use them helped him persevere.

Zeb rated the stimulus control strategies as the most useful to him. Although he had been skeptical about these techniques since he had tried to control distractions in the past, he was encouraged to try using all the stimulus control techniques simultaneously. He reported that this had been effective in helping him manage his distractibility. He also found the notebook and the ABC prioritizing system to be helpful, noting that having a visual representation of which tasks were the most important kept him on track.

Treatment results summary. At the start of treatment, Zeb seemed to have a high level of IA symptoms, and he endorsed substantial impairment via the OQ-30 and the WFIRS. He sought treatment to help him manage his tendency to procrastinate, and to help him work more effectively. Post-treatment, Zeb indicated that the techniques he had learned helped him manage distractibility and control his work environment, and he cited the directive nature of treatment and emphasis on practicing skills repeatedly to be key to his improvement. He seemed to experience an increase in his confidence in his ability to manage his own symptoms, which may have facilitated reduced functional impairment.

Case Presentation: Participant Three

Presenting problem. Mark was a 21 year old Caucasian male who volunteered to participate in the study after seeing a posted flyer. He presented with complaints about time management and difficulty controlling procrastination. Mark noted that although he generally performed well academically (e.g., current 3.2 GPA), he had trouble meeting personal goals. Specifically, he complained of his tendency to forget things, become overwhelmed by large projects and tasks, and engage in impulsive behavior such as reckless spending.

Assessment and treatment history. Mark was first diagnosed with ADHD-C by a family doctor in first grade after he began to have difficulty sitting still in class, following directions and showed high levels of inattention, impulsivity (e.g., excessive talking) and emotional lability (e.g., lost his temper often). He was prescribed Ritalin to address his symptoms of ADHD. Mark notes that his grades in school have generally been A's and B's, but added that he has struggled with math classes since he was in middle school. He described experiencing heightened levels of anxiety when taking math tests; despite spending a large amount of time studying, he typically was so anxious when testing that he would

forget facts and perform poorly. Due to this test anxiety and some other symptoms of social anxiety, Mark began seeing a psychiatrist during high school, and was prescribed Zoloft (25 mg daily) to address these symptoms. This medication has since been switched to Strattera (100 mg daily), which Mark believes addresses both his ADHD symptoms and anxiety symptoms. In addition, Mark reported about midway through the course of treatment that he takes an immediate release Adderall sporadically, when he needed to complete assignments. Currently, Mark sees a psychiatrist every five months to monitor his current medication regimen.

Psychosocial history. Mark was raised by his biological parents, with one younger sister. He reported no significant medical history and that, to his knowledge, he met all developmental milestones on time in childhood. Mark described himself as having been "rebellious" and "emotional" as a child, specifying that he was hot-tempered, often argued with others, and refused to comply with rules. These tendencies faded as Mark grew older, and he described himself currently as a very even-tempered person who does not have trouble making friends. He indicated that he is in a long-term romantic relationship and has several close friends.

Mark reported that he does not use any recreational drugs or tobacco. He drinks alcohol on weekends and has 5-6 drinks per episode (~5-10 total/week).

Assessment at recruitment. Mark completed the CAARS, CSS, WFIRS, BDI, BAI and OQ-30 at his screening session. The Adult Interview and SCID-1 screener were also administered to Mark. At screening, Mark endorsed slightly elevated IA (T = 61) on the CAARS, 6 out of 9 IA symptoms on the CSS, and 4 out of 9 HI symptoms on the CSS. On the WFIRS, Mark reported elevated levels of impairment in the domains of Work (item M =

.64; 1 item = 3; 2 items = 2), School (item *M* = .45; 1 item = 3), Life Skills (item *M* = .83; 4 items = 2), and Self-Concept (item *M* = 1.2; 3 items = 2). Mark reported minimal levels of depressive (7) and anxiety symptoms (5) on the BDI and BAI, respectively. Mark scored a 19 (*T* = 41; 18.4th percentile) on the OQ-30. Mark's symptoms of anxiety at recruitment appeared to be subclinical, and he did not meet criteria for any other kind of comorbid disorder (per SCID-I). Mark was assigned a GAF score of 61.

Course of treatment and assessment of progress: Participant Three

Mark began treatment one week after his screening session. At the start of treatment, Mark described his goals for treatment as improving his efficiency, time management, and productivity, to keep better track of his personal items, and to reduce forgetfulness. He completed eight sessions of approximately 60 minutes each. He rescheduled several times, due to a need to complete school work and studying, consistent with his presenting complaints of problems with time management.

In his study initiation assessment, Mark reported an elevation (*T* =77) on the DSM-IV IA subscale of the CAARS. He endorsed 3 out of 9 symptoms of IA and 3 out of 9 symptoms of HI on the CSS. On the WFIRS, Mark reported experiencing elevated levels of impairment in the domains of School (item *M* = .64; 1 item = 3, 1 item = 2) and Life Skills (item *M* = .58; 1 item = 3). He reported negligible levels of depressive (1) and anxiety symptoms (3) on the BDI and BAI, respectively. On the OQ-30, Mark scored a 4 (*T* = 22; 0.3rd percentile). At pre-treatment, Mark was assigned a CGI-Severity Score of 2. Mark's scores at the study initiation assessment were noticeably lower than those of his screening session, with the exception of his score on the CAARS DSM-IV IA subscale, which was 10 points higher at study initiation than at screening. One possible reason for this overall

"improvement" may be that Mark's study initiation assessment took place directly after spring break at a time when, by his own admission, he was feeling very little stress and was caught up with his schoolwork.

At post-treatment, Mark reported no elevations on any CAARS subscale, no symptoms of IA or HI on the CSS, and no elevated levels of impairment on the WFIRS. He reported no depressive symptoms on the BDI (0) and minimal levels of anxiety symptoms on the BAI (5). On the OQ-30, Mark scored a 5 (T = 24; 0.5th percentile). At post-treatment, Mark was assigned a CGI-Severity Score of 2, and a CGI Improvement score of 3. Mark was assigned a GAF score of 85, reflecting his high level of functioning and the relative absence of ADHD or other symptoms.

On the treatment satisfaction survey, Mark indicated a high level of satisfaction with the treatment (item M = 4.6). Mark reported that the treatment helped him become more aware of how his symptoms were interfering with his functioning, and through the treatment he learned strategies to address these symptom-related difficulties. Mark identified the strategies which were most crucial to his improvement as the task list and prioritizing system and the cognitive techniques (identifying thinking errors and using adaptive thinking). Mark described how using the ABC system gave him a visual reference for identifying his most important tasks, thus reducing his anxiety. Interestingly, despite Mark's BAI score, he described experiencing persistent maladaptive thoughts concerning his competency, which he reported caused him a great deal of stress and anxiety. By addressing these thoughts using the adaptive thinking techniques, Mark was able to feel more in control of his worries. Mark also noted that breaking tasks down into smaller chunks that matched his attention span helped him work more productively by making tasks feel more manageable and thus preventing

procrastination. Finally, Mark reported that the techniques for keeping track of important objects helped him keep track of things like his keys, cell phone, and wallet. Mark indicated that he would have preferred more emphasis on adaptive thinking and the identification of thinking errors.

Treatment results summary. Mark presented with complaints about difficulty with time management and procrastination. In addition, despite the fact that he appeared to a generally well-functioning and high-performing student, Mark described some persistent anxiety about his academic abilities. After learning and applying cognitive behavioral strategies throughout the treatment period, Mark appeared to be more self assured in his ability to manage his symptoms with these strategies. In addition, by learning to identify maladaptive thoughts and counteract them with more adaptive thinking, Mark qualitatively reported a reduction in his anxiety. Although Mark may not have been as impaired as he first perceived himself to be, the treatment appears to have helped improve his sense of competency.

