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# Does Subtype Matter?: Comparing the Effects of a Self-Monitoring Intervention on ADHD-C and ADHD-I

Caleb James Corwin

*Louisiana State University and Agricultural and Mechanical College*

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DOES SUBTYPE MATTER?:  
COMPARING THE EFFECTS OF A SELF-MONITORING INTERVENTION  
ON ADHD-C AND ADHD-I

A Dissertation

Submitted to the Graduate Faculty of the  
Louisiana State University and  
Agricultural and Mechanical College  
in partial fulfillment of the  
requirements for the degree of  
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in

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by

Caleb J. Corwin

B.A., East Carolina University, 2007

M.A., Western Carolina University, 2009

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## ABSTRACT

Recently Attention-Deficit/Hyperactivity Disorder (ADHD) research has been confronted with questions regarding the subtype distinctions. Millich, Ballantine, and Lyman (2001) have claimed that ADHD – Combined Type (ADHD-C) and ADHD – Predominantly Inattentive Type (ADHD-I) are “distinct and separate disorders.” As important as this distinction is diagnostically, it is, possibly equally important with regards to treatment. Multiple pharmacological studies have compared the responsiveness of ADHD-C and ADHD-I to stimulant medications, yet the results are often conflicting (e.g. Grizenko, Paci, & Joobar, 2010; Solanto et al., 2009; Stein et al., 2003). To date, only one study has compared ADHD subtypes with respect to their response to a non-pharmacological treatment (Antshel & Remer, 2003). The current study aims to add to this line of research by comparing the effect of a self-monitoring intervention on daily routines, homework problems, and ADHD related problems between participants with ADHD-C and those with ADHD-I. Participants were 28 adolescents (14 ADHD-C, 14 ADHD-I) and their parents. The intervention consisted of four treatment sessions over a 5-week period, with outcome measures collected pre- and post-treatment. Results indicated that, while all participants, regardless of ADHD subtype, improved in parent reported daily routines, there was no significant difference between ADHD subtypes in their response to the self-monitoring intervention. Additionally, no interaction was found between subtype and change in homework problems or ADHD problems, and the intervention did not significantly improve homework problems or ADHD related problems for either subtype. Overall, this study found that adolescents with ADHD-C and those with ADHD-I do not differ significantly in their response to a self-monitoring intervention.

## INTRODUCTION

According to estimates from the 2001-2004 National Health and Nutritional Examination Survey (Merikangas et al., 2010), up to 8.6% of children and adolescents in the U.S. meet current *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV; American Psychiatric Association [APA], 1994) diagnostic criteria for one of the three subtypes of Attention-Deficit/Hyperactivity Disorder (ADHD). The subtypes, Inattentive (ADHD-I), Hyperactive/Impulsive (ADHD-HI), and Combined (ADHD-C) are often ignored or are confused by non-professionals (McLeod, Fettes, Jensen, Pescoso, & Martin, 2007). Among researchers this distinction has become a point of controversy in recent years. Millich, Balentine, and Lynam (2001) posited that ADHD-C and ADHD-I were “distinct and unrelated disorders.” Recent research has sought to evaluate and understand the possible implications of this claim.

Per the *Diagnostic and Statistical Manual, Fourth Edition, Text Revision* (DSM-IV-TR; APA, 2000), ADHD-C is diagnosed when criteria is met for both ADHD-I and ADHD-HI. ADHD-I and ADHD-HI both require the presence of a minimum of 6 of 9 symptoms, occurring across multiple settings (e.g., school, home). Symptoms must have persisted for at least 6 months, cause significant distress, and have an age of onset prior to the age of 7. The symptoms of ADHD-I consist of non-disruptive problems such as difficulty sustaining attention, distractibility, and difficulty completing tasks. Alternatively, ADHD-HI includes symptoms such as hyperactivity, fidgeting, difficulty awaiting turns, and excessive talking.

Recent debate regarding the differences in ADHD subtypes has even prompted several changes in the *Diagnostic and Statistical Manual, Fifth Edition* (DSM-5; APA, 2013). Although several changes to the diagnostic criteria were proposed prior to the publication of the DSM-5 (e.g., replacement of subtypes with specifiers), only five changes were implemented. The first,

and perhaps, least surprising change involved the increase in the age of onset criterion from age 7 to age 12 (Tannock, 2012). Multiple studies have revealed that using age 7 was overly restrictive and failed to capture a sizeable number of individuals with marked impairment in sustained attention (Applegate et al., 1997; Barkley & Fischer, 2008; Kessler et al., 2005; Miller, Newcorn, & Halperin, 2010). Additional changes to diagnostic criteria include a requirement for more informants (Valo & Tannock, 2010), removal of the exclusionary criteria for autism spectrum disorders (Murray, 2010), and an elaboration of symptoms to include adult presentations of inattention and impulsivity (Kessler et al., 2010). In an effort to account for the persistent attention-related dysfunction present in adults despite an age-related decline in total symptoms, the symptom threshold for adults with ADHD was reduced (Biederman et al., 2006). The most controversial proposed change, and one that was not adopted, was the replacement of formal ADHD subtypes with specifiers (e.g. hyperactive-impulsive presentation, inattentive presentation, restrictive presentation, and combined presentation). The goal of including the restrictive presentation was to specifically capture people with dysfunctional levels of inattention but minimal hyperactive and impulsive symptoms (Tannock, 2013). The replacement of the subtypes would have been premature given the number of studies examining the differences between these two subtypes and the current status of the debate regarding ADHD subtype differences (Millich, Balentine, & Lynam, 2001).

### **DSM-IV ADHD Subtype Differences**

Empirical evidence indicates differences in the developmental course of individuals who exhibit either inattention or disinhibition symptom clusters. Disinhibition often is evident sooner than symptoms of inattention in children who are later diagnosed with ADHD-C (Barkley, 2002). Further, disinhibition frequently subsides with age, while inattention persists through

adolescence and into adulthood (Hart, Lahey, Loeber, Applegate, & Frick, 1995). The apparent inverse relationship between the developmental course of disinhibition and inattention has contributed to concerns regarding the validity of ADHD subtypes. The instability of disinhibition symptoms throughout childhood is consistent with analyses of longitudinal studies, which suggest that children with ADHD often meet criteria for multiple ADHD subtypes throughout their lifetime (Lahey, Pelham, Loney, Lee, & Willcutt, 2005). Inquiries regarding the validity of ADHD subtypes prompted a DSM-5 subcommittee to conduct a meta-analysis aimed at answering that question. Willcutt et al. (2012) concluded that:

The DSM-IV ADHD subtypes provide convenient clinical shorthand to describe the functional and behavioral correlates of current levels of inattention and hyperactivity-impulsivity symptoms, but do not identify discrete subgroups with sufficient long-term stability to justify the classification of distinct forms of the disorder. (p. 2)

Extant research has amassed to support the distinction between the ADHD-C and ADHD-I subtypes in terms of age of onset and common co-occurring disorders. Consistent with the earlier onset of disinhibition symptoms, children with ADHD-C are typically diagnosed earlier than those with ADHD-I (Applegate et al., 1997; Faraone, Biederman, Weber, & Russell, 1998; Paternite, Loney, & Robers, 1996). ADHD-C is associated with higher rates of Conduct Disorder (CD), Oppositional Defiant Disorder (ODD), and Bipolar Disorder (BPD) than ADHD-I (Bauermeister, Alegra, Bird, Rubio-Stipec, & Canino, 1992; Faraone, Sergeant, Gillberg, & Biederman, 2003; Gaub & Carlson, 1997; Wolraich, Lambert, Worley, Doffing, Simmons, & Bickman, 2003). This difference is significant given the poor long-term outcomes associated with CD and BPD (Offord & Bennett, 1994).

