



Cognitive-Behavior Therapy for Depressed Cancer Patients in a Medical Care Setting

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Major depression is the most common psychiatric disorder among cancer patients and is associated with decreased quality of life, significant deterioration in recreational and physical activities, relationship difficulties, sleep problems, more rapidly progressing cancer symptoms, and more metastasis and pain relative to nondepressed cancer patients. Although some research has explored the utility of psychological interventions with cancer patients, only one study to date has explored the potential benefits of cognitive-behavior therapy among cancer patients with *well-diagnosed depression*. Addressing this gap in the literature, this study represents an open clinical trial to assess the effectiveness of a brief Cognitive-Behavioral Treatment for Depression (CBTD) among depressed cancer patients in a medical care setting. Results revealed strong treatment integrity, good patient compliance, excellent patient satisfaction with the CBTD protocol, and significant pre-post treatment gains across a breadth of outcome measures assessing depression, anxiety, quality of life, and medical outcomes. These gains also were associated with strong effect sizes and generally maintained at 3-month follow-up. Behavioral activation

interventions, especially when paired with cognitive techniques, may represent a practical medical care treatment that may improve psychological outcomes and quality of life among cancer patients. Study limitations and future research directions are discussed.

AMONG CANCER PATIENTS, MAJOR depression is the most common psychiatric disorder, with prevalence rates ranging from 13% to 50% (Croyle & Rowland, 2003). Functional impairment among depressed cancer patients is extensive, including exacerbation of medical illness, impact on physical health, and increased anxiety and substance use (Baum & Andersen, 2001; Evans et al., 2005; Lundberg & Passik, 1997; Ronson & Razavi, 2000). Significant deterioration also is observed in quality of life, including recreational activities, social life, family relationships, self-care skills, physical activities, and sleep (Baum & Andersen, 2001; Ciaramella & Poli, 2001). Depressed cancer patients also experience decreased immune system functioning, a more rapid progression of cancer symptoms, more metastasis and pain, and possibly increased mortality relative to nondepressed patients (Ciaramella & Poli, 2001; Spiegel & Giese-Davis, 2003). Economic issues also are consequential in that depression in cancer patients is associated with increased physician time, more frequent hospital and primary care visits, and higher cost to the system (Carlson & Butz, 2004;

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Hewitt & Rowland, 2002). Given the impact of depression, the importance of developing and evaluating psychosocial interventions for depressed cancer patients has been highlighted as a pressing need (Spiegel & Giese-Davis, 2003).

Psychological interventions for cancer patients have included psychoeducation, supportive therapy, cognitive therapy, relaxation training, problem-solving and social skills training, biofeedback, and hypnosis (Andersen, 1992; Baum & Andersen, 2001; Carlson & Butz, 2004; Evans et al., 2005). In studies assessing the efficacy of these interventions, several have reported reduced symptoms of depression, anxiety, and pain (Antoni et al., 2001; Carlson & Butz, 2004; Goodwin et al., 2001; Moorey, Greer, Bliss, & Law, 1998; Trijsburg, van Knippenberg, & Rijma, 1992). However, there are also several studies in which psychosocial interventions have had minimal impact in reducing psychological distress (e.g., Cunningham et al., 1998; Edelman, Bell, & Kidman, 1999). Moreover, in the most rigorous review of the literature to date that summarized the effectiveness of psychosocial interventions for cancer patients, it was concluded that although no intervention can be highly recommended for reducing depression in cancer patients, there are some data to support group therapy, education, structured counseling, cognitive-behavioral therapy, communication skills training, and self-esteem building approaches (Newell, Sanson-Fisher, & Savolainen, 2002).

It certainly is true that in the past three decades, important progress has been made toward exploring the efficacy of psychosocial interventions with cancer patients. A number of methodological and practical limitations characterize many of these studies, however, and highlight the need for further scientific inquiry (Newell et al., 2002). First, in none of the outcome studies referenced herein did researchers target cancer patients with *well-diagnosed major depression* (i.e., through using empirically valid structured interviewing strategies). As such, it is unclear the extent to which positive effects of psychosocial interventions extend beyond non-clinical samples to clinically depressed patients, a population that is more difficult to treat (McCullough, 2000). Second, outcome measures have primarily been limited to core symptoms of depression and anxiety. Only infrequently has attention been given to outcomes that include functional status (quality of life, medical outcomes, social support) and patient satisfaction. Third, interventions studied in prior clinical trials have often been ill defined. Further, several interventions that potentially may be useful in medical care settings may not be optimal given such factors as the

expertise and number of sessions required for their administration (Coyne & Kagee, 2001).

