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Motivational Interviewing Assessment and Behavior Therapy as a Stepped-Care Approach to the Treatment of Adolescent Depression

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MOTIVATIONAL INTERVIEWING ASSESSMENT AND BEHAVIOR THERAPY AS A STEPPED-CARE APPROACH TO THE TREATMENT OF ADOLESCENT DEPRESSION

by

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Depression is a significant public health concern with a lifetime prevalence of 24.01 for adolescents in grades 9-12 (Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993) and a point prevalence of 4-6% (Kessler, Avenevoli, & Ries, 2001). The risks associated with adolescent onset depression include comorbidity, depressive episodes continuing into adulthood, and suicidality. These risks make it imperative to develop effective treatments to address adolescent depression. Stepped care is an approach to treatment which involves treatment of illness using the least invasive measures first and moving toward more invasive treatment as indicated by ongoing assessment. Through a single-participant design, the current study sought to determine the effectiveness of using a stepped care approach in the treatment of adolescents with depression using a motivational interviewing assessment (MIA), fun activities (FA), and values-based behavioral activation (VBBA) phases as treatment steps. Fourteen participants were subjected to varying levels of the independent variable based on cut off scores on the Child Depression Rating Scale-Revised (CDRS-R). That is, those who did not have a clinically robust response following MIA received FA and failure to respond to FA resulted in participants receiving VBBA. Nine participants experienced a clinically significant response during one of the three phases of

treatment, while five dropped out of the study. Participants who received behavioral activation experienced increases on activation measures and decreases on depression measures following the behavioral activation steps, which provides support for the behavioral theory of depression.

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Tanya N. Douleh

TABLE OF CONTENTS

Table of Contents—continued

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

The lifetime prevalence of Major Depressive Disorder (MDD) in the United States has been noted to be 16.2%, while the point prevalence has been estimated at 6.6% (Kessler et al., 2003) among adults. Depression, however, is also a significant clinical problem among adolescents. In their survey, Kessler et al. (2003) found that depressive symptoms appear to rise significantly during the teenage years. In fact, MDD is the most common psychiatric diagnosis of adolescence with a lifetime prevalence of 24.01 for individuals in grades 9-12 (Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993) and a point prevalence of 4-6% (Kessler, Avenevoli, & Ries, 2001).

The economic cost of depression is a staggering one. Wang, Simon, and Kessler (2003) noted that depression is one of the most economically burdensome diseases, impacting the United States by $53 billion annually in 1996. By the year 2000, the World Health Organization estimated the annual cost to the United States for MDD among all age groups to have grown to $83 billion (2004). In their survey of participants in the Treatment for Adolescents with Depression Study (TADS; see below), Domino et al. (2009) noted that depressed adolescents account for $12 billion of this amount.

While most research on the topic of depression has been related to adults, there is clear understanding that episodes of adult depression may have an early onset during adolescence. In fact, one predictor of adult depressive episodes is the experience of depressive episodes during adolescence (Harrington, 1996; Pine, Cohen, Cohen, and Brook, 1999). In a community sample survey, Lewinsohn and colleagues (2000) identified that among individuals who reported experiencing psychiatric difficulties as an

adult and who had experienced depression as an adolescent, many tended to have more severe depressive episodes during adolescence. Even subclinical depressive symptomotology has been indicated as a predictor of early adult depressive episodes. Pine et al. (1999) found that many adolescents who presented with subclinical or clinical depression continued to experience these symptoms throughout adolescence and that these symptoms were predictive of depressive episodes in early adulthood. These findings indicate that intervention during adolescence may be both immediately useful as well as preventative with regard to the recurrence of depression in adulthood.

Comorbidity is also common among those with a MDD diagnosis. Findings from the TADS group revealed that 51.7% (n = 227) of the sample met diagnostic criteria for at least one disorder in addition to MDD and 21.4% (n = 94) of the sample met criteria for three or more disorders beyond MDD (Small, Simons, Yovanoff, Silva, Lewis, et al., 2008). Consistent with previous findings, this study also reported that among their sample anxiety disorders were the most common disorders to co-occur with MDD; and, it has been documented that the rate of co-occuring anxiety disorders may be as much as 26 times higher among depressed adolescents (Angold & Costello, 1993). Further, a meta-analysis of published literature identifying disorders comorbid with MDD indicates that conduct and oppositional defiant disorders are 3.6-9.5 times higher among adolescents with a diagnosis of MDD than for those not experiencing depression (Angold & Costello, 1993).

It is widely understood that several factors may be associated with the onset of adolescent depression. In a longitudinal study, Mazza, Abbott, Fleming, Harachi, Cortes, Park, et al. (2009) cited family discord, individual characteristics of the adolescent, the

everyday psychological functioning of the individual, and female gender to be potential risk factors for depression. Conflict within the family has been implicated to be one of the most predictive factors with regard to child and adolescent depression (Bond, Toumbourou, Thomas, Catalano, & Patton, 2005; Seiffge-Krenke, Weidemann, Fentner, Aegenheister, & Poeblau, 2001). Adolescents who have at least one depressed parent are also more likely to be depressed themselves (Beardslee, Versage, & Gladstone, 1998; Field, Diego, & Sanders, 2001; Hammen, Shih, Altman, & Brennan, 2003). Poor academic performance (Bond et al., 2005) and early peer-related social difficulties (Reinherz et al., 2000) have also been implicated as risk factors for adolescent depression. Additionally, as with adult depression, adolescent females appear to be diagnosed with depression at rates twice as high as adolescent males (Crowe, Ward, Dunnachie, and Roberts, 2006; Nolen-Hoeksema and Girgus, 1994). While there has been only speculation as to the reason for a gender-specific difference in rates of depression, Nolen-Hoeksema and Girgus (1994) argue that girls experience more difficulties during adolescence than do boys and that these difficulties may moderate risk factors and subsequent depression.

As the aforementioned risk factors implicate environmental factors in the onset of depression, these factors may also affect the maintenance of the disorder. Ferster (1973) and Lewinsohn (1974) proposed a behavioral account for the development and maintenance of depression. According to this account, depression is maintained as a result of (a) reinforcement of depressotypic behaviors and (b) a lack of response-contingent positive reinforcement. Individuals who are depressed tend to engage in depressotypic behaviors such as crying, not getting out of bed, or making negative self-

statements in the presence of others. These behaviors tend to be reinforced, for example, either through help-statements made by others or through escape/avoidance of what are perceived to be difficult tasks. Alternately, individuals experience anhedonia, or the failure to experience pleasure in things that the individual used to find reinforcing. Here, the individual may experience reduced pleasure in hobbies, work, family outings, or other activities that were once enjoyable.

Treatment of Adolescent Depression

Pharmacotherapy. Three large-scale studies revealed interesting results with regard to the use of antidepressant medication and psychosocial treatment of MDD among adolescents. First, the TADS group randomly assigned 439 adolescents to receive fluoxetine, CBT, combination of fluoxetine plus CBT, or pill placebo (TADS Team, 2004). Study outcomes indicate that during the first 12 weeks of treatment, participants who received the combination of fluoxetine plus CBT and fluoxetine alone experienced significant decreases in depressive symptoms, as reflected by dependent measures, than those who received placebo, while those receiving CBT alone did not. By week 18, however, those in the CBT alone group experienced similar decreases in depressive symptoms as those in the combination and fluoxetine groups. A second noteworthy study, the Adolescent Depression Antidepressant and Psychotherapy Trial (ADAPT), randomized 208 adolescents to receive an SSRI or SSRI in combination with CBT (Goodyer, Dubicka, Wilkinson, Kelvin, Roberts, Byford, et al., 2007). Outcomes of the study revealed no significant outcome advantage for those who received combination treatment over those who received antidepressant medication alone. Finally, the Treatment for SSRI-Resistant Depression in Adolescents (TORDIA) study randomly

assigned 334 adolescents to receive one of two antidepressant medications either with or without CBT (Brent, Emslie, Clarke, Wagner, Asarnow, Keller, et al., 2008). Results of the TORDIA study indicate combination treatment was more effective than either medication treatment alone in decreasing depressive symptoms among adolescents with medication-resistant depression.

Concern also remains about the use of antidepressant medications, particularly with children and adolescents, with regard to side effects. In a retrospective survey, Gualtieri and Johnson (2006) reported findings indicating that 28% (*n = 36*) of the participants the study experienced behavioral side effects while taking antidepressant medications, including suicidal and self-injurious behaviors. In fact, in 2004, the U.S. Food and Drug Administration issued a black box warning for SSRIs indicating the potential for suicidal behaviors among adolescents who take the medications. Further, tricyclic antidepressants have been implicated in sudden cardiac death among children and adolescents (Geller, Reising, Leonard, Riddle, and Walsh, 1999). In a review of insurance claim records from 1996 to 2005, Jerrell (2010) found that children and adolescents who were prescribed SSRIs were more likely to experience significant weight gain and to be diagnosed with Type 2 diabetes than those children who had not been prescribed the drugs. Conversely, a survey of 156 adolescents concluded that the participants hold a preference for psychotherapy over the use of antidepressant medications (Bradley, McGrath, Brannen, and Bagnell, 2010). Additionally, female participants reported weight gain and male participants indicated decreased sex drive as the most adverse side effects of antidepressant medication. Although there remains concern regarding the use of antidepressant medications among adolescents, there

continued to be an increase in the number of antidepressant prescriptions made to adolescents in the United States until the year 2000 (Vitiello, Zuvekas, and Norquist, 2006).

Psychotherapy. Cognitive-behavior therapy (CBT) has been largely recognized as the treatment of choice for mild to moderate depression based on research demonstrating its effectiveness and due to fewer side effects than medication treatment. This treatment involves both a cognitive component, which assists the individual in identifying the negative thoughts about the self, and a behavioral component, in which the individual is assigned homework to complete activities that they previously believed they were too depressed or no longer had interest in doing. In a meta-analysis of research that implemented Beck's Cognitive Therapy for depression (CT, but is now recognized as a CBT; Beck, Rush, Shaw, and Emery, 1979), Dobson (1989) found that CT was more effective than wait list control, other types of psychotherapy, behavior therapy, and pharmacotherapy. Since that time, Jacobson and colleagues (1996) conducted a component analysis of CT in order to delineate the efficacious treatment components and found that the behavioral component of the treatment (behavioral activation; BA) performed as well as the treatment component directly targeting automatic thoughts as well as the full treatment package at decreasing depressive symptoms. Given this finding, Chambless (1998) recognized BA as a well-established treatment for depression.

Behavioral treatments for depression have evolved since their induction in the 1970's. Initially, these treatments involved techniques aimed at increasing the individual's access to pleasant events and the naturally occurring reinforcers encountered as a result of engaging in pleasant events, while decreasing aversive consequences (see

Maintenance of Depression above; see also Hopko, Lejuez, Ruggiero, and Eifert, 2003; Lewinsohn and Graf, 1973; Lewinsohn, Sullivan, and Grosscup, 1980). As a result of the behavioral theory of the etiology and maintenance of depression, two behavioral treatments emerged that have extended beyond the therapist simply assigning pleasant events in which the client is to engage: behavioral activation (BA; Martell, Addis, and Jacobson, 2001) and brief behavioral activation to treat depression (BATD; Lejuez, Hopko, and Hopko, 2001).

Behavioral Activation (BA; Martell, Addis, and Jacobson, 2001). Behavioral activation is grounded in theory suggesting that aversive control maintains depressive behaviors. According to Martell and colleagues (2001), depressed individuals engage in an avoidance pattern that follows a trigger and a negative emotional response. Clients are taught to recognize this trigger, response, avoidance pattern (TRAP). Once the client becomes familiar with their own TRAPs, they are taught alternative coping strategies and to engage in trigger, response, alternative coping (TRAC), which are healthier behaviors than avoidance patterns. Other techniques used in BA to decrease depressive symptoms include events scheduling to increase both pleasure and mastery of activities, mental rehearsal, behavioral rehearsal, and skills training.

Brief Behavioral Activation to Treat Depression (BATD; Lejuez, Hopko, and Hopko, 2001). The BATD model is grounded in Hernnstein's matching law (1970; Hopko et al. 2003). As it applies to depression, the matching law indicates that the individual's frequency of behavior will match the reinforcement for that behavior set forth by the environment. In therapy, clients begin by collecting baseline data with regard to daily activities. This is followed by identifying their personal values that will later be

used to assist in developing an activity hierarchy for the client to work through throughout the course of treatment. A revised version of the BATD treatment manual, BATD-R, was recently published (Lejuez, Hopko, Acierno, Daughters, and Pagoto, 2011). Updates to the manual include a greater emphasis on values-driven work prior to activity scheduling, troubleshooting sections, and modified forms to accommodate individuals with lower reading abilities.

Components of Behavioral Treatments for Depression

While differences among the treatments are clear, Kanter, Manos, Bowe, Baruch, Busch, and Rusch (2010) identified the common components of these behavioral treatments for depression. According to the authors, any type of BA involves clearly delineated assessment, activation, and generalization techniques.

