To the Graduate Council:

I am submitting herewith a thesis written by Michael John Gawrysiak entitled “Behavioral activation for mildly depressed students: randomized controlled trial.” I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Psychology.

Derek Hopko, Major Professor

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(Original signatures are on file with official student records.)
BEHAVIORAL ACTIVATION FOR MILDLY DEPRESSED UNIVERSITY
STUDENTS: RANDOMIZED CONTROLLED TRIAL

A Thesis
Presented for the
Master of Arts
Degree
The University of Tennessee, Knoxville

Michael John Gawrysiak
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I wish to thank all those who helped me to complete my Master of Arts in Psychology. I would like to thank Dr. Derek Hopko for his guidance and effort in illuminating to me the field of behaviorally guided psychotherapies and for guiding me through the research process. I would also like to thank Drs. Michael Nash and Kristina Gordon for serving on my committee.

I would also like to thank my family and friends without whose support this work would not have been possible.
Abstract

Although depression is prevalent among university students, limited and dated research has examined the efficacy of behavioral interventions in treating this population. Based on a modified version of the Behavioral Activation Treatment for Depression (BATD; Hopko & Lejuez, 2007; Lejuez, Hopko, & Hopko, 2001) that involved a structured single-session intervention and 2-week treatment period, we conducted a randomized controlled trial comparing individualized BATD and a no-treatment control for university students with mild to moderate depression symptoms (N = 30). Outcome measures assessed depression severity, environmental reward, social support, and somatic anxiety. Repeated measures analyses of variance and reliable change indices indicated that individuals in the BATD group had significantly greater reductions in depression and increased environmental reward at post-treatment relative to the control group. A statistical trend also suggested BATD 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 such as BATD may represent a viable treatment option. Study limitations and future directions are discussed.
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The National Comorbidity Surveys indicate lifetime prevalence for major depression at 17%, with females (21%) almost twice as likely as males (12%) to develop the disorder (Kessler et al., 1994, 2003). Depression also is highly prevalent in university settings, with between 9-29% of students presenting with mild to moderate depression (American College Health Association, 2007; Brener et al., 1999; Gallagher, 2007; Kisch et al., 2005; Nagelberg, Pillsbury, & Balzer, 1983; Rosenthal, & Schreiner, 2000; Soet & Sevig, 2006) and recent data suggesting the prevalence of depression in university students is progressively increasing (Benton, Robertson, Tseng, Newton, & Benton, 2003). Functional impairment associated with depression is extensive, including exacerbation of medical illness and negative effects on physical health (Katon, Lin, & Kroenke, 2007), maladaptive cognitive processes (Abramson et al., 1989; Beck et al., 1979), decreased engagement in pleasurable or rewarding behaviors (Hopko, Armento, Chambers, Cantu, & Lejuez, 2003; Hopko & Mullane, 2008; Lewinsohn, 1974), and problems with interpersonal relationships (Weissman, Markowitz, & Klerman, 2000). Depression also is highly comorbid 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 as a function of depression and associated low self-esteem (Brooks & Dubois, 1995; 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 for those who are emotionally distressed. Moreover, these interventions must be somewhat time efficient, as many counseling centers are experiencing greater strain on their abilities to effectively treat students due to more students seeking mental health services and for increased time durations (Kitzrow, 2003). Obstacles toward meeting these demands include restricted funding, limited resources and providers, and
time restrictions, factors that may negatively affect treatment outcome (Federman, 2007; Gallagher, 2007; Guinee & Ness, 2000; Stone & Archer, 1990). Consequently, many academic institutions have strict policies on the maximum allowable counseling sessions and have emphasized the need to provide more time-limited and effective psychological interventions (Federman, 2007, Gallagher, 2007; Mowbray et al., 2006; Stone, Vespia, & Kanz, 2000).

