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Academic Self-Monitoring in College Students with Attention-Deficit/Hyperactivity Disorder

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ACADEMIC SELF-MONITORING IN COLLEGE STUDENTS WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER

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Table of Contents

List of Tables

List of Figures

Abstract

Self-monitoring is an intervention that can result in behavior change by having individuals observe and record their own behavior. Self-monitoring has received empirical support in changing Attention-Deficit/Hyperactivity Disorder (ADHD) related behaviors in children, but there is scarce research regarding self-monitoring with adults with ADHD. The current study implemented a self-monitoring intervention aimed at improving academic behavior and medication adherence in college students with ADHD. The self-monitoring intervention included study skills training, goal-setting, identification of individualized self-monitoring behavior, and follow-up meetings to discuss progress. The participants were asked to monitor their behavior on a daily basis using an electronic system. Compared to a control group, who received study skills training and goal-setting with no self-monitoring, participants in the self-monitoring group had significant improvement in their ADHD symptoms, academic behavior, GPAs, and goal attainment. No changes were found in medication adherence. The contributions of these findings to the current literature on self-monitoring and interventions for adults with ADHD are discussed.

Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurobehavioral disorder with characteristic symptoms of inattention, hyperactivity, and impulsivity. It is among the most commonly diagnosed disorders in childhood with a prevalence of 3-7% (Barkley, 2003). According to the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5; American Psychiatric Association [APA]) there are three major ADHD symptom specifiers: inattentive type, hyperactive-impulsive type, and combined type. For all subtypes, the symptoms must cause impairment in at least two settings and emerge before age fourteen (APA, 2013).

Until the early 1970s, there was a general consensus that children would simply outgrow their ADHD symptoms. However, there is now ample evidence suggesting this is not the case (Resnick, 2005; Rösler, Casas, Konofal, & Buitelaar, 2010). ADHD symptoms identified in childhood continue to exist at clinical levels into adulthood for about 50% of individuals (Frank-Briggs, 2011). The current prevalence of adult ADHD (ages 18-44 years old) is estimated at 4.4% based on results from the large-scale community sample used in the National Comorbidity Survey-Replication study (Kessler et al., 2006). Slightly lower, but similar, prevalence rates were identified in an American college population with 2.9% of men and 3.9% of women meeting diagnostic criteria for ADHD (DuPaul et al., 2001). Within university settings, approximately 25% of students enrolled with disability services receive accommodations for ADHD (Weyandt & DuPaul, 2008), displaying the high rates of services needed past childhood. The cause of ADHD and the the factors contributing to the continuation of ADHD into adulthood are unknown. Several variables are thought to contribute in a transactional model including genetic, social, cultural, and environmental factors.

The symptoms apparent in individuals with ADHD are correlated with a variety of detrimental outcomes for children, adolescents, and adults. Problematic behavior in school-aged individuals (e.g., off-task behavior and higher drop-out rates; Barbaresi, Katusic, Colligan, Weaver, & Jacobsen, 2007) evolve into more complex problems as young adults acquire new responsibilities and experience less external control over their behavior (Resnick, 2005). Both longitudinal and cross-sectional research has suggested deficits in adaptive functioning correlated with adult ADHD (Barkley, Murphy, & Fischer, 2008; Rösler et al., 2008). Specifically, some of these deficits include detrimental occupational performance (Young, 2000), higher unemployment rates (Halmoy, Fasmer, Gillberg, & Haavik, 2009), lower-ranking employment for individuals who are employed (Mannuzza, Klein, Bessler, Malloy, & Hynes, 1997), and lower socioeconomic status (Borland & Heckman, 1976). Contributing to these occupational and economical disadvantages are the lower rates of academic achievement among individuals with ADHD. Adults with ADHD are less likely to attend college, and those that do are more likely to drop out (Young, 2000), have lower GPAs, are more likely to experience academic probation, and endorse more academic difficulties (Heiligenstein, Guenther, Levy, Savino, & Fulwiler, 1999).

In an attempt to understand the academic problems associated with ADHD college students, it is important to consider that much of their course grades are due to performance on tests typically given infrequently. Thus, students must study or work well in advance to achieve optimal grades. This can be problematic because the ability to wait to gain long term reward in lieu of a short term reinforcement is a common impairment for individuals with ADHD (Bitsakou, Psychogiou, Thompson, & Sonuga-Barke, 2009; Plichta et al., 2009; Solanto et al., 2001). In addition, several of the intermediate steps required to achieve satisfactory grades, such

as organization, planning, avoiding distractions, and taking class notes, are common problems experienced by adults with ADHD (Goodman, 2009; Weyandt & DuPaul, 2008). Procrastination is also a common detriment to academic performance (Rabin, Fogel, & Nutter-Upham, 2011), and research suggests that procrastinating school work has more detrimental outcomes for individuals with ADHD than other college students (Advokat & Vinci, 2012). Therefore, despite the fact that long-term reinforcement of a desired grade is sufficient for many typically developing college students, individuals with ADHD may require interventions specifically targeting the intermediate steps required for academic success.

Psychosocial Interventions for ADHD

According to Pelham and Fabiano (2008), there are several evidence-based psychosocial interventions for ADHD. Research has been conducted on the advantages and limitations of several of these interventions in children; however, there is scant research on behavioral interventions for adults with ADHD (Weyandt & DuPaul, 2009). This paucity of research may be a contributing factor to the large proportion of adults with ADHD that go untreated. Recent estimates suggest that only 10-12% of adults diagnosed with ADHD have received services in the past year (Kessler et al., 2006). Lack of treatment is associated with more severe impairment in several areas including educational, occupational, and social functioning (Goodman, 2009).

One psychosocial intervention that may be beneficial for adults with ADHD is self-monitoring (SM). Self-monitoring involves teaching an individual to monitor and record his or her own behavior with the goal of increasing or decreasing that behavior in the future (DuPaul & Stoner, 2010). Through the process of reallocating attention to target behaviors, the intervention

is intended to create positive reactive effects and behavior change (Axelrod, Zhe, Haugen, & Klein, 2009; Shapiro, Durnan, Post, & Levinson, 2002).

SM has achieved empirical support in promoting attentiveness (Amato-Zech, Hoff, & Doepke, 2006; DuPaul & Stoner, 2010), task engagement (Graham-Day, Gardner, & Hsin, 2010; Wolfe, Heron, & Goddard, 2000), homework completion and accuracy (Falkenberg & Barbetta, 2013), and academic performance (Blick & Test, 1987; Carr & Punzo, 1993; Crabtree, Alber-Morgan, & Konrad, 2010) in school-aged children with ADHD and other academic deficits. SM used with children has been rated as highly acceptable by both interventionists and participants (Axelrod et al., 2009; Briesch & Chafouleas, 2009; Yücesoy Özkan & Sönmez, 2011). In addition, the intervention has support in the adult literature in the domains of weight management (Michie, Abraham, Whittington, McAteer, & Gupta, 2009), smoking cessation (Schmitz, Sayre, Stotts, Rothfleisch, & Mooney, 2005), job skill training (Goomas, 2007; Rose & Ludwig, 2009; Wright, Ellis, & Baxter, 2012), behavioral treatment integrity (Petscher & Bailey, 2006; Plavnick, Ferreri, & Maupin, 2010), and athletic performance (Polaha, Allen, & Studley, 2004).

A few studies have also used SM to target academic performance in college students. Richards, McReynolds, Holt, & Sexton (1976) required students in an introductory psychology course to monitor their studying and reading every night. Students who monitored their behavior, on average, performed better in the course than students who received study-skills training without self-monitoring. In several studies students enrolled in statistics classes who were instructed to use SM earned higher course grades than a control group (Lan, 1996; Lan, Bradley, & Parr, 1993). Similarly, Morgan (1985) found that college students who monitored behaviors related to short-term course goals performed significantly better than a no-treatment

control group on their final exams. Finally, Mount & Tirrell (1977) also found beneficial effects of monitoring study time on final exam grades and demonstrated that monitoring using multiple modalities (narrative and graphs) enhances the intervention's effectiveness. There have been a few additional studies that evaluated the effects of self-monitoring on college academic behaviors other than grades such as time spent on school work (Kremer, Aeschleman, & Petersen, 1983), standardized tests preparation (Mahoney, Moore, Wade, & Moura, 1973), classroom participation (Delprato, 1977), and writing quality (Cho, Cho, & Hacker, 2010; Kauffman, Ge, Xie, & Chen, 2008).

Although most research supports the use of self-monitoring for improving college academics, Van Zoost and Jackson (1974) suggested that self-monitoring might not have additive benefits to study skill training. Similarly, Morgan (1987) found no differences between college students who monitored their study time and those that were taught to set goals. Therefore, the additive effects of self-monitoring when incorporated with other treatment components should be considered.

Pharmacological Interventions for ADHD

In addition to psychosocial treatments such as self-monitoring, pharmacological treatments (most commonly stimulants; Frank-Briggs, 2011) are often used for ADHD. Specific studies have been divided concerning whether best practice is pharmacological interventions (Miller et al., 1998; MTA Cooperative Group, 1999), behavioral interventions (Fabiano, et al., 2009; Pelham & Fabiano, 2008), or a combination (Tamm & Carlson, 2007). Despite the

controversy, interdisciplinary interventions including both pharmacotherapy and behavioral interventions are the current treatment of choice (Abramowitz, Eckstrand, O'Leary, & Dulcan, 1992).