Activity Monitoring. Early on, the therapist presents the client with homework to keep a daily log of activities along with a rating of the individual's mood at the time of the activity. According to Kanter and colleagues (2010), the monitoring of activities is an ongoing assessment technique that assists both the clinician and client/participant to identify the relationship between the client's level and types of activities performed and the client's mood. Thus, the client is better able to understand the relationship between certain types of activities and the way the client feels.

Goals. Prior to prescribing specific activities, the therapist assists the individual to identify the goals he/she wants to attain. Inherently, the discussion of such goals often begins with identification of those things that are most important to the individual. The assessment of personal values, or what is most important to the individual, helps the client and therapist by developing a road map for selecting activities. Behavioral

activation for the treatment of depression has made implicit use of personal values to assist in directing activity scheduling (Lejuez et al., 2003, 2011). Currently unknown, however, is the extent to which making use of such values-driven assessment and activity scheduling impacts the outcome of the treatment (Kanter et al., 2010).

Activity Scheduling. Once the current activities and personal values are identified, specific activities, tied in with personal values, are prescribed for the individual. In a collaborative manner, the therapist works with the client to identify those activities that may assist the individual in living a life more consistently with their identified values (Kanter et al., 2010; Lejuez et al., 2003, 2011).

The Role of Personal Values in a Treatment for Depression

While BATD asserts that the assessment of personal values and their linkage to activity scheduling are important steps in the treatment, little is known about its necessity. In the original BATD treatment manual (Lejuez, Hopko, & Hopko, 2002), the valued life domains identified by Hayes, Strosahl, and Wilson (1999) are used to assist the client in acknowledging those life areas they find important. In the revised BATD manual, BATD-R (Lejuez, Hopko, Acierno, Daughters, & Pagoto, 2011), a strong argument is made for values assessment and scheduling activities directly related to important life areas. The authors suggest that the selection of activities closely related to valued life domains helps to ensure that activities will be positively reinforced, whereas, those activities that are selected arbitrarily are more likely to fail to result in positive reinforcement. In addition to the BATD-R manual, researchers have used a values-based approach to behavioral activation with depressed adolescent samples (Gaynor & Harris, 2008). While the assessment and functional use of personal values during event

scheduling appears to have face validity, the efficacy of such work over that of scheduling fun activities within the context of treatment for depression is currently unknown.

BA for Depressed Adolescents

While the use of BA with adult populations has been studied widely, few have published studies regarding its use with depressed adolescents. In a pilot study, Ritschel, Ramirez, Jones, and Craighead (2011) adapted BA for use with teens and concluded that BA is both a feasible and possibly effective treatment for adolescent depression. Their results indicate that four out of six participants experienced significant decreases in depressive symptoms related to dependent measures and were within the normal range at the end of treatment. Gaynor and Harris (2008) also conducted a single-participant study of BA with depressed adolescents and found that increased levels of activation predicted decreases in depressive symptoms, whereas changes in thinking patterns did not. Additionally, McCauley, Schloredt, Gudmundsen, Martell, and Dimidjian (2011) reported initial findings related to a pilot study of BA for depressed teens. Researchers reported that 72% of those in the BA group had been independently rated as having "much or very much improved" (p. 380) compared to 55% of those receiving treatment as usual. The limited evidence related to pilot studies and single-participant designs indicates that BA appears to be feasible for use with depressed adolescents and that more research should be conducted in order to determine its efficacy with this population.

Treatment Participation and Completion

Study attrition among adolescent treatment outcome research is concerning. Among privately-insured children and adolescents receiving outpatient mental health services, 45% remained in treatment less than 30 days (Harpaz-Rotem, Leslie, & Rosenheck, 2004). Further, participants of the TADS study who were more action-oriented responded more positively to treatment for depression, regardless of the type of treatment (Lewis, Simons, Silva, Rohde, Small, et al., 2009). Given these findings, efforts to ensure participants are action-oriented prior to the start of treatment may prove beneficial.

Motivational Interviewing. Developed out of the work highlighting the importance of identifying the individual's current stage of change relative to the difficult work of treatment, motivational interviewing (MI) involves techniques to help the client identify their own goals and to reinforce client actions in change-related directions (Miller & Rollnick, 2002). Previous research has shown MI to have positive effects on homework compliance and treatment outcome than groups who received the direct treatment alone (Westra & Dozois, 2006). Lewis et al. (2009) suggest supplementing depression treatments with techniques to address change ambivalence. Recently, Flynn (2011) suggested several areas of therapy in which CBT-MI could enhance outcomes related to treatment for depression: client-therapist relationship development, engaging the client in treatment, activation, and homework compliance. All of these factors may mediate treatment outcomes, so it is of great importance to establish strong ties with each.

The use of MI strategies for teens experiencing internalizing, externalizing, family, and health-related behavior problems has been described and recommended (Naar-King & Suarez, 2011). The important point for the present study is that the MI approach to interviewing and

assessment appears applicable to teens presenting with almost any problem. Studies using MI have reported the techniques to be effective for increasing change-related behaviors among several populations. In a meta-analysis of MI interventions coupled with behavior therapy for adolescents, Macgowan and Engle (2010) found that MI techniques have been implemented across different settings, including schools, other community settings, and primary care settings. It was also noted that MI techniques, followed by behavior therapy, has been effective in significantly decreasing substance use among mild to severe substance using adolescents. MI techniques may also be an effective intervention for adolescents by increasing medication adherence (Riekert, Borrelli, Bilderback, & Rand, 2011), increasing safety behaviors among recently injured adolescents seen in an emergency room (Dunn, Droesch, Johnston, & Rivara, 2004), and healthy behaviors involving diet and exercise (Olson, Gaffney, Lee, & Starr, 2008). For the present purposes, the most important finding is that the antidepressant fluoxetine did not add efficacy to an intervention combining MI and CBT for depressed adolescents (Cornelius et al., 2009). Moreover, the motivational enhancement complimented CBT group experienced improvements over a group who had received naturalistic treatment at two-year follow up (Cornelius et al., 2011). These data speak to the tolerability and possible efficacy of using both MI and CBT approaches with depressed adolescents.

A Stepped Care Approach to Intervention

Given the concerns regarding medication use among adolescents, as well as the potential costs related to treatment, a stepped care approach to intervention may be indicated. Stepped care has been evaluated among medical settings as a preferred approach to the treatment of physical illness. This type of intervention involves beginning

treatment with the least invasive treatment option and stepping up to increasingly more invasive approaches as indicated by the outcome of the prior treatment.

Several phases have been suggested for stepped-care treatment approaches. First, Broten, Naugle, Kalata, and Gaynor (2010) suggest beginning with self-report measures and clinical interviews that will inform decision making related to appropriate interventions. Repeated measures should assist the clinician in determining the effectiveness of the current intervention and whether or not a higher level of care is indicated. Second, a watchful waiting period may assist clinicians and clients in determining if depressive symptoms may remit without direct intervention. In a comparison of treatment approaches for adolescent depression, Gaynor et al. (2003) reported that 28% of participants experienced pretreatment improvements. The researchers also reported that as much as 40% of depressed adolescents may experience sudden gains, or decreases in depressive symptoms prior to the onset of specific therapeutic techniques. It has been suggested that a watchful waiting period is useful for patients as it may be more cost effective, particularly for those who respond early during treatment, and it is useful for researchers to identify early responders so that these individuals are not included as part of the participant pool with whom treatment is evaluated (Broten et al., 2010; Renaud et al., 1998). Watchful waiting periods should last approximately four weeks, as most pretreatment gains occur within this time frame (Broten et al, 2010; Gaynor et al, 2003). Third, in a stepped-care model, treatment is to begin with the most minimal intervention indicated for the individual client (Broten et al., 2010). Psychoeducation is one type of minimal intervention and involves providing information to the individual regarding the development and maintenance of depression,

including symptoms, treatment options, and relapse. Educating individuals about the specifics related to their disorder is a common practice among most types of interventions, and particularly within CBT. Outcome data related to the efficacy of psychoeducation implies that the technique may be useful in decreasing symptoms and reducing the rates of relapse for depression among adults (Cuijpers, 1998) and among adolescents when the family receives psychoeducation (Sanford et al., 2006). In addition to being more cost-effective, Broten et al. (2010) indicate that such minimal interventions do not require advanced training in the therapeutic techniques. Such interventions may easily be taught to individuals who have regular contact with adolescents such as teachers, school nurses, and the like. Next, it is recommended that for individuals who do not respond positively to minimal interventions, more invasive interventions should be introduced. According to Broten et al. (2010), these interventions may involve group or individual therapy and pharmacotherapy. Finally, the most invasive interventions are introduced when all other types of intervention have failed to lead to decreases in depressive symptomotology and there is concern for the safety of the individual due to the risk potential for suicide or other harm. Hospitalization, which is the most invasive intervention, is the last line approach to treatment for depression for several reasons. First, inpatient care is costly. In a nationwide review of hospital records collected by the Healthcare Cost and Utilization Project (HCUP) Kids' Inpatient Database (KID), researchers found the cost of one day of inpatient hospitalization for child or adolescent depression to be about $1,300 (Sclar, Robison, Gavrun, & Skaer, 2008). Second, the amount of time a child spends in the hospital may be equal to the amount of time the child is absent from school. Third, there may be stigma involved with psychiatric

inpatient stays. Finally, recent discharge from a psychiatric inpatient facility has been indicated as a risk factor for suicide (Jones, 1965; King et al., 2001; McKenzie & Wurr, 2001) and 47% of those who commit suicide following an inpatient stay do so within one month of discharge (Hunt et al., 2009).

A stepped care approach to the treatment of depression may be amenable to adolescent patients for several reasons previously indicated. First, although medication treatment is often an early intervention among prescribing physicians, adolescents prefer psychotherapeutic techniques due to the side effects produced by medications. Second, stepped care may be more cost effective than other approaches as it requires the consideration of less invasive techniques prior to those that are more invasive and costly. Additionally, the least invasive techniques may be administered by less specialized care providers, which may also be more cost effective. And finally, hospitalization is the last consideration in this approach. This saves money as hospitalization is costly and may serve as a risk factor for suicide, particularly following recent discharge.

Statement of Purpose

Given that adolescent depression is a major public health concern with implications for the recurrence of episodes into adulthood, there is a need to develop effective treatments to address the disorder. The current study sought to determine the effectiveness of implementing motivational interviewing assessment (MIA) prior to behavior therapy in order to attempt to increase the motivation of participants, increase retention, and increase homework compliance.

Further, the current study sought to determine the utility of presenting a stepped care approach to the treatment of adolescent depression. Participants were presented with

MIA, followed Fun Activities (FA) for those who did not respond to MIA, followed by Values-Based Behavioral Activation (VBBA) for those who did not respond to FA.

Finally, the usefulness of an explicit values component added to behavior therapy is currently unknown. This study sought to determine the utility of an added values component affects outcomes when treating adolescent depression.

METHODOLOGY

Participants

A total of 14 adolescents ages 13-18 were recruited from two local high schools to participate in the study (Appendix B). Participants were recruited without regard to race, sex, socio-economic status or ethnicity. All study related meetings with the participant and his/her guardian took place at the relevant school, with the exception of three meetings that took place at the participant's homes due to transportation difficulties or family preference.

Once the student investigator was contacted by a potential participant's caregiver or school counselor after receiving parental consent, an appointment was scheduled to conduct informed consent/assent and the initial screening. Participants were eligible for study inclusion if they were identified as experiencing clinically significant distress, as indicated by a score of 45 or higher on the Children's Depression Rating Scale-Revised (CDRS-R; Proznanski and Mokros, 1996). This cutoff score was used in the NIMH-sponsored TADS trial previously mentioned (TADS, 2004), which involved the largest adolescent depression treatment study ever conducted. All potential participants met inclusion criteria by meeting the CDRS-R inclusionary cutoff and by not endorsing psychotropic medication changes within the eight weeks prior to screening. Following

screening and study inclusion, all participants were asked to begin the MIA phase of treatment. Given the wide applicability of MI as a style of communicating with teens (Naar-King & Suarez, 2011), there were no exclusion criteria for entering the MIA phase. Measures given during MIA phase revealed diagnoses that served as exclusionary criteria for progressing to FA. Participants were to be excluded from study participation following MIA if they were prescribed antidepressant medication and have been taking the medication for less than eight weeks, a current diagnosis of bipolar disorder, psychotic disorder, pervasive developmental disorder, conduct disorder, anorexia nervosa, obsessive compulsive disorder, autism, or alcohol or drug dependence (excluding caffeine and nicotine). Potential participants were not excluded based on the presence of suicidal ideation, as this is one diagnostic criterion for depression. However, such participants were assessed for the presence of a suicide plan, intent to die, and access to means. No participants indicated the presence of the intent to die during this study.

The caregiver, child, and the study therapist were present at the beginning of the meeting, which began with a verbal explanation of the study. This explanation was guided by the consent document and was conducted verbally by the researcher. All details included in the consent form were summarized and any questions the participant or guardian had were answered. Caregivers and participants were encouraged to read the consent document prior to signing and to ask any unanswered questions. After both the caregiver and participant provided consent, the caregiver was asked to leave the room to complete a demographic questionnaire. All participants and at least one of their legal guardians provided written informed consent prior to the participant engaging in any

study-related activity.