Case Presentation: Participant Four

Presenting problem. David is a 22 year old Caucasian male who volunteered to participate in the study in response to a posted flyer. He presented with complaints about time management and procrastination, claiming he did not complete his school work as efficiently as he thought he could. Although he was a rising senior at ASU with a 3.66 GPA, he noted that he turned in most assignments late, and had never turned in a paper on time

Assessment and treatment history. David was diagnosed with ADHD when he was 14 years old, after academic tasks began to pose real difficulty. David reports that while he had found it relatively easy to make A's and B's in his classes up until he was in 7th grade, he

then began to struggle to maintain such grades, finding it difficult to concentrate and pay attention at school and home. He reported that he got his first C that year, and was very demoralized. Consequently, he began to put less effort into school, and his grades fell even more. His parents sought out a psychological evaluation in 2004, and David was diagnosed with Dysthymic Disorder and a learning disorder of written expression. He was not diagnosed with ADHD at this time, due to concerns that his low performance might be due to motivational factors. Concerns about David's motivation were resolved later in the same year, and at re-evaluation he was diagnosed with ADHD-IA by his neurologist, and began taking 25mg of Adderall daily to address symptoms. He continued with this medication regimen throughout high school, but a year before the current treatment he stopped taking it, citing difficulty interacting with his friends and general nervousness during social interactions as side effects. Although he was determined to continue to forego his medication at the screening assessment, David reported more struggles with time management than before desisting his Adderall regimen. Specifically, he felt that he often procrastinated and had more difficulty getting things done on time.

Psychosocial history. David is the older of two children raised by his biological parents. He reportedly met all developmental milestones on time (per prior assessment), and had no chronic medical conditions. David described himself as having been "all over the place" during childhood, and stated that he had difficulty sitting still, paying attention, and playing quietly in many different settings, including school and home. Despite these challenges, as noted above, his academic performance was excellent throughout childhood, perhaps due to superior cognitive ability (FSIQ = 131, CI = 127-134; derived with the Wechsler Adult Intelligence Scale, Third Edition, as per prior report).

David describes himself as sociable and friendly, and says he never had trouble making and keeping friends. He also noted that he has an amiable relationship with his parents, despite some "clashes" with them in high school, particularly over enforcement of rules and curfews. This type of disagreement ceased after David enrolled in college.

David reported some illicit substance use during his high school years. By his report he smoked marijuana almost daily, and drank alcohol often, particularly on weekend nights. David noted that his parents were "worried" about his substance use during high school and did pressure him to stop, but since David's grades remained high (A's and B's), they did not force the issue. David indicated that currently he drinks alcohol only on the weekends, and uses marijuana occasionally (two or three times a month). He did not report any tobacco use.

With a stable medication regimen and the accommodations provided to him in high school, David was able to perform quite well academically, making mostly A's and B's. He continued to make grades of this caliber during his first two years at ASU. In the fall of his junior year, he stopped taking his medication and found that he began to struggle with time management and procrastination. He reports that although his grades did not drop dramatically, he felt that he could have made better grades if he was still taking his medication; nevertheless, he did not resume taking Adderall. He volunteered to participate in the current study in order to learn strategies to address his areas of concern. It was hypothesized that David's ADHD-related inattention contributed to his tendencies to procrastinate and mismanage his time.

Assessment at recruitment. David completed the CAARS, CSS, BDI, BAI, WFIRS, and the OQ-30 at his screening session. The Adult Interview and the SCID-1 screener were also administered to David. On the CAARS, David reported elevated levels of DSM-IV

Inattentive symptoms (T = 77) and on the CAARS ADHD Symptoms Total index (T = 66). On the WFIRS, David reported elevated levels of impairment in the domains of School (item M = 1; 2 items = 2, 1 item = 3), Life skills (item M = .67; 3 items = 2), and Risk (item M = 1; 5 items = 2). On the CSS, David reported 9 out of 9 current symptoms of IA and 4 out of 9 symptoms of HI. On the BDI, David reported minimal levels of depressive symptoms (total score = 5), and on the BAI, he reported moderate levels of anxiety symptoms (21). On the OQ-30, David scored a 35 (T = 54; 65.5th percentile). David was assigned a GAF score of 58.

Course of Treatment and Assessment of Progress: Participant Four

David began treatment one week after his screening session. David's goals for treatment were to improve his time management skills, learn to control his distractibility and improve his ability to reach personal goals. For instance, David regularly turned in papers and assignments late, often despite his intention to start well in advance, and as a result his grades suffered. David described this as an example of how he set goals for himself regarding schoolwork, errands, and chores, but rarely completed what he set out to do. David perceived this to be related to his high distractibility, in that when he set out to do school work or chores, he often soon found himself doing other tasks, talking to the people around him, or attending to his cell phone or television instead of the task at hand.

David attended seven sessions of approximately 60 minutes each. While the treatment protocol was designed to consist of eight sessions, due to scheduling difficulties David only attended seven in-person sessions (see above). Although David did successfully attend seven sessions, he often called several hours before his session to reschedule it for later in the week. Several times, this was due to David's need to complete school assignments at the last minute.

In his study initiation assessment, David reported elevated levels of DSM-IV Inattentive symptoms (T = 77) on the CAARS. His score on the CAARS ADHD Symptoms Total index was also elevated (T = 69). On the WFIRS, David reported elevated levels of impairment in the domains of School (item M = 1.09; 2 items = 2, 1 item = 3), Life skills (item M = .75; 2 items = 2), and Risk (item M = .79; 2 items = 2). On the OQ-30, David's score at pre-treatment was 32 (T = 52; 57.9th percentile). At pre-treatment, David was assigned a CGI-Severity Score of 4.

These CAARS, WFIRS, and OQ-30 data were consistent with those collected at screening; however, David reported 4 out of 9 symptoms of IA and 0 out of 9 symptoms of HI on the CSS, which was far lower than at screening (see above). On the BDI, David reported minimal BDI depressive symptoms (2), and on the BAI he reported minimal levels of anxiety symptoms (7), the latter also a distinct change from screening (see above).

At post-treatment, David continued to report elevated levels of DSM-IV Inattentive symptoms (T = 77) on the CAARS. On the CSS, he again reported 4 symptoms of IA and 0 of HI. His scores on the WFIRS indicated that he was still experiencing impairment in the areas of School (item M = 1.18; 2 items = 3) and Life Skills (item M = .58; 1 item = 3). At post-treatment, David was assigned a CGI-Severity Score of 3 and a CGI-Improvement Score of 3. David was assigned a GAF score of 71, reflecting the fact that he was reporting levels of symptoms similar to his study initiation assessment but seemed to be functioning at a higher level in his work and school activities at post-treatment.

David reported minimal symptoms of depression on the BDI (5), and minimal symptoms of anxiety on the BAI (6). On the OQ-30, David's score at post-treatment was 22 (T = 44; 27.4th percentile). This change seems driven by better adjustment in work and school

activities; at post-treatment, David reported that he felt stressed at work, school and other daily activities *sometimes*, in contrast to *frequently* at study initiation. Similarly, he found his work, school and daily activities satisfying *frequently*, as prior ratings of *sometimes*. David also expressed a greater level of confidence in his ability to complete school and work-related activities. In response to "I am not working/studying as well as I used to" and "I feel that I am not doing as well at work/school or in other daily activities," David responded *rarely* at post-treatment, which was a noticeable improvement from his pre-treatment responses (*frequently* and *sometimes*, respectively).

On the treatment satisfaction survey, David endorsed a high level of satisfaction with the treatment, (item $M = 4.2$) David described the treatment as "helpful" and interesting, and noted that in his opinion, talking about his symptoms on a weekly basis and learning strategies to prioritize and break down tasks and gauge his attention span led to improvement. David noted that he felt that the weekly measures of his symptoms (i.e., the CSS scores) were not the best way to gauge improvement of his symptoms.

