Behavioral Activation for Moderately Depressed University Students: Randomized Controlled Trial

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Although depression is prevalent among university students, limited and dated research has examined the efficacy of behavioral interventions in treating this population (C. Lee, 2005). On the basis of a modified version of the Behavioral Activation Treatment for Depression (BATD; D. R. Hopko & C. W. Lejuez, 2007; C. W. Lejuez, D. R. Hopko, & S. D. Hopko, 2001) that involved a structured single-session intervention and 2-week treatment interval, the authors conducted a randomized controlled trial comparing individualized BATD and a no-treatment control for university students with moderate depression symptoms ($N = 30$). Outcome measures assessed depression, environmental reward, social support, and somatic anxiety. Relative to the control group, repeated measures analyses of variance and reliable change indices indicated that the BATD group had significantly greater reductions in depression and increased environmental reward at post-treatment that were associated with strong effect sizes. A statistical trend suggested that BATD also may show promise toward increasing social support. Given current conditions in many academic institutions that include high demand for mental health services, limited personnel, and time restrictions, brief and parsimonious interventions like BATD may represent a viable treatment option. Study limitations and future directions are discussed.

Keywords: behavioral activation, college students, depression, treatment outcome

Consistent with community samples, depression is found in about 15%–20% of university students, with increasing incidence in the past two decades (American College Health Association, 2007; Benton, Robertson, Tseng, Newton, & Benton, 2003; Gallagher, 2007; Voelker, 2003). Consequences of depression are extensive and include exacerbation of medical and physical problems (Katon, Lin, & Kroenke, 2007), maladaptive and distorted thinking (Abramson, Metalsky, & Alloy, 1989; Beck, Shaw, Rush, & Emery, 1979), behavioral avoidance (Hopko & Mullane, 2008; Lewinsohn, 1974), and problems with interpersonal relationships (Weissman, Markowitz, & Klerman, 2000). Depression also is highly coexistent with anxiety disorders (Mineka, Watson, & Clark, 1998) and alcohol and nicotine abuse (Grant & Harford, 1995; Lenz, 2004). Among university students with depression, academic performance and retention also are negatively impacted by depression and low self-esteem (Fazio & Palm, 1998; Gallagher, 2007; Pritchard & Wilson, 2003).

Given the prevalence and impact of depression in university students, there is a pressing need to develop and implement effective interventions. Moreover, these interventions must be time efficient, as counseling centers are experiencing greater difficulty effectively treating students because more students are seeking therapy for increased time durations (Kitzrow, 2003; Voelker, 2003). Obstacles toward meeting these demands include restricted

funding, limited resources and providers, and time restrictions, factors that may negatively affect treatment outcome (Gallagher, 2007; Guinee & Ness, 2000). As a result, many academic institutions have strict policies on the maximum allowable counseling sessions and have emphasized the need to provide time-limited and effective psychological interventions (Gallagher, 2007; Mowbray et al., 2006; Stone, Vespia, & Kanz, 2000). Despite this initiative, there is only limited support for depression interventions in university settings, as assessed with randomized controlled efficacy trials, and no systematic study of single-session depression interventions (Lee, 2005). In efficacy trial studies that have been conducted, cognitive, behavioral, and interpersonal therapies were more effective than wait-list conditions and were generally comparable to one another in reducing depression (Hodgson, 1981; Hogg & Deffenbacher, 1988; Pace & Dixon, 1993; Shaw, 1977; Taylor & Marshall, 1977).

Although these pioneering studies yielded encouraging support for standardized treatments for depressed students, important limitations must be addressed. First, these studies are about two decades old, so the efficacy of contemporary behavioral interventions for emotionally distressed students generally is unknown. Second, given data supporting single-session psychotherapy interventions as effective in relieving emotional problems (Ando, Morita, Okamoto, & Ninosaka, in press; Basoglu, Livanou, & Salcioglu, 2003; Kunik et al., 2001; Zlomke, & Davis, 2008), it seems pertinent to explore whether such interventions might generalize toward distressed university students, a population in need of such services. In particular, well designed single-session treatment outcome studies for depressed college students are nonexistent. Finally, core outcome assessment traditionally has involved self-reported depression, with no measure of transfer effects of treatment to coexistent problems (e.g., anxiety), environmental

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resources (e.g., social support), and increased magnitude of environmental reward, an outcome proposed as strongly related to decreased depression (Armento & Hopko, 2007; Lewinsohn, 1974).