As a potentially very practical solution, cognitive-behavioral therapies that emphasize behavioral activation (Hopko & Lejuez, in press; Lejuez, Hopko, & Hopko, 2002; Martell, Addis, & Jacobson, 2001) may be useful interventions for medical care settings and cancer patients. First, behavior activation therapy is time limited and less complicated than many other interventions for depression. Second, behavioral activation engenders healthy non-depressed behavior by way of guided behavioral scheduling, problem solving, and avoidance reduction strategies. Particularly relevant to cancer patients, considering limitations in overt behavior and increased problems and daily hassles often reported by cancer patients (Ciaramella & Poli, 2001; Nezu, Nezu, Houts, Friedman, & Faddis, 1999), this intervention may be optimal in bringing about behavior change and corresponding reductions in depressive affect. Behavioral activation also involves increasing "control" over one's life (and overt behavior), an attribute that may be useful in restoring the loss of control often experienced by cancer patients (Sandoval, Brown, Sullivan, & Green, 2006). Indeed, behavioral activation addresses essential components of cancer treatment that include enhancing social support, emotional expression, reordering of life priorities, stress management, avoidance reduction, and issues of symptom control and health education (Fawzy, Fawzy, & Canada, 2001). For example, through structured activation approaches, the quality of social support is assessed on an ideographic basis as it pertains to intimate, peer, and familial relationships. Graduated exposure to social situations, development of assertiveness and social skills, and social anxiety reduction strategies are used to increase response contingent positive (social) reinforcement and decrease negative affect. Through incorporating behavioral activation strategies that include self-hypnosis, mindfulness exercises, and relaxation practice (Hopko & Lejuez, in press), cancer-related symptoms that include pain, nausea, and vomiting also can be addressed (Newell et al., 2002).

In a pioneering study of mechanisms of change, behavioral activation was deemed as effective as a full cognitive behavior therapy intervention in reducing depressive symptoms (Jacobson et al., 1996). Following this study, behavioral activation approaches have been effectively used 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), as a supplemental intervention for patients with coex-

istent Axis I (Hopko, Hopko, & Lejuez, 2004; Jakupak et al., in press; Mulick & Naugle, 2004) and Axis II disorders (Hopko, Sanchez, Hopko, Dvir, & Lejuez, 2003), in both individual and group therapy formats (Porter, Spates, & Smitham, 2004). In perhaps a study 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 depressed patients (Dimidjian et al., 2006).

Most relevant to the current study, our research team conducted a preliminary study that investigated the efficacy of a 9-session brief behavioral activation therapy (Lejuez et al., 2002) among depressed cancer patients in a medical care setting (Hopko, Bell, Armento, Hunt, & Lejuez, 2005). Results indicated significant pre-post treatment gains on measures of depression that included the Hamilton Rating Scale for Depression (HRSD; Hamilton, 1960), Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996), and the Center for Epidemiological Studies of Depression Scale (CES-D; Radloff, 1977). Self-reported quality of life (Quality of Life Inventory; Frisch, 1994) and medical functioning (Medical Outcomes Study Short Form; Ware & Sherbourne, 1992) also improved following the intervention, and patient satisfaction was strong. However, pre-post treatment anxiety symptoms did not improve following behavioral therapy. Partially as a result of these findings, the behavioral activation intervention was modified to include treatment components hypothesized to better attenuate co-existent anxiety symptoms (cognitive-behavioral therapy for depression or CBTD). From a theoretical perspective, intervention modification also was conducted to better address cancer-relevant cognitive encodings, appraisals, and expectancies (Miller, Fang, Diefenbach, & Bales, 2001), sleep problems (Anderson et al., 2003), and increased problems and daily hassles often reported by cancer patients (Nezu et al., 1999). Although the number of treatment sessions remained the same and the behavioral activation protocol was administered in its usual format (Hopko et al., 2005), relaxation training, brief cognitive therapy, cancer exposure, problem solving, and sleep skills training also were administered during sessions. The primary hypothesis was that depressed cancer patients would still exhibit substantial pre-post treatment outcome gains on measures of depression, quality of life, and medical outcomes, but also that the more comprehensive protocol might be more valuable in diminishing anxiety-related responding.

Method

PARTICIPANTS

Participants included 18 adults with a principal diagnosis of major depression who were being treated at the University of Tennessee Medical Center's Cancer Institute. Patients were recruited through clinic screening procedures and clinic brochures. If patients expressed interest in being assessed for study inclusion, they completed the Harvard Department of Psychiatry National Depression Screening scale (HANDS; Baer et al., 2000), a brief measure that assesses depressive symptoms. The HANDS is a 10-item instrument that has a score range of between 0 to 30, with a cut-point score of 9 or greater having diagnostic sensitivity of 95% (Baer et al., 2000). Accordingly, patients who met this criterion were asked to participate in the pretreatment diagnostic assessment. This assessment included administration of the Anxiety Disorders Interview Schedule-IV¹ (ADIS-IV; Brown, DiNardo, & Barlow, 1994), HRSD, and various self-report instruments (outlined below). Advanced clinical psychology graduate students conducted psychological assessments and were supervised by the principal investigator (DH) in the context of audiotape review and discussion, resulting in a consensus diagnosis. Individuals were included only if they were greater than 18 years of age, diagnosed with cancer, and had a principal (and primary) consensus diagnosis of major depression with moderate severity [i.e., a "4" on a 0 (*no depressive symptoms*) to 8 (*very severe symptoms*) scale].