Multiple studies have suggested short-term academic improvements associated with the use of stimulant medications for individuals with ADHD. For example, improvement on quiz scores, writing quality, note-taking, and attentiveness have been demonstrated shortly after drug administration. However, these short-term gains do not appear to normalize academic performance. Individuals with ADHD treated with stimulant medications still have lower GPAs, worse scores on standardized tests, higher drop-out rates, and more academic difficulties than controls (Advokat, 2010; Weyandt & Dupaul, 2006).

In addition, adherence to stimulant medication regimens is a consistent concern for both children (Pappadopulos et al., 2009) and adults (Bulloch and Patten, 2010; Meaux, Hester, Smith, & Shoptaw, 2006) with ADHD. Highly reported reasons for medication non-compliance are forgetting to take the medication or taking it intermittently. SM has been established in the medical field for increasing patients' compliance with medical procedures and prescription (e.g., Ruppar, Conn, & Russell, 2008; Schmitz et al., 2005). However, SM has not been empirically demonstrated to improve medication adherence in adults with ADHD.

Although self-monitoring has empirical support in many domains (e.g., childhood ADHD symptoms, adult weight-loss, adherence to medical protocols), the support for its use with college academics is limited, and there is a dearth in its use with ADHD college students. Therefore, the current study analyzed the effects of a self-monitoring intervention targeting both academic behaviors and stimulant medication adherence for adults with ADHD.

Methods

Participants & Setting

Participants signed up for the study through the psychological experiment system at a public university and received credit for their participation, which was later exchanged for course credit. All sessions took place in a one-on-one setting in a therapy room at the psychological services center at a public university.

In total, 53 participants signed-up and attended the first session. One participant did not provide consent and dropped out before initiating the first session activities. The experimenter randomly assigned the remaining 52 participants to either the treatment (i.e., Self-Monitoring group) or control group during the first session. Initial random assignment resulted in 27 treatment participants and 25 wait list control participants. Of these participants, 11 (five from the treatment group and six from the control group) completed the first session but failed to attend other appointments For a timeline of when participants dropped out of the study and for demographic information separated out by treatment and control group, see Figure 1 and Table 1 respectively.

Of the remaining 41 participants who completed the study, the sample was predominately female (75.61%) and Caucasian (80.49%). In addition, 9.76% identified themselves as African American, 2.44% as Hispanic/Latino, 2.44% as Asian American, and 4.88% did not report their race. All students were currently enrolled in a four-year undergraduate program, with 21.59% in their first year, 24.39% in their second year, 34.15% in their third year, and 19.51% in their fourth year or beyond. Participants' ages ranged from 18 to 32 years with a mean age of 20.48 years. There were no significant differences between participants who completed the study and

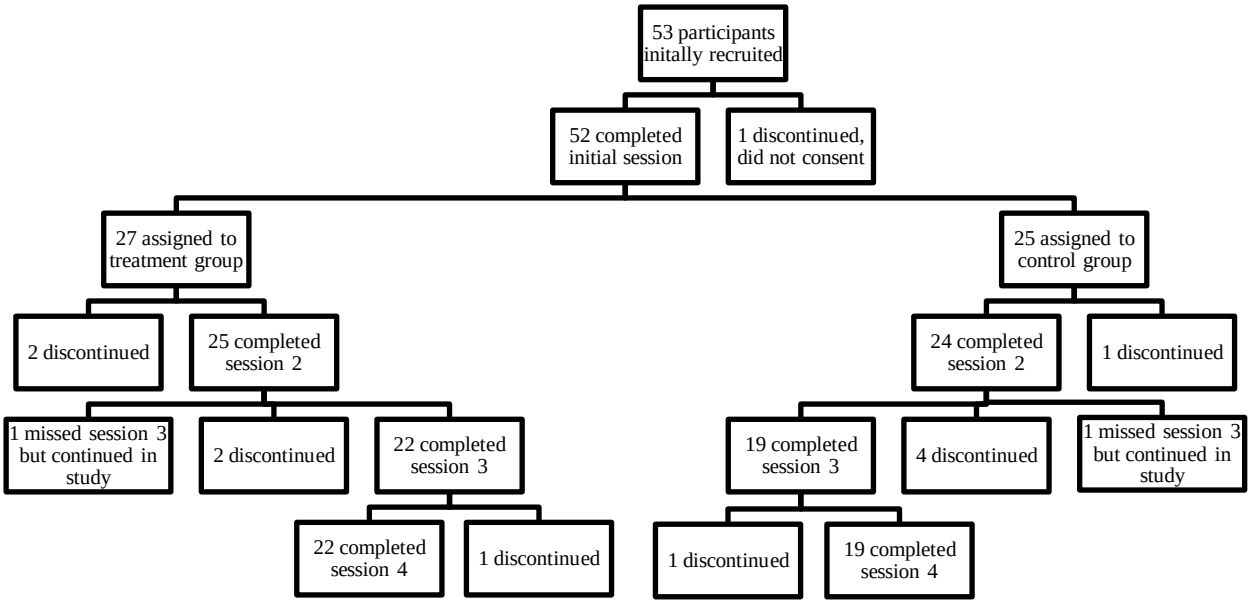

Figure 1. Flowchart representing all participants' progress through the study and times of dropout. The number of participants discontinued means they did not attend the remaining sessions and could not be contacted to reschedule.

those who dropped out based on gender, $X^2(1, N = 52) = .19$, $p = .66$; race, $X^2(4, N = 52) = 3.61$, $p = .46$; GPA, $T(50) = .12$, $p = .91$; or age, $T(50) = .28$, $p = .78$. However, there was a significant difference in year in school: participants who dropped out of the study were earlier in their college career ($M = 1.7$ years) compared to participants who completed the study ($M = 2.5$ years), $T(50) = 2.3$, $p = .03$.

All participants were previously diagnosed with ADHD and prescribed a current psychotropic medication, which the experimenter verified and recorded (type of medication, date of prescription, and dosage). Participants who completed the study reported being treated for an average of 15.0 years, with no significant differences in age of first diagnosis between individuals who dropped out and completed the study, $T(50) = .09$, $p = .92$.

Table 1.
Percent of Participants in Each Demographic Grouping

Demographic	SM (n=22)	Control (n=19)	Total (n=41)
Age			
18-20	50.00	68.42	58.54
21-23	40.91	26.32	34.15
24-26	4.55	5.26	4.88
27+	4.55	0.00	2.44
Gender			
Male	13.64	36.84	24.39
Female	86.36	63.16	75.61
Race			
Caucasian	81.82	78.95	80.49
African American	9.09	10.53	9.76
Hispanic/Latino	4.55	0.00	2.44
Asian American	4.55	0.00	2.44
None of the Above	0.00	10.53	4.88
Year in School			
First Year	18.18	26.32	21.95
Second Year	27.27	21.05	24.39
Third Year	36.36	31.58	34.15
Fourth Year +	18.18	21.05	19.51
GPA			
4.0-3.5	4.55	15.79	9.76
3.4-3.0	18.18	52.63	34.15
2.9-2.5	45.45	21.05	34.15
2.4-2.0	27.27	10.53	19.51
1.9-1.5	4.55	0.00	2.44
1.4-1.0	0.00	0.00	0.00
CAARS			
Inattention	100.00	84.21	92.68
Hyperactivity	68.18	68.42	68.29
Total	85.37	86.36	84.21

Measures

Adult ADHD Self Report Scale (ASRS). The ASRS is a measure used to aid in the diagnosis of ADHD in adults (Kessler et al., 2005). It consists of 18 items employing adult-directed language, corresponding to the ADHD diagnostic criteria in the DSM-IV-TR (APA, 2000). Each item is rated on a 5-point likert scale, with specific rating for each item required for

that item to be considered significantly at risk. This measure was used to identify national prevalence rates in the NCS-R study (Kessler et al., 2006). It has high internal consistency (Cronbach's alpha = .88) and is consistent with clinician rating scales of ADHD symptoms (Intraclass correlation = .83; Adler et al., 2006). The ASRS has also demonstrated adequate psychometric properties when used with a community sample (Reuter, Kirsch, & Hennig, 2006) and with college students (Garnier-Dykstra, Pinchevsky, Caldeira, Vincent, & Arria, 2010). The ASRS was used as a treatment outcome measure by counting the total number of symptoms endorsed in the significant range at both prettest and posttest.

Conners Adult ADHD Rating Scales (CAARS). The CAARS (Conners, Erhardt, & Sparrow, 2002) is a norm-referenced measure of ADHD symptoms in adults. The measure contains 66 statements responded to using a 4-point likert scale. The CAARS is a valid measure of self-rating of ADHD symptoms in adults, with sufficient internal consistency (coefficient alpha range from .86 to .92 across scales) and test-retest reliability (Erhardt, Epstein, Conners, Parker, & Sitarenois, 1999). It also has adequate sensitivity (82%) and specificity (87%) when compared to groups based off a semi-structed interview conducted by a trained clinician (Erhardt et al., 1999). The standardized scores on the DSM-IV scales of this questionnaire (DSM-IV Inattentive Symptoms, DSM-IV Hyperactive-Impulsive Symptoms, & DSM-IV ADHD symptoms) were used for descriptive purposes to assess the severity and type of ADHD symptoms present in our participants. Although both the ASRS and the CAARS were designed to align with the DSM-IV (APA, 2000), they also correspond well with the DSM 5 (APA, 2013) as the essential symptoms for an ADHD diagnosis remained stable between the two editions.