In addition to developmental and comorbidity differences, interpersonal differences have been identified between children and adolescents with different ADHD subtypes. For instance, children with ADHD-C exhibit greater deficits in self-control (Solanto, Pope-Boyd, Tryon, &



Stepak, 2009) and experience more frequent peer rejection (Lahey & Willcutt, 1998). Although studies have shown that children and adolescents with ADHD-C have adequate knowledge of social skills, they have also been found to use those skills less consistently than their ADHD-I counterparts (Maedgen & Carson, 2000). Conversely, children with ADHD-I exhibit more impaired assertiveness (Solanto et al., 2009), experience greater peer neglect (McBurnett, Pfiffner, & Ottolini, 2000), and exhibit greater impairment in their knowledge of social skills (Maedgen & Carlson, 2000).

Neuropsychological research comparing ADHD subtypes has indicated that ADHD-C is associated with greater impulsivity, while ADHD-I is associated with processing speed deficits (Solanto, et al., 2007). Researchers have found genetic differences in children based on their ADHD subtype (Curran, Purcell, Craig, Asherson, & Sham, 2005; Waldman, et al., 1998). Lasky-Su and colleagues (2008) found that the Dopamine D4 receptor gene (DRD4) is more strongly associated with ADHD-I, while Mill and colleagues (2005) found that the Dopamine transporter gene (DAT1) is more strongly associated with ADHD-C. Together, findings from neuropsychological and genetic research have concluded that differences between the subtypes are evident on a biological level. Thus, in an effort to explore further differences, ADHD-C and ADHD-I should be considered separately in future ADHD research.

Barkley's (1997) disinhibition model is the leading theory of ADHD. This model states that the primary deficit in ADHD is behavioral inhibition, which in turn may lead to deficits in four executive functions (i.e., non-verbal working memory, verbal working memory, self-regulation of affect/motivation/arousal, and reconstitution). Barkley (2006) explicitly stated that the model applies solely to ADHD-C and not ADHD-I. There currently remains no accepted model of ADHD-I, which has led to speculation regarding the factors contributing to the

observed deficits. The argument for separate models is based on the hypothesis that ADHD-C and ADHD-I are distinct disorders (e.g., Millich, Ballantine, & Lyman, 2001). The current body of literature provides no definitive answer to this question. Thus, the question becomes, if there is a possibility that ADHD-C and ADHD-I are separate disorders with separate underlying factors, should treatment outcomes studies evaluate the possibility that these two subtypes respond differently to intervention?

### **Interventions for ADHD, Subtype Differences**

There is a general assumption that interventions for improving ADHD symptoms and related problems generalize across ADHD subtypes. The majority of ADHD treatment outcome research has focused on children and adolescents with ADHD-C. The Multimodal Treatment Study of Children with ADHD (MTA), which represents the largest multimodal ADHD treatment study to date, included only the combined subtype of ADHD in their participants (MTA Study; 1999). Other studies often include youth who vary in subtype, but differential subtype responses are not compared. Despite focusing primarily on ADHD-C and not directly comparing ADHD subtypes, the results from ADHD intervention studies are commonly cited as evidence for the benefits of pharmacological and behavioral interventions in treating ADHD, irrespective of specific subtypes.

**Pharmacological Interventions.** ADHD is primarily treated with psychopharmacological interventions due to the numerous studies evincing high levels of efficacy (see Faraone, Biederman, Spencer, and Aleardi, 2006 for a review). Less evidence exists comparing the response of ADHD subtypes to medication and when the efficacy of medication is compared across ADHD subtypes the results become less clear. An initial study examining differential responses of ADHD subtypes to stimulant medication found that children with

ADHD-C experienced greater improvements than children with ADHD-I (Barkley, DuPaul, & McMurray, 1990). This finding was later replicated in a study that found a significantly higher percentage of children with ADHD-C exhibit a “good response” to stimulant medication, defined as the consensus between two or more professionals of a moderate or large response as determined by multiple measurements across multiple settings, compared to children with ADHD-I (Grizenko et al., 2010). Solanto et al. (2009) introduced uncertainty to this line of research when they found that stimulant medications were equally effective in the treatment of both ADHD-C and ADHD-I. These results were then replicated by Stein and colleagues (2003); however, their results indicated that children with ADHD-I responded to lower doses of medication than children with ADHD-C. Adding further confusion to this line of research, Kopecky et al. (2005) found that stimulant medications produced greater improvements in executive functioning among children with ADHD-I relative to children with ADHD-C. Taken together these studies highlight the inconsistency within this body of literature and highlights that pharmacological treatment may be differentially effective depending on ADHD subtype.

**Non-pharmacological Treatments.** Psychosocial and behavioral interventions have a long history of effectively treating ADHD (see Fabiano et al., 2009 for a review). Effective non-pharmacological interventions in the treatment of children with ADHD have included organizational strategies (Langberg, Epstein, Urbanowicz, Simon, & Graham, 2008), self-monitoring (Gureasko-Moore, DuPaul, & White, 2006), academic interventions (DuPaul & Eckert, 1998), behavioral classroom interventions (Fabiano & Pelham, 2003; McCain & Kelley, 1993), daily report cards (Fabiano et al., 2010), summer treatment programs (Pelham et al., 2000), social skills training (Frankel, Myatt, Cantwell, & Feinberg, 1997; Pfiffner & McBurnett, 1997), working memory training (Beck, Hanson, Puffenberger, Benninger, & Benninger, 2010),

and parent training (Chronis, Chacko, Fabiano, Wymbs, & Pelham, 2004). The wide range of treatments utilized reflects efforts to treat the variety of impairments experienced by children and adolescents with ADHD across multiple settings.

Studies examining the efficacy and effectiveness of psychosocial and behavioral interventions for ADHD have routinely included multiple subtypes (e.g., Anastopoulos, Shelton, DuPaul, & Guevremont, 1993; Barkley, Edwards, Laneri, Fletcher, & Metevia, 2001; Bor, Sanders, & Markie-Dadds, 2002; Fabiano et al., 2004; Miranda, Presentacion, & Soriano, 2002); however, to date, only one study has compared ADHD subtypes on their response to a non-pharmacological intervention. Antshel and Remer (2003) examined the efficacy of an 8-week social skills training for children diagnosed with ADHD-C and ADHD-I. Results revealed that all children improved in assertiveness but children with ADHD-I demonstrated significantly greater improvement relative to those with ADHD-C. Potential reasons for the differential treatment response may include, most notably, that children with ADHD-C evinced significantly higher rates of ODD compared to children with ADHD-I. In fact, this is consistent with previous studies of ADHD subtypes, which have found higher rates of behavior problems among children with ADHD-C compared to ADHD-I (e.g. Faraone, Sergeant, Gillberg, & Biederman, 2003). Therefore, it appears that the higher rates of behavior problems associated with ADHD-C may contribute to the differential treatment gains observed between the two subtypes.

Given the number of differences (i.e., developmental, behavioral, social, neuropsychological, and genetic) between the ADHD-C and ADHD-I subtypes and the paucity of research comparing ADHD subtypes on their response to non-medication treatments further research in this area is clearly warranted. Examining differences in response to psychosocial and

behavioral treatments may provide information for improved treatment selection and, therefore, improved treatment outcomes based on ADHD subtype.