Clinic screening occurred over an 8-month period during which 23 prescreened individuals agreed to complete the comprehensive assessment. Of these patients, 18 were included (5 patients were not diagnosed with depression) and 13 individuals completed the entire CBTD protocol. Five patients were lost to attrition (28%).² Of these patients, three discontinued prior to initiating treatment (two because of physical symptoms/side effects associated with concurrent cancer treatment and one for undisclosed reasons because of an inability to contact) and two following the second session (transportation issues). The final sample consisted of 11 females and 2 males, all Caucasian [mean age = 52.2 years (*SD* = 10.9)]. Patients had an average education of 14.8 years (*SD* = 2.2). Mean level of clinician-rated severity of major depression was

¹ Note that the Anxiety Disorders Interview Schedule-IV comprehensively assesses for all anxiety and mood disorders and also includes screens for substance abuse and psychotic disorders.

² Note that the attrition rate is relatively equivalent to that reported for other cognitive-behavioral interventions for depression (DeRubeis, Gelfand, Tang, & Simons, 1999; Hollon, Thase, & Markowitz, 2002).

282 5.7 ($SD=1.1$), suggesting moderate clinical depression. Coexistent diagnoses included generalized
 283 anxiety disorder (GAD; $n=7$), social phobia
 284 ($n=3$), panic disorder ($n=1$), obsessive-compulsive
 285 disorder (OCD; $n=1$), specific phobia ($n=1$), and
 286 anxiety disorder not otherwise specified ($n=1$).
 287 Cancer diagnoses were breast cancer ($n=7$), lung
 288 cancer ($n=1$), stomach cancer ($n=1$), colon cancer
 289 ($n=1$), prostate cancer ($n=1$), pancreatic cancer
 290 ($n=1$), and bone cancer ($n=1$), and the average time
 291 since diagnosis was 1.5 years ($SD=2.0$). All of the
 292 participants had either Stage 1 or 2 cancer. Of the 13
 293 patients, 3 were actively engaged in chemotherapy
 294 or radiation therapy during their participation in
 295 psychotherapy ($M=4.3$ sessions of psychotherapy).
 296 Participants were included only if they were not
 297 presently taking an antidepressant or antianxiety
 298 medication ($n=5$), or if they were taking one of these
 299 medications, they had been stabilized at a *consistent*
 300 dosage for 8 weeks prior to study assessment ($n=8$).
 301

302 OUTCOME MEASURES

303 The *Hamilton Rating Scale for Depression* (HRSD;
 304 [Hamilton, 1960](#)) is a 24-item semistructured inter-
 305 view designed to measure symptom severity in
 306 patients diagnosed with depression. The instrument
 307 is the most widely used and accepted outcome
 308 measure for the evaluation of depression and has
 309 become the standard outcome measure in clinical
 310 trials ([Kobak & Reynolds, 1999](#)) ($\alpha=.80$ and range
 311 [R]=10 to 36 for the present study).

312 The *Beck Depression Inventory-II* (BDI-II; [Beck](#)
 313 [et al., 1996](#)) consists of 21 items, each of which is
 314 rated on a 4-point Likert scale. The instrument has
 315 been demonstrated to have excellent reliability and
 316 validity with depressed younger and older adults
 317 ([Beck et al., 1996](#); [Dozois, Dobson, & Ahnberg,](#)
 318 [1998](#)). The psychometric properties of the BDI-II
 319 have been studied in cancer patients as well as a
 320 diverse primary care sample, with the instrument
 321 having strong predictive validity as it pertains to
 322 diagnoses of clinical depression, strong internal
 323 consistency ($\alpha=.94$), and adequate item-total cor-
 324 relations ($R=.54$ to $.74$; [Arnau, Meagher, Norris,](#)
 325 [& Bramson, 2001](#); [Katz, Kopek, Waldron, Devins,](#)
 326 [& Thomlinson, 2004](#)) ($\alpha=.89$ and $R=16$ to 51 for
 327 the present study).

328 The Center for Epidemiological Studies of
 329 Depression Scale (CES-D; [Radloff, 1977](#)) is a 20-
 330 item self-report questionnaire of depressive symp-
 331 toms that has adequate psychometric properties
 332 and modestly relates to a diagnosis of major
 333 depression ([Nezu, Ronan, Meadows, & McClure,](#)
 334 [2001](#); [Radloff, 1977](#)). However, the CES-D was
 335 reported to have strong predictive validity as it per-
 336 tained to diagnosing clinical depression in patients

with head and neck cancer ([Katz et al., 2004](#)).
 Moreover, strong internal consistency, a stable
 factor structure, and good predictive validity also
 was demonstrated in a sample of newly diagnosed
 cancer patients ([Beeber, Shea, & McCorkle, 1998](#))
 ($\alpha=.83$ and $R=21$ to 54 for the present study).

The Beck Anxiety Inventory (BAI; [Beck & Steer,](#)
 1993) is a 21-item questionnaire designed specifi-
 cally to distinguish cognitive and somatic symp-
 toms of anxiety from those of depression. Good
 psychometric properties have been demonstrated
 among community, medical, and psychiatric out-
 patient samples ([de Beurs, Wilson, Chambless,](#)
[Goldstein, & Feske, 1997](#); [Morin et al., 1999](#);
[Wetherell & Areán, 1997](#)) ($\alpha=.92$ and $R=3$ to 48
 for the present study).