Once consent and assent documents were thoroughly reviewed and signed, participants were assessed for qualification for inclusion. Inclusion criteria for the MIA phase were age of 13- 18 years and a CDRS-R score of 45 or higher at the time of consent. Those who failed to meet inclusion criteria, meet exclusion criteria, or decide to discontinue participation following MIA were to be referred for additional services within the community, however, all potential participants met initial inclusion criteria and were asked to continue into the MIA phase.

Design

A single participant A/B/C design was utilized where exposure to the next level of the independent variable in the sequence is based on treatment response at the prior level (see Appendix A). That is, a clinically significant response to A precluded exposure to B. Specifically, those participants who experienced a decrease in depressive symptoms below the depressive cutoff during MIA were deemed to fail to meet the inclusion criterion (CDRS-R score ≥ 45) for continuance into the active treatment. In the current study, MIA was conceptualized as a minimal intervention, rather than a watchful waiting period. In clinical settings, clients typically attend several sessions prior to the receipt of an active treatment. The current study attempted to mimic the flow of treatment found within clinical settings. Following FA, those who experienced a clinically significant change received one session of FA Booster, while those who did not experience a clinically significant change following FA were asked to continue on to VBBA. Following FA Booster, or VBBA, whichever applied, participants who wished to receive further services were provided with a list of local providers. Multiple measures were

taken throughout the course of the study in order to determine treatment effects and ensure that change occurred at a reasonable time in the treatment protocol. This protocol involved a stepped-care approach which mimics increasing levels of care that may be recommended in practice settings.

Informed Consent

Since youth under the age of legal consent were recruited for the study, a consent document for the legal guardian and a document of child assent were created that included the name program, names of the principle and student investigators, the project title, and a detailed explanation of the rights of the child. A flow chart to accompany the consent form was developed to help consenting caregivers and participants track the possible courses of care more readily (Appendix A). As the study also included participants who are of the legal age to consent (those who are 18 years of age), a consent document was also created for those potential participants to sign without parental consent. These rights include a simple description of the study, the right to withdraw/not participate, information regarding their role in the experiment including risks and benefits, the right to access the results and of confidentiality. Permission to videotape the sessions is also included with contact information for the investigators. Additionally, the parental consent document included method of dissemination, explanation of the tests and measures, description of data collection, confidentiality, storage, and HSIRB contact information. An explanation was given informing the parent that they have the right to withdraw their child at any point during the experiment with no negative effects on them or their child.

Measures

Demographic measure. This measure has been developed by the researcher and is meant to gather information related to the background characteristics of each participant including age, sex, race, and grade in school.

Mini International Neuropsychiatric Interview for Children and Adolescents (MINI-KID; Sheehan et al., 2010). This is a screening instrument and follow up diagnostic interview appropriate for children and adolescents that was used to screen for depression and other DSM-IV-R diagnoses (*kappa = 0.56-0.87* for mood disorders). Based on scores obtained, diagnostic cutoffs were used to identify those individuals who were experiencing major depression, minor depression, subclinical depression, and those who are not depressed. The MINI-KID consists of a screening measure and follow up interviews based on the indication of the possible presence of a disorder per scores obtained through the screening measure. All follow up interviews were administered as were indicated ideographically by the screening measure with all participants.

As the interviews are idiographic based on the screening measure, the length of administration varies (M = 33 ± 14 minutes). Therefore, the screening tool was administered during pre-screening and the interviews were administered during the final session of the MIA phase. The depression interview was administered with all participants regardless of screening score.

Children's Depression Rating Scale-Revised (CDRS-R; Proznanski & Mokros, 1996). This semi-structured interview was used as the primary dependent variable. A score of 40 or higher is indicative of depressive disorder. The CDRS-R was initially developed for children, but has shown good to excellent internal consistency ($\alpha = .74$ -

.*92*) when used to measure depression among adolescents (Mayes, Bernstein, Haley, Kennard, and Emslie, 2010). The CDRS-R was administered at each assessment session.

Twenty percent (n = 9) of the 45 CDRS-R interviews were also coded by an independent rater, who was trained on practice tapes to reliability and had experience administering the CDRS-R in a similar setting. Intra-class correlation across all items was ICC = .89 (*n = 153, p = .00*), indicating significant reliability between raters among measure items. As the CDRS-R total was the dependent measure that determined the participant's next step (either into the next study phase or out of study treatment), the independent rater's scores were examined to see if they resulted in the same decisions as those of the study therapist (i.e., whether or not the participant experienced a clinically significant change). There was 100% agreement in clinically significant change between the therapist and coder.

Multigroup Ethnic Identity Measure (MEIM; Phinney, 1992). The MEIM is a 14-item measure on a four-point Likert scale that is used to determine the ethnic group with which participants personally identify. This measure was used in order to most accurately characterize the cultural identification of participants and to examine correlates between treatment outcome and ethnicity. The MEIM has good internal consistency (*Cronbach's* α = *.81*) when administered to high school students (Goodstein & Ponterotto, 1997). MEIM was administered at pretreatment assessment.

MacArthur Scale of Subjective Social Status-Youth Version (MSSSS; Goodman, Adler, Kawachi, Frazier, Huang, & Colditz, 2001). This 1-item measure was used to characterize the perceived socioeconomic status of the participants. The MSSSS asks the respondent to indicate where his/her family stands on a ladder. The rungs on the ladder

correspond to common SES indicators; that is, the top rung represents those with the most money, education, and prestigious jobs and the bottom rung represents those with the least money, education, and employment prestige. The scale shows good reliability at .73-.79. MSSSS was administered at pretreatment assessment.

Stages of Change Questionnaire (SOCQ; McConnaughy, Prochaska, & Velicer, 1983). This 32-item measure identifies the participant's current level of motivation for change, which is indicative of the effort the individual is likely to put forth for such change to occur. The measure has good reliability (*Cronbach's* $\alpha = .88$ - .89) on each of four subscales. The SOCQ was used by Lewis et al. (2009) to determine the association of the particular stage of change with scores on depression measures among adolescents participating in the TADS study. Item factors were found to account for 56% of the variance along four subscales: precontemplation, contemplation, action, and maintenance. This measure was administered at pre-treatment, A2, A3, A4, and A5.

Behavioral Activation for Depression Scale-Short Form (BADS-SF; Manos, Kanter, & Luo, 2011). A nine-item shorter version of the BADS was administered to the adolescents at each therapy and assessment session. This measure provides a total score, with higher scores indicative of higher activation. Scores range from 0-54 through a seven-point Likert scale. BADS-SF has shown good internal consistency ($\alpha = .819$).

Beck Depression Inventory –II (BDI-II; Beck, Steer, & Brown, 1996). The BDI-II is a 21-item self report measure related to symptoms of depression. Ranges for interpretation have been recommended as follows: 0 to 9 = non-depressed; 10 to 15 = mild depression; 16 to 23 = moderate depression; and $\geq$ 24 = severe depression (Roberts,

Lewinsohn, & Seeley, 1991; Appendix I). BDI-II was administered at each assessment point.

Beck Depression Inventory –Short Form (BDI-SF; Beck & Beck, 1972). This 13-item measure is an abbreviated version of the BDI. The BDI-SF has samples from the negative self-attitude, performance difficulty, and somatic symptoms factors of the BDI as they have been found to have discriminant validity (Bennet et al., 1997). A cut off score of 9 is recommended as it has been found to maximize specificity and sensitivity. BDI-SF was administered as a repeated measure at each therapy session.

Therapist Alliance Scale for Adolescents (TASA; Shirk, 2003). TASA is a 12-item measure, scaled on a six-point Likert, of therapeutic alliance and is administered to the participant. The measure has good internal consistency ($\alpha = .86$). This measure was administered at the assessment sessions following MIA, FA, and VBBA.

Procedure

Screening. Potential participants were referred to the study therapist by the school counselor or Communities in Schools representative. Either the school representative or the study therapist scheduled a time to meet with the potential participant and a guardian to begin the informed consent process. During the initial appointment, participants and their parent or guardian were informed of the study and presented with the informed assent and consent documents, respectively. Once informed consent/assent was obtained, participants were asked to complete the CDRS-R as a pre-screening assessment for the study. Participants who scored at or above 45 on the CDRS-R were to be eligible for further assessment and potential inclusion in the study.

Once an adolescent agreed to participate and the legal guardian consented, and the CDRS-R has been administered, further assessment took place. The measures administered during screening include: Demographic measure, CDRS-R, MEIM, MSSSS, SOCQ, BDI-II, BADS-SF, and MINI-KID.

Motivational Interviewing Assessment. Once screening was concluded, participants entered the MIA phase in which they received up to three weekly sessions of Motivational Interviewing Assessment (MIA) with the therapist over a four week period. Post-MIA evaluation occurred four weeks following the screening, which was enough time to allow for three sessions of MIA to occur between assessment points.

The MIA strategy was guided by a publically available training manual; that is, Motivational Interviewing Assessment: Supervisory Tools for Enhancing Proficiency (MIA: STEP; Martino, Gallon, Hall, et al., 2006). In short, the manual provides a "sandwich" approach to interviewing when structured assessments (in this case MINI-KID) are sandwiched between MI-style discussions. Each of the three possible MIA sessions used this approach. Once the MINI-KID interviews were complete, the sessions took on an MI-style discussion. The therapist began each MIA session by administering the BADS-SF and BDI-SF. During the first three possible MIA sessions, the therapist spent approximately the first 1/3 of the session engaging the participant in a MI-style discussion of the participant's motivation for change. This was followed by approximately 1/3 of the session spent engaging the participant in MINI-KID follow up interviews. Finally, the therapist completed the remaining 1/3 of the session with MI-style discussion of the participant's motivation for change as well as discussion structured to build rapport and gain information from the participant related to their own perception

of the problems he or she was experiencing, and reinforce occurrences of change talk on the part of the participant.

During the fourth session of MIA, participants were asked to participate complete the following measures: CDRS-R, SOCQ, BDI-II, BADS-SF, and TASA. Participants who experienced a decrease in depressive symptoms as evidenced by both (a) an 11 point decrease in CDRS-R scores and (b) a total CDRS-R score ≤ 37 were discontinued from treatment and scheduled for a follow up assessment to take place six weeks later. Those who did not experience this clinically significant response were asked to continue into Fun Activities.

Fun Activities. Behavior therapy consisted of up to four sessions of fun activities (FA) adapted from the STEADY manual (Clarke, DeBar, Ludman, Asarnow, & Jaycox, 2002). The STEADY manual consists of 9+ sessions divided between cognitive restructuring and behavioral activation (fun activities). The current study used fun activities materials borrowed from the STEADY manual. During the FA phase, participants received psychoeducation related to depression, discussion of fun activities, and assignment of fun activities and mood diaries to complete between sessions. Prior to each session, the therapist administered the BADS-SF and BDI-SF. Assessment following FA took place six weeks following the final session of MIA, which allowed time for participants to receive up to four FA sessions.

Post-Fun Activities Assessment. Six weeks following the final MIA session, participants were asked to complete Post-Fun Activities Assessment measures. This session consisted of administration of CDRS-R, SOCQ, BDI-II, BADS-SF, and TASA. Again, participants who experienced a clinically significant decrease in depressive

symptoms were discontinued from treatment and scheduled for a follow up assessment to take place six weeks later. Those who did not experience a response to treatment were asked to continue into values-based behavioral activation.

Values-Based Behavioral Activation. Values-based behavioral activation (VBBA) consisted of up to four sessions of treatment. The protocol for this phase of treatment was adapted from the Gaynor and Harris (2008) manual. Psychoeducation was provided related to activities of importance and the participant's own personal values were assessed. Values-based activities were scheduled for the participant to complete based on the assessment and in collaboration with the participant through values clarification exercises. Prior to each session, BADS-SF and BDI-SF were administered. Assessment following VBBA was scheduled six weeks following post-FA assessment. Assessment was linked to time rather than the number of sessions the participant has received.

Post-Values-Based Behavioral Activation Assessment and Follow Up. Six weeks following post-FA assessment, participants were asked to complete the post-VBBA assessment. Once again four weeks following post-VBBA assessment, participants were asked to complete the follow up assessment. Both of these assessment points consisted of participants being asked to complete the CDRS-R, SOCQ, BDI-II, BADS-SF, and TASA.

Treatment Integrity

The study therapist completed a measure of treatment adherence following each therapy session. Items on the adherence measure were derived from similar items used by Gaynor and Harris (2008) in a study of treatment for adolescent depression and were

scored on a 1 (*not at all*) to 6 (*entirely*) Likert scale. Twenty-five percent (*n* = 14; 8 MIA, 5 FA, and 1 VBBA) of sessions were also coded by a trained doctoral student and were selected quasi-randomly to ensure adequate distribution of participant recordings and treatment phases. Those sessions coded by both the therapist and the independent coder indicated significant agreement for MIA items (*n=168, r=.98, p=.00*), FA items (*n=105, r=.96, p=.00*), and VBBA items (*n=21, r=.99, p=.00*). An intraclass correlation also showed high therapist and coder agreement (*n = 294, ICC = .953, p = .00*).