### **Adolescents with ADHD and Daily Routines**

Consistent routines are associated with lower levels of parent–child conflict (Nelson, Erwin, & Duffy, 2007), improved positive parent-child interactions and communication (Robin & Weiss, 1980), as well as reduced ratings of problem behaviors (Kiser, Bennett, & Paavola, 2005). Developing structured and consistent routines is of paramount importance to the successful management of ADHD symptoms (Hammerness, 2008; Mash & Barkley, 2003). Families of adolescents with ADHD have typically been found to incorporate fewer routines than families without adolescents with ADHD (Kiser, Bennett, & Paavola, 2005), report greater family conflict and negative communication (Coghill et al., 2008), and have difficulty with medication management (Wolraich et al., 2005). Additionally, families with consistent routines report better academic performance and lower rates of family stress (Robin, 1998). Given the importance of routines to medication adherence, family stress, and academic success, it is important to further evaluate the effectiveness of interventions designed to improve daily routines (e.g., self-monitoring).

### **Self-Monitoring Interventions**

Research has amassed to support the efficacy of self-monitoring interventions in decreasing undesired behaviors and increasing positive behaviors among both children and adolescents (for a review see Reid, Trout, & Schartz, 2005). Self-monitoring interventions have been used with a variety of diagnoses including learning disabilities (Graham & Harris, 2003), mental retardation (Cole & Gardner, 1984), and ADHD (e.g., Axelrod, Zhe, Haugen, & Klein, 2009; Meyer & Kelley, 2007; Shapiro, DuPaul, & Bradley-Klug, 1998). Self-monitoring

interventions involve defining target behavior and training to monitor the occurrence of the behavior. Goal-setting and contingency contracting are often combined with self-monitoring, due to evidence that the combination of such interventions has been shown to increase effectiveness compared to self-monitoring alone (Kelley & Stokes, 1982). Among children with ADHD, self-monitoring has been shown to improve organization and time management (Toney, Kelley, & Lanclos, 2003), increase homework completion (Axelrod et al., 2009), improve grades (Meyer & Kelley, 2007), and increase rates of on-task behavior (Shapiro, DuPaul, & Bradley-Klug, 1998).

### **Summary and Rationale**

There has been considerable debate in the ADHD literature regarding whether children and adolescents with ADHD-C and ADHD-I represent individuals with “separate and distinct disorders” and/or differentially respond to treatment. Despite this debate, only a single study (Antshel & Remer, 2003) has explicitly evaluated the efficacy of a non-pharmacological treatment (i.e., social skills training) between ADHD-C and ADHD-I. The findings suggest that co-morbid behavior problems, which are often seen in children with ADHD-C, may negatively impact the effectiveness of psychosocial and behavioral interventions. The current study examines whether a self-monitoring intervention involving goal-setting, a contingency contract, and the emphasis on a consistent homework routine for adolescents is differentially effective with ADHD-I and ADHD-C.

### **Study Hypotheses**

1. Adolescents with ADHD-C will display significantly higher levels of externalizing behavior problems as rated by the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001) than adolescents with ADHD-I.

2. Adolescents with ADHD-I and ADHD-C will experience significant improvements in their daily routines (as measured by the parent version of the Adolescents Routine Questionnaire; Meyer & Kelley, 2010) from pre-treatment to post-treatment.
3. Adolescents with ADHD-I will experience significantly greater pre-treatment to post-treatment improvements in their daily routines (as measured by the parent version of the Adolescent Routines Questionnaire) and significantly greater pre-treatment to post-treatment decreases in their homework problems (as measured by the parent report of the Adolescent Homework Inventory) and attention problems (as measured by the Child Behavior Checklist, Attention Problems scale) than adolescents with ADHD-C.

## METHOD

### Participants

Participants were recruited through referrals from physicians and psychologists as well as advertisements in local schools and pediatrician's offices. Study inclusionary criteria included: (1) currently enrolled in middle or high school, (2) parent report of a previous ADHD diagnosis from a psychologist or physician, (3) continues to meet current DSM-IV diagnostic criteria for ADHD-I or ADHD-C based on the Anxiety Disorder Interview Schedule for DSM-IV (ADIS-IV; Brown, DiNardo, & Barlow, 1994) ADHD module. During recruitment 70 families were contacted regarding an expressed interest in participation. Of those families, 13 did not meet inclusionary criteria and were referred for more appropriate services, 20 families did not respond to attempts to schedule an initial screening appointment, and 9 families dropped out of treatment. Demographic characteristics for the total sample, stratified by study condition, are presented in Table 1. Participants were 28 adolescents between the ages of 12 and 17 who were diagnosed with ADHD-I ( $n=14$ ) or ADHD-C ( $n=14$ ). Adolescents were not required to be on medication to meet criteria for participation, but medicated youth (ADHD-I,  $n=10$ ; ADHD-C,  $n=10$ ) were asked to maintain their current medication regimen for the duration of the study. Adolescents were randomly assigned to receive the treatment immediately (ADHD-I,  $n=8$ ; ADHD-C,  $n=8$ ) or receive the treatment after a 5-week waitlist control (ADHD-I,  $n=6$ ; ADHD-C,  $n=6$ ).

### Measures

**Demographic Questionnaire.** Demographic data including adolescents' gender, age, race, and academic grade level were collected via parent report (Appendix A). Data concerning the parents' age, race, estimated annual income, marital status, and highest level of education attained by either of the adolescents' parents were also collected.



Table 1. Adolescent Participant Characteristics by ADHD Subtype

Characteristic	Study Condition	
	ADHD Predominately Inattentive Type (n=14)	ADHD Combined Type (n=14)
Gender		
Male	7	8
Female	7	6
Age	14.36 (1.60)	13.64 (1.74)
Grade		
5-6	1	3
7-8	6	5
9-10	5	3
11-12	2	3
Ethnicity		
Caucasian	14	12
African American	0	2
Annual Household Income		
25,000-34,999	0	1
50,000-74,999	1	1
75,000-99,999	5	5
100,000+	8	7

**Adolescent Homework Inventory-Parent- & Self-Report** (AHI-P & AHI-S; Geary & Kelley, 2010). The 38 items on the AHI-P and 39 items on the AHI-S were used to measure homework problems over the past month. Items are rated on a five-point Likert-type scale ranging from one (never true) to five (always true). Preliminary investigations indicate internal consistency reliability alpha coefficients of .96 for the AHI-P and .94 for the AHI-S (Geary & Kelley, 2010; Appendix B). Within the current sample the internal consistencies was consistent with those findings (AHI-P,  $\alpha=.88$ ; AHI-S,  $\alpha=.92$ ). Positive correlations between both the AHI-P and AHI-S and the Homework Problems Checklist (HPC) suggest concurrent validity (Geary & Kelley, 2010).

**Classroom Performance Survey (CPS; Robin, 1998).** The 20 items on the CPS are rated by teachers on a five-point Likert-type scale ranging from one (*always*) to five (*never*). This measure was used to assess classroom performance and behavior. Additionally, the CPS contains 3 open-ended questions to gain information about the percentage of homework turned in by the target student over the past month and the percentage of homework turned in by the average student in class during the same time frame.