The Quality of Life Inventory (QOLI; [Frisch,](#)
 1994) is a 16-item self-report measure of life satis-
 faction. The instrument provides a global measure
 (ranging from -6 to $+6$) based on the average of
 satisfaction ratings across a range of life domains.
 The scale is a valid and reliable measure of life
 satisfaction ([Frisch, 1999](#)) ($\alpha=.82$ and $R=(-3)-4$ for
 the present study).

The Medical Outcomes Study Short Form (SF-36;
[Ware & Sherbourne, 1992](#)) assesses health and
 functional status and includes eight subscales:
 Physical Functioning, Role Disability-Physical Pro-
 blems, Bodily Pain, Health Perceptions, Vitality,
 Social Functioning, Role Disability-Emotional Pro-
 blems, and Mental Health. The SF-36 has a stable
 factor structure and adequate internal and external
 validity ([Dexter, Stump, Tierney, & Wolinsky,](#)
[1996](#); [Ware & Sherbourne, 1992](#)) ($\alpha=.82$ and
 $R=0$ to 87 for the present study). Factor structure,
 strong internal consistency, and good discriminant
 validity also were demonstrated for the measure in
 a sample of patients with laryngeal cancer ([Mos-](#)
[coni, Cifani, Crispino, Fossati, & Apolone, 2000](#)).

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, friends, and significant
 others. The instrument has adequate psychometric
 properties in clinical and nonclinical samples of
 adults ([Stanley, Beck, & Zebb, 1998](#); [Zimet et al.,](#)
 1988) ($\alpha=.87$ and $R=12$ to 81 for the present
 study). The measure was included to assess whether
 activation strategies designed to increase social
 reinforcement translated into patients perceiving
 stronger social support systems at posttreatment.

Satisfaction with CBTD was assessed with the
 Client Satisfaction Questionnaire ([Larsen, Attkis-](#)
[son, Hargreaves, & Nguyen, 1979](#)). The scale is an
 8-item measure (scored from 0 to 32), with higher
 scores indicating greater treatment satisfaction.

393 CBTD INTERVENTION

394 Behavioral activation is the central component of
395 CBTD and is defined as a therapeutic process that
396 emphasizes structured attempts to increase overt
397 behaviors that bring patients into contact with
398 reinforcing environmental contingencies and corre-
399 sponding improvements in thoughts, mood, and
400 overall quality of life (Hopko, Lejuez, Ruggiero,
401 & Eifert, 2003). A number of cognitive-behavioral
402 therapies for depression have been developed
403 over the years, including traditional behavioral
404 approaches that progressively have integrated more
405 cognitively based strategies (cf. Hopko, Lejuez,
406 Ruggiero, et al., 2003), problem-solving therapy
407 (Nezu, Nezu, & Perri, 1989), self-control therapy
408 (Rehm, Kaslow, & Rabin, 1987), cognitive-beha-
409 vioral analysis system of psychotherapy (CBASP;
410 McCullough, 2000), traditional cognitive therapy
411 (Beck, Rush, Shaw, & Emery, 1979), and several
412 others (cf. Friedman & Thase, 2006). In the
413 cognitive-behavioral intervention assessed in this
414 study, the overwhelming emphasis was on the
415 behavioral activation component, with other com-
416 ponents considered supplemental and administered
417 in an abbreviated format. So although CBTD may
418 not be a novel intervention per se in that many of its
419 components have been examined in other outcome
420 work, it is unique in its strong emphasis on
421 behavioral activation strategies—a component of
422 depression treatment in need of more systematic
423 research (Hopko, Lejuez, Ruggiero, et al., 2003).

424 Within the behavioral activation model (see
425 Lejuez et al., 2002 for the comprehensive protocol),
426 the process of increasing response-contingent rein-
427 forcement follows the basic behavioral principles of
428 extinction, shaping, fading, and in vivo exposure
429 (Hopko et al., 2003). Initial sessions consisted of
430 assessing the function of depressed behavior,
431 establishment of patient rapport, and introduction
432 of the treatment rationale. Once efforts were made
433 to reduce reinforcement for depressed behavior, a
434 systematic approach for increasing healthy beha-
435 vior was initiated by increasing the value of
436 reinforcers for such behavior and devaluing rein-
437 forceners for depressed behavior.