Treatment adherence was defined as the extent to which the therapist applied the treatment as indicated by the protocol. Not all sessions contributed to all items, therefore, adherence scores were calculated for items during relevant sessions, according to the protocol for each phase. For MIA, depending on the session, items rated were: Did the therapist provide a sensible treatment rationale in a clear manner? (Session 1); Did the therapist check the participant's understanding of the treatment rationale? (Session 1); To what extent was the therapist's behavior mainly directed toward attempts to understand the participant's life difficulties and/or ambivalence toward treatment? (Sessions 1, 2, and 3); To what extent was the session's content focused primarily on the client's feelings/emotions (as opposed to skill acquisition or activity scheduling)? (Sessions 1, 2, and 3); To what extent did the therapist use OARS (open-ended questions, affirmations, reflection, summarize)? (Sessions 1, 2, and 3); and, To what extend did the therapist make use of the Decisional Balance worksheet (introduce the worksheet, complete the worksheet, refer to the worksheet)? (Sessions 1, 2, or 3). MIA adherence (*n* = 36) averaged 5.69 (.96) for the study therapist and 5.84 (.49) for the coder.

Items rated for FA were: Did the therapist provide a sensible treatment rationale in a clear manner? (Session 1); Did the therapist check the participant's understanding of the treatment rationale? (Session 1); Did the therapist review the client's homework from the previous session? (Sessions 2, 3, and 4); Did the therapist explain and assign the homework (Fun Activities, Values-Based Activities) for the next session? (Sessions 1, 2, and 3); Did the therapist make use of the Mood Diary by explaining its use? (Session 1); Did the therapist assign the Mood Diary for homework? (Sessions 1, 2, and 3); Did the therapist explain the association between thoughts, feelings, and behavior? (Sessions 1 and 2); Did the therapist explain both upward and downward spirals? (Session 1); Did the therapist assist the participant in selecting fun activities? (Sessions 2 and 3); Did the therapist assist the participant in selecting mood and activity goals? (Sessions 3 and 4); Did the therapist review the participant's progress toward mood and activity goals? (Session 4); Did the therapist make use of the Daily Activity Log by explaining its use? (Session 1, 2, or 3); Did the therapist assign the Daily Activity Log for homework? (Session 1, 2, and/or 3). FA adherence ratings were (n = 37, M = 5.8, SD = .83) for the study therapist and (n = 35, M = 5.93, SD = .93) for the coder. The difference between the number of items coded by the therapist and the coder are due to video recording difficulties that did not allow the coder to view the entirety of one session selected for coding.

Based on the quasi-random selection of session recordings for treatment adherence coding, only one session of VBBA was selected. For VBBA session 2, the following items contributed to adherence ratings: Did the therapist provide a sensible treatment rationale in a clear manner?; Did the therapist check the participant's

understanding of the treatment rationale?; Did the therapist review the client's homework from the previous session?; Did the therapist explain and assign the homework (Fun Activities, Values-Based Activities) for the next session?; Did the therapist administer the values assessment?; Did the therapist clearly define values?; and, Did the therapist assign the 20 things chart? Adherence ratings for the VBBA session were (n = 7, M = 5.71) for the therapist and (n = 7, M = 5.71) for the independent coder.

RESULTS

Sample Characteristics

Fourteen participants ages 14-18 (M = *15.71*) were recruited and provided consent/assent to participate in the study (see Table 1). Participants were students in grades 9-12 (M = *10.29*) and were recruited through two high schools. The study sample self-reported as a diverse group of participants; 28.6% Euro-American, 42.9% African American, 14.3% Latino, and 14.3% Biracial. Normative data for the MSSSS community ladder showed a mean of 7.2 ± 1.3 (Goodman et al., 2001). Average self-report of socioeconomic status as indicated via the MSSSS for the current sample was 4.93 (SD = 2.20). Responses ranged from 1-10 with 1 = "people who are worst off" and 10 = "people who are the best off." Upon caregiver report, 50% indicated a household income of $5,000 – 24,999 annually, and 50% reported an income of $25,000 – 74,999. Fifty-seven percent (n = 8) of participants were reported to live in a single-parent home and in 57% of cases, it was reported that the biological mother had a history of depression.

Table 1. Demographic and Clinical Characteristics

Participant	Sex	Age	Grade	Ethnicity	Live with 2 caregivers	MINI-KID Diagnoses	Family History of Depression
1	Male	17	11	African American	Yes	MDD	1st Degree (mother)
2	Female	17	11	Caucasian	Yes	MDD, ADHD, ODD	1st Degree (mother)
3	Male	18	12	Caucasian	No	MDD, ODD	1st Degree (mother)
4	Female	15	10	African American	No	MDD	1st Degree (mother)
5	Female	17	12	Biracial	No	MDD, Anxiety	1st Degree (mother)
6	Female	15	10	African American	No	MDD, ADHD	None
7	Female	16	11	Caucasian	Yes	MDD, SA, CD	1st Degree (mother)
8	Male	14	9	African American	No	None	None
9	Male	14	9	African American	No	MDD	None
10	Female	17	12	African American	Yes	MDD, Anxiety	None
11	Male	14	9	Latino	No	MDD, Anxiety	1st Degree (mother)
12	Male	15	9	Biracial	No	MDD	None
13	Male	16	10	Caucasian	Yes	MDD, Anxiety	Aunt
14	Male	15	9	Latino	Yes	None	1st Degree (mother)

Note: MDD = Major Depressive Disorder; ADHD = Attention Deficit Hyperactivity Disorder; ODD = Oppositional Defiant Disorder; SA = Substance Abuse; CD = Conduct Disorder

Measures administered during Assessment 1 (A1) indicated that participants were significantly depressed. CDRS-R scores at A1 ranged from 47 to 79 with a mean (SD) of 58.79 (9.11). A CDRS-R score ≥ 45was required for inclusion (following TADS, 2004) and a score of ≥ 40 is generally accepted as indicative of probable major depressive disorder (MDD), while a score of ≤ 28 has been used as a cutoff for remission (Mayes, Bernstein, Haley, et al., 2010). Ranging from 3-44, the mean (SD) BDI-II score at screening was 21 (11.48), a score suggestive of moderate depression. BADS-SF scores at screening were indicative of lower levels of activation with a range of 11-35 and M = 22.57 (7.24). BADS-SF scale scores range from 0-54 with higher scores indicative of more activation and a normative mean of 25.68 (8.21) in a sample of undergraduates who felt sad, down, or blue (Manos, Kanter, & Luo, 2011). According to their HRQOL responses, participants also reported having poor mental health on 43% of the 30 days prior to screening with a mean (SD) of 13.43 (8.85) and a range of responses from 0-28.

Diagnostic status was determined via the MINI-KID conducted during MIA. Results of MINI-KID interviews indicate 12/14 (86%) participants met criteria for MDD. In 8/12 (67%) cases, participants also met criteria for at least one comorbid diagnosis including anxiety (n = 4) and disruptive behavior disorder (n = 4) (see Table 1).

Sample Outcomes

Of the fourteen participants recruited for the study, fourteen entered the MIA phase and were considered part of the intent-to-treat sample. Participants were considered to have a clinically significant change on the CDRS-R, the primary dependent measure, if their score decreased by ≥ 11 points (reliable change index) resulting in a total score of

$\leq$ 37 (placing the participant within 1 SD of the normative range on the CDRS-R). These values were determined *a priori* to capture a magnitude of change that was beyond what might be expected by sampling variation alone on the CDRS-R that resulted in functioning that approximated that expected among normative group. Nine of the fourteen participants (64%) met CDRS-R criteria for clinically significant change at some point during the stepped-care protocol. Five participants (35.7%) had a clinically significant change during MIA as indicated by their A2 CDRS-R scores and were stepped out of additional treatment and assessed again at A5, while two (14%) dropped out during MIA. Seven participants continued into the FA phase. Three participants (42.9% of those entered into FA) dropped out of FA, while three (42.9% of those entered into FA) showed clinically significant change at A3 and were stepped out of additional treatment. The one remaining participant who entered FA failed to show significant change and was entered into the VBBA phase. The participant who entered VBBA showed clinically significant improvement at A4 on the CDRS-R. Thus, of the 64% who had a clinically significant response on the CDRS-R, 36% responded to MIA and were stepped out of treatment, 21% responded to FA and were stepped out of treatment, and 7% responded to VBBA. The remaining 36% dropped out during the stepped care protocol. Figure 1 shows the flow of participants through each phase of the study and Table 2 shows attendance for each participant.

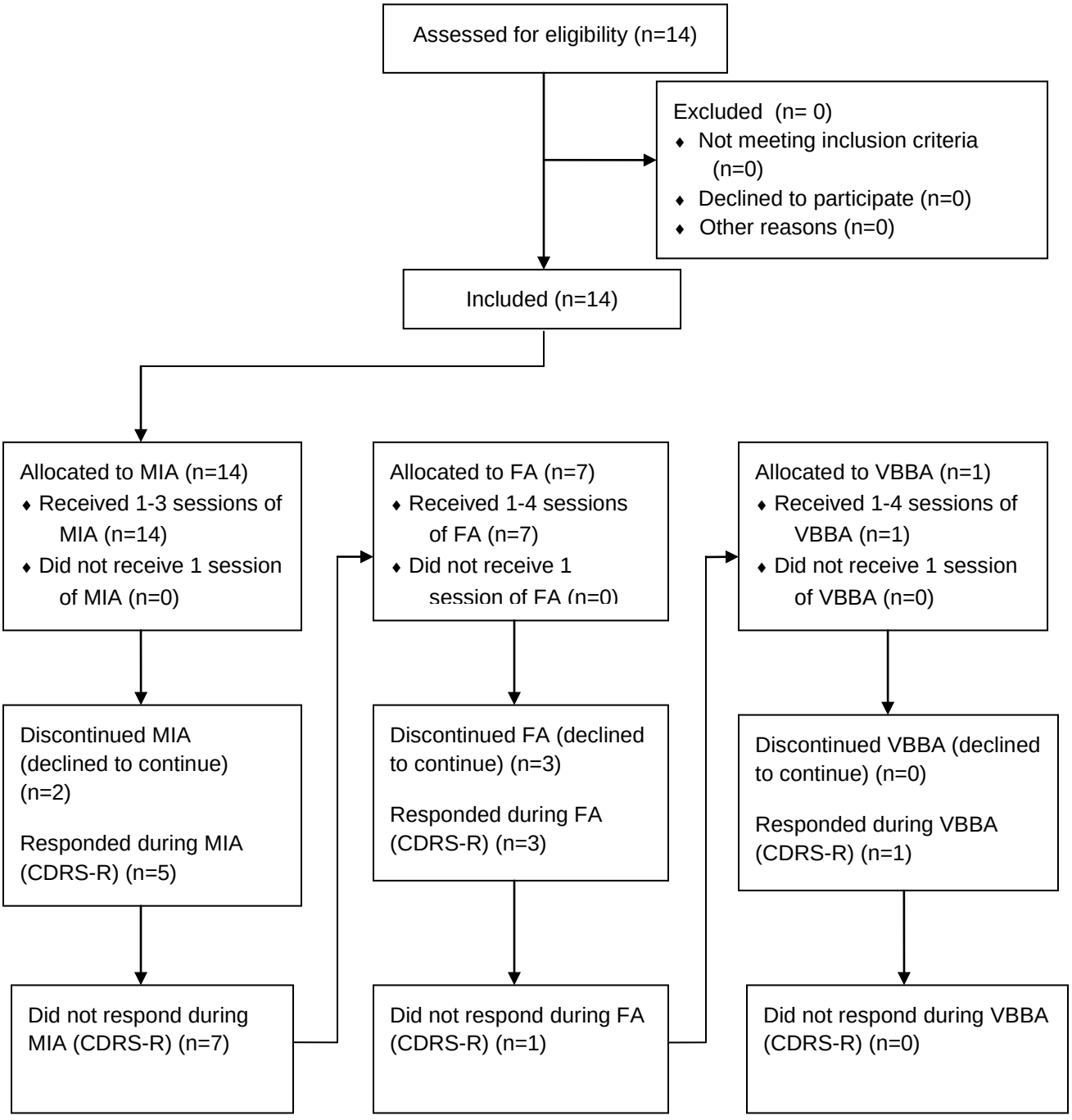


Figure 1. Participant Flow Diagram

Table 2. Responder Status and Attendance

Part	Responder Status	A1	MIA 1	MIA 2	MIA 3	A2	FA 1	FA 2	FA 3	FA 4	A3	VBBA 1	VBBA 2	VBBA 3	VBBA 4	A4	A5
1	FA Drop out	X	X	X	X	X	X				X						
2	VBBA	X	X	X	X	X	X	X	X		X	X	X		X	X	X
3	FA	X	X	X	X	X	X	X	X	X	X					X	X
4	FA Drop out	X	X	X		X	X									X	
5	FA	X	X	X		X	X	X		X	X						X
6	MIA	X	X	X	X	X											X
7	MIA	X	X	X		X											
8	MIA	X	X			X											
9	MIA	X	X	X	X	X											X
10	MIA	X	X	X	X	X											X
11	MIA Drop out	X	X	X	X	X											X
12	FA	X	X			X	X	X	X	X	X					X	
13	FA Drop out	X	X	X	X	X	X	X		X						X	
14	MIA Drop out	X	X			X											

As noted previously, 36% of the sample had a clinically significant response to MIA. One way ANOVAs were conducted in order to explore A1 differences between those who responded to MIA and those who did not (including those who either responded to FA or VBBA or dropped out of the study). A significant difference ($F_{1, 13}$ = 4.57, p = .05) was found between CDRS-R scores for MIA responders [M = 52.60 (4.56)] at A1 and those who did not have a significant response to MIA [M = 62.22 (9.34)]. Similarly, participants who responded to MIA [M = 12.8 (6.38)] reported fewer depressive symptoms on the BDI-II ($F_{1, 13}$ = 5.28 p = .04) at A1 than other participants [M = 25.56 (11.33)]. Interestingly, 4/5 who had a clinically significant change during MIA were also 4/5 participants (6, 8, 9, & 10) who had no family history of depression in a first degree relative (Fisher's Exact Test, p = .02). In addition, those responding to MIA [M = 28.00 (5.79)] also reported higher activation ($F_{1, 13}$ = 6.03 p = .03) at baseline than later treatment responders and those who dropped out of the study [M = 19.67 (6.23)]. MIA responders [M = 7.80 (5.45)] did not report having less difficulty as a result of poor mental health as indicated through the HRQOL than other participants [M = 16.56 (9.03)], although the trend was nearing significance ($F_{1, 13}$ = 3.84, p = .07). Finally, those responding to MIA [M = 65 (7.35)] were not significantly different than other groups [M = 60.88 (8.74)] with regard to therapeutic alliance, as measured by the TASA at A2, following the receipt of MIA ($F_{1, 13}$ = .767, p = .40). Thus, alliance does not appear a plausible explanation for those who had a clinically significant change in MIA, instead it appears that those who responded to MIA were less severely depressed, had a less significant family history of depression and were more activated prior to the start of treatment.