**Adolescent Routines Questionnaire, Parent and Self-Report (ARQ; Meyer & Kelley, 2010).** The 33 items on the ARQ are rated by parents and adolescents on a five-point Likert-type scale ranging from zero (*almost never*) to four (*always*). The ARQ measures the frequency of daily and weekly routines. Preliminary investigations indicate adequate internal consistency (ARQ-P,  $\alpha=.84$ ; ARQ-S,  $\alpha=.85$ ) and adequate test re-test reliability (ARQ-P,  $r=.74$ ; ARQ-S,  $r=.67$ ; Meyer & Kelley, 2010; Landry, 2010). Internal consistency within the current sample was consistent with these findings for both the ARQ-P ( $\alpha=.82$ ) and ARQ-S ( $\alpha=.86$ ). Concurrent validity for the ARQ has been established alongside the Family Routines Inventory, Parent and Adolescent versions (FRI:P and FRI:A, respectively; Jensen, James, Boyce, & Hartnett, 1983). Moderate significant correlations were found between parent report (ARQ-P and FRI:P,  $r=.64$ ) and adolescent report versions (ARQ-S and FRI:A,  $r=.55$ ; Meyer & Kelley, 2010).

**Child Behavior Checklist (CBCL), Youth Self-Report (YSR; Achenbach & Rescorla, 2001).** The 112 items on the CBCL and YSR are rated by parents and adolescents, respectively, on a three-point Likert-type scale from zero (*not true*) to two (*very true*). The CBCL and YSR are parallel forms of a broadband measure used to assess various areas of potential psychological dysfunction, including attention, anxiety, depression, and conduct problems. The CBCL and

YSR both have adequate internal consistency reliability, test-retest reliability, and construct validity (Achenbach & Rescorla, 2001).

**Conners 3, Self and Parent Versions** (Conners-3 SS/SP; Conners, 2008). The Conners-3 consists of 99 items on the self-report form and 110 items on the parent report form. Items are rated on a 4-point Likert scale from zero (*not true at all*) to three (*very much true*). The Conners-3 is a norm referenced measure of ADHD and comorbid disorders which provides separate norms for males and females. The Conners-3 has been found to have good psychometric properties and the ADHD Index has been shown to reliably distinguish children with ADHD from children without ADHD (Conners, 2008).

**Treatment Evaluation Inventory – Short Form** (TEI-SF; Kelley, Heffer, Gresham, & Elliott, 1989). The TEI-SF is a 9 item abbreviated version of Kazdin’s 1980 Treatment Evaluation Inventory which was composed of 16 items. The TEI-SF items are each rated on a 5-point Likert scale, ranging from “strongly agree” to “strongly disagree.” Internal consistency for the TEI-SF is .85 (Kelley et al., 1989).

### **Design and Procedure**

A pre-post between groups design with two groups (i.e., ADHD-PI and ADHD-C) was used. Participants were randomly assigned to either an immediate treatment group or a waitlist control group based on their ADHD subtype, age, gender, and race. Randomization was accomplished by the urn randomization design (Wei, 1978). Urn randomization attempts to maintain balance between groups and eliminate experimental bias (Wei & Lachin, 1988). Treatment was delivered immediately to 16 families while 12 families received treatment after a five-week waitlist delay.

**Initial Screening.** An initial intake appointment was scheduled for each participating family. Information was provided regarding the study including associated risks and benefits. Informed consent and assent was obtained from parents and adolescents, respectively. Parents completed the AHI-P, ARQ-P, Conners-3 Parent Form, CBCL, Demographic Questionnaire, and Treatment History form while the adolescent was administered the ADHD module of the ADIS by a trained graduate-student clinician. Once the adolescent interview was completed, each adolescent completed the questionnaire battery while the parents were administered the ADHD section of the ADIS. The purpose of the initial intake was to determine eligibility criteria while simultaneously collecting baseline data. Families that qualified for the study were asked to distribute classroom performance questionnaires to their adolescents' core teachers (i.e. Reading, Writing, Math, and Science) and signed a release authorizing the researchers to collect the questionnaires from the school. The waitlist control group then completed pre-treatment baseline questionnaires.

**Intervention.** Following completion of baseline questionnaires, adolescents and their families attended four treatment sessions over a 5-week period. Appointments were completed in local outpatient psychology clinics by clinicians who were master-level doctoral students in clinical psychology. The initial treatment session involved psycho-education on ADHD, the importance of daily routines, and how to effectively establish a self-monitoring routine. Clinicians then worked with adolescents and their parents to create a daily checklist that targeted specific problem areas. Clinicians specifically highlighted the importance of homework completion and a daily homework routine to academic achievement. Items on the daily checklist were organized into "morning," "during school," "after school," and "before bed" to denote the time period during which each task should be completed. Clinicians worked with families to

include at least 10, but no more than 20, items on the daily checklist (see Appendix D for an example checklist). Additionally, space was provided at the bottom of each checklist for adolescents to write-in personal activities that they wanted to accomplish (e.g., “get permission slip signed”).

Clinicians then assisted the parents and adolescents in developing a contingency contract (Appendix E), that identified behavioral expectations and consequences for using and completing the checklist. Each family developed two lists of possible rewards. Rewards from the first list were earned for appropriately keeping track of and filling out the checklist each day. To earn rewards from the second, more desirable, list adolescents had to complete a specific percentage of items on the checklist each day. Each family, with the assistance of the clinician, determined the specific criteria for earning rewards. Additionally, each family listed negative consequences for the failure of an adolescent to complete the checklist. Clinicians worked with each family to identify a “check-in” time each night for jointly reviewing the checklist and providing consequences. Parents were encouraged to set attainable goals for their child that would gradually become greater with time. Parents were instructed to initially remind their adolescent to complete their checklist periodically throughout the day, however, parents were told to gradually phase out the frequency with which they monitored the checklist as their adolescent exhibited consistency completing it independently. Parents were instructed to only check in at the predetermined time and refrain from periodic monitoring throughout the day when adolescents achieved 90% completion on two consecutive nights.

Sessions occurred one week apart, with two weeks elapsing between sessions two and three. Completed checklists were collected at each session. Subsequent sessions were used to modify the checklist and contingency contract as needed. It also provided parents and

adolescents with an opportunity to ask questions or express any concerns they had concerning treatment. Additionally, clinicians contacted parents via telephone or e-mail one time between each session to ensure that the intervention was being implemented. Following the completion of the fourth session, parents and adolescents completed their respective versions of the AHI, ARQ, and ASEBAs. They also completed the TEI-SF to measure their treatment satisfaction. Teachers were also asked to re-complete the CPS to evaluate any changes in their classroom performance.

## RESULTS

The data for the current study was initially collected as part of a study designed to compare the self-monitoring intervention to a wait-list control. For the purposes of the present study only pre-treatment and post-treatment data was analyzed to compare the response of ADHD subtypes to the self-monitoring intervention. Analyses were conducted using PASW Statistics 22 package. Analyses were conducted in two parts. First, differences between groups on demographic variables were examined. Second, hypotheses were tested using a series of one-way between subjects analysis of variance (ANOVA) and mixed within between subjects ANOVAs were conducted.

Initial analyses served as a check for the potential influence of confounding effects due to differences in demographic variables or pretreatment scores. No between group differences were found on any of the demographic variables (age, race, sex, participant age, participant grade, parent age, medication, or annual household income) or on pre-treatment scores (AHI-P, ARQ-P, and CBCL Attention problems scale).