438 Within this model, systematically increased
439 healthy activity is a necessary precursor in the
440 reduction of overt and covert depressed behavior.
441 Patients began by engaging in a weekly self-
442 monitoring (or daily diary) exercise to examine
443 already occurring daily activities to provide a base-
444 line measurement and to identify potential activities
445 to target during treatment. Following this monitor-
446 ing, emphasis shifted to identifying a person's values
447 and goals within a variety of life areas that included
448 family, social, and intimate relationships, education,

employment/career, hobbies/recreation, volunteer 449
work/charity, physical/health issues, and spirituality 450
(Hayes, Strosahl, & Wilson, 1999). Following this 451
exercise, an activity hierarchy was constructed in 452
which 15 activities were rated ranging from 453
“easiest” to “most difficult” to accomplish. Using 454
a master activity log and behavioral checkout to 455
monitor progress, patients progressively moved 456
through the hierarchy, moving from the easier 457
behaviors to the more difficult. For each activity, 458
the therapist and patient collaboratively determined 459
the *final goal* in terms of the frequency and duration 460
of activity per week. These goals were recorded on 461
the master activity log that was kept in the pos- 462
session of the therapist. *Weekly goals* were recorded 463
on a behavioral checkout form that the patient 464
brought to therapy each week. At the start of each 465
session, the behavioral checkout form was dis- 466
cussed, with the following weekly goals established 467
as a function of patient success or difficulty. Treat- 468
ment involved 9 (1-hour) sessions that included 469
psychoeducation, presentation of the treatment 470
rationale, activity and goal selection, and behavioral 471
activation. 472

In this more comprehensive CBTD approach, 473
additional treatment components included relaxa- 474
tion training, cognitive therapy, behavioral expo- 475
sure, problem-solving skills training, and sleep 476
management skills. Relaxation training (integrated 477
into Session 2) involved breathing retraining and 478
postural relaxation. Cognitive therapy (integrated 479
into Sessions 5 and 6) included thought stopping, 480
coping self-statements, and training in alternative 481
thoughts and logical errors. Behavioral exposure 482
involved three written exercises (integrated into 483
Sessions 3, 4, and 5) that were designed to expose 484
cancer patients to the experience of being diagnosed 485
and living with cancer. Patients were particularly 486
encouraged to write about situational details and 487
emotional (physical, cognitive, and behavioral) 488
experiences involved with being diagnosed and 489
living with cancer and then to process these 490
experiences with the clinician. Problem-solving 491
skills training (integrated into Session 7) was based 492
on procedures outlined by Nezu and colleagues 493
(1989), and sleep management (sleep hygiene and 494
stimulus control; Session 8) followed the strategies 495
of Morin (1993). 496

497 THERAPISTS AND TREATMENT INTEGRITY

498 Three clinical psychology (doctoral) students served
499 as therapists. All therapists were skilled in the
500 administration of cognitive-behavioral interven-
501 tions and were specifically trained by the first
502 author to administer CBT. To ensure competent
503 provision of CBTD, all sessions were audiotaped

504 for weekly individual supervision sessions con-
 505 ducted by the principal investigator (DH). In
 506 addition, 20% of these tapes were selected
 507 randomly for ratings of therapist competence and
 508 adherence by an independent evaluator with
 509 expertise in CBT (S.D.H., M.A.). Ratings were
 510 made on 0 (*no adherence/competence*) to 8
 511 (*complete adherence/competence*) Likert-type scales
 512 on a session-by-session basis, with ratings for each
 513 session highlighting specific session objectives. For
 514 example, for Session 6 (which included behavioral
 515 activation and cognitive therapy components), an
 516 adherence and competence rating was made for
 517 each component (i.e., a total of four ratings). Rat-
 518 ings indicated high therapist adherence ($M=7.3$;
 519 $SD=1.0$) and competence ($M=7.1$; $SD=1.1$) in
 520 administering CBT.

521 PROCEDURE

522 Following the diagnostic screening described above,
 523 eligible participants were administered the ADIS-IV
 524 and all self-report measures. If included in the study
 525 following the diagnostic staffing, participants com-
 526 pleted the 9-week (one-on-one) CBT treatment.
 527 All psychological assessments and treatment ses-
 528 sions were conducted at the Cancer Institute. When
 529 it was convenient, therapy sessions were scheduled
 530 to coincide with medical appointments. However,
 531 as only three of the study participants engaged in
 532 cancer treatment during the course of their psy-
 533 chotherapy, the overwhelming majority of patients
 534 were seen on a weekly basis without having a
 535 concurrent medical appointment scheduled. As two
 536 assessment and therapy rooms were reserved for
 537 study personnel and ongoing communication and
 538 regularly scheduled meeting times were maintained
 539 among the principal investigator, director of the
 540 cancer institute (JB), medical oncologists, and staff,
 541 obstacles impeding data collection were quite
 542 limited. Posttreatment assessments were conducted
 543 following completion of CBT and at 3-month
 544 follow-up. All patients were assessed and treated by
 545 the same clinical graduate student.