Brief behavioral activation interventions may represent time-efficient and effective strategies to address clinical depression (Cuijpers, van Straten, & Warmerdam, 2007; Hopko, Lejuez, Ruggiero, & Eifert, 2003) and may resolve some of the pragmatic problems outlined. To date, research supports two behavioral interventions: *behavioral activation* (BA; Martell, Addis, & Jacobson, 2001) and the *Brief Behavioral Activation Treatment for Depression* (BATD; Lejuez, Hopko, & Hopko, 2001; Hopko & Lejuez, 2007). The theoretical foundation for these interventions implicates decreases in response-contingent reinforcement for nondepressive behavior as causal in eliciting depression (Lewinsohn, 1974). This reduction of reinforced healthy behavior is attributable to a decrease in the number and range of reinforcing stimuli available to an individual for such behavior and/or a lack of skill in obtaining reinforcement (Lewinsohn, 1974). On the basis of this model, conventional behavioral therapy for depression aimed to increase access to pleasant events and decrease the frequency of aversive events and consequences (Lewinsohn & Graf, 1973; Lewinsohn, Sullivan, & Grosscup, 1980).

Behavioral therapy for depression has undergone several modifications since this initial work, and recent outcome data are highly encouraging (Cuijpers et al., 2007; Hopko, Lejuez, Ruggiero, & Eifert, 2003). BA has been used effectively with depressed patients in a community mental health center (Lejuez, Hopko, LePage, Hopko, & McNeil, 2001), an inpatient psychiatric facility (Hopko, Lejuez, LePage, Hopko, & McNeil, 2003), a representative community outpatient sample (Jacobson et al., 1996), as a supplemental intervention for patients with coexistent Axis I (Jakupcak et al., 2006) and Axis II disorders (Hopko, Sanchez, Hopko, Dvir, & Lejuez, 2003), in a group therapy format (Porter, Spates, & Smitham, 2004), and as a treatment for depressed cancer patients (Hopko et al., 2008). In a most compelling study, BA was comparable to antidepressant medication and both interventions were superior to cognitive therapy in treating depression (Dimidjian et al., 2006).

Although most often used as a depression intervention, BA may be useful in treating coexistent anxiety symptoms (Hopko, Robertson, & Lejuez, 2006). For example, considerable data support the pervasiveness of altered contingencies of reinforcement and avoidance behaviors in individuals with anxiety and depressive disorders (Barlow, 2002). In line with this unified model of avoidance behavior as a pathognomonic feature of emotional disorders, facilitating approach behaviors to expedite the extinction process and increase response-contingent positive reinforcement (RCPR) has been a highly effective means of treating emotional problems (Barlow, 2002; Cuijpers et al., 2007) and is a central tenet of BA for depression (Hopko, Lejuez, Ruggiero, & Eifert, 2003; Martell et al., 2001). It is therefore reasonable to suspect that BA also may reduce anxiety symptoms within emotionally distressed university students through systematically addressing avoidance behaviors that serve to increase RCPR.

In a recent study addressing mechanisms of change associated with BA, it was demonstrated that the most sizeable reductions in depressive symptoms (i.e., sudden gains) generally occurred in the first three therapy sessions (Hopko, Robertson, & Carvalho, in press). In the context of reviewed support for single-session interventions, increased needs for time efficiency and efficacy in university mental health care delivery (Kitzrow, 2003; Lee, 2005), and the fact that the modal number of therapy sessions attended by college students is one (Draper, Jennings, Baron, Erdur, & Shankar, 2002), these data collectively served as a catalyst toward investigating whether a parsimonious single-session BA intervention might effectively reduce depression in university students.