### Hypothesis Testing

**Hypothesis 1.** The first hypothesis stated that adolescents with ADHD-C would have significantly higher levels of externalizing behavior problems as measured by the CBCL than adolescents with ADHD-I. To test this hypothesis a one-way between groups ANOVA was conducted between ADHD subtypes (ADHD-C and ADHD-I) on pre-treatment externalizing behavior scores via the CBCL. In contrast to this hypothesis, there was no significant difference between ADHD-C and ADHD-I in pre-treatment externalizing behavior scores on the CBCL [ $F(1,26)= 0.748, p= .395, \eta_p^2=.028$ ].

**Hypothesis 2.** The second hypothesis stated that adolescents with ADHD-I and ADHD-C would experience significant improvements in their daily routines (as measured by the ARQ-P) following the self-monitoring intervention. To test the second hypothesis a one way repeated measures ANOVA was conducted to compare scores on the ARQ-P at Time 1 (pre-treatment) and Time 2 (post-treatment). There was a significant effect for time [Wilks' Lambda=.705,  $F(1, 27)=11.30$ ,  $p=.002$ ,  $\eta_p^2=.295$ ]. This finding provided evidence in support of the second hypothesis in that adolescents, regardless of ADHD subtype, displayed significant improvements in daily routines from pre-treatment ( $M=106.34$ ,  $SD=16.08$ ) to post-treatment ( $M=113.04$ ,  $SD=15.73$ ).

**Hypothesis 3.** The third hypothesis stated that adolescents with ADHD-I would experience significantly greater pre-treatment to post-treatment improvements in their daily routines (as measured by the ARQ-P) and significantly greater pre-treatment to post-treatment decreases in their homework problems (as measured by the AHI-P) and attention problems (as measured by the CBCL, Attention Problems scale) than adolescents with ADHD-C. To test the third hypothesis a series of mixed within-between ANOVAs were conducted for the target dependent measures (ARQ-P, AHI-P, and CBCL attention problems scale). Additional main effect analyses were performed to assess the response of participants to the intervention regardless of their ADHD subtype classification.

A mixed within between ANOVA was conducted to explore the difference between the response of ADHD subtypes (ADHD-C, ADHD-I) to time (pre-treatment, post-treatment) on the ARQ-P. The interaction between ADHD subtype and time was not significant [ $F(1, 26) = .174$ ,  $p=.683$ ,  $\eta_p^2=.007$ ].



A mixed within between ANOVA was then conducted to explore the interaction between ADHD subtypes (ADHD-C, ADHD-I) and time (pre-treatment, post-treatment) on the AHI-P. In contrast to the hypothesis, the interaction between ADHD subtype and time was not significant [ $F(1, 26) = 0.009, p=.925, \eta_p^2=.0001$ ]. In addition there was no significant main effect of time [ $F(1, 26)=0.703, p=.409, \eta_p^2=.026$ ]. This finding indicates that, unlike the ARQ-P, the intervention did not produce significant improvements in parent-reported homework problems (regardless of ADHD subtype) on the AHI-P from pre-treatment ( $M=112.12, SD=14.41$ ) to post-treatment ( $M=114.41, SD=13.06$ ).

A mixed within between ANOVA was then conducted to explore the interaction between ADHD subtypes (ADHD-C, ADHD-I) and time (pre-, post-treatment) on the CBCL attention problems scale. The interaction between ADHD subtype and time was not significant [ $F(1,26)=0.019, p=.891, \eta_p^2=.001$ ]. Additionally, there was no significant main effect of time [ $F(1, 26)=2.78, p=.108, \eta_p^2=.100$ ]. This finding indicates that the intervention did not significantly improve CBCL attention problems scores.

## DISCUSSION

The current study aimed to examine the potential differences in the response of ADHD subtypes to a self-monitoring intervention. Unlike Antshel and Remer's (2003) finding that participants with ADHD-I benefitted more from a social skills intervention than participants with ADHD-C, the current study failed to find any interaction between ADHD subtypes and their response to the intervention. In fact, ADHD subtypes did not respond differently to treatment in any of the three areas assessed (i.e., homework improvement, improvement in daily routines, and reduction of ADHD problems). One of the most interesting aspects of this finding was the magnitude of the effect sizes for the interaction terms which were all below .05, with effect sizes for the interaction between time and the ARQ-P and AHI-P both falling below .01. Effect sizes of this scale suggest a larger sample of participants with similar characteristics would be unlikely to produce a statistically significant interaction term.

As hypothesized, the self-monitoring intervention was found to improve parent-reported ratings of routines, with both ADHD subtypes displaying similar improvements. Interestingly this finding was further supported by adolescent reports (ARQ-S) of improved routines. Both the parent- and self-report improvements were associated with large effect sizes (ARQ-P,  $\eta_p^2=.295$ ; ARQ-S,  $\eta_p^2=.173$ ) based on suggested effect size interpretations (Cohen, 1988). Overall this finding is promising and suggests that this self-monitoring intervention improved daily routines for adolescents with ADHD regardless of subtype (ADHD-C and ADHD-I). Additionally, the finding that this study produced significant behavioral improvements among adolescents (mean age of 14) is noteworthy given the majority of ADHD intervention studies target younger children (e.g. MTA Cooperative Group, 1999).

The findings from the current study also have important implications for clinical practice as they suggest the possibility that psychosocial interventions for ADHD may be selected without consideration for the specific subtype. While this practice is already widely accepted, it is important to further compile empirical support. To verify this claim replications are required, including studies that examine the response to a wide variety of psychosocial interventions. Ideally a large scale meta-analysis of the extant ADHD treatment literature would compare effect sizes for the ADHD subtypes response to various pharmacological and non-pharmacological interventions. Such an endeavor is not currently possible due to the accepted practice of combining ADHD subtypes for data analyses. Future studies should take care to compare the responsiveness of ADHD subtypes to various interventions, thus providing data necessary for a meta-analysis.

Despite having a large effect in improving daily routines as rated by both parents and adolescents, the intervention did not produce improvements in homework problems (AHI-P and AHI-S) or reductions in ADHD-related problems (ADHD problems scale from the CBCL and YSR). The absence of significant change scores on the CBCL and YSR are perhaps unsurprising after considering the items comprising those subscales. The ADHD problems subscale includes items that assess problems such as impulsivity, difficulty concentrating, being loud, and talking excessively. These types of problems were not targeted specifically by this intervention. Additionally, while the intervention did specifically address homework routines for most families, the primary focus of the intervention was daily routines and this focus does not appear to have exhibited an observable improvement for the wide variety of homework problems that adolescents with ADHD experience.

Surprisingly our study found no differences in externalizing problems between ADHD subtypes. ADHD-C has generally been found to be associated with higher rates of comorbidity with ODD and CD, lending to our hypothesis that these two subtypes would respond differently to the self-monitoring intervention (Eiraldi, Power, & Nezu, 1997; Gaub & Carlson, 1997). The lack of this discrepancy in our sample may have been attributed to the absence of a significant interaction term between ADHD subtype and response to the intervention. Overall there were low levels of comorbid externalizing behavior problems in our sample. The overall average t-score across ADHD subtypes ( $M=56.71$ ) did not indicate clinical or borderline clinical elevations based on the suggested interpretive guidelines (Achenbach & Rescorla, 2001). The lack of externalizing behaviors may have been influenced by characteristics of our sample. Additionally, we found no difference between ADHD subtypes in their scores on the Conners DSM-IV-TR ODD subscale. This is inconsistent with the literature which has indicated higher rates of comorbid ODD among children with ADHD-C (Wolraich et al., 2003). One possible factor contributing to the lack of externalizing behavior problems are the demographic characteristics of the families that participated in the study. The majority of our sample was white (92.9%) and 25 out of 28 families had an annual household income greater than \$74,999. The absence of low income families may be related to the absence of behavior problems within our sample given the robust evidence indicating high rates of externalizing problems among low income families (for a review see Huaqing & Kaiser, 2003). Future studies should explore the differential response of ADHD subtypes in a more generalizable sample which better captures the comorbid externalizing disorders.