546 Results

547 PATIENT ADHERENCE

548 In terms of meeting regularly on a weekly basis,
 549 participants were largely compliant with treatment
 550 (mean number of weeks to complete CBT = 10.0,
 551 $SD=1.3$). In addition, the structure of CBT allows
 552 for a unique and quantifiable index of patient
 553 adherence with treatment recommendations based
 554 on weekly behavioral checkout and master activity
 555 log data. Specifically, an adherence score was
 556 formulated for each patient by dividing the number

of behavioral assignments completed by those 557
 assigned. For the entire sample, patients averaged 558
 145.6 ($SD=54.6$) assigned activities over the 559
 duration of treatment, or about 24.3 behaviors 560
 per each of the 6 sessions that behavioral assign- 561
 ments were provided. Patients completed an aver- 562
 age of 118.9 ($SD=49.8$) assigned activities, 563
 resulting in an overall patient adherence score of 564
 82%. Treatment outcome data 565

All clinical variables were examined with 566
 repeated-measures analyses of variance (pretreat- 567
 ment, posttreatment, 3-month follow-up).³ Signifi- 568
 cant effects were followed by Tukey HSD post hoc 569
 analyses ($\alpha=.05$), and the clinical significance of 570
 pre-post differences was assessed using Cohen's *d* 571
 statistic, for which effect sizes of .2, .5, and .8 are 572
 considered small, medium, and large, respectively. 573
 As reported in Table 1, significant main effects of 574
 treatment were evident across all outcome measures 575
 with the exception of the SF-36 (bodily pain) 576
 subscale and the MSPSS. Post hoc analyses revealed 577
 significant pre-post treatment improvement on 578
 measures of depression, anxiety, quality of life, 579
 and medical outcomes, improvements that were 580
 clinically significant as indicated by moderate-large 581
 effect sizes ($R=0.6$ to 2.0). All treatment gains were 582
 maintained at 3-month follow-up. Interestingly, 583
 although scores for outcome measures at 3-month 584
 follow-up continued to be significantly better than 585
 those obtained at pretreatment, somatic anxiety 586
 (BAI) did increase slightly at follow-up. Although 587
 the severity of anxiety symptoms continued to be 588
 similar to that reported at posttreatment, symptom 589
 severity no longer differed statistically from pre- 590
 treatment. Finally, in addition to notable patient 591
 improvement, patients were strongly satisfied with 592
 CBT (CSQ: $M=30.5$ of a possible 32). 593

To further assess the significance of patient 594
 change on a more ideographic level, we utilized 595
 the reliable change index, a very rigorous statistic 596
 used to assess the clinical significance of pre-post 597
 changes for each individual patient (RCI; Jacobson 598
 & Truax, 1991). Based on the RCI, all patients 599
 improved significantly on the CES-D and all but 600
 one patient (92%) improved on the BDI and HRSD. 601
 Although clinically significant change was robust 602
 across all measures of depression, results specific to 603
 individualized change were encouraging but less 604
 compelling on other outcome measures. For exam- 605
 ple, 54% of patients demonstrated statistically 606

³ A statistical (e.g., Bonferroni) correction was not used given concerns regarding its use with conceptually divergent outcome variables (e.g., depression, social, medical outcomes), experimenter reluctance to increase Type II error, and other concerns associated with statistical adjustment procedures (Perneger, 1998).

t1.1 Table 1

t1.2 Outcome data for cancer patients treated with cognitive-behavioral therapy

t1.3	Assessment measure	Pre-treatment	Post-treatment	3mo. FU	<i>F</i>	<i>p</i>	Effect size (<i>d</i>)
t1.4	<i>Center for epidemiological</i>						
t1.5	Studies of depression scale	30.6 ^a (7.7)	12.5 ^b (9.6)	15.9 ^b (12.6)	14.8	<.001	1.7
t1.6	Beck depression inventory	25.5 ^a (9.2)	11.5 ^b (9.9)	11.3 ^b (10.2)	35.8	<.001	2.0
t1.7	Hamilton rating scale for depression	17.5 ^a (6.0)	5.5 ^b (5.4)	5.9 ^b (6.5)	68.5	<.001	2.0
t1.8	Quality of life inventory	-.4 ^a (2.1)	1.6 ^b (1.8)	1.5 ^b (1.7)	11.3	<.01	0.9
t1.9	<i>Medical outcomes survey short form</i>						
t1.10	<i>Medical outcomes survey short form</i>						
t1.11	Physical functioning	49.1 ^a (21.0)	60.9 ^b (29.2)	63.6 ^b (26.0)	3.5	<.05	1.1
t1.12	Mental health	45.8 ^a (15.5)	64.7 ^b (22.0)	64.0 ^b (24.1)	5.1	<.05	0.8
t1.13	Role-emotional	18.2 ^a (22.9)	42.4 ^b (47.4)	51.5 ^b (45.6)	5.5	<.05	0.6
t1.14	Role physical	11.4 ^a (17.2)	43.2 ^b (47.8)	45.5 ^b (45.9)	5.4	<.05	0.7
t1.15	General health	34.1 ^a (17.1)	51.8 ^b (26.3)	50.9 ^b (21.1)	4.4	<.05	0.6
t1.16	Bodily pain	44.6 ^a (22.0)	52.0 ^a (23.8)	59.9 ^a (27.3)	2.1	=.14	0.3
t1.17	Vitality	16.4 ^a (10.3)	41.8 ^b (24.2)	36.8 ^b (23.9)	10.1	<.01	1.2
t1.18	Social functioning	46.6 ^a (23.8)	70.5 ^b (22.6)	71.6 ^b (25.1)	6.5	<.010.8	0.8
t1.19	<i>Multidimensional scale of</i>						
t1.20	<i>Multidimensional scale of</i>						
t1.21	Perceived social support	43.9 ^a (20.2)	36.4 ^a (22.3)	36.8 ^a (18.9)	2.3	=.13	0.5
t1.22	Beck anxiety inventory	15.1 ^a (7.5)	9.5 ^b (6.3)	11.4 ^{a,b} (8.3)	4.2	<.05	0.9
t1.23	Client satisfaction questionnaire	-	30.5 (2.3)	-	-	-	-

t1.24 Note. Means in the same row with different superscripts are significantly different ($p < .05$).