Medication adherence. The medication adherence questionnaire, designed for the current study, assessed participants' adherence to their stimulant prescriptions (see Appendix A).

This was a five item measure with responses on a five point likert scale. Items on the form were averaged to obtain a medication adherence score, with high scores representing better adherence. Participants also completed open-ended questionnaires about their ADHD diagnosis, medications, and previous treatments on both the medication adherence questionnaire and on a general participant information form.

School Success Checklist (SSC). Participants rated their academic behaviors using the SSC (Appendix B). The SSC was adapted for the current study from the Diagnostic Checklist for School Success designed for adolescents with ADHD (Robin, 1998), with items irrelevant to college-courses removed or slightly modified. The assessment included 42 statements about academic behaviors divided into six categories (inattention, organization, test preparation and test taking, note taking, reading comprehension, and classroom behavior). Each item is rated according to the participant's typical behavior over the past two weeks using a five point likert scale. The mean of all items on the SSC, and on individual categories on the SSC, was used to assess academic behavior (higher scores representing more positive academic behavior).

Intake interviews. Two interviews were conducted. The first was a brief intake interview designed for this study which included information regarding marital status, occupational status, relevant history, academic performance, and prior experience with psychological assessments or treatments (see Appendix C). The second was the The Mini International Neuropsychiatric Interview (M.I.N.I.; Sheehan, Janavs, Harnett-Sheehan, Sheehan, & Gray., 2009), which is a brief structured interview assessing a wide range of psychological disorders. The M.I.N.I. has similar positive predictive and negative predictive power as longer interviews (e.g., Lecrubier et al., 1997; Sheehan et al., 1998), but is more efficient in administration time.

Goal Attainment Scale (GAS). The GAS is a standardized way of assessing goal progress (Kiresuk & Sherman, 1968; Appendix D). Participants start by setting two to three goals and assigning weights to the goals relative to priority. Next, possible outcomes are behaviorally defined and labeled on a likert scale ranging from '-2' or worst expected outcome to '+2' or best expected outcome. These behavioral anchors are later used to rate goal progress. In the current study, the experimenter multiplied the participant's rating of each goal by the weight of the goal then divided by the sum of all weights to form a goal attainment score (possible range from -2 to +2).

Grade information form. Participants documented all grades received while enrolled in the study and the weight of each exam/assignment to the overall course grade using the Grade Information form (see Appendix E). Participants were encouraged to use gradebooks, syllabi, and copies of tests and assignments to enhance accuracy. The experimenter calculated participants' posttest GPAs by averaging the grades received while participating in the study (weighted by the contribution to the final course grade), calculating a letter grade for each course, and transposing these into a GPA using the standard university point system.

Treatment Evaluation Inventory – Short Form. The Treatment Evaluation Inventory-Short Form (TEI-SF; Kelley, Heffer, Gresham, & Elliott, 1989) is a measure of acceptability designed for use with childhood interventions. This questionnaire was slightly modified to accommodate an adult population and administered to participants in the treatment group. Items on the TEI-SF were averaged to obtain an acceptability score.

Procedures

During session one, the experimenter explained the study and obtained informed consent. Next, participants completed a demographic form (see Appendix F) and were assigned an identification number that was used throughout the study to maintain confidentiality. The participants then completed the ASRS, CAARS, SSC, medication adherence form, intake interview, and M.I.N.I.. Subsequently, all participants identified academically-related and objective goals using the GAS.

Next, the experimenter presented a brief discussion of study skills to all participants and provided two informational handouts. The first handout covered the SQ4R method of reading textbooks which includes several steps: (1) surveying the book, (2) writing questions about the topic, (3) reading the text while answering the questions, (4) reciting the answers after reading, (5) relating/reflecting to previous information, and (6) reviewing all material (See Appendix G). The SQ4R has been shown to improve college exam scores during both immediate and delayed testing (Hartlep & Forsyth, 2000). The second handout reviewed general study-skills (see Appendix H), which included several topics (e.g., organization, distraction-free studying, self-testing) that have been consistently shown to improve academics in college students (e.g., Crede & Kuncel, 2008; Proctor, Prevatt, Adams, & Reaser, 2006; Ramdass & Zimmerman, 2011). For participants in the control group, this was the last step of the initial session.

Self-Monitoring Treatment. Participants assigned to the SM group were introduced to SM with a brief handout (see Appendix I) and the experimenter assisted the participants in setting up the electronic SM intervention. The intervention utilized a SM form designed in Microsoft Excel and accessed by the participant and experimenter through Dropbox, an

application that allows for sharing of documents between people officially invited. All participants downloaded the program to their personal computers and set up an account. The experimenter then shared a folder with the participant that was used throughout the study. To familiarize the participant with the intervention, he or she completed a sample self-monitoring form uploaded to the dropbox folder by referencing a vignette of a fictitious college student's behavior across a day. Participants completed the sample form with different vignettes until they could independently open, complete, and save the form.

After mastering the electronic format, the experimenter and participant identified the specific SM items to use in the intervention. All participants monitored class attendance and medication adherence, but individualized items were also included so that participants' self-identified problematic behavior were addressed. All monitored behaviors were operationally defined with the participant. The SM checklist contained academic behaviors listed separately for each day, and the participant recorded behaviors by marking 'yes', 'no', or 'n/a' for each item (see Figure 2 for a sample SM form and common academic behaviors). Because the checklist was tailored to the student, the number of items varied across participants. Also, depending on the students' class schedule items may vary across days. However, participants used the same form from one week to another. The self-monitoring form also contained a progress report tab in which the percentage of SM items completed each day was tabulated and presented graphically (see Appendix J for a sample progress report). Participants were instructed to complete the checklist and check the progress report daily. Students who did not complete the checklist were reminded to do so via e-mail.

Check-in sessions. Participants in both groups were scheduled for two check-in sessions after the initial meeting. Although sessions were initially scheduled 14-21 days apart, due to holidays and rescheduling the actual length between sessions ranged from 7 to 27 days (M = 15.33 days, SD = 3.50).

Monday (3/18)

Study behavior	Yes/No	Comments
I spent 30 minutes completing assignments or studying for Math	Yes	
I finished my Biology lab quiz	Yes	
I reviewed my notes from today's lectures	Yes	
I completed my work in a distraction free setting	Yes	
Organization	**Yes/No**	**Comments**
I entered any new due dates or assignments in my phone calendar	Yes	
I checked my calendar for assignments and appointments	Yes	
I went to bed by 11:30 pm	No	
Class Attendance	**Yes/No**	**Comments**
I attended Sociology	Yes	
I paid attention and avoided distractions in my class today	Yes	
Medication	**Yes/No**	**Comments**
I took my medication at the correct time today	Yes	
I took the correct dose of my medication today	Yes	

Tuesday (3/19)

Study behavior	Yes/No	Comments
I spent 30 minutes completing assignments or studying for Math		
I completed the chemistry practice problems for the material covered in class today		
I reviewed my notes from today's lectures		
I completed my work in a distraction free setting		
Organization	**Yes/No**	**Comments**
I entered any new due dates or assignments in my phone calendar		
I checked my calendar for assignments and appointments		
I went to bed by 11:30 pm		
Class Attendance	**Yes/No**	**Comments**
I attended Biology		
I paid attention and avoided distractions in Biology		
I attended Psychology		
I paid attention and avoided distractions in Psychology		
I attended Biology lab		
I paid attention and avoided distractions in Biology Lab		
Medication	**Yes/No**	**Comments**
I took my medication at the correct time today		
I took the correct dose of my medication today		

Figure 2. A two-day example of the self-monitoring form completely daily by the SM group.

Check-in sessions lasted approximately 10-20 minutes. For students in the SM group, their progress based on the SM data was discussed and problems were addressed. The experimenter also answered any questions and on a few occasions modified the form to reflect changes in course requirements (e.g., dropping a class). For students in the control group, the experimenter and participant discussed the use of study-skills, general academic progress, and the goals set in the initial session. At the end of the session, participants in both groups completed the medication adherence form.

Final session. Finally, participants attended a wrap-up session, initially scheduled for 14-21 days after the last check-in session (intended intervention duration of 42-63 days; 2-3 weeks scheduled between each of the four appointments). Participants actually completed the intervention in a mean of 45.93 days (range 31-58 days).

At the final session, all participants completed the medication adherence form, ASRS, CAARS, School Success Checklist, GAS ratings, and grade information form. The SM group also completed the TEI-SF to assess acceptability. In addition, participants in the control group were introduced to the SM treatment and given the opportunity to make a future appointment to set up a personalized SM form.

At each session, the experimenter completed an integrity checklist to ensure that each step was completed with high fidelity (see Appendices K, L, and M for integrity checklists for sessions one through four, respectively).