The ongoing debate regarding the nature of the ADHD subtypes has been driven by a variety of motivations. Some researchers (e.g. Millich, Ballentine, and Lynum, 2001) have made

arguments that the ADHD-I subtype represents a distinct disorder which should be researched and diagnosed separately. Other researchers have posited (e.g. Barkley, DuPaul, & McMurray, 1990), despite conflicting evidence (e.g. Kopecky et al., 2005), that ADHD subtypes respond differently to pharmacological interventions. The studies on differential responses to medication represent efforts to assist clinicians in appropriately selecting treatments based on the specific ADHD subtype presentations. Antshel and Remer (2003) sought to expand this question to include non-pharmacological interventions, and in their study provided evidence that children with ADHD-I displayed greater improvements in assertiveness following a social skills intervention than children with ADHD-C. Similar to the findings of Solanto et al. (2009) that ADHD-C and ADHD-I respond similarly to medication treatment, our results indicated that both subtypes respond similarly to a self-monitoring intervention. These findings, the present study further contributes to the conflicting results comparing the responsiveness of ADHD subtypes to various interventions.

A possible interpretation of the different findings between the current study and the findings of Antshel and Remer (2003) is to assume that the differences are due to the nature of the intervention. Possibly ADHD subtypes respond differentially to social skills interventions but similarly to self-monitoring interventions. While differences due to the specific interventions used is plausible, it is difficult to fully understand without further studies designed to make those comparisons. Another, more plausible explanation, could be that the differences in results are confounded by characteristics of the samples included in the study. Antshel and Remer (2003) had a sample with a mean age of 9.61 years while the current study had a mean age of 14.00 years. This is a notable difference in age and may be attributable to the developmental course of ADHD (i.e. reductions in impulsivity; Hart, Lahey, Loeber, Applegate, Green, & Frick, 1995;

Mick, Faraone, & Biederman, 2004; Molina et al., 2008). As mentioned earlier the participants from the current study exhibited surprisingly low levels of externalizing behavior problems, unlike Antshel and Remer's sample. Within their sample ADHD-C was associated with higher rates of ODD which likely contributed to the higher rates of externalizing behavior problems and possibly contributed to the differential response of the ADHD subtypes to the intervention.

### **Limitations and Future Directions**

One major limitation to this study is the small homogeneous sample size. Future studies should aim to examine the difference between ADHD subtypes in their responsiveness to psychosocial interventions by utilizing a larger, more racially and socioeconomically diverse sample. It will be particularly important to attempt to replicate these findings among a sample of lower socioeconomic families and families of children with higher rates of externalizing behavior problems. Another limitation is related to the type and amount of data collected. All data was self-report data, and the majority was collected using self and parent report questionnaires. Although attempts were made to collect information from teachers using the CPRS, low response rates precluded examination of this data. To examine the possible generalizability of benefits to the classroom setting, future studies should ensure the collection of teacher-report questionnaires. In addition to being limited in the source of data, limitations exist due to the absence of permanent product data. This study did attempt to collect teacher ratings of homework completion pre-treatment and post-treatment but return rates for this data were too low to be included in analyses. Specific permanent product data for homework (e.g. rates of homework completion or accuracy) may have allowed for greater sensitivity in analyzing results. Collecting this data would also allow results from this study to be compared more easily to homework intervention studies which routinely collect this type of data.

Finally, a possible limitation of our study may be related to the lack of participants with a “restrictive inattention presentation” of ADHD. According to Tannock (2013), “restrictive inattention presentation” was a specifier considered for inclusion in the DSM-5. The “restrictive inattention presentation” would have been identified as 6 of 9 inattentive symptoms but 2 or fewer hyperactive impulsive symptoms. The sample from this study only had four participants who met this qualification and therefore analyses of the “restrictive inattention presentation” as a separate group was not feasible. Future studies should seek to examine differences between “pure” ADHD-I and those with ADHD-I plus more than 3 hyperactive-impulsive symptoms. Improved distinctions in the classification of the subtypes may lead to greater differences in their response to both psychosocial and pharmacological interventions.

## **Conclusions**

In light of the study limitations the main results should be revisited. Overall, this study indicated few differences between the two subtypes in their initial demographic characteristics and their response to intervention. While the aim of the current study was not to refute the contention that ADHD-I represents a distinct disorder (see Millich, Balentine, & Lynam, 2001), but instead to examine possible differences in their response to a non-pharmacological intervention. The findings do suffice to provide initial evidence that adolescents with both ADHD-I and ADHD-C benefit from a self-monitoring intervention targeting daily routines. Additionally our analyses did not reveal any significant differences in the improvements experienced by either subtype.

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## APPENDICES

### Appendix A: Demographic Questionnaire

**Directions:** Please complete the following information about you and your child.

Today's Date \_\_\_\_\_

Child Sex \_\_\_\_\_ Child Race/Ethnicity \_\_\_\_\_ Child Age \_\_\_\_\_ Child Grade \_\_\_\_\_

Child's Current Medications (dose, how often taken, time taken) \_\_\_\_\_

Parent's Relationship to Child (Mom, Dad, Aunt, Grandparent): \_\_\_\_\_

Parent Age: \_\_\_\_\_ Parent Race/Ethnicity \_\_\_\_\_

Parish/County you live in: \_\_\_\_\_ Phone: \_\_\_\_\_

What is your current marital status?

Married  Divorced  Widowed  Single  Living with Partner

Currently, what is the *highest* level of education YOU have completed? (Please check one)

1.  6<sup>th</sup> Grade or less
2.  Junior High School (7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup> grade)
3.  Partial High School (10<sup>th</sup>, 11<sup>th</sup> grade)
4.  High School Graduate
5.  Partial College (at least 1 year) or specialized training
6.  Standard College Graduate (B.A., B.S.)
7.  Graduate Professional Degree (Masters or Doctorate)

Currently, what is the *highest* level of education your SPOUSE/live in partner has completed?

1.  6<sup>th</sup> Grade or less
2.  Junior High School (7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup> grade)
3.  Partial High School (10<sup>th</sup>, 11<sup>th</sup> grade)
4.  High School Graduate
5.  Partial College (at least 1 year) or specialized training
6.  Standard College Graduate (B.A., B.S.)
7.  Graduate Professional Degree (Masters or Doctorate)

What is the total and CURRENT annual income of your household? (the income of *all* people living in your house right now, plus any government assistance; please check one)

1.  \$0-4,999
2.  \$5,000-14,999
3.  \$15,000-24,999
4.  \$25,000-34,999
5.  \$35,000-49,999
6.  \$50,000-74,999
7.  \$75,000-99,999
8.  \$100,000 and up

## Appendix B: Adolescent Homework Inventories

### Adolescent Homework Inventory- Parent (AHI -P)

**Directions:** Many children and adolescents have problems with homework. Please rate how often *your child* has done the following over the past month.