In terms of didactic material introduced in the protocol, David found the strategies for managing distractibility to be most useful to him. By identifying and implementing steps to reduce distractions during academic work (e.g., turning off the ringer on his cell phone, working on the quiet floor of the library, using the distractibility delay technique), David was able to work more efficiently. David also rated the prioritizing system as highly useful, and noted that writing tasks down and breaking them into smaller steps (i.e., 15-to-20-minute parts) made his work seem more manageable and less stressful, and worked well for him. Part of David's struggles with time management may have been the result of his prior tendency to set unrealistic deadlines for himself (i.e., finishing an entire lab report in one

night). Learning to set more realistic goals and to break tasks into smaller parts allowed him to successfully accomplish the goals he set for himself. David did not find the cognitive techniques introduced during treatment to be as useful for him. This may be due to the fact that David had generally been successful in school, and therefore did not doubt his ability to succeed.

Treatment results summary. David presented as a generally high-functioning student who appeared motivated and able to perform well academically, yet still struggled with time management, procrastination, and distractibility. He sought treatment to help him address these weaknesses that had been managed to a degree by Adderall prior to desistence due to side effects. Post-treatment, David was confident in his ability to apply learned behavioral strategies, and assured that these would help him to continue to perform at a high level academically.

Summary of Results

On the CAARS, participants reported a mean reduction of 10 points on the DSM-IV Inattention subscale, with changes in scores that ranged from 0 to a 38 point reduction and a mean reduction of 8.25 on the DSM-IV HI subscale, with changes ranging from 0 to 20. On the CAARS ADHD Index, participants reported a mean reduction of 5, with changes in scores ranging from a reduction of 14 points to an increase of 7 points; and on the CAARS Self Concept subscale, participants reported a mean reduction of 5.25 points, with changes ranging from a reduction of 5 points to an increase of 2 points. On the CSS, participants reported a mean reduction of .5 on the IA scale measured in terms of symptom count, and mean reduction of 1.5 on the HI scale. Participant reductions on the CSS IA ranged from a 3 point symptom reduction to a 1 point symptom increase. Participant reductions on the CSS

HI scale ranged from a three point reduction to no change. Participants also reported a mean reduction of 1.5 in symptoms of depression and anxiety, as measured by symptom counts on the BDI and BAI, respectively, from pre to post treatment. Reductions on the BDI from pre to post treatment ranged from a 6 point reduction in symptoms to a 3 point increase in symptoms. Reductions on the BAI ranged from a 5 point reduction in symptoms to a 2 point increase in symptoms.

On the WFIRS, participants reported a mean of 3.25 domains impaired (out of seven total domains) during pre-treatment assessments. At post-treatment, participants reported a mean of 1.5 domains impaired. The mean change in terms of reduction in number of domains impaired was 1.75 domains. The highest reduction in number of domains impaired was four, and the lowest was zero. On the OQ-30, participants reported a mean change of 16.25, with changes ranging from a decrease of 35 points to an increase of 1 point.

In summary, it appears that greater change was observed on continuous measures of ADHD symptoms (i.e., CAARS IA and HI subscales) and functional impairment as measured by the WFIRS and OQ-30, as compared to change on symptom counts (i.e., CSS, BDI, BAI). Overall, participants reported a high level of satisfaction with both the didactic material covered in treatment and the delivery of the protocol, as evidenced by their responses on the treatment satisfaction survey. All participants endorsed an item mean of 4 or greater on this survey, indicating that participants were at least "quite" satisfied with the treatment, and similarly found the therapist competent and knowledgeable, found the techniques useful and anticipated them to continue to be in the future, and were likely to recommend this treatment to others. Informally, participants reported that the treatment increased their sense of insight about their ADHD symptoms, as epitomized by one

participant's statement, "I found treatment to be very useful, and it helped me to become more aware of my symptoms and to use strategies to reduce them." In addition to this heightened awareness of symptoms, participants reported that the cognitive techniques introduced in the study were essential to their improvement. Most participants said that the cognitive techniques were particularly helpful at reducing anxiety, which often was reported to spring from maladaptive schemas that seemed to have arisen from the cumulative impact of their individual life experiences with ADHD. As one participant put it, "CBT also helped me to assess and reframe one of my major negative automatic beliefs concerning ADHD and life success." Overwhelmingly, participants indicated that treatment was important to them because it improved their ability to manage stress and anxiety. Participants varied somewhat in which particular strategies reduced their anxiety the most. Some participants found that the prioritizing list and breaking tasks into smaller chunks had the greatest impact on anxiety management, while others found the cognitive techniques to be the most crucial. Nevertheless, all indicated that this aspect of treatment (cognitive-behavioral techniques that directly or indirectly reduce anxiety) was highly valuable to them.

In terms of specific strategies, participants indicated that the prioritizing system used in conjunction with the technique of breaking tasks down into smaller chunks was an important component of the treatment for them. Participants felt that the value of this system came from the fact that it helped their tasks seem more manageable, thus reducing the associated stress. One participant described it as a "visual reminder of what you need to work on" and added that the list reduced his anxiety because it helped to get it out on paper, so he could "break things down and quit worrying about how to do it."

Interestingly, although all participants displayed some in vivo skepticism when introduced to the techniques for reducing distractibility by managing stimuli in the environment, at the end of treatment three out of four participants reported benefitting greatly from these same techniques. Participants indicated that by listing and then addressing common distractions one by one and encouraging them to use multiple techniques in concert to control distractibility, they were able to greatly improve their concentration and efficiency. As one participant commented, "it was not surprising to list [the distractions] out, but following the strategies to address them was helpful."

Discussion

The principal aim of this study was to investigate the effectiveness of an abbreviated version of the *Mastering Your Adult ADHD* protocol in typically-aged, full-time college students. Considering these four clients as a group, some degree of positive change seemed to be the rule rather than the exception. For instance, on average, at post-treatment participants reported a mean reduction of 16.25 points on the OQ-30, and a mean reduction of 1.75 impaired domains on the WFIRS. When individualized composite scores were calculated for the WFIRS, by using scores from impaired domains only, three out of four participants showed a decrease in overall impairment at post-treatment, with an average reduction of .31 points. However, improvement of specific ADHD symptoms (IA and HI), as measured by the CSS and the CAARS, was modest in comparison to changes on the OQ-30. These results stand in contrast to the results reported by Safren, Otto, et al. (2005), who found a between-groups effect size of 1.7 from pre to post treatment on self-reported CSS

scores, but seem to be more in line with the type of improvement produced by meta-cognitive therapy (Solanto et al., 2010). In a clinical trial of the latter, participants in the intervention group reported significant improvements over and above control participants on time management, organization, and planning skills, but reported less improvement on core symptoms of ADHD, per se (Solanto et al., 2010). For instance, while participants in the Solanto et al. study reported a pre-treatment *M t* score of 84.73 and a post-treatment mean score of 75.80 on a global ADHD symptoms measure, they reported a more notable improvement in time management and organization (i.e., change from *M* = -40.56 to *M* = -22.10, with a possible range from -102 to +102 and lower scores indicating more difficulties). Similarly, behavioral parent training, which is considered an evidence-based treatment for ADHD in children (Pelham & Fabiano, 2008), often seems to produce a stronger impact on impairment as measured by child compliance, positive parent-child interactions, and other *functional* measures, rather than on core ADHD symptoms (McGoey, Eckert & DuPaul, 2002). Corcoran and Dattalo (2006) reported results from a meta-analysis of behavioral-parent treatment studies that seemed to indicate much stronger results on measures of academic performance (*d* = 8.2) and family functioning (*d* = .6730) as compared to symptoms of ADHD (*d* = .3970). In a more recent meta-analysis of the impact of behavioral parent training, Lee, Niew, Yang, Chen and Lin (2012) reported a modest average effect size of *r* = .32 at post-treatment on observer-rated child behavior (i.e., increased positive, decreased disruptive behavior) but noted that this effect size declined to *r* = -.04 at follow-up (three months to three years). In contrast, these researchers found a substantial average post-treatment effect size (*r* = .53) for parenting stress and perceived competence.