Results

ADHD Symptoms and Comorbidity

According to the CAARS, 85.37% of our participants reported clinical or subclinical elevations on the DSM-IV ADHD Symptoms Total scale: 92.68% reported elevations on the Inattentive Symptoms scale and 68.29 % reported elevations on the Hyperactive-Impulsive scale. There were no significant differences in the elevations of the DSM-IV ADHD Symptoms Total Scale between participants who did and did not completed the study, $X^2(1, N = 52) = .708$, $p = .40$.

According to The M.I.N.I., several participants screened positive for comorbid symptomology. Of participants who completed the study, 75.61% reported the presence of one or more past or present comorbid conditions. The most common symptoms reported by the participants were those associated with Generalized Anxiety Disorder (26.83%), Alcohol Abuse (24.39%), and Major Depressive Disorder-Past or Present (24.39%). Some participants also screened positive for Alcohol Dependence (14.63%), Panic Disorder (14.63%), Social Phobia (14.63%), Obsessive Compulsive Disorder (12.20%), Specific Phobia (12.20%), Substance Abuse (9.76%), and Antisocial Personality Disorder (7.32%). Finally, 4.88% of participants screened positive for each of Bipolar Disorder I, Bipolar Disorder II, and Substance Dependence and 2.44 % screened positive for each of Agoraphobia, Post-Traumatic Stress Disorder, and Bulimia Nervosa. For specific information regarding the positive screens for the treatment and control group separately see Table 2.

Table 2.
Number of Participants Screening Positive for Comorbidity on the M.I.N.I.

Screener	SM (n=22)	Control (n=19)	Total (n=41)
GAD	7	4	11
Alcohol Abuse	6	4	10
MDE past	4	5	9
Alcohol Dependence	3	3	6
Panic Disorder	3	3	6
Social Phobia	3	3	6
OCD	2	3	5
Specific Phobia	4	1	5
Substance Abuse	2	2	4
ASPD	2	1	3
Bipolar I	1	1	2
Bipolar II	1	1	2
Substance Dependence	2	0	2
MDE present	1	0	1
Agoraphobia	1	0	1
PTSD	0	1	1
Bulimia	0	1	1
At Least One Screen[a]	17	14	39

[a] Number of participants who screened positive for at least one disorder, several participants screened positive for multiple screens.

Treatment Effects

To evaluate the effects of the SM intervention, five main dependent variables were assessed: ASRS, medication adherence, SSC, GAS, and GPA. These dependent variables were analyzed with a mixed-design MANOVA, comparing the pretest and posttest scores for both the control and SM groups. For this test and all following analyses, the assumption of normality was tested via visual analysis and the assumption of equality of variance was assessed using Levene's Test: no assumptions were violated. The omnibus mixed-design MANOVA analysis suggested there was a statistically significant difference between the control and SM group from pretest to posttest on the composite of the dependent variables, F (5,35) = 5.56, p = .001, partial η^2 = .443 (see Table 3 for group means and standard deviations).

Table 3.
Dependent Measures Scores

	Treatment		Control	
Measure	Prettest M (SD)	Posttest M (SD)	Prettest M (SD)	Posttest M (SD)
ASRS	13.14 (3.18)	7.59 (5.23)	11.37 (3.79)	11.84 (4.25)
SSC	3.25 (.39)	3.66 (.53)	3.26 (.51)	3.34 (.54)
GAS	0 (0)	.77 (.67)	0 (0)	.24 (1.91)
GPA	2.65 (.49)	3.03 (.48)	3.02 (.48)	2.89 (.68)
Medication Adherence	3.99 (.55)	4.05 (.57)	3.93 (.63)	4.12 (.69)

Next, post-hoc mixed-design ANOVA analyses were conducted on each dependent variable. Significant interaction effects were found between the groups for the ASRS, F (1,39) = 13.61, p = .001, η^2 = .259; SSC, F (1,39) = 4.81, p = .034, η^2 = .11; GAS, F (1,39) = 23.67, p <.001, η^2 = .38; and GPA, F (1,39) = 7.16, p =.011, η^2 = .155 (see Figure 3-6). The analysis found no significant interaction effect for medication adherence, F (1,39) = .743, p = .394, η^2 = .019 (see Figure 7).

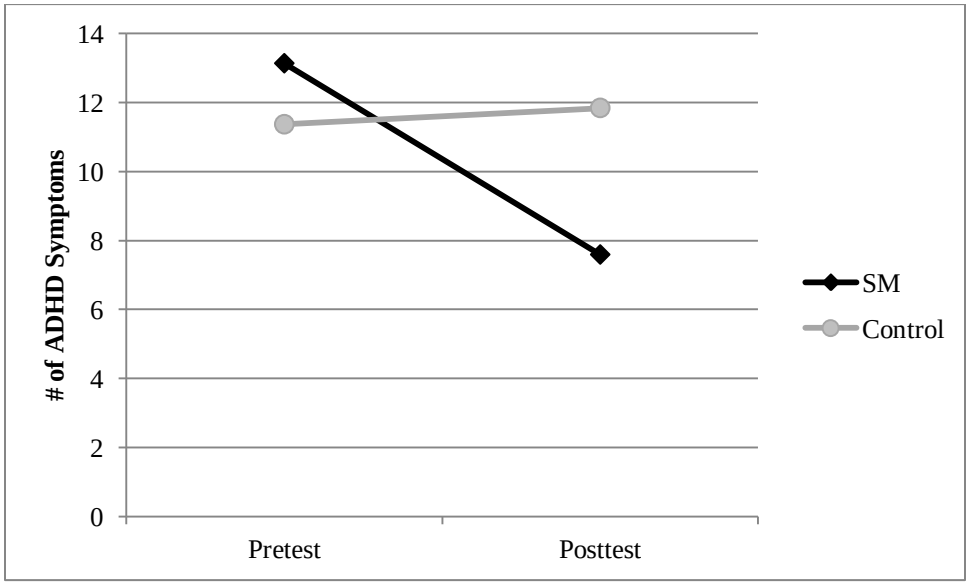

Figure 3. The mean number of symptoms endorsed in the significant range on the ASRS for the self-monitoring and control groups at both pretest and posttest.

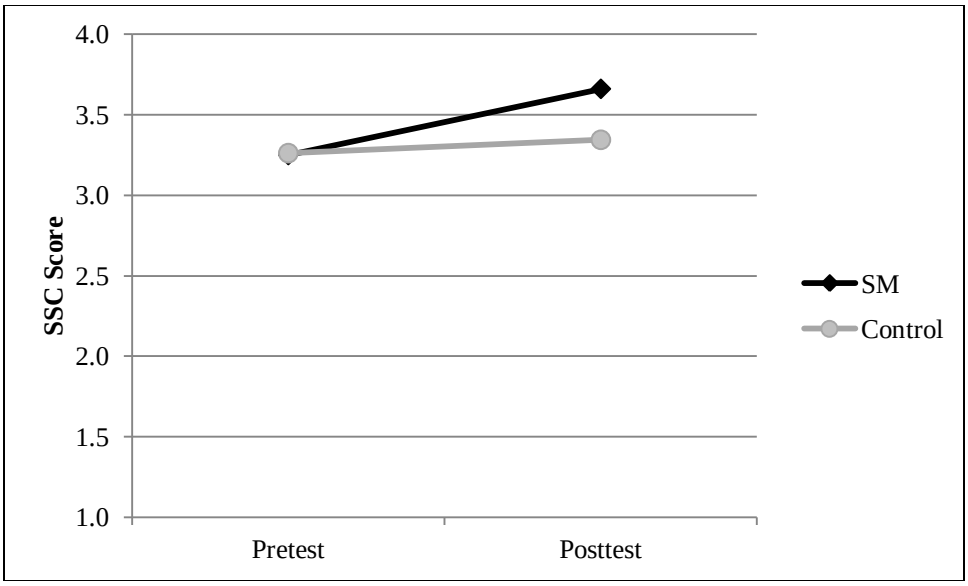

Figure 4. The mean scores on the School Success Checklist for the self-monitoring and control groups at both pretest and posttest.

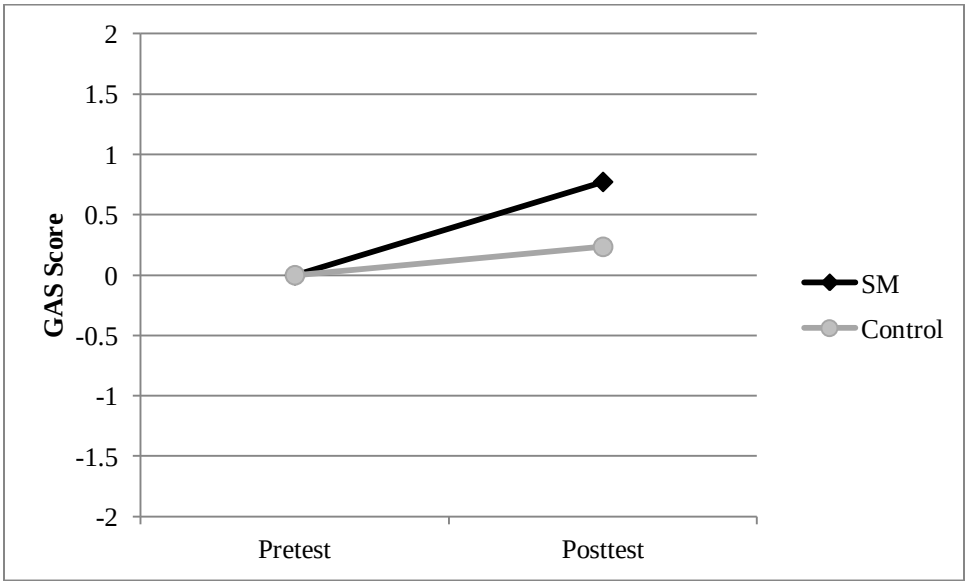

Figure 5. The GAS scores for the self-monitoring and control groups derived from the participants' goal weights and self-ratings at both pretest and posttest.