Despite this initiative, there is a paucity of empirical support for depression interventions in the context of university settings (Lee, 2005). In one of few studies exploring this issue, Shaw (1977) compared the relative efficacy of group administered cognitive and behavioral treatments. Both interventions were more effective than a wait-list control condition, and cognitive therapy was more effective than behavioral therapy in reducing depression. In direct contrast, Hodgson (1981) compared behavioral and cognitive interventions and demonstrated both treatments were more effective than no treatment, with some evidence supporting behavioral therapy as most effective. Hogg and Deffenbacher (1988) compared cognitive and interpersonal-process group therapies among moderately depressed students and found treatments to be equally effective. Common across these early studies, all treatments involved group therapy. To assess the efficacy of individualized psychotherapy for moderately depressed university students, Pace and Dixon (1993) compared cognitive therapy and a wait-list control group. Cognitive therapy effectively reduced depressive symptoms and the frequency and intensity of negative cognitions associated with depressive schemas. Reagin (1982) also conducted a series of case studies and found some support for time-limited cognitive behavioral therapy in treating depressed students. Finally, in outcome studies examining the relative efficacy of brief behavioral, cognitive, and combined cognitive-behavioral therapies, combined interventions have been proposed as potentially most effective in reducing depression (McNamara & Horan, 1985; Taylor & Marshall, 1977).
Although these pioneering studies yield encouraging support for standardized treatments for depressed university students, important limitations need to be addressed. First, these studies are about two decades old, so the efficacy of more contemporary behavioral interventions for emotionally distressed university students generally is unknown. Particularly given college counselors perceptions of increased depression prevalence and increased environmental stressors experienced by current university students (Benton et al., 2003; Gallagher, 2007; Gallagher, Zhang, & Taylor, 2004), understanding whether more novel psychotherapies effectively attenuate depressive symptoms is a high priority. Second, given recent data supporting abbreviated psychotherapy interventions as effective in relieving emotional problems (Ando, Morita, Okamoto, & Ninosaka, in press; Basoglu, Livanou, & Salcioglu, 2003; Kunik et al., 2001; Öst, Svensson, Hellstrom, & Lindwall, 2001; Zlomke, & Davis, 2008), it seems pertinent to explore whether such time-limited interventions might generalize toward emotionally distressed university students, a population in need of such services. Finally, in earlier studies cited, core outcome assessment primarily involved pre-post changes in self-reported depression, with no measure of potential transfer effects of treatment to coexistent problems (e.g., anxiety), perceptions of environmental 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). Limiting outcome indices to depression symptoms restricts clinical and theoretical conclusions that can be drawn about the efficacy of cognitive-behavioral interventions.

Brief behavioral activation interventions may represent time efficient and effective strategies to address clinical depression (Cuijpers, van Straten, & Warmerdam, 2007; Ekers, Richards, & Gilbody, 2008; Hopko, Lejuez, Ruggiero, & Eifert, 2003) and may assist in resolving some of the pragmatic problems outlined. Specifically, brief behavioral activation may help to
ameliorate pervasive demands within counseling centers by efficiently treating students with depressive symptoms who may be at risk for developing clinical depression. To date, research supports the utility of two behavioral interventions: Behavioral Activation (BA; Addis & Martell, 2004; 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 are behavioral models of depression that implicate decreases in response-contingent reinforcement for nondepressive behavior as the causal factor in eliciting depressive affect (Ferster, 1973; Lewinsohn, 1974). According to these theories, the reduction of positively 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), or to an increased frequency of punishment (Lewinsohn, Antonuccio, Breckenridge, & Teri, 1984). Based on this model, conventional behavioral therapy for depression was aimed at increasing access to pleasant events and decreasing the frequency of aversive events and consequences (Lewinsohn & Graf, 1973; Lewinsohn, Sullivan, & Grosscup, 1980; Sanchez, Lewinsohn, & Larson, 1980). In pioneering research, Lewinsohn and colleagues demonstrated that through daily monitoring of (pleasant) events and corresponding mood states as well as behavioral interventions that included activity scheduling, social skills development and time management training, depressive symptoms often were alleviated (Brown & Lewinsohn, 1984; Lewinsohn & Atwood, 1969; Lewinsohn & Shaffer, 1971; Lewinsohn & Shaw, 1969; Zeiss, Lewinsohn, & Munoz, 1979).