This study was the first efficacy study of a single-session individualized BA intervention based on the more comprehensive BATD protocol (Hopko & Lejuez, 2007; Lejuez, Hopko, & Hopko, 2001). A controlled design was used, such that participants were randomized to either BATD or a no-treatment control group. Although efficacy studies would most typically involve treatment–treatment or treatment–placebo comparisons (Chambless & Hollon, 1998), such a design was premature given that this study was an initial exploration of a single-session behavioral treatment for depression that, because of its brevity, theoretically might not be associated with favorable outcomes relative to a control group. The study therefore was designed to answer this initial question and with the objective of providing informative effect sizes prior to conducting more stringent comparisons with empirically supported interventions. Primary outcome measures assessed symptoms of depression, environmental reward, anxiety, and social support. Hypotheses were that between-group analyses would demonstrate that individuals in the BATD condition exhibit increases in environmental reward and social support and reductions in depressive symptoms and anxiety. In a more ideographic process of evaluating clinical significance, it was hypothesized that the proportion of patients improving in the BATD group would be greater than that in the control group as demonstrated through a reliable change index (RCI; Jacobson & Truax, 1991). Finally, to address potential BA mechanism of change issues, we hypothesized that, on the basis of change scores for outcome measures, increased environmental reward, as targeted through BA, would be strongly correlated with decreased depression and anxiety, as well as increased social support.

Method

Participants

We conducted a preliminary power analysis (using statistical software G*Power 3.0.10, Institute for Experimental Psychiatry, University of Dusseldorf, Germany) to assess preferred sample size. Given an a priori F test analysis for a repeated-measures within–between interaction effect and specifying parameters (power = .95, α = .05, and moderate effect size F = 0.3), it was determined that a total of 26 participants would need to be included in a two-group research design. Accordingly, we included 30 participants, all of whom were introductory psychology students recruited from a public Southeastern university who received credit for participation. Potential participants read an online study description that outlined the purpose of the study as an examination of the effectiveness of brief therapy for depression for those individuals who might currently be depressed and in need of assistance. The University Counseling Center and Psychological Clinic also have websites that similarly highlight counseling services for students in need, with the overwhelming majority of

clients being self-referred, as was the case in this outcome study. We asked participants to complete a Beck Depression Inventory—II (BDI–II; Beck, Steer, & Brown, 1996) and demographic questionnaire to assess eligibility. Participants 18 years and older who scored 14 or higher on the BDI–II ($M = 20.4$, $SD = 5.6$) and were not presently undergoing pharmacological or psychological treatment for depression were included in the study. Participants also were excluded if they had been involved with psychotherapy within the past 2 years. A total of 20 participants (66%) reported never having been in therapy, whereas 10 participants (33%) reported a history of psychotherapy. Individuals with active suicidal intent, current psychosis, or bipolar disorder were not included in the study and were immediately referred to the university-based psychological clinic for further assessment and possible intervention ($n = 1$).

The final sample consisted of 6 men (20%) and 24 women (80%), with a mean age of 18.4 years ($SD = 0.81$). Racial distribution was as follows: 21 Caucasian (70%), 4 African American (13%), 2 Latino (7%), 2 Asian American (7%), and 1 participant who identified as "other" (3%).[1] On the basis of independent-samples t tests and chi-square analyses, the BATD and no-treatment control groups did not differ as a function of age, gender, race, or whether they had a history of psychosocial or pharmacological intervention. Groups also were not statistically different on pretreatment scores on any primary outcome measure, including the BDI–II (for BATD, $M = 21.1$, $SD = 6.6$; for control, $M = 19.8$, $SD = 4.7$). All participants completed informed-consent procedures prior to participating in the study.