To follow up significant interactions for individual variables, separate paired sample t-tests were performed for the control and SM groups. A Bonferonni correction was applied to

account for the four comparisons conducted for each group; therefore, our significance level for determining positive effects was set at .0125. For the SM group all four dependent variables

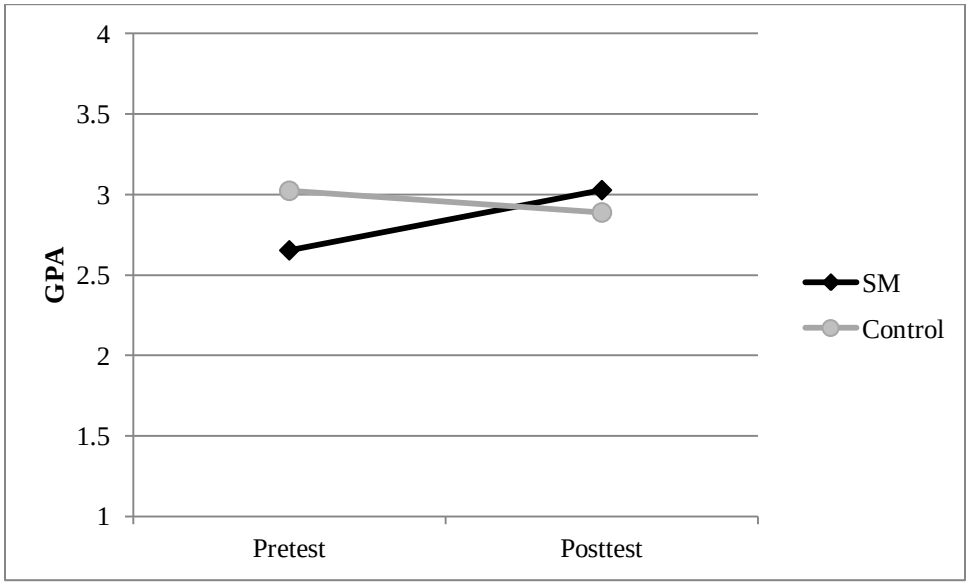

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Figure 6. GPAs for the self-monitoring and control groups prior to the study and while in the study.

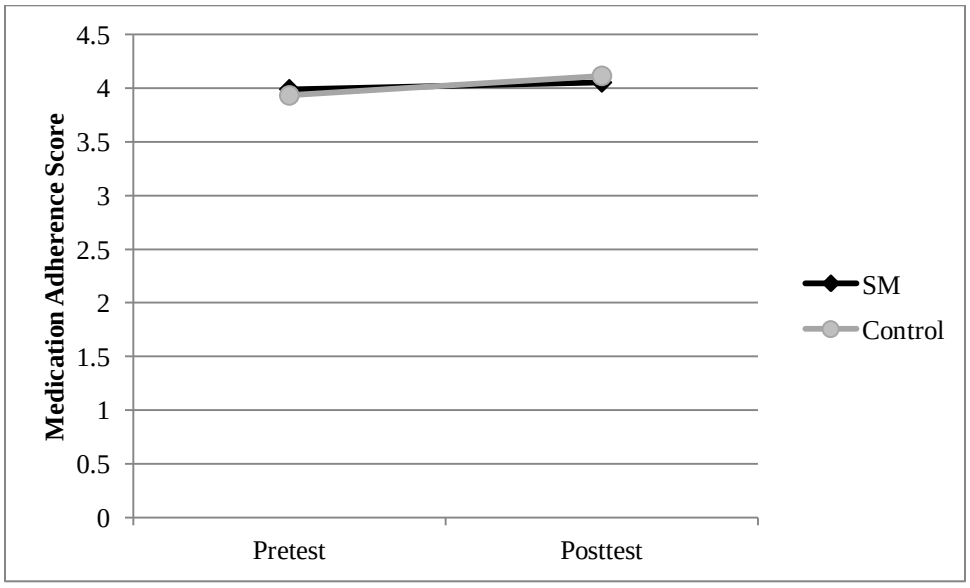

Figure 7. The mean scores on the medication adherence questionnaire for the self-monitoring and control groups at both pretest and posttest.

showed significant improvement including: (a) fewer symptoms on the ASRS at posttest than at pretest, T (21) = 3.92, p =.001, d = .84., (b) more positive academic behaviors on the SSC, T (21) = 3.71, p = .001, d = .79., (c) significant goal attainment, T (21) = 5.40, p < .001, d = 1.15, and (d) higher GPAs compared to prior performance, T (21) = 3.14, p = .005, d = .67. The control group did not show significant changes from pretest to posttest on either the ASRS, T (18) = .76, p =.457; SSC, T (18) = .85, p .406; GPA, T (18) = .89, p = .384; or the GAS, T (18) = 1.36, p = .19.

As an exploratory analysis, dependent sample t-tests were run on each of the six subcategories on the SSC for the SM group to determine if specific types of academic behaviors improved. Using a Bonferonni correction (p = .008), participants showed significant improvements on the subcategories of inattention, T (21) = 3.60, p = .002, d = .77; test taking, T (21) = 4.67, p < .001, d = 1.00; and reading, T (21) = 3.72, p = .001, d = .79. The other subcategories (i.e., organization, note-taking, and classroom behavior) were not significantly effected; however, the mean of all subcategories changed in an improved direction from pretest to posttest (see Table 4 for scores from individual scales).

Table 4.
School Success Checklist Subcategory Scores

	Treatment		Control	
	Prettest	Posttest	Prettest	Posttest
Subcategory	M (SD)	M (SD)	M (SD)	M (SD)
Inattention	3.21 (.68)	3.77 (.69)	3.35 (.70)	3.38 (.61)
Organization	3.66 (.84)	4.06 (.83)	3.31 (.91)	3.63 (.76)
Test Preparation & Test Taking	3.08 (.43)	3.56 (.53)	3.14 (.63)	3.30 (.62)
Note Taking	3.80 (.61)	4.02 (.82)	3.78 (.58)	3.80 (.94)
Reading Comprehension	2.85 (.52)	3.38 (.70)	3.04 (.68)	3.09 (.77)
Classroom Behavior	3.39 (.61)	3.52 (.57)	3.21 (.66)	3.13 (.82)

The treatment acceptability ratings on the TEI-SF indicated scores in the highly acceptable range (M = 4.26, SD = .56). For a breakdown of mean scores for each item see Table 5.

Finally, the experimenter assessed participants' adherence to the SM protocol through integrity checks conducted every 2 to 4 days. Participants experienced a mean of 18.23 integrity checks while in the study (*SD* = 2.33, range 12 to 21). Participants passed (updated the form at least 48 hours prior to the check) a mean of 67.02% of their checks; although there was significant variability between participants (*SD* = 22.78%, range 26.32% to 100.00%; see Figure 8).

Table 5.
Acceptability Measure Individual Items Scores

Item	M (SD)
I find this treatment to be an acceptable way of dealing with college study skills.	4.27 (.70)
I would be willing to use this procedure if I had to change other types of behavior.	4.14 (.89)
I like the procedures used in this treatment.	4.36 (.73)
I believe this treatment is likely to be effective.	4.14 (.71)
I experienced discomfort during the treatment.	1.23 (.43)
I believe this treatment is likely to result in permanent improvement.	3.68 (.99)
Overall, I have a positive reaction to this treatment.	4.36 (.58)
I would refer this treatment to a friend.	4.32 (.65)

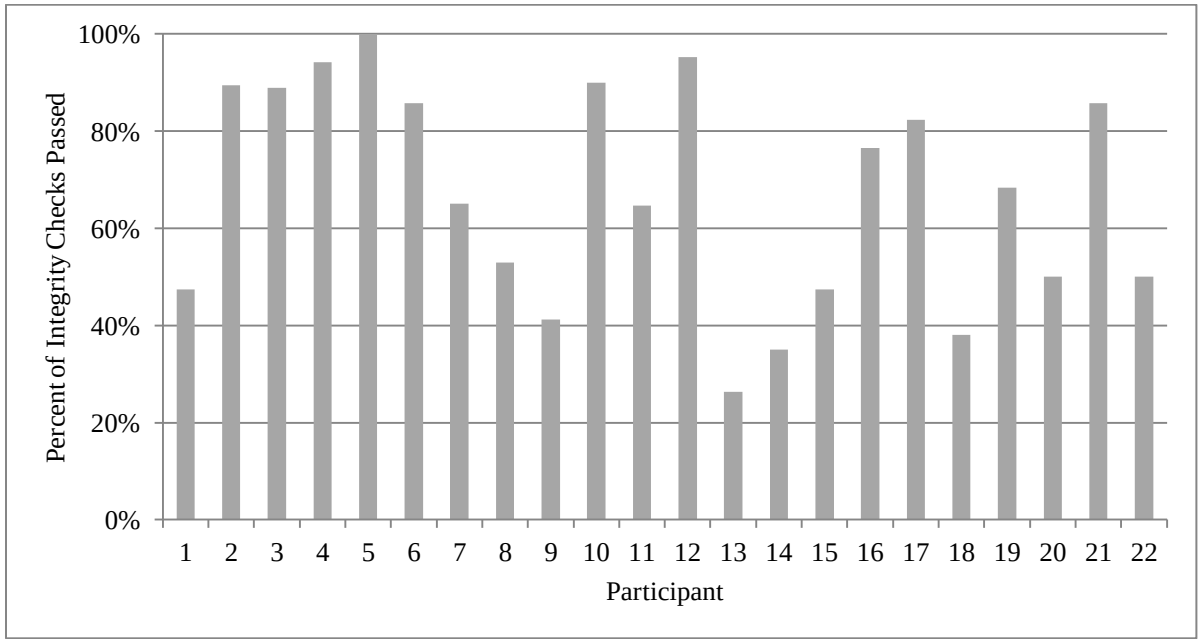

Figure 8. Percentage of integrity checks past by each participant in the treatment group.