Furthermore, at follow-up this effect was still somewhat meaningful (r = .27; Lee et al., 2012).

In this study, there were two major procedural differences that might have contributed to more modest observed gains than in Safren, Otto, et al. (2005). First, the *Mastering Your Adult ADHD* protocol was shortened from twelve sessions to eight sessions in the current study. This allowed treatment to fit comfortably into one college semester with weekly sessions, but came at the cost of abbreviated coverage of procrastination management, rehearsal of adaptive thinking, and relapse prevention. More than one participant listed procrastination as an area to be addressed in their "goals" and noted that they would have found it helpful if this topic were addressed earlier in the protocol. Hence, it can be hypothesized that this area was one of high concern to these participants, and so the limited time spent addressing procrastination may have been insufficient. Moreover, while cognitive restructuring and adaptive thinking were addressed in two sessions, the session dedicated to a comprehensive review of these skills was omitted. None of the participants had been exposed to these techniques before, by their own report. Thus, it may be that these skills were more unfamiliar to participants, as compared to other areas addressed in the protocol, such as time management or prioritizing skills; participants might have benefited from an additional session dedicated to the review of these skills, as in the original, unabbreviated protocol. Finally, while in the original protocol an entire session was dedicated to relapse prevention, so that participants worked with a therapist to consider how to apply the skills learned in the treatment to new situations and without the support of weekly sessions; in the current study this was covered in half of a session. It is possible that if the coverage of relapse prevention was lengthier, as in the original protocol, participants' confidence in their progress and

ability to apply skills in the future may have been more developed, and this might have been reflected in different results. It may be that a longer-term approach—with more opportunity for learning skills and activities that encourage mastery thereof—is necessary to address core symptoms of ADHD. Accordingly, an intervention targeting ADHD symptoms in undergraduates which spans two college semesters might be a fruitful area for further investigation.

A second procedural difference which should be noted is level of clinician experience. In the study conducted by Safren, Otto, et al. (2005), the therapists administrating the protocol were licensed psychologists who had experience delivering CBT, and who had assisted in developing the protocol used in this study. In contrast, the graduate student clinician delivering the protocol in this study was a second year graduate student with limited experience in delivering CBT. Thus, the therapist's level of training and experience with this particular protocol may play a role in the degree of improvement achieved, perhaps through the extent of fidelity to the protocol, or through ability to address concerns or issues which commonly arise.

In addition, Safren, Otto, et al.'s (2005) average participant age was 45 years, while in this study, the average age was approximately 22 years. Adults in the former age group are likely to have a different lifestyle than college-aged young adults. For instance, the level of academic work that a college student is typically responsible for tends to vary drastically depending on how far into the semester it is at the time, as will related stress. While older adults may experience some variation in workload, it may not fluctuate to the same extent. Thus, it might be more difficult for college students to implement the strategies from the protocol on a consistent basis over time. Moreover, given the waxing and waning of stress

due to academic responsibilities, it is more challenging to interpret the self-reported symptoms and functioning of college students, as were measured in the current study. In addition, there might be differences in commitment level and motivation to change between college-aged adults and older adults. While there has been no research to date on this topic with regards to treatment for ADHD, one study found that age was the only pre-treatment factor associated with adherence in a medically-based, psychosocial treatment for alcohol dependence, which drove a lower rate of relapse in older versus younger adults (Oslin, Pettinati, & Volpicelli, 2002).

Medication status might also partly account for the difference between results observed in this study and that of Safren, Otto, et al. (2005). Participants in the latter study were included only if stabilized on a medication regimen, while some participants in the current study chose to forego medication entirely (i.e., Participants 2 and 4) and another chose to take his medication sporadically (i.e., when his workload increased, Participant 3). While there were no clear-cut differences between the treatment response of medicated and non-medicated participants considered herein, those who chose to forego medication entirely or took medication irregularly (i.e., Participants 2, 3, and 4) did show a more striking downward trend on ADHD-related impairment as measured by the WFIRS. This was apparent when compared to Participant 1, whose ADHD-related medication use seemed the most consistent and who had the least improvement across both ADHD symptoms and related impairment. This trend is encouraging when considering efficacy of psychosocial treatments, in that it appears as though these treatments can help to reduce the impact that ADHD asserts on an individual's life. Therefore, CBT protocols such as the one used in this study may be an appropriate stand-alone treatment for individuals with relatively milder

symptoms of ADHD, who may be able to see significant improvement without the use of medication.

Solanto et al. (2010) noted that in their study that medication status did not correspond to symptom severity at baseline or to treatment response. Similarly, in this study, symptom severity did not seem to correspond to medication status, since participants reporting relatively higher impairment and symptom severity were either un-medicated (such as Participant 2) or took medication regularly (Participant 1). Moreover, Solanto et al. (2010) noted that baseline symptom severity *did* correspond with treatment response, such that participants with more elevated ADHD symptoms showed the greatest improvement at post-treatment. Similarly, Participant 2 herein exhibited the most symptoms and impairment at pre-treatment, and the most adaptive improvement on the WFIRS, reporting a reduction from 5 domains impaired at pre-treatment, to only 1 domain impaired at post-treatment. This might indicate that, even without medication stabilization, it is possible to see reductions in impairment and improvement in functioning when using this protocol to treat adults with ADHD.

Furthermore, it is of note that most participants listed their top pre-treatment goals as learning to work effectively, through improvement in time management. Only two participants expressed a desire to directly target ADHD symptoms (impulsivity and distractibility), but these goals appeared secondary to other areas of concern. Hence, it is possible that participant expectancies may have influenced perceptions of improvement; participants expected improvement in academic skills rather than targeting their core ADHD symptoms.

It was notable that several participants presented with concerns regarding procrastination. In the current study, procrastination is not addressed until the seventh session. In the original *Mastering Your Adult ADHD* protocol, procrastination is addressed only as an optional session. Verbal and written feedback from the participants confirmed they wished it was addressed earlier in treatment. Procrastination may be more problematic for college students than the older adults included in Safren, Otto, et al. (2005), and as such it seems advisable for this topic to be included regularly and early on when working with the former population.

Interestingly, many participants displayed a sharp drop in BDI and BAI scores between screening and study initiation. This might reflect a sense of relief engendered by the commitment of therapy-to-come. Even taking this trend into consideration, overall, three out of four participants displayed a post-treatment decrease in symptoms on both the BDI and BAI (see Figures 3 and 4). While it is encouraging to see this pattern of reduced comorbid dysphoric symptomatology, the degree of change on these measures was small in comparison to the results observed by Safren et al. (2005) and in comparison to that captured by the OQ-30 and WFIRS. Further, Participants 3 and 4 reported slight *increases* on these measures at post-treatment (on BAI and BDI, respectively). This might be explained by the fact that Participants 3 and 4 finished treatment at the end of the term, attending their final sessions during the exam period. Both participants reported understandably higher workloads during this time, which were accompanied by some heightened anxiety and worry that was likely captured in these measures. As such, it is advised that these specific results be interpreted with caution.