Tables 3-11 include participant scores on measures taken at assessment points throughout the study and are grouped by responder status. Means and standard deviations are included in the tables. Reliable change indices (RCI) were calculated for outcome and process measures in order to determine the changes in scores necessary to identify that which is beyond what would be expected as a result of measurement error. The asterisks in Tables 3-5 and 7-11 indicate where participants met the RCI. Reliable change was not calculated for HRQOL as no normative data for this single-item measure is available. The CDRS-R was the main dependent measure for the current study and the cutoff was based on an *a priori* RCI criterion of ≥ 11-point change (Poznanski & Mokros, 1996). Step progression; however, was not determined solely by the RCI. Participants were stepped out of the protocol if they met the RCI and had a total CDRS-R score of ≤ 37. When both criteria were met, the participant was considered to have had a clinically significant change; that is, a clinical response that was large in magnitude and placed him/her within 1 SD of the normative mean on the CDRS-R. The asterisks in Table 3 represent only the RCI. As indicated in Table 3, 9/14 (64%) met the RCI criterion from A1 to A2, which was the assessment point immediately following MIA. One participant (7%) experienced a reliable worsening of symptoms during the interval containing MIA. Four participants who were stepped into and completed FA met the RCI at A3, while the participant (P1) who dropped out after 1 FA session showed a reliable worsening of symptoms at A3. Of note, 3/4 who met the RCI during the FA interval also had an RCI during MIA. The combined effect resulted in these 3 participants having CDRS-R scores indicative of clinically significant change at A3. The participant who had a reliable worsening during MIA had an RCI during FA that represented a return to the pretreatment level on the

CDRS-R. This participant was stepped into VBBA during which change that satisfied the RCI was achieved that also resulted in meeting the threshold for clinically significant change.

Psychometric evaluation of the BDI-II with both adult and adolescent outpatient populations has yielded a Cronbach's alpha of .92 (Beck et al., 1996; Steer et al., 1998). Using Cronbach's alpha as the measure of reliability and the standard deviation from the current sample at A1 (11.48), yielded an RCI of 9 for BDI-II. Table 4 shows the mean (SD) on the BDI-II for each participant, with an asterisk indicating the RCI was met. Three of five (60%) of those who had a clinically significant CDRS-R change during MIA met the BDI-II RCI criterion at A2; however, as previously mentioned, MIA responders had significantly lower A1 BDI-II scores than other participants so that the RCI was more difficult to achieve, which was particularly apparent for P6. Of the four participants who completed FA, two met reliable change following MIA and 1 following FA. Participant 12, who did not reach the RCI, had a relatively low A1 BDI-II score of 16 and a score of 9 at A2. P5 met the reliable change criterion at A2, and reached the criterion again at A3, following receipt of FA. As the BDI-II score for P3 at A2 decreased to 7, it was impossible for the participant to meet the criterion at A3. Finally, P2 did not meet RCI following MIA or FA but was identified on the CDRS-R as having a clinically significant VBBA response and achieved the RCI at A4, following receipt of VBBA.

The RCI for BADS-SF was calculated using psychometric data, specifically Cronbach's alpha of .82, reported in Manos, Kanter, and Luo (2011) and the standard deviation of the current sample (SD = 7.16) at A1 to yield a RCI of 8.44. Overall, 2/14 (14%) participants demonstrated reliable change on the BADS-SF during the A1-A2

interval. One of five participants who had a clinically significant change during MIA (P10) achieved the RCI at A2. Of those who participated in FA, 2/4 met the RCI during FA (P5 and P12), including 2/3 of those who had a clinically significant response on the CDRS-R during FA. Interestingly, the third participant (P3), while not meeting the RCI criterion during the A2-A3 interval, did show change from A1-A3 such that the cumulative effect exceeded the RCI. Finally, the participant who had a clinically significant CDRS-R response to VBBA also met the RCI on the BADS-SF during the A3-A4 assessment interval. Thus, of the 4 participants who demonstrated a clinically significant change during either of the two behavior therapy steps, 3/4 showed reliable change on the BADS-SF during that same assessment interval, while 1/4 did not exceed the RCI criterion during the A2-A3 interval but the accumulated change from A1-A3 did. These findings suggest that while MIA likely took advantage of participants with less severe depressive symptoms and higher baseline activation levels, it was not particularly associated with increased activation. On the other hand, response to behavior therapy was consistent with the theory of therapeutic change wherein activation treatment produces reliable increases in client activation in his/her environment resulting in decreased depressive symptoms.

SOCQ subscale reliable change criteria were calculated using reliability data reported by Lewis et al. (2009) and the standard deviations from the current sample at A1. Based on Cronbach's alpha of .80 and a standard deviation of 4.44 for the total sample, the precontemplation RCI was calculated to be 5.50. Of the participants who entered MIA, 2/14 (14%) showed a reliable decrease in precontemplation during MIA. One of fourteen (7%) showed a reliable increase during MIA and one participant showed

a reliable increase on precontemplation over the follow up period. The contemplation subscale RCI was determined to be 3.84 based on Cronbach's alpha of .75 and standard deviation of 2.77. Three of fourteen (21%) participants showed a reliable increase in contemplation during MIA. One of four (25%) participants who entered FA showed a reliable decrease in contemplation at A3, which immediately followed the FA phase. Two of four participants (50%) who received FA experienced a reliable change increase in contemplation at A4, which was a follow up session for those participants, one of which (P12) returned to the near baseline contemplation score. Reliable change of 4.86 on the action subscale was derived from Cronbach's alpha of .76 and the current sample standard deviation of 3.58. Three of fourteen (21%) participants showed a reliable decrease in action scores following MIA. One of four (25%) participants who received FA experienced a reliable change decrease at A3. The lack of increase in action scores is of interest as others have reported that adolescents who received CBT or a combination of CBT and antidepressants showed larger gains in action scores over those who received antidepressants alone or pill placebo (Lewis et al., 2009). Our findings did not reveal reliable improvements in action scores, even for those who received behavior therapy. Lastly, Cronbach's alpha .67 and a standard deviation of 2.13 yielded a RCI of 3.39 for the maintenance subscale of the SOCQ. Two of fourteen (14%) participants showed a reliable decrease in maintenance scores following MIA while one participant showed a reliable increase over the follow up period. Although motivational interviewing techniques were presented during the MIA phase of the study, participant reports of motivation to change did not consistently improve to achieve the action or maintenance stages of change. Of note, however, is that those who received FA, 2/4 showed reliable

increases in contemplation subscale scores following MIA, and again at six week follow up.

A reliable change criterion was also calculated for participant reports of therapeutic alliance. Shirk, Gudmundsen, Kaplinski, and McMakin (2008) reported Cronbach's alpha for the TASA adolescent reports at .86 and a standard deviation of 8.43. The standard deviation for the current sample was quite similar to that of Shirk et al. at 8.18. Reliable change calculations yielded a RCI of 8.48. None of the nine participants who completed the study reported a reliable change in therapeutic alliance at an assessment point immediately following an active treatment phase, therefore, therapeutic alliance did not account for changes on dependent measures.

Pearson correlations were conducted to determine the amount of association between depression scores and activation for the entire sample. As expected, BDI-II scores were negatively related to activation scores on the BADS-SF at most assessment points: [A1 = r (14) = -.601, p = .012]; [A2 = r (13) = -.754, p = .001]; [A3 = r (5) = -.925, p = .012]; [A4 = r (5) = -.639, p =.123]; and [A5 = r (7) = -.79, p = .017]. Further, activation was negatively associated with depression on the BADS-SF and CDRS-R, respectively: [A1 = r (14) = -.525, p = .027]; [A2 = r (13) = -.721, p = .003]; [A3 = r (5) = -.937, p = .009]; [A4 = r (5) = -.866, p = .029]; and [A5 = r (7) = -.857, p = .071]. These associations provide further support for the behavioral model of depression, which indicates that depressive symptoms increase as activation decreases.

Table 3. CDRS-R Scores Across Assessment Times by Responder Status

Participant	A1	A2	A3	A4	A5
MIA					
6	49	22*	-	-	25
7	47	30*	-	-	-
8	57	26*	-	-	-
9	57	32*	-	-	23
10	53	26*	-	-	17
Mean (SD)	52.6 (4.56)	27.2 (3.90)	-	-	21.67 (4.16)
FA					
3	59	47*	27*	27	21
5	79	61*	21*	-	22
12	58	41*	21*	25	-
Mean (SD)	65.33 (11.85)	49.67 (10.26)	23 (3.46)	26 (1.41)	21.5 (.71)
VBBA					
2	53	67*	52*	31*	25
Drop out					
1	65	44*	56*	-	-
4	49	44	-	35	-
11	72	63	-	-	25
13	66	56	-	52	-
14	59	-	-	-	-
Mean (SD)	62.2 (8.70)	51.75 (9.39)	56	43.5 (12.02)	25

*Meets RCI criterion during preceding interval

Table 4. BDI-II Scores Across Assessment Times by Responder Status

Participant	A1	A2	A3	A4	A5
MIA					
6	3	0	-	-	0
7	16	13	-	-	-
8	20	5*	-	-	-
9	14	2*	-	-	1
10	11	2*	-	-	1
Mean (SD)	12.8 (6.38)	4.40 (5.13)	-	-	.67 (.58)
FA					
3	24	7*	3	2	1
5	42	30*	5*	-	0
12	16	9	8	9	-
Mean (SD)	27.33 (13.32)	15.33 (12.74)	5.33 (2.51)	5.5 (4.95)	.5 (.71)
VBBA					
2	31	26	24	14*	11
Drop out					
1	25	33	24*	-	-
4	19	16	-	25	-
11	44	37	-	-	5
13	16	23	-	12	-
14	13	-	-	-	-
Mean (SD)	23.4 (12.34)	27.25 (9.54)	24	18.5 (9.19)	5

*Meets RCI criterion during preceding interval

Table 5. BADS-SF Scores Across Assessment Times by Responder Status

Participant	A1	A2	A3	A4	A5
MIA					
6	32	30	-	-	34
7	27	28	-	-	-
8	35	40	-	-	-
9	26	27	-	-	34
10	20	42*	-	-	45
Mean (SD)	28.00 (5.79)	33.40 (7.06)	-	-	37.67 (6.35)
FA					
3	27	33	37†	40	36
5	16	10	46*	-	49
12	25	27	39*	39	-
Mean (SD)	22.67 (5.86)	23.33 (11.93)	40.67 (4.73)	39.5 (.71)	42.5 (9.19)
VBBA					
2	11	15	14	29*	17
Drop out					
1	14	17	22	-	-
4	26	34	-	28	-
11	16	23	-	-	38
13	16	25*	-	23	-
14	26	-	-	-	-
Mean (SD)	19.6 (5.9)	24.75 (7.04)	22	25.5 (3.54)	38

*Meets RCI criterion during preceding interval, † cumulative change exceeds RCI

Table 6. HRQOL Scores Across Assessment Times by Responder Status

Participant	A1	A2	A3	A4	A5
MIA					
6	0	3	-	-	7
7	10	7	-	-	-
8	7	3	-	-	-
9	7	9	-	-	2
10	15	10	-	-	7
Mean (SD)	7.8 (5.45)	6.4 (3.29)	-	-	5.33 (2.89)
FA					
3	18	5	4	3	2
5	24	15	4	-	0
12	10	8	7	7	-
Mean (SD)	17.33 (7.02)	9.33 (5.13)	5 (1.73)	5 (2.83)	1 (1.41)
VBBA					
2	26	27	17	10	5
Drop out					
1	3	20	20	-	-
4	5	2	-	4	-
11	28	4	-	-	5
13	20	18	-	20	-
14	15	-	-	-	-
Mean (SD)	14.2 (10.43)	11 (9.31)	20	12 (11.31)	5