Discussion

Participants in the SM group improved their academic behavior, ADHD symptoms, GPA, and goal attainment; whereas these changes were not reported by the control group sample who received all active components of the intervention with the exception of SM. This suggests that SM is the essential component of an intervention that includes study-skills instruction and goal-setting. The use of SM with adults with ADHD is novel and demonstrates that the methods used to improve academic performance in children with ADHD, are also beneficial with college students. This is especially important because adults with ADHD historically struggle in academic settings (Heiligenstein, Guenther, Levy, Savino, & Fulwiler, 1999; Young, 2000) and there is a paucity of empirically supported interventions for this population.

The analysis of individual subcategories on the SSC suggested the intervention may improve some academic behaviors more than others. Specifically, SM improved participant's inattention, test taking/test preparation, and reading but did not have a significant impact on organization, note-taking, and classroom behavior. Future research should examine whether some behavior is more resistant to change via SM and develop modifications to enhance the effects of SM on the behavior.

Counter to previous research (Ruppar et al., 2008; Schmitz et al., 2005), the current SM intervention did not improve medication adherence. There are several potential explanations for the lack of improvement. First, unlike the academic behavior which was individualized based on participants' deficits and goals, medication adherence was measured in an identical manner with all participants. Creating medication SM items that are more personalized may increase motivation and improve outcomes. Second, participants often reported a different prescribed regimen in the intake (e.g., as needed) than was listed on the written prescription (e.g., 50 mg

every morning). This discrepancy may have caused confusion in SM items (e.g., "I took my medication at the correct time") and impeded the effectiveness. Third, the novel medication adherence measure used in the study has untested psychometric properties. This measure was selected because it addressed common reasons for adherence deficits with college students with ADHD (e.g., only taking medication to study; Meaux et al., 2006), which other more broad measures do not assess (e.g., Medication Adherence Rating Scale; Fialko et al., 2008). Future research should use a multi-method assessment of medication adherence to distinguish if the lack of improvement is an artifact of the measurement system.

Another interesting outcome is the inconsistent integrity with which participants completed the SM form. Although it is unclear whether additional improvements would have been achieved if integrity was higher, our results suggest that SM may be somewhat robust to treatment integrity errors, at least with an adult population when the intervention is self-administered. However, considering the ample research on the importance of treatment integrity (e.g., Cochrane & Laux, 2007; Cook et al., 2012), additional research is needed to identify the degree to which integrity may mediate specific types of improvement and the robustness of the intervention to different types of integrity errors.

It is also important to note that although participants rated the intervention as highly acceptable, several participants dropped-out of the study (22.64%). Those who dropped out were on average earlier in their college careers, suggesting skills acquired later in college might serve as prerequisites for the process of SM. For example, it is possible that students become more aware of their academic behaviors after being in college for some time, and this may result in the SM process requiring less response effort. Future research may consider lowering the response

effort of the intervention by having individuals monitor on a more lean schedule (e.g., every other day) or decreasing the number of SM items, to assess whether this impacts drop-out rates.

A limitation of this study was the restricted sample (self-referred college students), who may differ from adults with ADHD in the general population. Future investigations should generalize the SM intervention to adults in the general community and expand targets to vocational and other daily living skills. Additional extensions to the current study may include assessing if differential outcomes are related to ADHD subtypes or comorbid diagnosis, comparing standardized to individualized SM interventions, determining the optimal format for SM (e.g., electronic vs. paper and pencil), and measuring the maintenance and generalization of behavior change.

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Appendix A
Medication Adherence Form

Medication Form Participant ID: Date:
Experimenter:

Respond to the following items regarding your typical medication regimen. Check the box that most applies to your behavior.

1) I take my medication on a regular basis (i.e., every day).

☐ Never ☐ Occasionally ☐ Usually ☐ Almost Always ☐ Always

2) When I take my medication I do so at the time suggested by my physician.

☐ Never ☐ Occasionally ☐ Usually ☐ Almost Always ☐ Always

3) When I take my medication I take the recommended dose of my medication.

☐ Never ☐ Occasionally ☐ Usually ☐ Almost Always ☐ Always

4) I take my medication right before I study.

☐ Never ☐ Occasionally ☐ Usually ☐ Almost Always ☐ Always

5) I take my medication when I am tired and trying to stay awake.

☐ Never ☐ Occasionally ☐ Usually ☐ Almost Always ☐ Always

Please answer the following questions about your current medications:

How long have you had the current prescription?

Do you experience any side-effects as an effect of the medication? If so please list specific side-effects.

If you do not take your medication as prescribed what is the primary reason?

To be completed by experiment from prescription note or bottle:

Medication(s): Dose: Prescription Date:

Appendix B
School Success Checklist

School Success Checklist Participant ID: Date:
Experimenter: Pre/Post:

Rate each statement according to your typical behavior using the scale below:

1: Never 2: A little 3: Sometimes 4: Often 5: Always

INATTENTION

_____ I use an assignment book
_____ I do homework in a nondistracting, quiet environment
_____ I have a planful approach to the order for doing homework
_____ I complete homework on time
_____ I spend sufficient time on homework
_____ I keep and follow a written plan with calendar for long-term assignments
_____ I am currently up-to-date on homework

ORGANIZATION

_____ I come to class prepared with materials
_____ I keep notebooks, papers, and study area organized and accessible
_____ I use a calendar, schedule, planner to manage time
_____ I keep track of grades regularly/know grading criteria
_____ I keep my backpack organized

TEST PREPARATION AND TEST TAKING

_____ I spend sufficient time studying (e.g., I don't cram at the last minute)
_____ I match study to the types of questions on exam
_____ I use old tests to help prepare for upcoming exams
_____ I have an organized approach to studying (e.g., SQ4R)
_____ I have an organized approach to taking tests
_____ I read and follow directions carefully and don't respond impulsively
_____ I pay attention adequately during tests
_____ I receive passing grades on tests
_____ I do not cheat
_____ I remember information during tests
_____ I finish tests within allotted time
_____ I manage anxiety effectively during tests

School Success Checklist Participant ID: Date:
Experimenter: Pre/Post:

NOTE TAKING

_____ I take notes during lectures

_____ I get main points in notes

_____ My notes are legible

_____ I use notes for studying

_____ I take accurate notes

READING COMPREHENSION

_____ I use organized methods such as SQ4R

_____ I can identify topics, main ideas, and details

_____ I understand what has been read

_____ I underline text effectively

_____ I can answer questions about text

_____ I can summarize what was read

_____ I have a method for learning new vocabulary in readings

_____ I can pay attention while reading

CLASSROOM BEHAVIOR

_____ I attend all classes

_____ I get to class on time

_____ I participate in discussion

_____ I volunteer answers to questions

_____ I ask for help when needed

Adapted from : Robin, L. A. (1998). *ADHD in Adolescents: Diagnosis and Treatmen.* New York, NY: The Guilford Press.

Appendix C
Initial Session Intake Interview Form

Intake Interview Participant ID: Date:
Experimenter:

DOB:

Living Arrangements: **Relationship Status:**

Occupation: **Hours worked per week:**

Behavioral Observations:

Arrival/Dress:

Eye Contact, Body Language:

Speech:

Concentration, Cooperation:

Mood, Affect:

Family History

Mother	Father
Relation to child:	Relation to child:
Employed:	Employed:
Quality of relationship:	Quality of Relationship

Historical family stressors (violence, drug abuse, etc.):

Current family stressors:

Familial psychological diagnoses:

Psychological and Medical History

Developmental milestones:

Relevant medical diagnosis or syndromes:

Hospitalizations:

Previous psychological assessments (and diagnoses):

Previous psychological treatments:

Intake Interview Participant ID: Date:
Experimenter:

Past psychotropic medications:

Current medications:

Academic History

High School(s):

Grades:
Relationships with teachers:
Behavioral problems

College:

Grades: Desired Grades (Grade Potential):
Current year in school:
Relationships with professors:
Behavioral problems:
Major/Minor:

Future Academic/Career Goals:

Academic Problems

Trouble paying attention:	Making careless mistakes:	Distracted:
Understanding directions:	Losing things:	Trouble listening:
Trouble completing tasks:	Forgetful:	Fidgety:
Talking excessively:	Difficulty waiting turn:	Difficulty finishing tasks:
Unorganized:	Easily distracted:	Daydreaming:

Academic probation or suspension?