	Never True	Seldom/ Rarely True	Sometimes True	Frequently /Often True	Always True
1. Reads the textbook to prepare for tests.	1	2	3	4	5
2. Complains about homework.	1	2	3	4	5
3. Unmotivated to study.	1	2	3	4	5
4. Puts off starting homework.	1	2	3	4	5
5. Rereads textbook or notes when he/she doesn't understand the assignment.	1	2	3	4	5
6. Daydreams during homework.	1	2	3	4	5
7. Unmotivated to complete homework.	1	2	3	4	5
8. Easily distracted during homework.	1	2	3	4	5
9. Rewarded for good grades.	1	2	3	4	5
10. Takes too long to complete homework.	1	2	3	4	5
11. Reviews errors made on old tests (learns from past mistakes).	1	2	3	4	5
12. Makes careless mistakes on homework.	1	2	3	4	5
13. Does as little as possible to complete homework.	1	2	3	4	5
14. Rushes through homework.	1	2	3	4	5
15. Dissatisfied with completed homework.	1	2	3	4	5
16. Checks homework for correct answers.	1	2	3	4	5
17. Punished for bad grades.	1	2	3	4	5

18. Frustrated when a parent/tutor tries to help with homework.	1	2	3	4	5
19. Studies enough for tests.	1	2	3	4	5
20. Calls a friend for help with homework when needed.	1	2	3	4	5
21. Rewrites notes when studying.	1	2	3	4	5
	<b>Never True</b>	<b>Seldom/Rarely True</b>	<b>Sometimes True</b>	<b>Frequently/Often True</b>	<b>Always True</b>
22. Rewarded for completing homework.	1	2	3	4	5
23. Takes too many breaks during homework.	1	2	3	4	5
24. Records homework assignments correctly.	1	2	3	4	5
25. Organizes his/her notes when studying.	1	2	3	4	5
26. Gets annoyed when asked to complete or correct mistakes on homework.	1	2	3	4	5
27. Punished for failing to complete homework.	1	2	3	4	5
28. Asks for help from teacher when he/she doesn't understand an assignment.	1	2	3	4	5
29. Highlights or underlines important points in notes.	1	2	3	4	5
30. Studies material related to homework.	1	2	3	4	5
31. Takes legible, organized notes.	1	2	3	4	5
32. Organizes backpack for the next day.	1	2	3	4	5
33. Rewarded for studying.	1	2	3	4	5
34. Creates flashcards to study for a test.	1	2	3	4	5
35. Studies based on test format.	1	2	3	4	5

36. Waits too long to start long-term assignments.	1	2	3	4	5
37. Reviews material until memorized.	1	2	3	4	5
38. Punished for failing to study.	1	2	3	4	5

## Adolescent Homework Inventory- Self (AHI-S)

**Directions:** Many children and adolescents have problems with homework. Please rate how often each statement has been true of *you* in the past month.

	Never True	Seldom/ Rarely True	Sometimes True	Frequently / Often True	Always True
1. I fail to bring home necessary materials.	1	2	3	4	5
2. I read the textbook to prepare for tests.	1	2	3	4	5
3. I complain about homework.	1	2	3	4	5
4. I am unmotivated to study.	1	2	3	4	5
5. I put off starting homework.	1	2	3	4	5
6. I reread the textbook or notes when I don't understand the assignment.	1	2	3	4	5
7. I daydream during homework.	1	2	3	4	5
8. I am unmotivated to complete homework.	1	2	3	4	5
9. I am easily distracted during homework.	1	2	3	4	5
10. I take too long to complete homework.	1	2	3	4	5
11. I review errors made on old tests (I learn from past mistake).	1	2	3	4	5
12. I make careless mistakes on homework.	1	2	3	4	5
13. I do as little as possible to complete homework.	1	2	3	4	5
14. I fail to bring homework to class.	1	2	3	4	5
15. I rush through homework.	1	2	3	4	5
16. I am dissatisfied with completed homework.	1	2	3	4	5
17. I checks homework for correct answers.	1	2	3	4	5
18. I turn in homework late.	1	2	3	4	5

19. I am frustrated when a parent/tutor tries to help me with homework.	1	2	3	4	5
20. I study enough for tests.	1	2	3	4	5
	<b>Never True</b>	<b>Seldom/Rarely True</b>	<b>Sometimes True</b>	<b>Frequently / Often True</b>	<b>Always True</b>
21. I call a friend for help with homework when I need it.	1	2	3	4	5
22. I rewrite notes when studying.	1	2	3	4	5
23. I take too many breaks during homework.	1	2	3	4	5
24. I record homework assignments correctly.	1	2	3	4	5
25. I organize my notes when studying.	1	2	3	4	5
26. I get annoyed when asked to complete or correct mistakes on homework.	1	2	3	4	5
27. I ask for help from the teacher when I don't understand an assignment.	1	2	3	4	5
28. I can't find where my homework assignment is written.	1	2	3	4	5
29. I highlight or underline important points in notes.	1	2	3	4	5
30. I study material related to homework.	1	2	3	4	5
31. I take legible, organized notes.	1	2	3	4	5
32. I organize my backpack for the next day.	1	2	3	4	5
33. I need supervision during homework to ensure completion.	1	2	3	4	5
34. I need adult help/instruction to complete homework.	1	2	3	4	5
35. I create flashcards to study for a test.	1	2	3	4	5
36. I study based on test format.	1	2	3	4	5

37. I wait too long to start long-term assignments.	1	2	3	4	5
38. I review material until it is memorized.	1	2	3	4	5
39. I lose my homework.	1	2	3	4	5



## Appendix C: Treatment Evaluation Inventory Short Form (TEI-SF) Parent Report

Please complete the items below by placing a checkmark in the box next to each question that best indicates how you feel about the treatment. Please read the items very carefully because a checkmark accidentally placed in one box rather than another may not represent the meaning you intended.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I find this treatment to be an acceptable way of dealing with the child's problem behavior.					
2. I would be willing to use this procedure if I had to change the child's problem behavior.					
3. I like the procedures used in this treatment.					
4. I believe this treatment is likely to be effective (to work).					
5. I believe the child will experience discomfort during the treatment.					
6. I believe this treatment is likely to result in permanent improvement.					
7. I believe it would be acceptable to use this treatment with individuals who cannot choose treatments for themselves.					
8. Overall, I have a positive reaction to this treatment.					
9. I believe that it would be acceptable to use this treatment without children's consent					

**Appendix D: Daily Checklist**

## My Daily Checklist

Target Behavior	Goal Completed?
<b>Getting Ready for School in the Morning</b>	
Brushed Teeth	Y    N
Showered	Y    N
Ready On Time	Y    N
Took my medications	Y    N
<b>School</b>	
Turned in my math homework	Y    N
Turned in my reading homework	Y    N
Wrote down my reading homework	Y    N
<b>After School</b>	
Completed my reading homework	Y    N
Completed my chores (took out the trash, emptied the dishwasher)	Y    N
Packed my book bag for tomorrow	Y    N
<b>Before Bed</b>	
Brushed Teeth	Y    N

**I completed \_\_\_\_\_ / \_\_\_\_\_ items on my daily checklist or \_\_\_\_\_ %**

(To calculate, divide the number of items completed that day by the total number of checklist items)

My Personal Goals	Met Goal Today?
<b>1.</b>	<b>Y    N</b>
<b>2.</b>	<b>Y    N</b>

## Appendix E: Contingency Contract

### Contingency Contract

When I complete my daily checklist at \_\_\_% accuracy, I may choose from one of the following rewards:

- 
- 
- 
- 

When I complete my daily checklist, but NOT at \_\_\_% accuracy, I may choose from one of the following rewards:

- 
- 
- 
- 

When I have not completed my daily checklist, I must do one of the following of my parent's choosing:

- 
- 
- 
- 

We agree to abide by and follow the above contingencies for completing daily checklists. This means delivering rewards when they are earned and completing tasks or losing privileges when rewards are not earned.