While the quantitative results regarding anxiety and depression are, therefore, somewhat equivocal, all participants noted via written feedback and verbal comments that the cognitive-behavioral strategies emphasized in their treatment were most helpful in *reducing* subjective stress and increasing confidence in their abilities to handle their academic workloads. This discrepancy between quantitative and qualitative data might reflect the quite specific type of anxiety endorsed by participants—regarding inefficiency and difficulty in academic pursuits-- that may not have been captured well by the BAI, which has a strong focus on somatic anxiety such as that observed in panic or generalized anxiety disorder. Hence, while all the participants reported that the treatment helped them feel less anxious, this improvement may not been reflected very well in the BAI scores. Future studies might benefit from using a different measure of anxiety, such as the Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) which has more of a focus on the cognitive experience of worry and anxiety as opposed to the somatic experience of the same. Alternately, a measure such as the Achievement Anxiety Test (Alpert & Haber, 1960) might be used to try and tap specific academic-related anxiety.

Treatment Implications

Overall, the *Mastering Your Adult ADHD* treatment protocol appears to be a viable choice for treating the distress and impairment associated with ADHD in college students. The effects are similar to other evidence based psychosocial treatments of ADHD, such as behavioral parent training (McGoey et al., 2002) and metacognitive therapy (Solanto et al., 2008; Solanto et al., 2010) , given that the gains seem to be observed largely in the improved adaptation and adjustment, as compared to reduction in core ADHD symptoms, per se. The qualitative data gathered in this study suggests effectiveness at addressing

participants' key self-reported areas of concern, such as time management and procrastination. At post-treatment, participants indicated that they believed the skills they learned improved their ability to work effectively, and they universally reported a high sense of satisfaction with the intervention.

The abbreviated protocol used in this study seems ideal for use in college counseling centers, which often utilize short-term treatment models. The current treatment would likely be quite cost-effective, and might function well as an adjunct to traditional individual or group therapy for ADHD-diagnosed college students with comorbid mood and/or anxiety disorders. In addition, the current, structured approach may be particularly suited for college students reporting moderate-to-severe levels of ADHD-related impairment and symptomology. In such cases, this treatment may serve as a "jump-start" by rapidly helping such individuals improve their adaptation and increasing motivation for longer-term, more comprehensive treatment. Alternately, this treatment might be useful for college students who have been recently diagnosed with ADHD. By offering a non-pharmacological option, or at least an adjunctive treatment to medication, treatment acceptability may be increased, as suggested by findings that parents of children with ADHD rate behavioral therapy as more acceptable than pharmacological treatment (Krain, Kendall & Power, 2005) and more acceptable than pharmacological treatment combined with psychosocial treatment (Wilson & Jennings, 1996).

Recommendations to Clinicians and Students

As noted above, when using this protocol to treat ADHD-related difficulties in college students, it may be beneficial to rearrange the order the sessions so that procrastination is addressed earlier in treatment. Students may benefit from a more

systematic monitoring of procrastination throughout the treatment (e.g., estimating how much time spent procrastinating in past week). This could be a valuable metric of progress over the course of treatment that is especially relevant to this population.

Given the escalating nature of a college student's workload (i.e., generally increases as a term progresses), it would be best to begin treatment as early in the semester as possible, so that the student may practice foundational skills presented during times of lighter academic workload. In addition, clinicians should expect that the students might experience an upswing in symptoms during points in the semester when the workload is heaviest. Extra time might be spent discussing how to use the strategies learned in treatment to balance daily responsibilities with academic work during such times.

Limitations and Future Directions

Considering the case series design of the current study, the generalizability of the results is inherently limited. However, it should be noted the sample used in the study was somewhat diverse, since participants consisted of both males and females as well as both four-year and community college students, and gains were observed even across this range of individuals. In addition, it might have been useful to obtain reports from the roommates, friends or partners of participants, to provide another, objective estimate of treatment response. More quantitative data capturing improvement in academic functioning, such as semester GPA at post-treatment relative to prior GPA, would have also been desirable and might productively be included in future studies. A self-report measure which gathered specific information on time management and school-related work productivity might have been useful as well, to get a more detailed understanding of participants' improvement in these areas. Lastly, it would have been interesting to gather data relating to participant

motivation and readiness to change, given that the treatment relied to a great extent on participant adherence to homework assignments and practice of skills outside of session. Further, due to difficulties with recruitment, it was not possible to implement a multiple-baseline strategy for the final two participants. Such data might have helped in interpreting the differences between screening scores and pre-treatment scores reported by several participants; future studies might address this limitation by allowing more time for identification of participants prior to study initiation. Another consideration for future researchers is how to optimally fill the role of "support person." On the whole, participants reported that they found it helpful to receive reminders about session days and times, but did not find it necessary to discuss homework and other treatment-related issues. Moreover, participants often did not answer the weekly phone call provided by the support person. Possible means of addressing this might include asking students to bring in a roommate or good friend to act as a support person, or setting up an automatic text messaging system which would send session reminders and homework reminders to participants.

In addition, future studies might examine the use of the protocol in a group format, or perhaps attempt to translate the treatment into an online, self-directed treatment. However, some of the qualitative data gathered helps to pinpoint the most useful aspects of the treatment, and allows a more in depth examination of the profiles of college students with ADHD who underwent treatment. Further format adaptations of *Mastering Your Adult ADHD* should not eschew examination of data at that level.

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Table 1

Treatment Outcome Studies of CBT interventions

Study	*M (SD)* age	No. of sessions	Measures	Manual used
Cognitive Remediation[a]	36.4	8	Self Report only	No
CBT for Medication-treated Adults with Residual Symptoms[b]	45.5 (10.6)	12-15	Independent Evaluator (primary) and Self-Report	Yes
Meta-Cognitive Therapy[c]	41.82 (9.98)	8-12	Independent Evaluator and Self-Report	Yes
CBT-Oriented Rehabilitation[d]	Not given[e]	10-11	Self report and third party report	Yes

Note. Age refers to age of participants.
[a] Stevenson, Whitmont, Bornholt, Livesey & Stevenson, 2002. [b] Safren, Otto, Sprich, Winett, Wilens, & Biederman, 2005. [c] Solanto, Marks, Mitchell, Wasserstein & Kofman. [d] Virta et al., 2008. [e] Range of ages was 18-45, median age was 31.

Table 2
Original Protocol Sessions and Descriptions

Session	Title	Content
Module One		
1	**Psychoeducation and Introduction to Organization and Planning Skills**	Provide psychoeducation about ADHD, set client goals and provide overview of treatment, and introduce notebook and calendar systems.
2	Involvement of Family Member	Not included
3	**Organization of Multiple Tasks**	Teach skills pertaining to management of multiple tasks and prioritizing tasks
4	**Problem Solving and Managing Overwhelming Tasks**	Teach skills pertaining to problem solving and work on breaking down problem into small, manageable parts.
5	Organizing Papers	Not included
Module Two		
6	**Gauging Attention Span and Distractibility Delay**	Teach skills pertaining to gauging attention span, go over how to break down tasks into parts corresponding to attention span, and teach the distractibility delay technique.
7	**Modifying the Environment**	Teach techniques to help manage distractibility in work environment, and engage in problem solving with client to address common distractions.
Module Three		
8	**Introduction to a Cognitive Model of ADHD**	Present CBT model for ADHD, teach skills pertaining to the identification of automatic thoughts, utilize thought records to identify negative thoughts and thinking errors and discuss how to label thinking errors.
9	**Adaptive Thinking**	Review thought records and discuss the formulation of a rational response to negative automatic thoughts.
10	Rehearsal and Review of Adaptive Thinking Skills	Not included
Module Four		
11	**Application of Skills to Procrastination**	Use a "pros and cons" exercise to identify the attractive aspects and negative consequences of procrastination, and go over how to use problem-solving skills and adaptive thinking techniques to manage procrastination.
12	**Relapse Prevention**	Review strategies and skills learned over the course of treatment, address how to maintain gains and discuss how to deal with possible problems in the future.