It is important to note that the clinical significance of the study was highly dependent on the degree to which the study methodology allowed for generalization to clinical samples, such as treatment-seeking college students. To proactively address issues of external validity and equate laboratory conditions with those found in counseling centers, we designed the study with careful reference to established "boundary" conditions of counseling research: (a) Counseling is a conversation and change is elicited through interaction; (b) status differences constrain the conversation; (c) the duration of counseling varies, and the impact of duration on theory and practice must be made clear; (d) clients generally are motivated to change; and (e) clients generally are psychologically distressed (Strong, 1971). In the current study, each patient was seen individually, with an emphasis on eliciting behavioral change through interpersonal interaction dynamics critically relevant to counseling process and outcome (Lejuez, Hopko, Levine, Gholkar, & Collins, 2005). Second, status differences were established through emphasizing counselor output based on adherence to a behavioral protocol in which the counselor elicited experiential information and a client value assessment but largely directed and structured the intervention to accomplish specified objectives. Third, the single-session duration of therapy and outcome data were meant to be generalized to similar short-term counseling practices, theories, and effectiveness data (Steenbarger, 2008) as opposed to counseling practice in a more general sense. Fourth, recruitment methods were designed to attract participants motivated to change (i.e., reduce their depression symptoms) and as a component of the intervention to enhance readiness for change if participant commitment was questionable. Finally, the ability to generalize from research to counseling practice involved inclusion of participants whose psychological distress resembled that of

typical counseling clients, a condition satisfied as outlined in the Method section. Accordingly, in this research project, it was a high priority to emulate as much as possible actual counseling conditions and practices. In meeting these boundary conditions, the study was conceptualized as a laboratory analogue to counseling that involved bridging a gap between basic behavioral research on operant principles of behavioral modification and traditional counseling practice (Strong, 1971).

Materials

The BDI–II (Beck et al., 1996) assesses the severity of depressive symptoms and includes 21 items rated on a 4-point Likert scale (range = 0–63). Higher scores suggest increased depression severity. Sample items include degree of "sadness" and "loss of pleasure." The instrument has excellent reliability and validity with depressed younger and older adults (Nezu, Ronan, Meadows, & McClure, 2000). In the present study, internal consistency was strong ($\alpha = .85$). Of critical importance in evaluating the external validity of this study was the fact that depression levels of participants were compared with those in other college student samples, using z score comparison of means statistics. Depression in this sample (BDI–II $M = 20.4$, $SD = 5.6$) was not statistically different from that in depressed treatment-seeking college students (BDI $M = 20.8$, $SD = 4.6$; Hogg & Deffenbacher, 1988; BDI $M = 18.2$, $SD = 5.1$; Pace & Dixon, 1993) or depressed college students participating in psychopathology research (BDI $M = 20.1$, $SD = 6.4$; Rude, Gortner, & Pennebaker, 2004).[2] Further highlighting the magnitude of depression symptoms, the sample was 1.15 standard deviations above the mean (87th percentile) of a representative sample of college students (BDI–II $M = 11.0$, $SD = 8.2$; Storch, Roberti, & Roth, 2004). Thus, by these data and current classification indices (Beck et al., 1996), the sample was moderately depressed and comparable to other depressed college student samples.

The Environmental Reward Observation Scale (EROS; Armento & Hopko, 2007) is a 10-item measure (1–4 point Likert scale) that assesses environmental reward and RCPR (Lewinsohn, 1974). Scores range from 10 to 40, with higher scores suggesting increased environmental reward. Sample items include "the activities I engage in usually have positive consequences" and "lots of activities in my life are pleasurable." Based on psychometric research with three independent college samples, the EROS has strong internal consistency ($\alpha = .85$–.86) and excellent test–retest reliability

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[1] Note that, in support of the study's external validity, this racial composition approximated the larger student population at the university, as well as students presenting to the counseling center for psychotherapy services (2008 data: 77% Caucasian, 8% African American, 3% Latino/a, 3% Asian American, and 9% "other."

[2] Note that, because of limited current research exploring treatment outcome with depressed college students and corresponding unavailability of BDI–II outcome data, z score comparison of means involved comparing BDI–II scores with BDI scores from past studies. These analyses, although not ideal, are deemed informative given research suggesting these two measures correlate very strongly ($r = .93$; Beck et al., 1996) and the fact that descriptive data (for all samples, regardless of BDI version) reflect individuals presenting with "moderate depression" based on accepted standards (Beck et al., 1996).