Table 7. SOCQ Precontemplation Scores Across Assessment Times by Responder Status

Participant	A1	A2	A3	A4	A5
MIA					
6	16	11	-	-	20*
7	16	18	-	-	-
8	11	15	-	-	-
9	20	14*	-	-	16
10	15	18	-	-	17
Mean (SD)	15.6 (3.21)	15.2 (2.95)	-	-	17.67 (2.08)
FA					
3	15	14	18	17	15
5	25	17*	16	-	16
12	14	15	17	14	-
Mean (SD)	18 (6.08)	15.33 (1.53)	17 (1.0)	15.67 (1.53)	15
VBBA					
2	11	17*	19	18	20
Drop out					
1	25	23	22	-	-
4	15	14	-	15	-
11	21	19	-	-	23
13	17	17	-	18	-
14	20	-	-	-	-
Mean (SD)	19.86 (3.85)	18.25 (3.77)	22	16.5 (2.12)	23

*Meets RCI criterion during preceding interval

Table 8. SOCQ Contemplation Scores Across Assessment Times by Responder Status

Participant	A1	A2	A3	A4	A5
MIA					
6	4	8*	-	-	6
7	9	9	-	-	-
8	8	7	-	-	-
9	9	11	-	-	11
10	10	9	-	-	12
Mean (SD)	8.00 (2.35)	8.8 (1.48)	-	-	9.67 (3.21)
FA					
3	8	11	9	10	12
5	4	10*	7	-	14*
12	12	16*	9*	13*	-
Mean (SD)	8.00 (4.00)	12.33 (3.21)	8.33 (1.15)	12.33 (2.08)	12
VBBA					
2	10	8	8	7	8
Drop out					
1	4	4	8	-	-
4	12	12	-	11	-
11	11	9	-	-	6
13	10	8	-	8	-
14	8	-	-	-	-
Mean (SD)	9.00 (3.16)	8.25 (3.30)	8	9.5 (2.12)	6

*Meets RCI criterion during preceding interval

Table 9. SOCQ Action Scores Across Assessment Times by Responder Status

Participant	A1	A2	A3	A4	A5
MIA					
6	6	5	-	-	20
7	10	14	-	-	-
8	18	12*	-	-	-
9	16	11*	-	-	16
10	17	10*	-	-	17
Mean (SD)	13.4 (5.18)	10.4 (3.36)	-	-	17.67 (2.08)
FA					
3	16	14	11	9	15
5	16	12	7*	-	6
12	15	15	12	15	-
Mean (SD)	15.67 (.58)	13.67 (1.53)	10 (2.65)	10 (4.58)	15
VBBA					
2	11	11	10	10	10
Drop out					
1	9	5	8	-	-
4	15	12	-	11	-
11	13	10	-	-	17
13	16	17	-	9	-
14	17	-	-	-	-
Mean (SD)	14 (3.16)	11 (4.97)	8	10 (1.41)	17

*Meets RCI criterion during preceding interval

Table 10. SOCQ Maintenance Scores Across Assessment Times by Responder Status

Participant	A1	A2	A3	A4	A5
MIA					
6	10	8	-	-	13*
7	11	12	-	-	-
8	13	11	-	-	-
9	13	12	-	-	15
10	10	13	-	-	16
Mean (SD)	11.4 (1.52)	11.2 (1.92)	-	-	14.67 (1.53)
FA					
3	10	11	14	13	12
5	13	8*	14	-	15
12	13	9*	16	14	-
Mean (SD)	12 (1.73)	9.33 (1.53)	14.67 (1.15)	14 (1.0)	12
VBBA					
2	8	9	12	10	11
Drop out					
1	13	13	10	-	-
4	12	12	-	16	-
11	15	15	-	-	17
13	12	12	-	13	-
14	16	-	-	-	-
Mean (SD)	13.6 (1.62)	13 (1.41)	10	14.5 (2.12)	17

*Meets RCI criterion during preceding interval

Table 11. TASA Participant Scores Across Assessment Times by Responder Status

Participant	A2	A3	A4	A5
MIA				
6	71	-	-	72
7	54	-	-	-
8	66	-	-	-
9	62	-	-	66
10	72	-	-	67
Mean (SD)	65 (7.35)	-	-	68.33 (3.22)
FA				
3	61	64	66	72
5	71	72	-	72
12	54	49	59*	-
Mean (SD)	62 (8.54)	61.67 (11.68)	62.5 (4.95)	72
VBBA				
2	70	72	65	71
Drop out				
1	71	56*	-	-
4	49	63*	-	-
11	56	-	-	69
13	55	-	45	-
14	-	-	-	-
Mean (SD)	57.75 (9.36)	59.5 (4.95)	45	69

*Meets RCI criterion during preceding interval

When participants were stepped out or chose to discontinue treatment, follow up data were collected whenever possible at the subsequent assessment points to assess maintenance. Follow up data from at least one time point was available for 11/14 (79%) participants. Those for whom there is no follow up data were two MIA responders and one who dropped out of MIA. As a reminder, the time interval between A1 and A2 was four weeks, A2-A3 was six weeks, A3-A4 was six weeks, and A4-A5 was four weeks. Maintenance data from the CDRS-R, BDI-II, and BADS-SF were emphasized because of their clinical and theoretical relevance. All participants who had a clinically significant change on the CDRS-R (and for whom follow up data were available) showed maintenance of their depression symptom change at follow up: 3/3 at 16 weeks post-MIA, 3/3 at six weeks (P3 and P12) or 10 weeks (P3 and P5) post-FA, and 1/1 at 4 weeks post-VBBA. The BDI-II data also suggest maintenance of gains for all seven participants. Among those who discontinued participation, 2/4 (P1 and P13) continued to meet the CDRS-R inclusion criterion at follow up, whereas 2/4 (P4 and P11) did not. The BDI-II also suggests decreased depression at follow up for 2/4 (P11 and P13) participants, but not the other 2/4 (P1 and P4; however, the CDRS-R and BDI-II data only agree on P1 and P11). In sum, the follow up depression data are consistent with the idea that those treated to when clinically significant change was achieved maintained improvement while follow up was more variable for those who discontinued treatment.

With respect to the BADS-SF, only one (20%) MIA responder (P10) met the RCI and increased activation was maintained 16 weeks later. For the remaining two MIA responders for whom follow up data was available (P6 and P9), no reliable change in activation was observed over the follow up interval. For the 3/3 responding to FA,

increased activation was maintained at follow up assessments at six weeks for P12, 10 weeks for P5, and six and 10 weeks for P3 (remembering that P3 only reached the BADS-SF RCI criterion cumulatively over the A1-A3 interval). For P2, the responder to VBBA, the increased activation was lost at four week follow up.

Mediator Analyses

Mediator analyses were conducted for participants 2, 3, 5, and 12 as these participants had clinically significant responses during the FA or VBBA treatment intervals and thus are candidates for closer examination of the time course of change during treatment. Gaynor and Harris (2008) identified four components necessary for the analysis of mediators in single-participant studies. The first component involves identifying if the participant received treatment. Second, it must be demonstrated that the participant experienced improvement during the time frame that the treatment was received. Next, assessment scores must indicate that there was a positive change in the proposed mechanism of action. Finally, a change on the proposed mechanism of action must precede a significant amount of symptom improvement. These components of mediator analysis are discussed below for the four participants who exhibited a significant response via CDRS-R scores following FA or VBBA.

For the current study, the receipt of treatment was determined first by identifying the percentage of sessions attended out of the number of sessions offered, relative to the final phase that the participant was invited to enter. Second, as previously mentioned, therapist adherence was excellent across treatment phases, indicating that the therapist did adhere to the treatment protocol as specified and therapist ratings on the main dependent measure showed excellent reliability.

Clinical improvement at the major assessment points was determined using the CDRS-R and BDI-II scores as described above. As activation is the proposed mechanism of action and outcome was measured by scores on depression measures, the BDI-SF and BADS-SF were given at each session (and assessment) as repeated measures. Using internal consistency data ($\alpha = .92$) on the BDI-II with adolescents (Steer, Kumar, Ranieri, & Beck, 1998) and a pretreatment SD from the current samples (M = 12.71, SD = 7.36) the RCI for BDI-SF was calculated to be 5.77. As described above, the RCI cutoff for the BADS-SF was > 8.44.

In order to determine the direction of change on depression symptoms and activation, ipsative *z* scores were calculated with regard to the BDI-SF and BADS-SF repeated measures. These scores are calculated by subtracting the participant's session score from that participant's mean score, then dividing by the participant's standard deviation on the measure (Meuser, Yarnold, & Foy, 1991; Gaynor & Harris, 2008). The resulting sign of the *z* score is the indicator of whether the score for the assessment point is higher or lower than average for that participant. Scores indicative of clinical worsening were coded as "0" while those indicative of clinical improvement were coded as "1."

Participant 3. P3 was an 18-year old Caucasian male in 12th grade at the time of the study. This participant lived in a single-parent home with one younger sibling. His mother completed the demographic questionnaire upon initial assessment and reported a household income in the range of $25,000 – 34,999. His mother also reported that she had a history of depression and anxiety, the biological father had a history of substance abuse, and a grandparent had completed suicide. At initial assessment, the CDRS-R score

for P3 was 57, placing him above the 95th percentile for depression severity. The BDI-II score for this participant at A1 was 24, which is indicative of severe depression (Roberts et al., 1991). P3 attended 3/3 MIA sessions and 4/4 FA sessions offered, suggesting that at least to some extent, treatment was received.

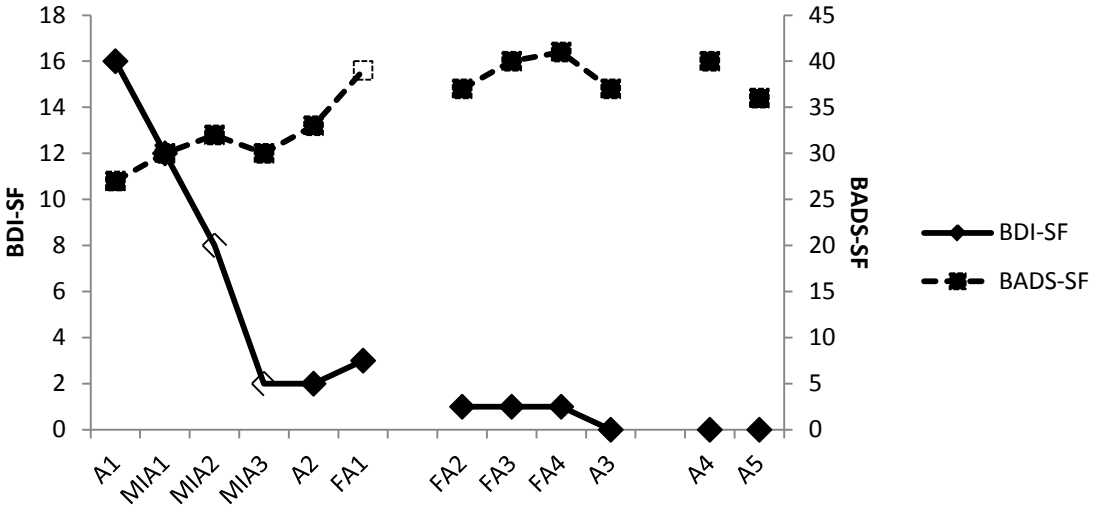
The data from the assessment sessions suggest P3 had a reliable change on the CDRS-R following MIA (CDRS-R = 47), but only showed a clinically significant change following FA based on a CDRS-R score of 27 at A3. The BDI-SF showed reliable change during MIA to a low level, while the BADS-SF showed gradual change only reaching the RCI at the conclusion of FA. Thus, these were indicators of both significant changes in depression and activation, the latter being the proposed mediator, in the assessment data. No reliable changes were noted on the SOCQ or TASA for P3.

Repeated measures data were collected on a session-by-session basis to examine the time course of change. Figure 2 shows BDI-SF and BADS-SF repeated measure scores for P3. As shown in the figure, a reliable change in depression scores occurred prior to receipt of MIA session 2 (as indicated by open markers). The reliable change in activation was observed prior to FA session 1. The RCI data suggest that for this participant the vast majority of change in depression preceded the increase in activation, and that both occurred before receipt of FA.

The ipsative *z* score data result in similar conclusions. The session in which the individual BDI-SF score was first lower than P3's average BDI-SF score across the course of participation was the 3rd MIA session. The first individual BADS-SF to exceed the overall average occurred later, prior to the initial FA session. Thus, the repeated

measures data for P3 are not consistent with the proposed model of change where FA increased activation which decreased depressive symptoms.

In sum, the combined assessment and repeated measure data for P3 suggest cumulative changes in both depression and activation over the course of the MIA and FA treatment interval that were significant and maintained across follow-up.