Note. Sessions in boldface type were retained in full or combined with other sessions in the brief protocol

Table 3

Screening, Pre-Treatment and Post-Treatment Scores

	Participant One			**Participant Two**			**Participant Three**			**Participant Four**		
Measure	*Screening*	*Study Initiation*	*Post-Treatment*	*Screening*	*Study Initiation*	*Post-Treatment*	*Screening*	*Study Initiation*	*Post-Treatment*	*Screening*	*Study Initiation*	*Post-Treatment*
DSM-IV IA	69	65	63	--	90	90	61	77	39	77	77	77
DSM-IV HI	84	84	84	--	64	59	51	56	36	49	54	46
Problems with Self Concept	69	57	59	--	68	63	38	49	36	53	49	44
ADHD Index	82	68	75	68	71	65	45	50	36	55	55	48
CSS-IA	3	2	2	8	8	9	6	3	0	9	4	4
CSS-HI	7	7	7	7	5	2	4	3	0	4	0	0
WFIRS-Family	0.38	0.25	0.13	_	0.86	0.25	0.25	0.13	0	0.43	0.5	0.25
WFIRS- Work	0.72	0.73	1.09	_	0.91	0.45	0.64	0	0	0.27	0.18	0.18
WFIRS- School	0.27	0.27	0.73	_	1.91	1.73	0.45	0.64	0	1	1.09	1.18
WFIRS- Life Skills	0.58	0.5	0.33	_	0.92	0.25	0.83	0.58	0	0.67	0.75	0.58
WFIRS- Self Concept	1.2	1	1	_	2	1	1.2	0.4	0	0.6	0.2	0.4
WFIRS- Social	1.2	1	0	_	0.5	0.11	0	0.11	0	0.11	0	0.11
WFIRS- Risk	0.85	0.5	1	_	1.2	0.14	0.29	0.36	0	1	0.79	0.71
BDI	23	8	6	_	13	7	7	1	0	5	2	5
BAI	26	16	11	_	3	1	5	3	5	21	7	6
OQ-30[6]	45	39	18	59	53	30	19	4	5	35	32	22

Note. Scores for the CAARS subscales (DSM-IV IA; DSM-IV HI; ADHD Index and Problems with Self-Concept) are given as t-scores. The CSS IS and CSS HI scores are positive symptom counts. The WFIRS Domain Scores are composite scores for each domain, and reflect degree of impairment in each domain, with higher scores indicating more impairment. The BDI and BAI scores are symptom counts of depressive and anxiety symptoms, respectively. Scores for the OQ-30 are composite scores, reflect degree of impairment, and are highly sensitive to change.

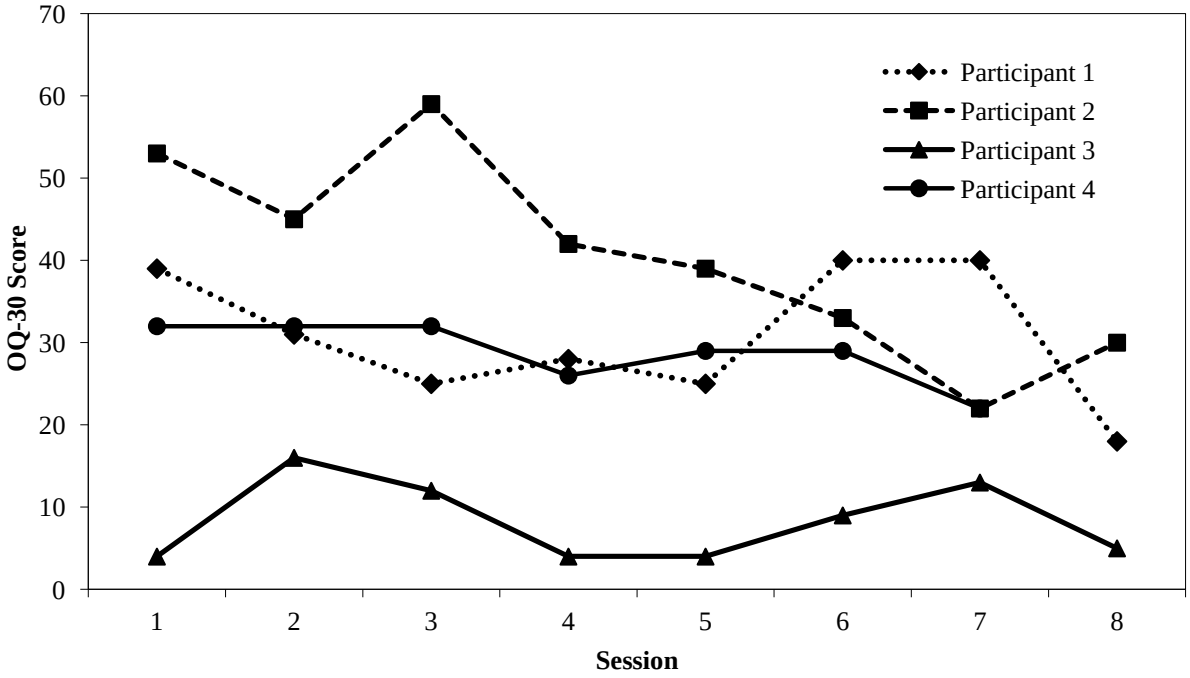

Figure 1. Participant scores on the OQ-30 by session. Participant 4 attended only seven sessions, although all material was covered. See Participant 4 case summary for more detail. Scores are composite scores, reflect degree of impairment and are highly sensitive to change.

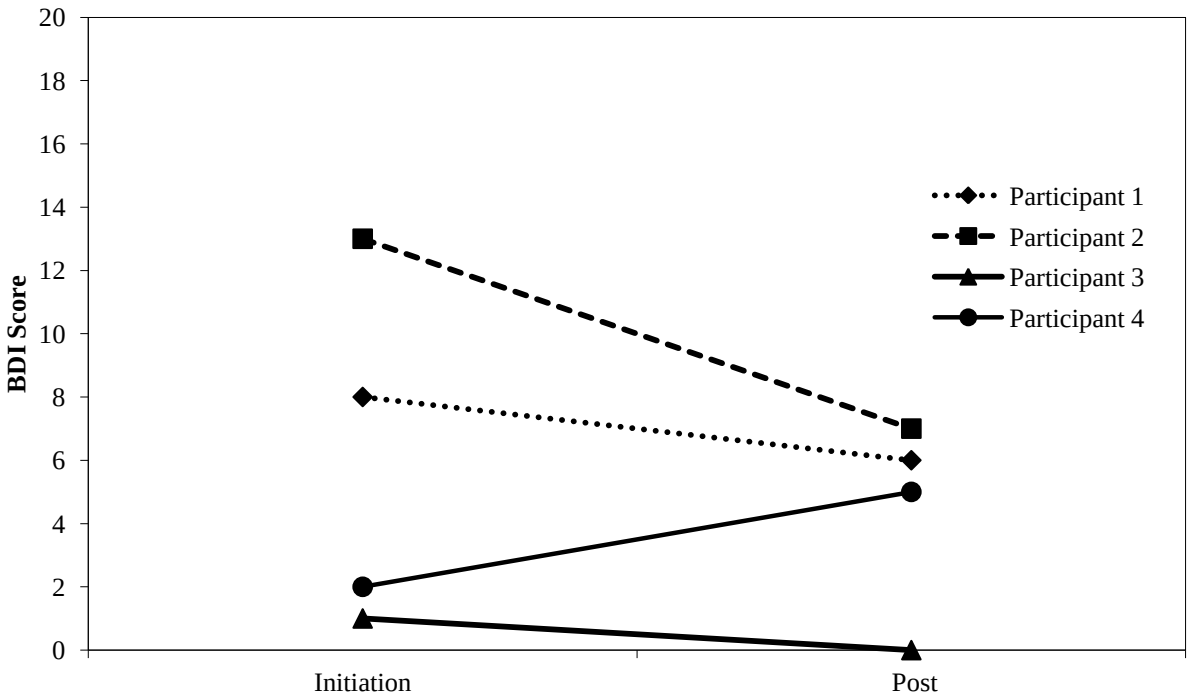

Figure 2. Participant scores on the BDI at study initiation time and post-treatment.