($r = .85$) and correlates strongly with other commonly administered and psychometrically sound self-report measures of depression ($r = -.63$ to $-.69$) and anxiety (Armento & Hopko, 2007). In the present study, internal consistency was strong ($\alpha = .88$).

The Beck Anxiety Inventory (BAI; Beck & Steer, 1993) is a 21-item questionnaire that measures cognitive and somatic symptoms of anxiety, with higher scores indicating increased anxiety (range $= 0–63$). Sample items include "unable to relax" and "heart pounding or racing." Good psychometric properties have been demonstrated among college, medical, and psychiatric samples (Antony, Orsillo, & Roemer, 2001). In the present study, internal consistency was strong ($\alpha = .87$).

The Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988) is a 12-item scale that assesses adequacy of social support from family and significant others (range $= 12–84$). Higher scores suggest decreased social support, and sample items include "my friends really try to help me" and "I can talk about my problems with my family." The instrument has adequate psychometric properties in clinical and nonclinical samples of adults (Zimet et al., 1988; $\alpha = .92$ for the present study). We included the measure to assess whether activation strategies partially designed to increase social reinforcement translated into patients perceiving stronger social support systems at post-treatment.

BA Intervention

The comprehensive BATD treatment (Hopko & Lejuez, 2007; Lejuez, Hopko, & Hopko, 2001) is based on the premise that increased activity and the resulting experience of environmental reinforcement is sufficient for the reduction of depressive symptoms and a corresponding increase in positive thoughts and feelings. The current treatment protocol represented a major modification of the original BATD intervention in that it was reduced to a one-session treatment. This decrease in therapy duration from the typical nine-session format predominantly resulted in five fewer weeks of activity scheduling (i.e., BA); a nonprogressive approach to activating, in which a much greater number of behaviors were targeted for activation immediately, as opposed to the traditional graded approach to activity scheduling; and omission of behavioral contracting strategies to decrease rewards for depressive behaviors. Otherwise, all elements of the comprehensive BATD treatment were maintained.

One of two male doctoral students in clinical psychology, who were trained in BATD, administered the intervention in an individualized format. All components of therapy, listed next, were demarcated within the protocol and checked off by the therapist with their initials to indicate therapist adherence to the treatment protocol. During the 90-min intervention session, participants were first provided with the treatment rationale as extracted from the BATD protocol. This rationale involved an explanation of the theory underlying BATD, with specific emphasis on the relevance of engaging in value-based activities that elicit a sense of pleasure and accomplishment as a way to combat feelings of depression and low self-esteem. Participants were then educated about depression and possible etiological factors associated with its onset and were prompted through motivational exercises to enhance readiness for change. Guided by the clinician, each participant in the treatment condition then completed the life values assessment. This compo-nent of the intervention was aimed at identification of important life areas by which specific activities could be targeted for change. Consistent with the comprehensive manual, values and goals were assessed within the following life areas: family, peer, and intimate relationships; education; employment/career; hobbies/recreation; volunteer work and charity; physical and health issues; and spirituality. Following this exercise, an activity hierarchy was constructed in which value-based behaviors were selected for change (range $= 5–13$). Each participant and the clinician collaboratively established structured behavioral goals (frequency and duration), which the participant would attempt to complete during the 2-week treatment interval. Each participant used a behavioral checkout form to monitor progress during the treatment interval. The clinician and participant discussed how to monitor progress toward completing desired goals and activities on the behavioral checkout, identified particular contexts (e.g., day, time, place) in which behavioral change might more likely elicit environmental reinforcement, and problem solved around obstacles to change.