Behavioral therapy for depression has undergone several modifications since this initial work and recent outcome data are highly encouraging (Cuijpers et al., 2007; Ekers et al., 2008; Hopko et al., 2003). Behavioral activation has been effectively used with depressed patients in a community mental health center (Lejuez, Hopko, LePage, Hopko, & McNeil, 2001), an inpatient
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psychiatric facility (Hopko, Lejuez, LePage, Hopko, & McNeil, 2003), a representative community outpatient sample (Jacobson et al., 1996), as a supplemental intervention for patients with co-existent Axis I (Hopko, Hopko, & Lejuez, 2004; Jakupcak et al., 2006; Mulick & Naugle, 2004) 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 in primary care (Hopko, Bell, Armento, Hunt, & Lejuez, 2005; Hopko et al., 2008). In perhaps the most compelling study to date that incorporated a randomized placebo-controlled design, the comprehensive behavioral activation protocol (Martell et al., 2001) 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, behavioral activation may be theoretically useful insofar as 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; Barlow, Allen, & Choate, 2004). 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 have been highly effective means of treating emotional problems (Barlow, 2002; Cuijpers et al., 2007; Ekers et al., 2008) and is a central tenet of behavioral activation strategies for treating depression (Hopko et al., 2003; Martell et al., 2001). Also supporting a unified approach to treating emotional disorders, cognitive-behavioral therapy for a given anxiety or depressive disorder often results in the attenuation of symptoms associated with the treated condition, but also involves transfer effects to the “non-targeted” disorder (Borkovec, Abel, & Newman, 1995; Brown, Antony, & Barlow, 1995; Schulberg, et al., 1996; Stanley et al., 2001). It is therefore reasonable
to suspect that a behavioral activation intervention also may reduce anxiety symptoms within emotional distressed university students through systematically addressing avoidance behaviors that serve to increase response contingent positive reinforcement.

With the exception of one study conducted over three decades ago, behavioral activation treatment outcome studies have been restricted primarily to clinical samples. Hammen and Glass (1975) used behavioral therapy to assess whether moderately depressed students benefited from being asked to identify potentially pleasurable activities and subsequently increase participation in these activities, completing depression outcome measures two weeks later. Results indicated that increases in self-identified pleasurable activities did not effectively reduce symptoms of depression. Among limitations of this study, participants were not provided with a structure or plan for how to engage in behavioral activities, nor were these behaviors based on a comprehensive value assessment that might be critical toward the motivation, persistence, and reward salience of emitted behaviors (Hayes, Strosahl, & Wilson, 1999). Some contemporary behavioral interventions such as BATD provide both increased structure as well as a value-based model by which to guide the activation process. As such, it is conceivable that BA approaches might enhance both treatment compliance and associated outcome. Second, it also is imperative that we begin to explore whether behavioral activation treatment protocols demonstrate efficacy beyond clinical samples and generalize to less severely impaired university students with mild-moderate symptoms of depression who may be at risk for further exacerbation of depressive symptoms. Proactively targeting students who are emotionally distressed may theoretically attenuate depressive symptoms prior to these symptoms manifesting into a more debilitating depressive diagnosis. Third, given increased needs for time efficiency and efficacy in university mental health care settings (Kitzrow, 2003), developing parsimonious and effective interventions is a pressing need.
In line with these objectives, this study was designed to assess the efficacy of a 1-session individualized behavioral activation intervention based on the more comprehensive BATD protocol (Hopko & Lejuez, 2007; Lejuez et al., 2001). A controlled design was used such that participants were randomized to either BATD or a no-treatment control group. Primary outcome measures assessed for symptoms of depression, environmental reward, anxiety, and social support. Hypotheses were that individuals in the BATD condition would exhibit increases in environmental reward and social support and reductions in depressive symptoms and anxiety.
Method