-When and why?

Other Academic Problems:

Appendix D
Goal Attainment Scale Form

Goal Attainment Scale

Participant ID:
Experimenter:

Pre/Post:
Date:

Identify Goal:

Worse Expected Outcome (-2)	Less than Expected Outcome (-1)	Expected Outcome (0)	More than Expected Outcome (+1)	Best Expected Outcome (+2)

Appendix E
Grade Report Form

Grade Information Participant ID: Date:
Experimenter:

GPA prior to this semester _____ **Semesters enrolled in college** _____

Current semester GPA _____

Course: _____ **Grade** _____

Exam grades:

Assignment grades:

Other grades (e.g., participation):

Course: _____ **Grade** _____

Exam grades:

Assignment grades:

Other grades (e.g., participation):

Course: _____ **Grade** _____

Exam grades:

Assignment grades:

Other grades (e.g., participation):

Appendix F
Participant Demographic Form

Participant Information Participant ID: Date:
Experimenter:

BASIC INFORMATION

Date of Birth: _____

Major: _____

Classes enrolled in this semester:

_____ **Current Grade**____

_____ **Current Grade**____

_____ **Current Grade**____

_____ **Current Grade**____

_____ **Current Grade**____

Gender: ☐ Male ☐ Female

Race: ☐ Caucasian ☐ African American

☐ Hispanic/Latino ☐ Asian American

☐ Not stated above,
Please specify _____

Year in School: ☐ 1st year ☐ 2nd year

☐ 3rd year ☐ 4th year +

Current GPA: _____

Email: _____

PSYCHOLOGICAL HISTORY

When did you first receive a diagnosis of ADHD?

Have you been tested/evaluated again, since the first diagnosis, if so when?

Have you ever been diagnosed with any other psychological disorder?

Which of the following treatment modalities have you used to target your ADHD symptoms?

☐ Counseling ☐ Medication, if yes indicate type/dose: _____

_____

☐ Academic Accommodations ☐ Other, if yes indicate what type of treatment _____

_____

For any treatments marked above, please indicate when the treatment was started, how long it lasted, and whether or not you found the treatment effective: _____

_____

_____

_____

Appendix G
SQ4R Handout for Participants

Reading Textbooks

A key requirement for most college courses is reading textbooks and material outside of class. However, this material is often much more complex and detailed then standard reading material. Because of this, reading textbooks like you would read any other book can be problematic. It is easy to get distracted while reading or lose the focus of the chapter. Below is a structured method that improves student's ability to efficiently read academically related material.

SQ4R Method of Reading Textbooks: Survey, Question, Read, Recite, Relate, Review

Survey

- Determine the organization of the chapter
- Review the title, headings, and subheadings
- Look at charts and graphs throughout the chapter/article
- Review any embedded outlines or teacher notes
- Look over the summary section and introductory paragraph

Question

- Convert the title and headings into questions
- Read any questions provided at the beginning or end of the chapter
- State questions regarding how the material may relate to past material
- Ask questions about how the material discussed in class may relate to the readings
- Answer any parts of the questions you can using prior knowledge
- Write down these questions for future reference

Read

- Look for and highlight or underline answers to the questions you raised
- Relate any figures or tables to your questions
- Stop and reread portions that are confusing
- Read only one section at a time and pause to ensure understanding after each

Recite

- Re-ask the questions you posed earlier and attempt to write down answers in your own words
- Take notes on material related to your questions or key points of the chapter
- Recite key terms and definitions highlighted throughout the test

Relate

- Connect ideas within the chapter
- Create personal examples for different key terms and topics
- Find ways to relate the information to prior readings
- Relate the information to the notes from in-class presentations and discussions

Review

- Re-read questions and recite/write answers from memory
- Use the text to check and correct your responses
- Ask the teacher to explain any ideas that are still unclear
- Repeat this review several times at spaced intervals

Appendix H
Study Skills Handout for Participants

Study Skills

Organizing Your Study Area

- Always study in a distraction free setting
- Avoid using any unnecessary electronics (e.g., T.V., music, cell phone)
- Avoid studying around friends or peers who are not studying the same material
- All materials needed should be readily accessible

Scheduling Study Time

- Create a list of assignments and exams including due dates
- Dedicate a calendar to school assignments including all exams and assignments
- Break exam studying and assignments into component parts
    - Determine the amount of time needed for each sub-part of exams and assignments
    - Schedule specific components for completion on individual days
- Create a checklist for each study session and check off each item as it is completed
- Schedule breaks using a timer and avoid distractions between breaks

Ways to Study for a Test

- Reread notes and re-answer questions posed from the textbook reading
- Create flashcards of key terms and ideas
    - Self-test yourself using these flashcards
- Cover-copy-compare method
    - Read material, cover material so you cannot see it and recite or rewrite the material from memory, reveal the material to check your responses
- Have somebody else test you on the material
- Create a study group where material is discussed
    - Each member of the group should review the material prior to the meeting
    - Outlines and group objectives should be created to maximize productivity
- Create study material and self-questioning based on the type of questions expected on the test

Testing Behavior

- Read and understand any directions or instructions listed on the test
- Take your time and read the entire question and all possible answers
- Mark answers you are uncertain of to return to with greater attention later in the test
- Review all answers before submitting your test
- Ask the teacher questions on test wording that is unclear
- Create an outline and organize your thoughts prior to starting essay-type questions

After the test

- After the test or assignment is scored immediately review any points deducted
- Determine why you were confused and what you can do better for the next exam or assignment

Appendix I
Self-Monitoring Handout for Participants

Self-Monitoring Handout

In achieving success at the college level there are several details to remember. In addition, there are multiple distractions present making it easy to forget appropriate behaviors crucial to succeeding at the college level. Self-monitoring is a method that can assist in remembering these behaviors.

Within Self-Monitoring you will be observing and recording your own behaviors related to class attendance, organization, and time spent studying. You should complete this form every day in order to ensure the best results from the self-monitoring method.

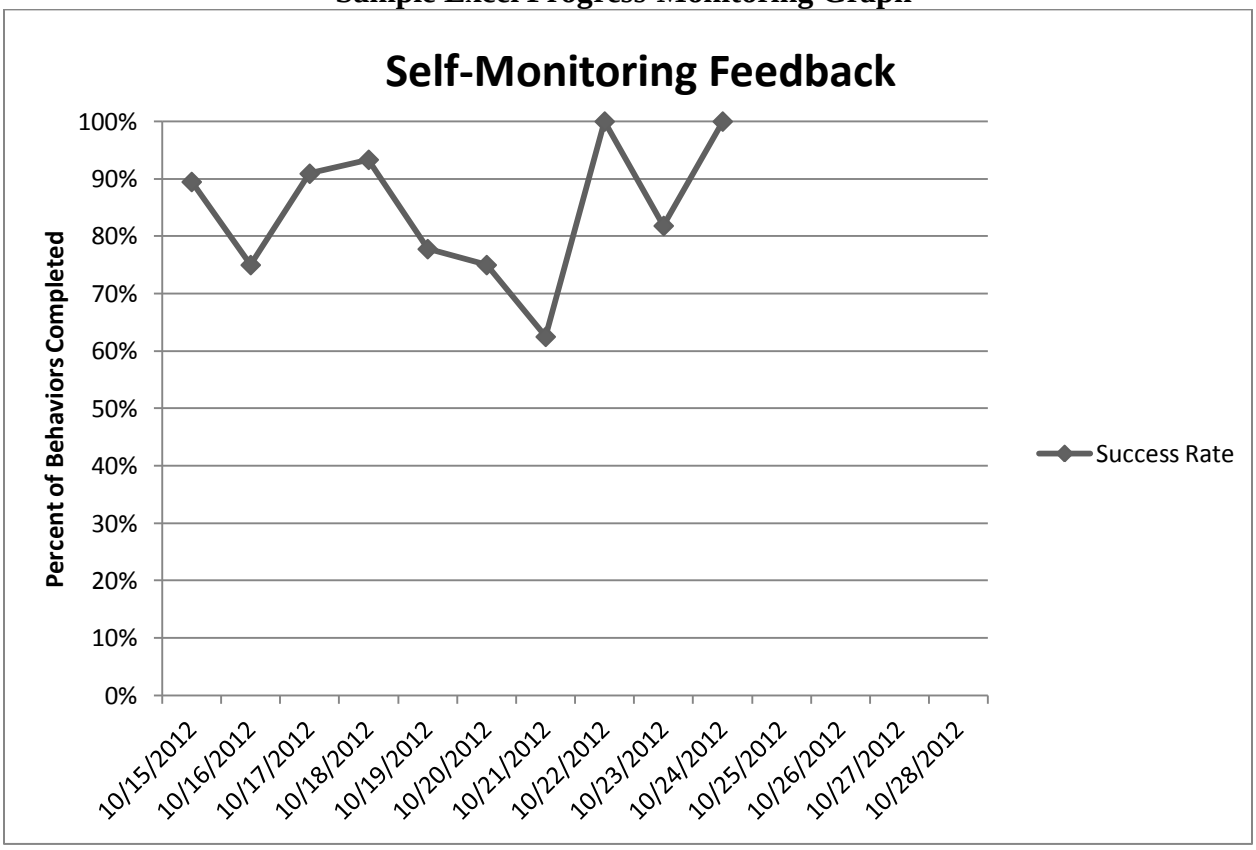
It is crucial that you complete the form honestly every day. You will not be graded or judged based on what you mark on the sheet but it is important that you complete it as truthfully as possible. Failing to complete the form honestly will create large detriments in the treatment's effectiveness.