Procedure

As per inclusion criteria, eligible students were contacted by telephone and asked to participate in the study. All but 2 contacted participants agreed to participate in the study, and all students who participated completed the study. Within 3 days of completing the online depression measure, participants were randomly assigned to either the BATD treatment ($n = 14$) or no-treatment control group ($n = 16$). Pretreatment questionnaires were administered (in counterbalanced design) to all participants and took approximately 15 min to complete. Each participant then had their initial session, in which they were exposed to either 90 min of BATD or a general discussion about research requirements and their participation in the study (control group). Control group participants completed questionnaires, were provided with a brief explanation of study, received no behavioral or cognitive intervention, and were informed that they should engage in their lives as usual, with the requirement that they would return in 2 weeks to complete additional questionnaires. For all participants, a follow-up session was scheduled 2 weeks later, during which outcome measures were administered, the behavioral checkout form was returned, and participants were debriefed. Participants were notified that they could contact the researcher if they encountered problems, although no participants found this necessary.

Results

Patient Adherence

Patient adherence to treatment recommendations was measured with the weekly behavioral checkout that was returned to the clinician at post-treatment. An adherence score was formulated for each patient by dividing the number of behavioral assignments completed by the number of those assigned. For the entire sample, patients were assigned an average of 8.2 behaviors over the duration of treatment ($SD = 2.3$). Patients completed an average of 5.9 ($SD = 2.5$) of the assigned activities, resulting in an overall patient adherence score of 72%. There was 0% attrition in both the BATD and control conditions.

Treatment Outcome Data

All clinical outcome variables were examined with a 2 (Group: BATD, control) × 2 (Time: pretreatment, post-treatment) repeated-measures analysis of variance. The clinical significance of pre–post differences was assessed using Cohen's d statistic, where effect sizes of .2, .5, and .8 are considered small, medium, and large, respectively. For effect-size analyses for each outcome measure, the between-group difference in pre–post change scores was used as the numerator, and the pooled standard deviation of difference scores represented the denominator. As reported in Table 1, significant Group × Time interactions were evident on both the BDI–II, $F(1, 28) = 12.54$, $p < .01$, and EROS, $F(1, 28) = 22.55$, $p < .001$, outcome measures. Large effect sizes on both the BDI–II ($d = 1.61$) and EROS ($d = 1.14$) revealed clinically significant improvements. BAI scores did not yield a significant Group × Time interaction, $F(1, 28) = 1.42$, $p = .25$, $d = .36$. There also was a trend toward increased social support in the BATD group relative to the control condition at post-treatment, MSPSS $F(1, 28) = 3.11$, $p = .08$, that was characterized by a moderate effect size ($d = .70$).[3]

RCI

To further assess the clinical significance of patient change on a more ideographic level, we used the RCI (Jacobson & Truax, 1991). Reliable change indices calculated for each measure indicated that on the BDI–II, 13 of 14 (93%) individuals in the BATD group significantly improved, compared with only 5 of 16 (31%) in the control group. On the EROS, 9 of 14 (64%) individuals in the BATD group improved, whereas not a single participant in the control group demonstrated clinically significant change. Although less compelling than these findings, MSPSS data revealed that 4 of 14 (29%) individuals in the BATD group improved significantly, compared with only 1 (6%) participant in the control group. Finally, RCI analyses of the BAI yielded comparable findings across groups, with 5 of 14 (36%) individuals in the BATD group and 5 of 16 (31%) participants in the control group demonstrating clinically significant change.

Change-Score Correlation

A manipulation check was conducted to assess whether changes in depression (BDI–II) were in fact related to increased RCPR (EROS). In other words, we calculated pre–post treatment change scores to determine the degree to which efforts to structure guided activities and engender environmental reward were effective in reducing depressive affect. Pre–post treatment change scores were calculated across all participants, and correlations are presented in Table 2. Although causality cannot be inferred, change-score data indicate strong relationships, whereby the magnitude of increased environmental reward was strongly correlated with decreased depression ($r = -.60$, $p < .01$) and anxiety ($r = -.44$, $p < .05$), as well as increased social support ($r = -.53$, $p < .01$).