607 significant improvement in somatic anxiety (BAI),
 608 and 62% reported increased quality of life (QOLI).
 609 On the SF-36, the proportion of patients demon-
 610 strating clinically significant change was as follows:
 611 physical functioning (62%), mental health (62%),
 612 role-emotional (54%), role-physical (54%), general
 613 health (62%), bodily pain (54%), vitality (69%),
 614 social functioning (62%). Important to note, the
 615 two patients (or 15% of completers) with the lowest
 616 treatment compliance scores on behavioral activa-
 617 tion assignments (49% and 69%) were also least
 618 likely to exhibit significant RCI scores across most
 619 measures (i.e., only 3 of the 14 scales and subscales
 620 in Table 1).

621 Discussion

622 These results provide positive preliminary support
 623 for the feasibility and effectiveness of CBTD among
 624 depressed cancer patients in a medical care setting.
 625 Nomothetic analyses revealed significant pre-post
 626 improvement across a variety of depression, anxiety,
 627 quality of life, and medical outcome measures,
 628 with associated effect sizes being strong. Import-
 629 antly, treatment gains were maintained at 3-month
 630 follow-up on all measures with the exception of the
 631 BAI (somatic anxiety).⁴ Patient satisfaction with the

⁴ Note that BAI scores were not extremely elevated in this patient sample, despite a significant co-existence of anxiety disorders. We attribute this finding at least partially to the fact that GAD was the primary co-existent anxiety disorder, an anxiety condition less related to somatic symptoms and thus less likely to impact scores on the BAI.

CBTD protocol was also very high. The more
 ideographic (RCI) analyses revealed robust
 improvement on depression symptoms for all but
 one patient who exhibited very poor treatment
 compliance (on behavioral activation assignments).
 Between 54% and 69% of patients also demon-
 strated significant improvement on measures of
 anxiety, quality of life, and medical outcomes, with
 the two patients with the lowest treatment com-
 pliance scores (15% of the sample) generally not
 exhibiting significant pre-post treatment change.

These findings are provocative in that this is only
 the second study to document the utility of
 cognitive-behavior therapy among cancer patients
 with well-diagnosed depression using a breadth of
 outcome measures. Interestingly, effect sizes in this
 study closely resemble those reported in our initial
 study (using the same outcome measures) in which
 the “purer” behavioral activation protocol was
 administered to depressed cancer patients (Hopko
 et al., 2005). Given the small sample sizes and lack
 of a randomized control trial design, it would
 certainly be premature to conclude that the more
 compact behavioral activation protocol is as
 efficacious as the more comprehensive CBTD
 protocol. However, given recent findings that
 highlight the equivalence (Jacobson et al., 1996)
 or in some cases superiority of behavioral activa-
 tion strategies relative to the more inclusive
 cognitive-behavioral therapies (Dimidjian et al.,
 2006), this research question certainly warrants
 further attention. Indeed, from the practical per-
 spective of working toward developing uncompl-
 icated interventions that could be of value in medical

666 care settings in which time, expertise, and cost-
667 effectiveness is of a premium, the potential utility of
668 brief behavioral activation approaches in these
669 contexts is appealing. Being able to provide these
670 services within medical oncology settings may also
671 substantially increase treatment access and adher-
672 ence as well as decrease stress in cancer patients
673 who may already be overwhelmed by numerous
674 medical appointments. Finally, as with brief prob-
675 lem-solving interventions administered in medical
676 care settings (Mynors-Wallis et al., 1995, 1997,
677 2000), it might also be reasonable to effectively
678 incorporate alternative (behavioral activation)
679 treatment providers that might include oncologists,
680 nurses, nurse practitioners, depression health spe-
681 cialists, and/or physician extenders.