Below are the steps that will need to be taken to complete the self-monitoring method.

1. Open dropbox.
2. Open the 'Self-Monitoring' folder.
3. Open the self-monitoring excel sheet for the current week. For example, if the date was Wednesday 09/26 you would open the excel file labeled 'Self-Monitoring Form September 24-September 30'.
4. On the very bottom of the excel sheet you will see different tabs. The first one is labeled 'Self-Monitoring'. Click on this tab to open the page, there should be the 7 days of the week listed with a variety of behaviors listed below each.
5. Complete the form to represent your behavior that day.
6. When you have completed the behaviors for the day save the form, 'save' the file (do not hit 'save as')
7. At this time go back to the very bottom of the screen and find the 'Progress Report' tab.
8. There is a graph on this page that you should view each day to see your current progress.
9. Close the Excel file.

Other notes: The excel sheet labeled 'Experimenter Use Only' contains information to allow the self-monitoring form to function appropriately as well as information for the progress report file to be updated. Please do not change anything on this form as it will create errors in the other two.

Appendix J
Sample Excel Progress-Monitoring Graph



Appendix K
Experimenter Checklist for the Initial Meeting

Completion of Forms	
	Read consent form and answer any questions
	Have participant sign consent form
	Give participant copy of consent form for personal records
	Have participant complete demographic form
	Ensure they are currently enrolled in courses
	Ensure they have a past ADHD diagnosis
	Ensure they have a current prescription
	Have participant complete medication form
	Complete medication information with the prescription note or bottle
	Have participant complete the ASRS
	Have participant complete the Diagnostic Checklist for School Success
GAS	
	Identify 2-4 academic goals using the Goal Attainment Scale format
	Rank behaviors at each anchor (+2 to -2) for each goal
	Have participant rate their current status for each goal
Study Skills Training	
	Review "SQ4R" worksheet
	Ask participant for any questions and have them provide an example of how they could use the method
	Review Study Skills worksheet
	Ask participant for any questions and have them provide an example of how they could use the method
	Randomly assign participant to a group and precede accordingly
Self-monitoring (for treatment groups only)	
	Review the top portion of the "Self-Monitoring" handout
	Answer any participant questions
	Set up a drop-box account for the participant using instructions on the "Drop-Box" Handout
	Review the bottom portion of the "Self-Monitoring" handout describing instructions
	Display how to enter behavior, save, and view progress monitoring graphs
	Have participant complete the sample exercises until completing all tasks independently
Terminating Session	
	Schedule a check-in meeting with the participant
	Provide participant with an appointment reminder card

Appendix L
Experimenter Checklist for Check-In Sessions

Prior to session	
	Have participant's folder
	Have up-dated copy of participant's self-monitoring graph (treatment group only)
During session	
	Ask participant for any questions or concerns with self-monitoring procedures (treatment group) or study-skills training
	Identify scenarios where participant used distraction-free studying and SQ4R
	If self-monitoring was not done consistently discuss this with the participant and problem solve solutions (treatment group)
	Review the self-monitoring graph with the participant, discussing trends in behavior (treatment group only)
	Discuss any instances where monitoring was not completed (treatment group only)
	Identify any problem areas (where behaviors are lacking) and discuss problem-solving techniques (treatment group only)
Session Termination	
	Provide participants with appointment reminder for next session
	Record session information in session log

Appendix M
Final Session Checklist

Prior to Session	
	Have up-dated copy of participant's self-monitoring graph (treatment group only)
	Update participant's folder
Completion of Forms	
Have participant complete:	
	Goal Attainment Scale Ratings
	ASRS
	School Success Checklist
	Medication Adherence Form
	Course-grade Sheet
	TEI-SF
Explanation of Self-Monitoring (for control group only)	
	Provide participant with the "Self-Monitoring Handout"
	Provide participant with the option of receiving an e-mailed copy of the self-monitoring excel form used by the participants during the study (e-mail appropriate documents if participant desires)
	Answer any questions the participant may have concerning the self-monitoring intervention
Terminating Session	
	Answer any questions the participant has concerning the study
	Calculate the participant's treatment integrity from the self-monitoring excel forms and record in the participant's file
	Ensure all identifying information is decoded from the participant's folder and file with the other completed participants

Appendix N
IRB Approval

Application for Approval of Projects Which Use Human Subjects

This application is used for projects/studies that cannot be reviewed through the exemption process.

LSU

Institutional Review Board
Dr. Robert Mathews, Chair
131 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.6792
irb@lsu.edu
lsu.edu/irb

– Applicant, Please fill out the application in its entirety and include two copies of the competed application as well as parts A-F, listed below. Once the application is completed, please submit to the IRB Office for review and please allow ample time for the application to be reviewed Expedited reviews usually takes 2 weeks. Carefully completed applications should be submitted 3 weeks before a meeting to ensure a prompt decision.

– A Complete Application Includes All of the Following:
(A) Two copies of this completed form and two copies of part B thru E.
(B) A brief project description (adequate to evaluate risks to subjects and to explain your responses to Parts 1&2)
(C) Copies of all instruments to be used.
*If this proposal is part of a grant proposal, include a copy of the proposal and all recruitment material.
(D) The consent form that you will use in the study (see part 3 for more information.)
(E) Certificate of Completion of Human Subjects Protection Training for all personnel involved in the project, including students who are involved with testing or handling data, unless already on file with the IRB. Training link: (http://phrp.nihtraining.com/users/login.php)
(F) IRB Security of Data Agreement: (http://research.lsu.edu/files/item26774.pdf)

1) Principal Investigator*: Mary Lou Kelley, PhD **Rank** Professor
*PI **must be** an LSU Faculty Member

Dept: Psychology **Ph:** (225) 578-4113 **E-mail:** mlkelley@lsu.edu

2) Co Investigator(s): please include department, rank, phone and e-mail for each
Mindy Schoithauer, Psychology, Graduate Student, (440) 213-1236, mindysche@gmail.com

IRB# 3290 | LSU Proposal #:
- Full
- Expedited
- Human Subjects Training
- Complete Application

3) Project Title: Academic Intervention for Adults with ADHD

4) Proposal Start Date: 06/04/2012 **5) Proposed Duration Months:** 12

6) Number of Subjects Requested: 80 **7) LSU Proposal #:**

8) Funding Sought From: n/a

ASSURANCE OF PRINCIPAL INVESTIGATOR named above
I accept personal responsibility for the conduct of this study (including ensuring compliance of co-investigators/co-workers) in accordance with the documents submitted herewith and the following guidelines for human subject protection: The Belmont Report, LSU's Assurance (FWA00003892) with OHRP and 45 CFR 46 (available from http://www.lsu.edu/irb). I also understand that copies of all consent forms **must be maintained at LSU for three years after the completion of the project**. If I leave LSU before that time, the consent forms should be preserved in the Departmental Office.

Signature of PI Mary L Kelley Date 5·31·12

ASSURANCE OF STUDENT/PROJECT COORDINATOR named above. If multiple Co-Investigators, please create a "signature page" for all Co-Investigators to sign. Attach the "signature page" to the application.

I agree to adhere to the terms of this document and am familiar with the documents referenced above.

Signature of Co-PI (s) M Schoithauer Date 5/31/12

Study Approved By:
Dr. Robert C. Mathews, Chairman
Institutional Review Board
Louisiana State University
203 B-1 David Boyd Hall
225-578-8692 | www.lsu.edu/irb
Approval Expires: 6/23/2013

VITA

Mindy Scheithauer was born in 1987, in Lorain, Ohio. Mindy graduated from Clearview High School in 2005 with several college credits obtained at Lorain County Community College. After graduation, Mindy attended Ohio University and graduated with a Bachelor of Science degree in psychology in 2007. Following this, Mindy enrolled in a clinical psychology program at Ball State University where she obtained her Master of Science in psychology. In 2009 Mindy was accepted into Louisiana State University's doctoral program in psychology under the supervision of Dr. Jeffrey Tiger where her research interests have focused on behavioral concepts and treatments. In 2009, Mindy continued her doctoral training in the clinical psychology program under Dr. Mary Lou Kelley and the biological psychology program under Dr. Claire Advokat with a continued focus on behavioral treatments and the effects of pharmacological interventions on behavior. In 2013, Mindy continued her clinical training through a predoctoral internship position at the Kennedy Krieger Institute through the Johns Hopkins School of Medicine in Baltimore, Maryland. Mindy's plan is to further her education through a postdoctoral position at the Marcus Autism Institute in Atlanta, Georgia.