BDI-SF Ipsative *z* scores: 000111 1111 11
BADS-SF Ipsative *z* scores: 000001 1111 11

Figure 2. Repeated Measures for Participant 3

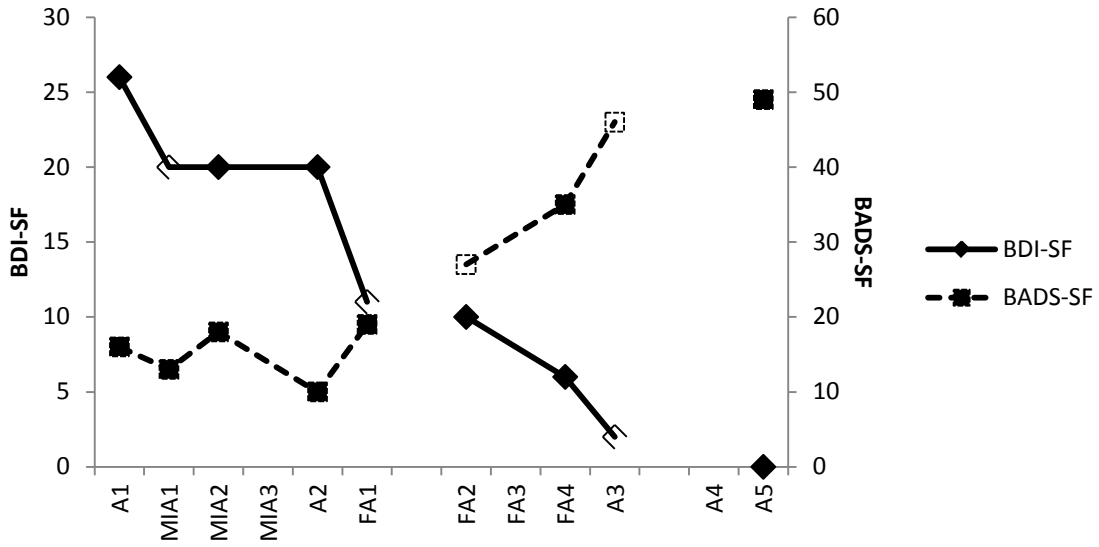
Participant 5. P5 was a 17 year-old multiracial female in 12th grade at the time of the study. She lived in a single-parent home with her mother and no siblings and had a reported household income of $10,000 – 14,999. Family history of mental health indicated that the participant's mother had a history of depression, anxiety, and suicidality while her father had been convicted of a felony. At A1, this participant's CDRS-R score was 79, placing her in the 99th percentile for depressive symptomatology.

Her BDI-II score was 42, indicating severe depression. P5 attended 5/7 (71%) of available treatment sessions (2/3 MIA and 3/4 FA sessions offered).

The CDRS-R score for P5 showed a reliable change from A1 to A2 from 79 to 61, respectively. The CDRS-R did not show clinically significant change until A3, with a score of 21. Similarly, the BDI-II decreased to a score of 30 at A2 but showed its largest decrease after FA at A3 to a score of 5. The BADS-SF data are especially interesting as there was no reliable change from A1 to A2 but a large increase was observed at A3. Thus, these data suggest the most substantial changes in both depressive symptoms and activation occurred in the time frame when FA was provided. Therapeutic alliance did not change during this interval.

Figure 3 shows BDI-SF and BADS-SF repeated measure scores for P5. The BDI-SF scores for this participant show two reliable changes occurring before FA. Even with the substantial change in depression prior to FA, The BDI-SF score of 10 was only slightly above the recommended cut score of 9 when FA began. Two reliable changes on the BADS-SF were observed, one in FA session 2 and the other at the conclusion of FA at A3. The first reliable change in activation (which was followed by continued increases) preceded a subsequent reliable change on the BDI-SF to a level well below the recommended cutoff for detecting depression. BDI-SF ipsative *z* scores for P5 indicated that the first BDI-SF score that was below the series average occurred at FA session 1, prior to the receipt of FA. All subsequent administrations of the BDI-SF were also coded as 1. BADS-SF ipsative *z* scores prior to FA were not above the series average; however, beginning with FA session 2, and all subsequent sessions and assessment points the BADS-SF scores exceeded the series mean and were coded as 1.

The combined assessment and repeated measures data for P5 suggest that increased activation was uniquely associated with FA. Depressive symptoms began a decreasing trajectory during MIA that did not reach clinical significance until FA. The ultimate achievement of clinically significant change in depressive symptoms was preceded by reliable activation change, suggesting activation as a partial mediator.



BDI-SF Ipsative *z* scores: 000x01 1x11 x1
BADS-SF Ipsative *z* scores: 000x00 1x11 x1

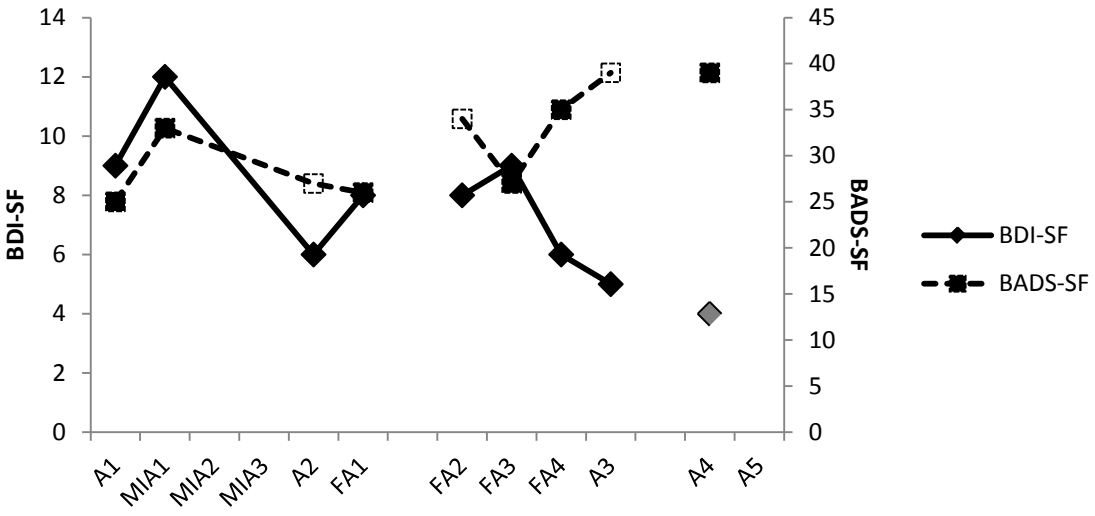
Figure 3. Repeated Measures for Participant 5

Participant 12. Participant 12 was a 15 year-old multiracial 9th grade male. He resided in a single-parent home with his father and brother at the time of the study. His father reported a household income of $50,000 – 74,999. This participant had an uncle with a history of schizophrenia and mental health hospitalizations. At baseline, Participant 12's CDRS-R score was 58, placing him above the 95th percentile with regard

to depression severity and his BDI-II score was 16, indicative of moderate depression. P12 attended 5/7 (71%) of therapy sessions offered, including 1/3 MIA and 4/4 FA.

A reliable but not clinically significant change was noted on the CDRS-R from A1 to A2. The BDI-II and BADS-SF did not meet the RCI during this interval. However, during the time in which FA was offered, the CDRS-R showed a second reliable change that resulted in meeting criteria for clinically significant change. Likewise, the BADS-SF showed a reliable increase by A3. The scores on the TASA suggest no reliable change in therapeutic alliance.

The BDI-SF and BADS-SF repeated measures for Participant 12 are shown in Figure 4. On the BDI-SF, there was no reliable change; however, activation scores exhibit a reliable change at FA session 2 and at A3. During FA, a divergent pattern between activation and depression clearly appears. A decrease in depression scores was observed during the first phase of treatment, which occurred at A2 but was not maintained (see Figure 4). Likewise, a change on the BADS-SF that nearly exceeded the series mean was noted at MIA session 1, but did not predict persisting change. However, the BADS-SF score to exceed the mean was in FA session 2 and three of the subsequent four BADS-SF scores were positive. The positive BADS-SF change in FA session 2 preceded change on the BDI-SF where positive ipsative *z* scores were not obtained until FA session 4 and A3. The combined assessment and repeated measures data for P12 indicate at a minimum a cross-sectional negative relationship between activation and depression with a hint that activation change may have preceded depression symptom change making activation a plausible mediator.



BDI-SF Ipsative *z* scores: 00xx10 0011 1x
BADS-SF Ipsative *z* scores: 01xx00 1011 1x

Figure 4. Repeated Measures for Participant 12

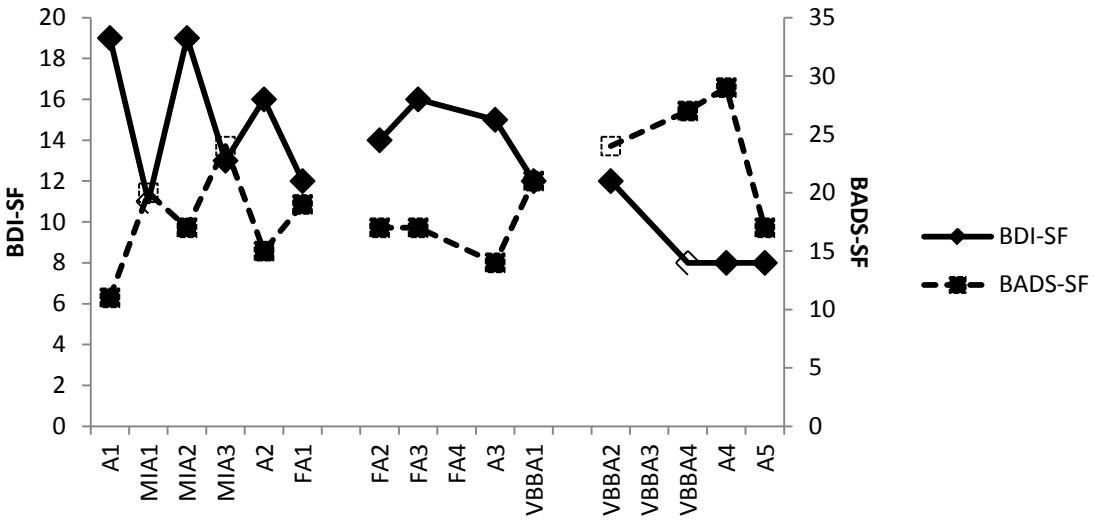
Participant 2. P2 was a 17 year-old Caucasian female in 11th grade at the time of the study. The participant resided with her mother, step-father, and four siblings in a rural community. At the time of initial assessment, the participant's mother reported her own history of depression, anxiety, and an eating disorder. Family income was not reported by the caregiver for this participant, although both the mother and step-father worked outside of the home. The CDRS-R score for this participant was 53 at baseline placing her above the 95th percentile for depressive symptomatology. Her BDI-II score was 31, indicating severe depression. P2 attended 9/11 (82%) therapy sessions, 3/3 MIA, 3/4 FA, and 3/4 VBBA.

P2's CDRS-R scores showed a reliable worsening from A1 to A2 followed by a reliable improvement from A2 to A3 that marked a return to pretreatment levels. From A3 to A4 a reliable change to a score indicative of clinically significant improvement was

observed on the CDRS-R. The BDI-II remained high across A1, A2, and A3 showing a reliable change at A4, while the BADS-SF was low across A1, A2, and A3 showing a reliable change only at A4. Thus the significant changes in depression and activation that were observed occurred during the interval in which VBBA was received. No reliable change on the TASA was observed from A2 to A3 or A3 to A4.

BDI-SF and BADS-SF repeated measures for Participant 2 are shown in Figure 5. Both depression and activation scores are quite variable during the first phase. The BDI-SF shows reliable change at MIA session 1 that is lost at MIA session 2 and regained at MIA 3. Similarly the BADS-SF met the RCI at MIA 3 but it was lost by A2. Thus, P2 entered FA with a BDI-SF score about the suggested cutoff of 9 and without a persisting change in activation. Neither the BDI-SF nor BADS-SF met the RCI during FA. However, reliable change in activation became apparent at VBBA session 2 which preceded the reliable change BDI-SF at VBBA session 4. Figure 5 also provides the BDI-SF and BADS-SF ipsative *z* scores for P2. The interval from A1 through FA1 showed the fluctuating of improvement and return to pretreatment levels of both depression and activation scores. Improvements on repeated measures were observed just prior to VBBA session 1, which were maintained across the course of VBBA.

The combined assessment and repeated measures data suggest that significant and persistent changes in depression symptoms and activation occurred during VBBA and that reliable changes in activation preceded a persisting reliable change in depression such that activation appears to be a plausible mediator for P2.