682 Although data from the study are promising,
683 several limitations remain. First, the sample was
684 small and no control group was included. As a
685 move in this direction, a randomized controlled
686 trial is presently under way examining the relative
687 efficacy of behavioral activation and problem-
688 solving therapy for depressed breast cancer patients
689 in a medical care environment. Second, the CBTD
690 intervention studied in this trial was more effective
691 in reducing somatic anxiety than the “purer”
692 behavioral activation protocol examined in our
693 earlier study (Hopko et al., 2005), even though
694 symptom recurrence was somewhat evident at
695 3-month follow-up. This finding encourages further
696 thought on the role of behavioral activation in
697 treating anxiety symptoms and disorders. For
698 example, in the two larger-scale randomized con-
699 trol trials (Dimidjian et al., 2006; Jacobson et al.,
700 1996), although results strongly supported the use
701 of activation methods for attenuating depressive
702 symptoms, no assessment of anxiety symptoms and
703 disorders and their relation to outcome was
704 presented. This situation is highly problematic
705 given the strong comorbidity between depressive
706 and anxiety symptoms and disorders (Barlow,
707 2002; Mineka, Watson, & Clark, 1998). Indeed,
708 when clearly distinguishing behavioral activation
709 from exposure-based therapy (Hopko, Lejuez,
710 Ruggiero, et al., 2003), current research on the
711 efficacy of behavioral activation for anxiety condi-
712 tions is minimal (Hopko et al., 2004; Jakupak et al.,
713 in press; Mulick & Naugle, 2004). Accordingly,
714 there is a pressing need to assess whether behavioral
715 activation therapies can stand alone or whether
716 these approaches need to be supplemented with
717 efficacious anxiety intervention strategies to more
718 adequately treat co-existent anxiety disorders
719 (DeRubeis & Crits-Christoph, 1998).

720 As a third limitation, as behavioral activation
721 was supplemented with additional treatment com-

ponents, cautions are necessary in concluding that
722 behavioral activation was the primary mechanism
723 of change. Incorporating a multiple baseline design
724 might be useful in further exploring this issue. In
725 addition, a randomized controlled study that com-
726 pared “pure” behavioral activation with the more
727 comprehensive approach could answer the question
728 of how vital supplemental strategies were toward
729 patient outcome. Alternatively, the argument also
730 could be made that the integration of supplemental
731 interventions was done in a way that the benefits of
732 the more comprehensive treatment package could
733 not be adequately tested as it was administered
734 (e.g., cognitive therapy and problem-solving ther-
735 apy generally require more than two sessions),
736 particularly given the very demanding behavioral
737 activation assignments given to patients. Fourth,
738 although CBTD data generally revealed mainte-
739 nance of gains across a 3-month follow-up interval,
740 longer-term follow-up will be essential to further
741 evaluate whether behavioral activation therapies
742 positively impact adjunctive cancer treatment and/
743 or prolong survival in cancer patients (Spiegel &
744 Giese-Davis, 2003). Fifth, primarily for rapport-
745 building purposes, clinical graduate students con-
746 ducted both assessments and intervention for pa-
747 tients they were following. As such, although the
748 direct effects of this procedure on most outcome
749 measures (i.e., self-report measures) is likely limited,
750 it is conceivable that rating biases might have on
751 some level contributed to pre-post treatment out-
752 come gains on the clinician-rated HRSD. 753

754 Sixth, although the ADIS-IV has good psycho-
755 metric properties and likely yielded valid diagnostic
756 data for the study, it is conceivable that use of a more
757 comprehensive protocol such as the Structured
758 Clinical Interview for DSM-IV-Patient Version
759 (SCID-I/P; First, Spitzer, Gibbon, & Williams,
760 1996) would have allowed for a more complete
761 diagnostic picture. Indeed, the ADIS-IV was chosen
762 so as to abbreviate an already very time-intensive
763 pretreatment assessment procedure. Relatedly, out-
764 come data also could have been solidified by re-
765 administering the ADIS-IV at posttreatment and
766 follow-up to determine whether patients no longer
767 met DSM criteria for major depression. Seventh,
768 although all outcome measures used in this study
769 have very strong psychometric properties, with the
770 exception of perhaps the BDI-II and CES-D,
771 substantially more empirical work is necessary to
772 demonstrate their utility among cancer patients. For
773 example, it is conceivable that the BAI, which is not
774 well studied among cancer patients, may include
775 somatic symptoms that overlap too greatly with
776 physical symptoms of cancer so as to decrease the
777 likelihood of finding significant and persisting

778 treatment effects. Finally, although treatment effect
779 sizes were substantial across all measures, a more
780 extensive and heterogeneous patient sample will be
781 necessary to replicate findings and assess external
782 validity. The sample also was too small to assess
783 important predictors of treatment outcome such as
784 the type, duration, and stage of cancer; psychiatric
785 and medical comorbidity; chronicity and family
786 history of depression; pretreatment anxiety, depres-
787 sion, optimism, and social support; treatment
788 expectancy; and previous psychotherapy and/or
789 pharmacotherapy for depression.

790 Despite these limitations, there is a growing
791 literature to support the effectiveness of behavioral
792 activation therapies and some preliminary data that
793 these approaches may be useful in the treatment of
794 depressed cancer patients. These data are especially
795 important given inadequate attention to recognizing
796 and treating clinical depression in cancer
797 patients and the substantial psychosocial and
798 medical impairment that depressed cancer patients
799 often experience. Further programmatic research in
800 the form of carefully designed randomized controlled
801 trials will help to discern the practicality and
802 efficacy of behavioral activation in reducing depres-
803 sion in cancer patients and other medical samples,
804 as well as whether activation-based treatments may
805 ultimately help to improve quality of care and
806 longevity of life.

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