Parent \_\_\_\_\_ Adolescent \_\_\_\_\_

## Appendix F: Consent and Assent Forms

### Parent Consent Form

**Performance Sites:** Children and their parents will be recruited on a voluntary basis from private physician waiting rooms and private clinician's offices.

**Names and Telephone Numbers of Investigators:** The following investigators are available for questions about this study, M-F, 8:00 am – 4:30 pm: Mary Lou Kelley, Ph.D. (225)578-4113 or Caleb Corwin (225) 578-8745.

**Purpose of the Study:** This study will help determine if using brief routines training will help adolescents improve their daily routine behavior and homework achievement.

**Participant Inclusion:** Fathers, mothers, or legal guardians and children (11-18) with a previous diagnosis of Attention-Deficit/Hyperactivity Disorder.

**Number of Participants:** 40

**Study Procedures:** Mothers, fathers, and caregivers will be asked to participate. Only those with signed consent forms will be included in the study. Participants will spend approximately 50-60 minutes completing questionnaires about their adolescent before and after the intervention. Adolescents whose parents have consented will be asked to provide assent and complete questionnaires about their own behavior. Researchers will provide assistance for participants who present difficulty reading questionnaire items. Following completion of questionnaires, parent(s), their adolescent, and the therapist will meet for a 1 hour session in which the therapist will help the family create daily routines checklists and homework checklists. The adolescent will be able to add personal goals as well. The family will be asked to attend follow-up sessions after 1 week and 3 weeks of treatment, to ensure any questions they have are answered and to determine if the treatment needs to be changed in any way. After 1 month of treatment, the parents and adolescents will complete the same questionnaires as they completed before treatment.

The study is confidential and you will not be linked to the data in any way. You have the option of providing your email address if you would like to be contacted about the results of the study. This is optional and not required. You will have no further obligation after you complete the final set of questionnaires.

**Benefits:** Completion of this project will help us better understand what can help adolescents and their families in their everyday lives and during homework completion. This may aid in providing treatment for adolescents with ADHD that is easy to use and helps the adolescent feel more

independent. Additionally, as the parent involvement is limited, it may help with parent-adolescent communication and decrease conflict, as the adolescent is in charge of completing much of the intervention.

**Risks/Discomforts:** There are no known risks associated with participation. Should you experience distress during participation in the study, the investigators can provide mental health and preventative services to children and their families. Also, as mandatory reporters of abuse and neglect, **any disclosure or threat of abuse revealed during data collection will be reported to Child Protective Services immediately. Additionally, as indicated in the child assent form, any report of abuse from the child will be reported to Child Protective Services. In both cases, the clinician will inform you if a report is warranted.**

**Right to Refuse:** Participants may choose not to participate or to withdraw from the study at any time without penalty.

**Right to Privacy:** Results of the study may be published, but no names or identifying information will be included in the publication. Your information will be identified by code rather than name. Any records with your name or your child's name will be maintained in a locked file cabinet in the research lab of Dr. Kelley at Louisiana State University. Participant identity will remain confidential unless disclosure is required by law.

This study has been discussed with me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigators. If I have questions about participants' rights or other concerns, I can contact Robert C. Matthews, Chairman, LSU Institutional Review Board at (225) 578-8692. I agree to participate in the study described above and acknowledge the researchers' obligation to provide me with a copy of this consent form if signed by me.

\_\_\_\_\_  
Printed Name of Parent Participant

\_\_\_\_\_  
Printed Name of Child Participant

\_\_\_\_\_  
Signature of Parent Participant

\_\_\_\_\_  
Date

The study participant has indicated to me that he/she is unable to read. I certify that I have read this consent form to the participant and explained that by completing the signature line above, the participant has agreed to participate.

\_\_\_\_\_  
Signature of Reader

\_\_\_\_\_  
Date

**STUDY APPROVED BY:**  
Dr. Robert C. Mathews, Chairman  
Institutional Review Board  
Louisiana State University  
130 David Boyd Hall  
225-578-8692 / [www.lsu.edu/irb](http://www.lsu.edu/irb)  
Approval Expires: 3/20/2015

## Child Assent Form

**Performance Sites:** Children and their parents will be recruited on a voluntary basis from private physician waiting rooms and private clinician's offices.

**Names and Telephone Numbers of Investigators:** The following investigators are available for questions about this study, M-F, 8:00 am – 4:30 pm: Mary Lou Kelley, Ph.D. (225)578-4113 or Caleb Corwin (225) 578-8745.

**Purpose of the Study:** This study will help determine if using brief routines training will help adolescents improve their daily routine behavior and homework achievement.

**Participant Inclusion:** Fathers, mothers, or legal guardians and children (11-18) with a previous diagnosis of Attention-Deficit/Hyperactivity Disorder.

**Number of Participants:** 40

**Study Procedures:** You and your parent will spend approximately 50-60 minutes completing questionnaires about their adolescent before and after the intervention. You will be asked to come with your parent to a one-hour session with a therapist to learn how to monitor your daily routines and homework routines. You will also be able to set personal goals. You will be asked to complete daily checklists about what you do throughout the day and during homework completion. After one week, then three weeks, you will again meet with your parent and the therapist to help with any questions you have or things you want to change. You will be able to ask any questions you have about the project, and do not have to answer any questions you do not want to answer.

**Benefits:** You may benefit from monitoring your daily routines and homework behavior by getting more accomplished each day during a shorter period of time. Also, you may notice an improvement in how quickly you are able to complete your homework. Lastly, this might help you and your parent(s) get along better because you will increase the number of things you do on your own.

**Risks/Discomforts:** You may become upset while answering questions about how your daily routines or homework are hard for you, but this is not likely. If you do become upset, we will give you phone numbers and addresses of clinicians that can help you. **Also, if you tell us that you have been abused, we will tell your guardian(s), mom, dad, (or both) and Child Protection Services.**

**Right to Refuse:** You may choose not to answer any questions or to quit the study at any time without any problem.

**Right to Privacy:** This study may be published, but your name and your parent's name will not be included in the publication.

\_\_\_\_\_ Child Participant's Age

\_\_\_\_\_  
Child Participant's Name

\_\_\_\_\_  
Child Participant's Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Witness

**STUDY APPROVED BY:**

Dr. Robert C. Mathews, Chairman  
Institutional Review Board  
Louisiana State University  
130 David Boyd Hall  
225-578-8692 / [www.lsu.edu/irb](http://www.lsu.edu/irb)

Approval Expires: 3/20/2015

## VITA

Caleb James Corwin, a native of Cullowhee, North Carolina, received his bachelor's degree at East Carolina University in 2007. He then went on to attend and receive his master's degree in psychology from Western Carolina University in 2009. During his time at Western Carolina University he developed a passion for working with children and adolescents that exhibit disruptive behavior disorders. This passion led him to enroll in the clinical psychology doctoral program at Louisiana State University under the guidance of Dr. Mary Lou Kelley. Following the completion of his doctoral degree in December 2014, Caleb plans to move to southern Appalachia and continue his work with children and adolescents with disruptive behavior disorders.