Discussion

The primary objective of this study was to use a randomized controlled design to assess whether a single-session BA intervention was efficacious in treating university students with symptoms of moderate depression, a population virtually unstudied in recent treatment-outcome research. The study was designed with a focus on maximizing external validity through strong adherence to laboratory-analogue boundary conditions (Strong, 1971); recruitment processes involving self-referral and highlighting aspirations for depression treatment as a desired participant attribute; incorporating motivational strategies within the behavioral intervention protocol to enhance commitment and treatment compliance; and inclusion of a moderately depressed study sample that, on the basis of symptom severity, was representative of depressed groups evaluated in past outcome research. The sample also was racially similar to students presenting to our university-based counseling center for treatment. On these grounds, although replication with treatment-seeking college samples is warranted, we suggest that generalization of study findings to real-world counseling environments and students is reasonably appropriate.

Study findings were consequential in that—on the basis of univariate statistical analyses, ideographic reliable changes indices, and large effect sizes—there was strong support for the efficacy of 2 weeks of BA in attenuating symptoms of depression and increasing response-contingent positive reinforcement. Considering the moderate effect size ($d = .70$), there also was encouraging (although not statistically significant) evidence that BATD might show some utility in creating a stronger and more rewarding social support system. Less compelling support was obtained for the utility of BATD in managing psychosomatic symptoms of anxiety. In examining the important theoretical issue pertaining to whether increased value-based activities and associated environmental reinforcement is the critical mechanism of change in alleviating depression, two findings are highly relevant. First, change-score data supported a strong relationship between decreased depression and increased response-contingent positive reinforcement. Second, consistent with previous research in which BATD compliance was also very good (70%–82%; Hopko et al., 2005, 2008), the comparably good compliance rate in this study increases confidence that improvement was associated with BA and increased environmental reward. Although it is conceivable that therapeutic alliance on some level contributed to positive treatment outcome, in a single-session intervention in which therapist contact was limited, it is difficult to conclude that treatment gains were largely a product of a strong therapeutic alliance. Accordingly, change-score data and good treatment compliance collectively are viewed as providing some support for traditional models of depression (Lewinsohn, 1974). Findings also are consistent with recent work highlighting the relevance of quantitative and qualitative differences in overt behavior found to differentiate depressed and nondepressed university students (Hopko, Armento, Chambers, Cantu, & Lejuez, 2003; Hopko & Mullane, 2008).

An important consideration of current findings was that pre–post treatment changes resulted from a single 90-min session of BATD. Although follow-up data were not obtained (which is a significant limitation of the study), results suggest that, at least in

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[3] For all outcome analyses, and within the context of each randomized group, we analyzed pre- and post-treatment outcome data (on each measure) to assess for the presence of outliers, defined as individual scores exceeding two standard deviations above or below the mean. Using this method, we identified no outliers.

Table 1
Treatment Outcome as a Function of Group

Outcome measure and group	Pretreatment		Post-treatment		Time × Group (F)	Effect size (d)
	M	SD	M	SD		
BDI–II						
BATD	21.0	6.6	8.1	3.0	12.54**	1.61
Control	19.8	4.7	14.7	4.5		
EROS						
BATD	23.8	4.1	28.5	4.6	22.55***	1.14
Control	24.9	3.9	24.6	4.6		
BAI						
BATD	13.4	8.9	5.9	5.9	1.42	0.36
Control	16.1	9.0	11.4	6.7		
MSPSS						
BATD	46.0	19.1	34.7	19.2	3.11	0.70
Control	35.6	12.0	35.6	14.0		

Note. BDI–II = Beck Depression Inventory—II (Beck, Steer, & Brown, 1996); BATD = Brief Behavioral Activation Treatment for Depression; EROS = Environmental Reward Observation Scale (Armento & Hopko, 2007); BAI = Beck Anxiety Inventory (Beck & Steer, 1993); MSPSS = Multidimensional Scale of Perceived Social Support (Zimet, Dahlem, Zimet, & Farley, 1988). $df = 1, 28$ for all analyses.
** $p < .01$. *** $p < .001$.

the short term, brief BA may effectively minimize depressive symptoms. Whether maintenance of gains would be observed, as well as the potential benefit of providing periodic "booster" sessions instead of the 10–20 session traditional cognitive–behavioral therapy, are empirical questions in need of further research. It also will be imperative to examine whether such parsimonious interventions generalize to depressed treatment-seeking college students and other clinical populations. Future research within this domain could potentially generate data addressing the optimal number of BA treatment sessions required as a function of depressive symptom severity and diagnostic presentation.