Participants

Participants included 30 introductory psychology students recruited from a public Southeastern University. Eligible participants who completed the study were provided with course credit. Potential participants read an online study description that briefly outlined the purpose of the study as an examination of the effectiveness of brief therapy for depression. Potential participants also completed the Beck Depression Inventory (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 two years. A total of 20 participants (66%) reported never having been in therapy while 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 sample consisted of 6 men (20%) and 24 women (80%), with a mean age of 18.4 years ($SD = 0.81$). Ethnic distribution was as follows: 21 Caucasians (70%), 4 African Americans (13%), 2 Latinos (7%), 2 Asian Americans (7%), and one participant who identified as “other” (3%). Based on independent-samples t-tests and chi-square analyses, the BATD and no-treatment control groups did not differ as a function of age, gender, ethnicity, or whether they had a history of psychosocial or pharmacological intervention. Groups also were not statistically different with regard to pre-treatment scores on any of the four primary outcome
measures, including the BDI-II (BATD: $M = 21.1$, $SD = 6.6$; Control: $M = 19.8$, $SD = 4.7$). All participants completed informed consent procedures prior to participating in the study.

**Materials**

The *Beck Depression Inventory-II* (BDI-II; Beck, Steer, & Brown, 1996) assesses the severity of depressive symptoms and consists of 21 items rated on a 4-point Likert scale. The instrument has excellent reliability and validity with depressed younger and older adults (Beck et al., 1996; Nezu, Ronan, Meadows, & McClure, 2000). In the present study, internal consistency was strong ($\alpha = .85$).

The *Environmental Reward Observation Scale* (EROS; Armento & Hopko, 2007) is a 10-item measure (1 to 4 point Likert Scale) that assesses environmental reward and response-contingent positive reinforcement (RCPR; Lewinsohn, 1974). The EROS has strong internal consistency and excellent test-retest reliability, and correlates strongly with other commonly administered and psychometrically sound self-report measures of depression 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. Good psychometric properties have been demonstrated among college, medical, and psychiatric outpatient 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. The instrument has adequate psychometric properties in clinical and non-clinical samples of adults (Stanley, Beck, & Zebb 1998; Zimet et al., 1988) ($\alpha = .92$ for the present study). The measure was included to assess whether activation strategies partially
designed to increase social reinforcement translated into patients perceiving stronger social support systems at post-treatment.

**Behavioral Activation Intervention**

The comprehensive BATD treatment (Hopko & Lejuez, 2007; Lejuez et al., 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.

One of two male doctoral students in clinical psychology trained in BATD administered the intervention in an individualized format. All components of therapy, listed below, 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-minute 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. Guided by the clinician, each participant in the treatment condition then completed the life values assessment. This component 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 goals (frequency and duration) of which the participant would attempt to complete during the two-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 any obstacles to change.

Procedure

As per inclusion criteria, eligible students were contacted by telephone to participate in the study. All but two contacted participants agreed to participate in the study, and all students who participated completed the study. Within three days of completing the online depression measure, participants were randomly assigned to either the BATD treatment \( n=14 \) or no-treatment control group \( n=16 \). Pre-treatment questionnaires were administered to all participants. Each participant then had their initial session where they were exposed to either 90 minutes 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 two weeks to complete additional questionnaires. For all participants, a follow-up session was scheduled two weeks later, during which outcome measures were administered, the behavioral checkout form returned, and participants debriefed. Participants were notified that they could contact the researcher if they encountered problems, though no participant found this necessary.
Results

Patient Adherence

Patient adherence to treatment recommendations was measured via 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 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 ($SD = 2.53$) of the assigned activities resulting in an overall patient adherence score of 72%. There was a 0% attrition rate in both the BATD and control conditions.