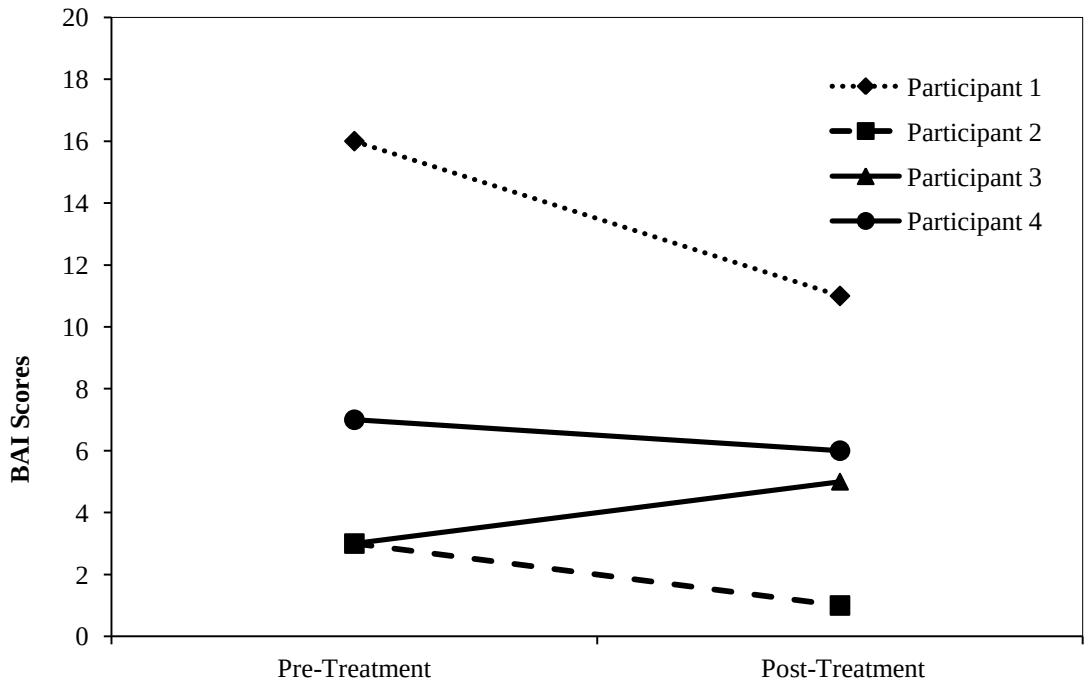

Figure 3. Participant scores on the BAI from study initiation time to post-treatment.

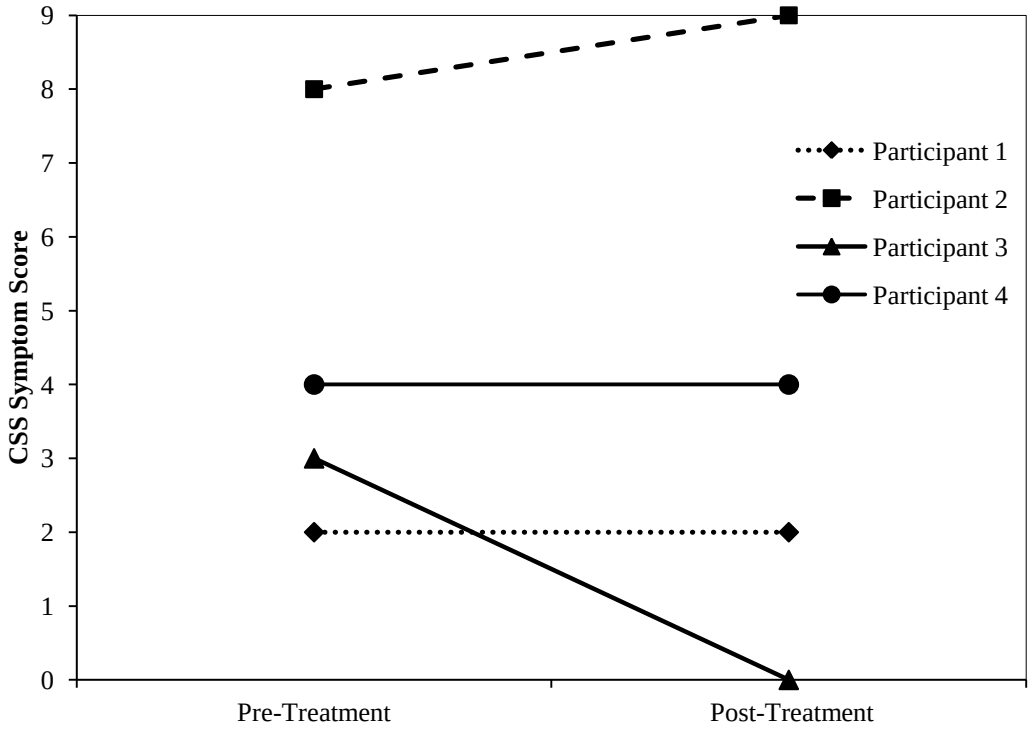

Figure 4. Participant IA symptom counts on the CSS at pre and post treatment.

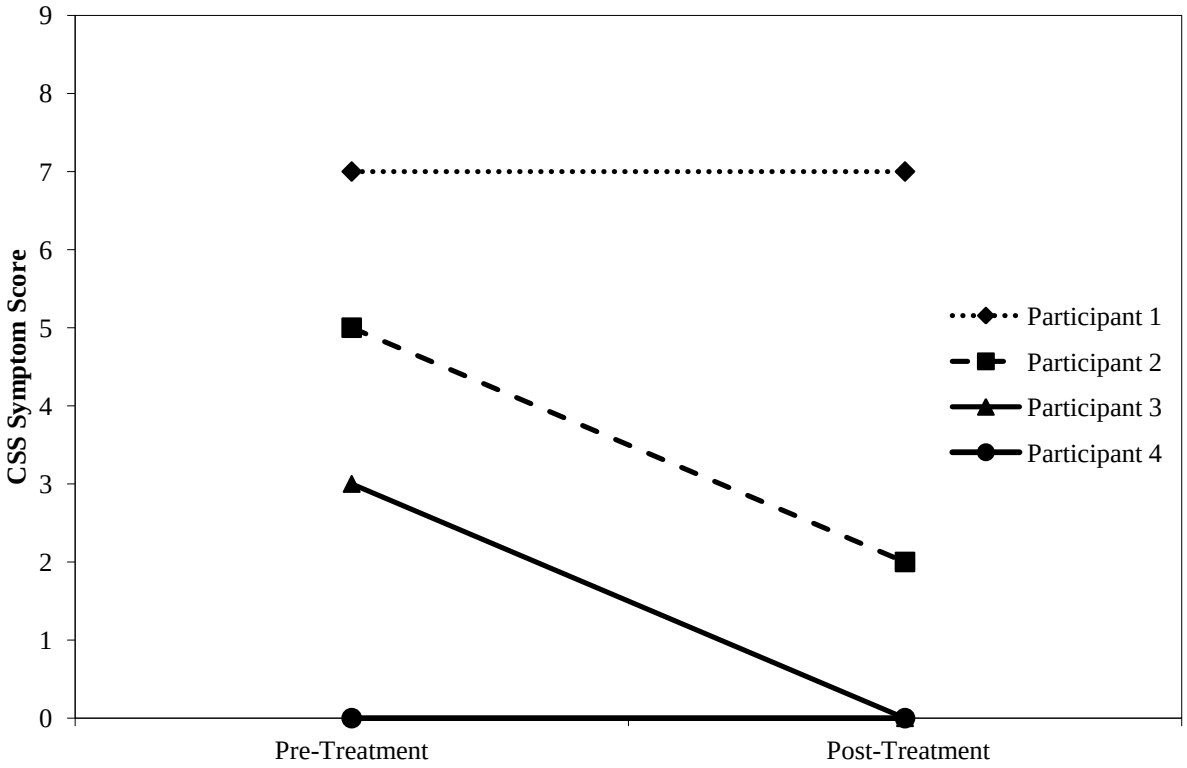

Figure 5. Participant HI symptom counts on the CSS at pre and post treatment.