In addition to unavailable follow-up data, several other limitations are inherent to this study. First, although it was adequately powered, the sample size was small. This factor may have contributed to the marginal support for BATD in increasing social support and decreasing anxiety. Replicating this study with a larger sample would allow for more precise effect sizes and would rule out the possibility of Type II errors. Second, although we made concerted efforts to maximize external validity, students in this study may have been differentially motivated relative to those seeking more traditional counseling services. Although compara-

Table 2
Pre–Post-Treatment Change-Score Correlation Matrix

Outcome measure	BDI–II	EROS	BAI	MSPSS
BDI–II	—			
EROS	−.60**	—		
BAI	.25	−.44*	—	
MSPSS	.21	−.53**	.30	—

Note. BDI–II = Beck Depression Inventory—II (Beck, Steer, & Brown, 1996); EROS = Environmental Reward Observation Scale (Armento & Hopko, 2007); BAI = Beck Anxiety Inventory (Beck & Steer, 1993); MSPSS = Multidimensional Scale of Perceived Social Support (Zimet, Dahlem, Zimet, & Farley, 1988).
* $p < .05$. ** $p < .01$.

ble in depression severity, participants engaged in treatment in response to a research opportunity, as opposed to pursuing counseling independently. Although this aspect is important to recognize, it is important to underscore the fact that the online study description portrayed the research as investigating brief therapy for individuals who were feeling depressed. Accordingly, students in the study may have represented individuals in more of a contemplative mode of seeking counseling services, who when the opportunity was presented, decided to take action (Miller & Rollnick, 2002). Third, although unlikely, other than participants' self-report on behavioral checkout forms, no direct observations can confirm whether assigned behaviors actually were completed, leaving open the possibility that participants reported activity completion without actual engagement. Fourth, students in the study were not comprehensively assessed with a structured interview to determine whether they actually met diagnostic criteria for major depression. Fifth, potential participants with elevated depression were excluded if they were currently on medication or had engaged in psychotherapy within the past 2 years. Thus, we may have inadvertently excluded participants who were more treatment resistant and therefore may not have benefited from the offered form of BATD. Sixth, although the sample was proportionately representative of racial diversity in the state and the student composition at the university, research is necessary to better establish the efficacy of BATD with samples more heterogeneous with regard to gender and race. Seventh, because of the time-limited nature of the intervention, clinicians using such an approach should be ethically vigilant of interacting with moderately depressed participants and be sure to screen for suicidal ideation (e.g., using the BDI–II) and refer for continued treatment when indicated. Finally, consistent with recommendations forwarded on evidence-based treatments for college students (Lee, 2005), along with other treatment interventions, future BATD research should move toward better establishing the impact of specific intervention components, common factors (e.g., therapeutic relationship, compliance, researcher ef-

fects), and other process variables in accounting for treatment outcome.

In summary, the single-session BATD intervention resulted in significant reductions in depressive symptoms and increased environmental reward. Although they need to be replicated, these findings suggest that abbreviated treatments may have some utility toward effectively and efficiently reducing depressive symptoms in moderately depressed university students. Results are particularly consequential in that counseling facilities in academic institutions may have high patient flow and limited personnel who may be working under considerable time restrictions (Kiracofe, 1993; Lee, 2005; Mowbray et al., 2006). This parsimonious treatment may serve as an effective and proactive intervention for students at risk of experiencing increased emotional distress in response to the environmental changes, stress, and often associated decreased environmental reward that come with transitioning to life as a university student. In the context of recognizing that most students presenting for counseling services attend only a single session (Draper et al., 2002), using brief and standardized treatments also may be an effective and partial solution toward buffering staffing problems and time restrictions and could provide new possibilities for university practitioners to better accommodate contextual limitations and the needs of university students.

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