BDI-SF Ipsative *z* scores: 010101 00x01 1x11 1
BADS-SF Ipsative *z* scores: 010100 00x01 1x11 0

Figure 5. Repeated Measures for Participant 2

DISCUSSION

The purpose of the current study was to further evaluate the utility of a stepped-care approach to the treatment of adolescent depression utilizing motivational interviewing assessment, fun activities, and values-based behavioral activation as less to more invasive steps of treatment. Motivational interviewing and behavioral activation are empirically supported treatments that are relevant across a wide range of populations. While a values-based approach to behavioral activation has been recommended (Lejuez et al., 2011), little is known of the utility of this approach over assigning enjoyable activities during behavioral activation. Subsequent to findings by Gaynor and Harris (2008) indicating the receipt of VBBA as a possible mediator for increased activation, which may have mediated decreased depression scores, the present study sought to

determine the utility of presenting VBBA to those participants who did not experience a clinically significant change on depression scores following the receipt of FA.

Results of the current study clearly support a stepped-care model for the treatment of adolescent depression. The MIA approach allowed the therapist to conduct the MINI-KID assessment interview over three sessions in combination with motivational interviewing strategies in an effort to increase motivation for change. During the interval from A1-A2, 12/14 (86%) participants showed a numerical decrease in depressive symptoms on the CDRS-R. This change was a reliable improvement for 9/12 (75%) participants. Participants who experienced a clinically significant change immediately following the MIA phase of treatment were observed at pretreatment to have lower scores on depression measures and higher levels of activation than those who responded to behavior therapy or those who withdrew from the study. Further, therapeutic alliance was not able to account for differences in outcome for this group (see below). These findings are consistent with behavioral models of depression indicating that depression may be functionally related to avoidance (Ferster, 1973) or low rates of reinforcement for activities in which the individual engages (Lewinsohn & Graf, 1973) but that, for those who experienced a clinically significant change during MIA, activation was within the individual's repertoire and motivation to engage the repertoire may have increased during the MIA phase of the study. The stepped-care model requires the application of the least invasive treatments as the first treatment approach. Therefore, MIA can be considered a reasonable first step in treating depressed adolescents.

Behavioral activation, the proposed mechanism of change, was observed to be a reasonable, partial, or plausible mediator in the current study. As mentioned above, it

appears that those who experienced a clinically significant change during MIA may have experienced increased motivation to engage an existing activation repertoire during the initial phase of the study. For those receiving behavior therapy (either FA or VBBA), activation increased and depressive symptoms decreased during the phase in which those participants experienced a clinically significant change. This finding is consistent with that of Gaynor and Harris (2009) in which 3/4 participants who received VBBA experienced increased activation, and, for 2/4 activation was a reasonable mediator. The current study replicated this finding as activation was determined to be a potential mediator for 3/4 who received behavior therapy. Additionally, 4/4 participants in the current study who received behavior therapy experienced an increase in activation. Pooling the Gaynor and Harris (2009) data with the data from the current study, for 50-75% of adolescents who received behavior therapy, activation appears to mediate depressive symptoms.

Fourteen participants were enrolled and nine (64%) completed the study. All participants who completed the study experienced a clinically significant change in depression scores. Therapeutic alliance was not found to be a plausible mediator for any of the participants. This finding was not due to poor therapeutic alliance; rather, the A2 TASA average of 62.46 (8.18) is quite similar to a normative sample of depressed adolescents reported by Shirk et al. (2008) to be M = 62.07 (8.43). While the alliance data of the current study appear to represent that reported in Shirk et al. (2008), A2 TASA scores in the present study were not correlated with A2 depression scores

(n = 13, r = -.115, p = .709), while those in the normative sample did. In sum, MIA may create effective alliance and change, but alliance is not a mediator for depressive symptoms, even within the MIA phase.

Baseline depression scores of participants in the current study are also comparable to those of TADS (2004), which is, to date, the largest empirical evaluation of treatment for adolescent depression. The sample used in the TADS study was found to have an average CDRS-R score of 60 (10.4) at pretreatment, and the current study participants had an average score of 58.79 (9.11). Ages and grades of the current sample were also comparable to that of the TADS study. The present study enrolled a diverse sample of participants: 42.9% of the sample identified as African American, 28.6% as Euro-American, 14.3% as Latino, and 14.3% as Biracial. A total of 71% (n = 10) of the sample identified as belonging to a racial minority group. Half of the participants were reported to live in a single-parent home, and 50% were reported to have a household income at or near the Federal Poverty Guidelines (United States Department of Health and Human Services, 2012). The demographic data for the current study is more diverse than that reported in TADS (2005) in which the authors reported that 73.8% of the sample was white and 61% reported a household income > $40,000. As reported by the TADS team (2006) income level was a significant moderator for outcomes on depression. For the total sample in their study, combination treatment (both antidepressant and CBT) was found to perform better than CBT alone. However, for those participants with higher household incomes (≥ $75,000), combination treatment and CBT alone both performed better than placebo. The current study was much more diverse in terms of race and income than that reported in TADS. Present results indicate that MIA and behavior

therapy can be effective in the treatment of depression for a racially diverse group of adolescents from low income households. Jacob, Keeley, Ritschel, and Craighead (2013) also recently reported outcomes for behavioral activation with depressed, low-income, African American adolescents. The authors indicated that outcomes with this population had not previously been published and that they found the treatment to be effective in decreasing symptoms of depression for 2/3 participants. Data from the current study support these findings and contribute to our knowledge of the effectiveness of behavioral activation among a racially diverse, low-income sample.

Another point of divergence from previous outcome studies related to adolescent depression is that therapy sessions for the current study took place at two Midwestern high schools. Shirk, Kaplinski, and Gudmundsen (2009) found school-based CBT for depressed adolescents to be effective in decreasing depressive symptoms for 64% of the sample. Data from the current study support these findings as 64% (n = 9) of the current sample experienced a clinically significant change during treatment. The present study provides further support for behavioral activation within a school setting.

There are several limitations to the current study. First, the study therapist conducted all assessments and was aware of the progression of each participant through study phases. While independent assessors are typically a requirement in clinical outcome research involving the efficacy of proposed treatments, within clinical settings including mental health clinics, schools, and private practices, therapists are often those administering and interpreting assessments. Second, attrition reached 36% (n = 5). Given the small sample size, many group-level statistics were not able to be conducted. While single-participant meditational analyses were conducted, some may argue that conclusive

causal statements cannot be made regarding the relationship between activation and depressive symptoms. Further, while participants were informed during the consent process and were reminded of ongoing assessments throughout the study, several assessment times were not attended by participants, particularly MIA responders and those who withdrew from the study. Third, protocols for FA and VBBA were noticeably different in the approach to activation. However, it is possible that some fun activities may also be values-consistent activities. For example, P12 enjoyed specific activities with his parent and sibling and increased his participation in such activities during the FA phase. It is possible that these types of activities also activated a value involving family relationships or health-related activities. Since values were not assessed during the FA phase of the study, it is unknown if participants who increased fun activities also increased values-based activities.

In sum, the current study provides support for the utility of a stepped-care approach to adolescent depression using motivational interviewing assessment as the first and least invasive step and fun activities and values-based behavioral activation as increasing levels of care, respectively. Sixty-four percent of the sample experienced a clinically significant improvement in depression scores during treatment. While 36% of the sample experienced clinically significant change during the MIA phase of treatment, those participants were significantly less depressed and more activated at pretreatment than were other participants. Four participants entered and experienced a clinically significant response to behavior therapy (either FA or VBBA). For 3/4 who received behavior therapy, activation was found to be a potential mediator for clinically significant change on depression scores. Based on SOCQ scores, motivational interviewing

assessment did not alter participant motivation for treatment; however, it is possible that the measure did not capture participant's experience of increased motivation for change. Therapeutic alliance was also not able to account for changes on outcome measures. This study also provides further support for the use of a stepped-care model with a diverse sample of adolescents in a school-based setting.

Future research should endeavor to further evaluate the usefulness of motivational interviewing as a strategy to improve motivation and the utility of stages of change to predict the appropriate first step for treatment among depressed adolescents. Although the current study contributes to our knowledge of stepped-care approaches, behavioral activation, and treatment of low-income, racially diverse, depressed adolescents in a school-based setting, the small sample size requires that data continue to be collected in order to draw more firm conclusions about the effectiveness of the approach with this population.

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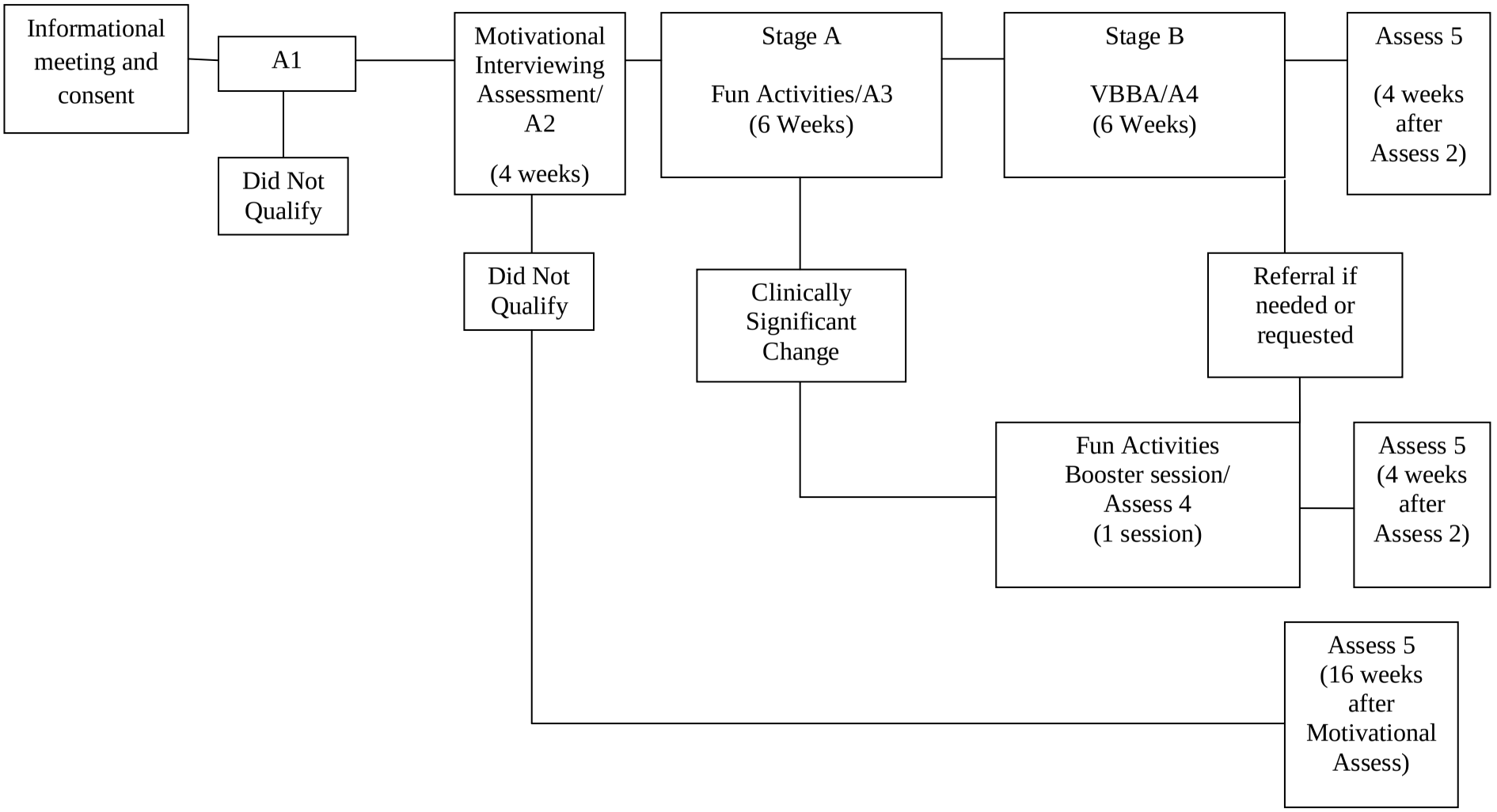
Appendix A

Participant Flow Chart


Informational meeting and consent
A1
Did Not Qualify
Motivational Interviewing Assessment/ A2
(4 weeks)
Did Not Qualify
Stage A
Fun Activities/A3
(6 Weeks)
Clinically Significant Change
Stage B
VBBA/A4
(6 Weeks)
Assess 5
(4 weeks after Assess 2)
Referral if needed or requested
Fun Activities Booster session/ Assess 4
(1 session)
Assess 5
(4 weeks after Assess 2)
Assess 5
(16 weeks after Motivational Assess)

Appendix B

HSIRB Approval

WESTERN MICHIGAN UNIVERSITY

Human Subjects Institutional Review Board

Date: April 25, 2012

To: Scott Gaynor, Principal Investigator
Tanya Doaleh, Student Investigator for dissertation

From: Amy Naugle, Ph.D., Chair

Re: HSIRB Project Number 11-11-02

This letter will serve as confirmation that the change to your research project titled "Motivational Interviewing Assessment and Behavior Therapy as a Stepped-Care Approach to the Treatment of Adolescent Depression" requested in your memo received April 24, 2012 (Add student investigators Alissa Bailey, Allen Ramsey, Julissa Duenas, Daniel Maitland, Justin Moore, and Rachel Petts) has been approved by the Human Subjects Institutional Review Board.

The conditions and the duration of this approval are specified in the Policies of Western Michigan University.

Please note that you may **only** conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: November 21, 2012

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