Treatment Outcome Data

All clinical outcome variables were examined with a 2 (group) x 2 (time) repeated measures analyses of variance. The clinical significance of pre-post differences was assessed using the Eta-squared statistic, where effect sizes of 0.01, 0.06, and 0.16 are considered small, medium, and large respectively. As reported in table 1, significant group by 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. Effect size analyses revealed these improvements were clinically significant as indicated by large effect sizes. BAI scores did not yield significant group by time interactions [$F (1,28) = 1.4, p < .25$]. There also was a trend toward increased social support in the BATD group relative to the control condition at post-treatment [MSPSS ($F (1,28) = 3.1, p = .08$) that was characterized by a moderate effect size, although results were not statistically significant.
Table 1
Treatment Outcome as a Function of Group

<table>
<thead>
<tr>
<th>Outcome Measures</th>
<th>Group</th>
<th>Pre-Tx</th>
<th>Post-Tx</th>
<th>TimeXGroup (F)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDI-II</td>
<td>BATD</td>
<td>21.0 (6.6)</td>
<td>8.1 (3.0)</td>
<td>12.5*</td>
<td>.45</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>19.8 (4.7)</td>
<td>14.7 (4.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EROS</td>
<td>BATD</td>
<td>23.8 (4.1)</td>
<td>28.5 (4.6)</td>
<td>22.5**</td>
<td>.81</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>24.9 (3.0)</td>
<td>24.6 (4.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAI</td>
<td>BATD</td>
<td>13.4 (8.9)</td>
<td>5.9 (5.9)</td>
<td>1.4</td>
<td>.05</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>16.1 (9.0)</td>
<td>11.4 (6.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSPSS</td>
<td>BATD</td>
<td>46.0 (19.1)</td>
<td>34.7 (19.2)</td>
<td>3.1</td>
<td>.11</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>35.6 (12.0)</td>
<td>35.6 (14.0)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. * indicates a p-value less than .01. ** indicates a p-value less than .001.

Reliable Change Index (RCI)

To further assess the clinical significance of patient change on a more ideographic level, we used the reliable change index (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 to 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 to only one (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 response-contingent positive reinforcement (EROS). In other words, pre-post treatment change scores were calculated to determine the degree to which efforts
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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 a correlation matrix is 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 ($r = -.53, p < .01$).

Table 2
Pre-post Treatment Change Score Correlation Matrix

<table>
<thead>
<tr>
<th>Outcome Measures</th>
<th>BDI-II</th>
<th>EROS</th>
<th>BAI</th>
<th>MSPSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDI-II</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>EROS</td>
<td>-.602**</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>BAI</td>
<td>.251</td>
<td>-.439*</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MSPSS</td>
<td>.212</td>
<td>-.530**</td>
<td>.301</td>
<td>-</td>
</tr>
</tbody>
</table>

Note. * indicates a $p$-value less than .05. ** indicates a $p$-value less than .01.
Discussion

The primary objective of this study was to use a randomized controlled design to assess whether a single-session behavioral activation intervention was efficacious in treating university students exhibiting symptoms of depression, a sample largely understudied in recent treatment outcome literature. Based on both univariate statistical analyses and more ideographic reliable changes indices, there was strong support for the efficacy of two weeks of behavioral activation in attenuating symptoms of depression and increasing response contingent positive reinforcement. There also was encouraging, though not statistically significant findings, 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.