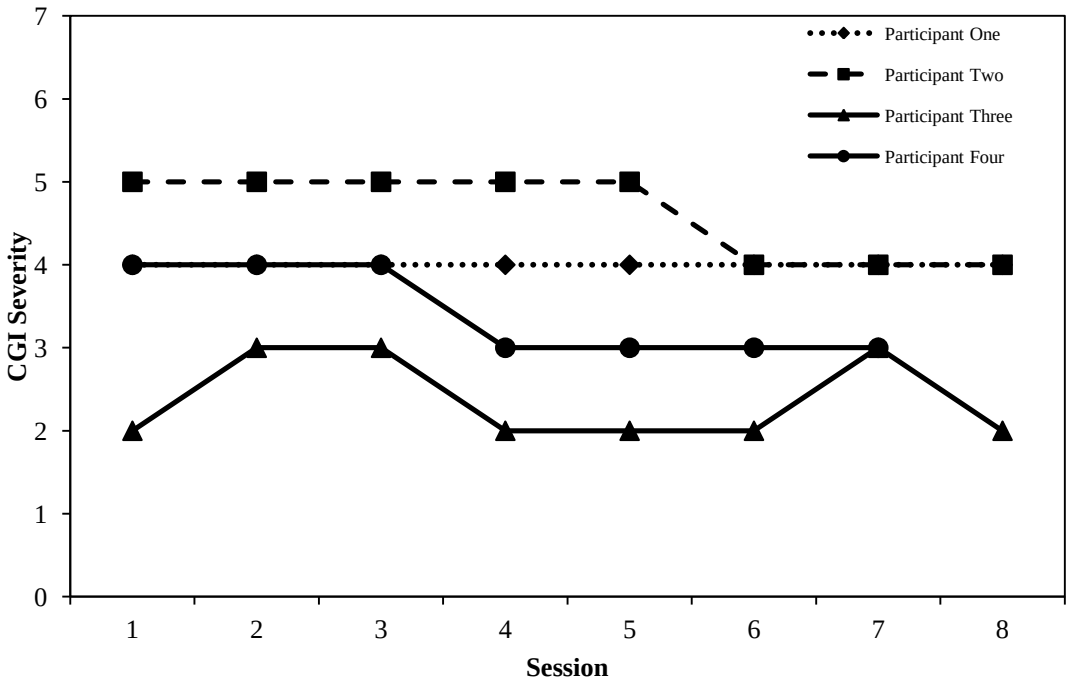

Figure 6. Participant scores on the CGI-Severity scale by session

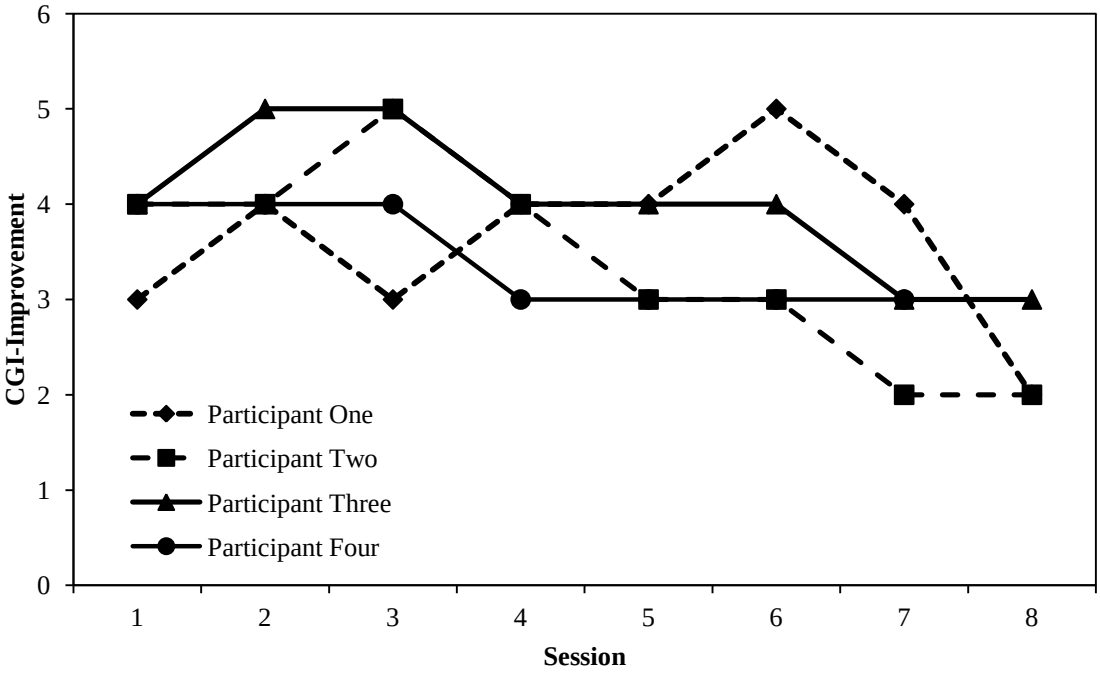

Figure 7. Participant scores on the CGI-Improvement scale by session

Appendix

To: Laura Eddy

CAMPUS MAIL

From: Dr. Stan Aeschleman, Institutional Review Board Chairperson
Date: 9/21/2011
RE: Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)
Study #: 12-0004
Study Title: Use of a Brief Cognitive Behavioral Intervention to Address Attention-Deficit/Hyperactivity-Related Difficulties of College Students
Submission Type: Initial
Expedited Category: (6) Collection of Data from Recordings made for Research Purposes,(7) Research on Group Characteristics or Behavior, or Surveys, Interviews, etc.
Approval Date: 9/21/2011
Expiration Date of Approval: 9/19/2012

This submission has been approved by the Institutional Review Board for the period indicated. It has been determined that the risk involved in this research is no more than minimal.

Vita

Laura Downs Eddy was born in Southern Pines, North Carolina to Ben and Caroline Eddy. She graduated from Pinecrest High School in North Carolina in May of 2003. The following autumn, she enrolled at the University of North Carolina at Chapel Hill, and in May of 2007 she was awarded the Bachelor of Arts Degree, in the field of classical studies. In the fall of 2009, Ms. Eddy began taking psychology courses at the University of North Carolina at Asheville, and in the fall of 2010 she enrolled as a graduate student in clinical health psychology at Appalachian State University, where she began working towards her Masters of Arts degree. The M.A. was awarded in the spring of 2013. In the fall of 2013, Ms. Eddy began doctoral studies at Virginia Commonwealth University.

Ms. Eddy is an avid reader, devoted dog owner, and an amateur runner.