An important theoretical issue pertaining to behavioral activation interventions is whether increased value-based activities and associated environmental reinforcement is the critical mechanism of change in alleviating depressive symptoms. Indeed, it has been proposed that even in behaviorally-based psychosocial interventions, therapeutic alliance may be fundamental toward positive treatment outcome (for a discussion see Lejuez, Hopko, Levine, Gholkar, & Collins, 2005). In the context of the current study that incorporated 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. Furthermore, the findings that individuals in the BATD group were largely compliant with behavioral activation and change-score data supporting a strong relationships between decreased depressive symptoms and increased response contingent positive reinforcement lends 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 that have been found to differentiate mildly depressed and non-depressed university students (Hopko, Armento et al., 2003; Hopko & Mullane, 2008).
Although data supporting increased social support in the BATD group at post-treatment was marginally significant, it warrants further consideration. Social support was measured via the MSPSS, which is a reflection of social support from family and significant others. Its inclusion was designed to assess whether activation strategies translated into increased social rewards and perceptions of social support at post-treatment. Given the documented efficacy of psychosocial interventions that target interpersonal relationships and social structure, such as interpersonal psychotherapy (Weissman, Markowitz, & Klerman, 2000), cognitive-behavioral analysis system of psychotherapy (CBASP; McCullough, 2000), and dialectical behavior therapy (Linehan, 1993), social reinforcement theoretically has an antidepressant function (Lewinsohn, 1974). Current data suggest the structure of BATD, that includes guided social activities, may have something to add to this therapeutic process. Particularly among university students, who often are living on their own or separated from their family for the first time, increasing focus on social reinforcement, such as participating in recreational or collegiate sport activities or extracurricular social organizations may be critical toward psychological health. Accordingly, supplementing BATD treatment with strategies associated with interpersonal approaches that facilitate social interaction may be a promising area to explore in future studies.

It was not particularly surprising that results failed to demonstrate significant reductions in anxiety for the BATD group. These findings most likely address the fact that increased exposure to environmental reinforcement was the primary target of intervention as opposed to strategies directly focused on exposure to anxiety-eliciting stimuli and the subsequent reduction in somatic features of anxiety. Future studies could involve protocol modifications that include more structured anxiety reduction methods such as breathing exercises, muscle relaxation strategies, and approach behaviors oriented toward extinguishing fear of anxiety-eliciting stimuli. Such methods might more effectively address co-existent anxiety symptoms and provide a more
comprehensive and efficacious behavioral activation, and one that better approximates the conceptualization of depression and anxiety as functionally similar emotional conditions (Barlow, Allen, & Choate, 2004).

An important consideration of current findings was that pre-post treatment changes resulted from a single 90-minute session of BATD. Although follow-up data were not obtained and is a significant limitation of the study, results suggest that at least in the short term, brief behavioral activation 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 can generalize to clinical populations or to students clinically diagnosed with depression. Future research within this domain could potentially generate data addressing the optimal number of behavioral activation 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, it is important to acknowledge that students participating in this study may be differentially motivated relative to those seeking more traditional mental health care services. Although plausibly comparable in depressive severity or emotional distress, participants engaged in treatment in response to a research opportunity as opposed to pursuing mental health care 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 whether brief therapy was effective in treating depression. Accordingly, students participating in the study may represent individuals in more of a contemplative mode of seeking mental health services, and with the opportunity presented decided to take action (Miller & Rollnick, 2002). Second,
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, perhaps motivated to report compliance for fear of not obtaining research credit. Third, students participating in the study were not comprehensively assessed with a structured interview to determine whether they actually met diagnostic criteria for major depression. Fourth, potential participants with elevated depression were excluded if they were currently on medication or engaged in psychotherapy within the past two 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.

In summary, the one-session BATD intervention resulted in significant reductions in depressive symptoms and increased environmental reward. Although in need of replication, these findings are suggestive that abbreviated treatments may have some utility toward effectively and efficiently reducing depressive symptoms in mild to moderately depressed university students. Results are particularly consequential in that mental health clinics within academic institutions may have high patient flow and limited personnel who may be working under considerable time restrictions (Kiracofe, 1993; 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. Utilizing brief and standardized treatments also may be an effective and partial solution toward buffering staffing problems and time restrictions and provide new possibilities for university practitioners to better accommodate contextual limitations and the needs of university students.
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